

Neg-Raising and Neg movement*

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Abstract

This paper is primarily concerned with the phenomenon known as Neg-Raising. All previous analyses of Neg-Raising fall into one of two main categories: syntactic and pragmatic. The syntactic approach derives the effect from a Neg movement operation in the syntax (Fillmore 1963) while the pragmatic approach derives the effect from a strengthening process attributed to an Excluded Middle assumption associated with Neg-Raising predicates (Bartsch 1973). In this paper, a variety of known and novel data points are argued to indicate that both a Neg movement operation as well as an Excluded Middle assumption are necessary to account for the full range data. It's proposed that the Neg-Raising phenomenon is a purely pragmatic phenomenon and that the Neg movement operation is conditioned by the presence of an Excluded Middle presupposition. The picture of Neg movement developed here will be shown to provide further insights into the syntax of negation and movement more generally.

1 Introduction

This paper will primarily be concerned with the phenomenon known as Neg-Raising. Neg-Raising expressions are exceptional due the availability and salience of an interpretation that corresponds to the narrow-scope of a negation below a matrix predicate. This reading is unexpected given the linear form of the expression, which corresponds to the weaker wide-scope reading of the negation, as shown in (1).

- (1) Mary doesn't think that it will snow.
= Mary thinks that it won't snow.

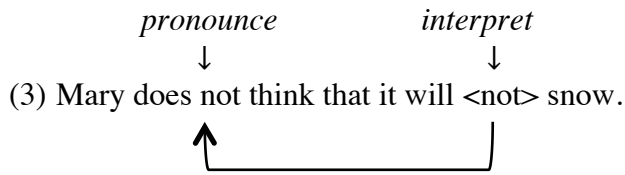
This effect is observed with only a subclass of predicates that includes *think* but not, for example, *say*, as illustrated in (2).

- (2) Mary didn't say that it would snow.
≠ Mary said that it wouldn't snow.

A variety of analyses have been proposed to account for the interpretation of (1), each falling into one of two general lines of approach: syntactic and pragmatic.

1.1 Syntactic analysis of Neg-raising

The first analysis in the generative tradition was offered in Fillmore (1963), which attributes the reading to a syntactic operation that raises the negation from an embedded position where it's interpreted to the matrix position where it's pronounced.



The means by which the disconnect is derived between the phonological and semantic treatment of negation will be ignored for now and will be taken up in Section 3. Early support for Fillmore's approach was provided by Lakoff (1969), Ross (1973) and Prince (1976) with more recent support offered by Collins & Postal (2014).

1.2 Pragmatic analysis of Neg-Raising

An alternative approach to Neg-Raising treats the interpretation as the result of a pragmatic strengthening effect. Negation is assumed to only occupy the matrix position throughout the derivation and the interpretation is the result of an inference supported by an pragmatic element of the expression's meaning. Barsch (1973) proposed that Neg-Raising predicates carry as a presupposition an Excluded Middle (EM) assumption, which is a statement that rules out the proposition corresponding to a wide-scope negation. On this account, the lexical entry for *think* is as shown in (4).

$$(4) \llbracket \text{think} \rrbracket = \lambda p_{\langle s, t \rangle}. \lambda x. \text{think}_x(p) \vee \text{think}_x(\neg p). \text{think}_x(p)$$

The effect of the EM is observed in expressions where a predicate like *think* is negated. In these contexts, an inference is derived from the asserted proposition and the associated EM, as illustrated in (5). The assertion is equivalent to the negation of the first disjunct of the EM which entails the truth of the second disjunct.

- | | |
|---|----------------|
| (5) i. $\neg \text{think}_x(p)$ | assertion |
| ii. $\text{think}_x(p) \vee \text{think}_x(\neg p)$ | presupposition |
| iii. $\text{think}_x(\neg p)$ | by i and ii |

The inferred reading in (5iii) is equivalent to a low-scope negation at LF. Some authors have argued against attributing the inference to a presupposition and propose treating it as a kind of implicature (Horn 1978, Romoli 2013). The issues discussed below will primarily bear on the distinction between the syntactic account and the family of non-syntactic accounts as a whole. However, the details of two recent non-syntactic proposals will be relevant in Section 2.2, namely the presuppositional approach of Gajewski (2007) and the scalar implicature approach of Romoli (2013). For expository reasons, the presuppositional account will be referred to here as a representative of the class of non-syntactic accounts throughout the paper, though no significant importance will be attributed to this particular approach.

1.3 Aims and overview

The main aim of this paper is to demonstrate the necessity of a syntactic Neg movement operation as well as a pragmatic strengthening effect. In section 2.1, two kinds of VP

ellipsis—big VP ellipsis and ACD—will be argued to show that a purely syntactic approach to Neg-Raising cannot be maintained, requiring an EM associated with Neg-Raising predicates. In Section 2.2, both known and novel data will be argued to indicate the availability of Neg movement in the syntax, focusing on the well known connection between Neg-Raising and strong NPI licensing. In Section 3, certain architectural assumptions will be set in place that allows for a detailed account of the Neg movement processes. A puzzle will then be introduced which arises from a novel VP ellipsis phenomenon whose solution will be argued to require both Neg movement and the EM assumption together. Additionally, the nature of the Neg movement operation will be discussed in this section and a number of assumptions will be shown to follow from the data which bear on the syntax of negation as well as the roles of movement in the system.

2 For a combined approach

2.1 Against a syntactic account: VP ellipsis

Two data points will be discussed in this section, the first will involve an case of non-embedded big VP ellipsis and the second will be involve a case of embedded big VP ellipsis. Both kinds expressions will be shown to indicate that Neg-Raising cannot be a purely syntactic phenomenon.

2.1.1 *Neg-Raising and big VP ellipsis*

Big VP ellipsis expressions involve deletion-under-identity of a VP headed by a clause-embedding predicate, as in (6).

(6) John_{VP}[thinks that it will snow]_A and Sue also does_{VP}[~~think that it will snow~~]_E

Taking for granted that deletion requires identity—either syntactic or semantic—between the elided VP and a salient antecedent, we can use big VP ellipsis expressions to test for the syntactic structure of Neg-Raising expressions. The syntactic approach to Neg-Raising attributes the unexpected reading to a covertly low scope of the negation at LF. This predicts that the big VP containing the negation could not serve as an antecedent to a VP that contains no such negation. However, this is not what we find. Consider (7), where VP ellipsis is licensed despite the ellipsis site being interpreted without a negation.

(7) John doesn't think that it will snow but Sue does <think that it will snow>.

The first conjunct in (7) receives the standard Neg-Raising interpretation while still providing an appropriate antecedent to the elided VP of the second conjunct. Thus, the negation of the first conjunct must not be low at LF. The syntactic account makes another prediction in these contexts where we are expected to be able to interpret an embedded negation in an ellipsis site with a negated antecedent VP. This prediction is also not born out, as shown by the unacceptability of (8).

(8) *John doesn't think it will rain and Sue also does <think it will not rain>.

From (7) and (8) we must conclude that the Neg-Raising reading of (7) is the result of strengthening by EM as illustrated in (5). Before moving on, another variant of big VP

ellipsis will be discussed which provides additional evidence against the syntactic account.

2.1.2 ACD, Neg-Raising and NPIs

The VP ellipsis phenomenon known as Antecedent-Contained Deletion (ACD) involves deletion of a VP in the relative clause of an object DP under identity with the larger VP containing that object. An example is shown in (9).

(9) John read a book that Mary did <read>.

The problem posed by (9) is that a VP cannot be identical to an object that properly contains it. Thus, if the object DP is contained within the matrix VP, as appears on the surface, the embedded VP does not have a parallel antecedent. May (1977) provided a popular solution, which involves raising the object DP by Quantifier Raising (QR) outside the matrix VP, creating the structure in (10).

(10) [[a book_i that Mary_{VP}[read t_i]_A]_j [John_{VP}[read t_j]_E]]

Granting that identity holds between the traces in the object positions of (10), the two VPs are appropriately parallel and ellipsis is licensed.

Turning our attention to Neg-Raising, consider the sentence in (11) which is an instance of big ACD featuring the deletion of a negated matrix VP headed by the Neg-Raising predicate *expect*. In addition to a big ACD site, the object DP contains the NPI *a single*, which is licensed by the high negation. We will return to the details of NPI licensing in Section 2.1 but for now it will be assumed that the NPI must be within the scope of the negation in (11).

(11) John doesn't expect to pass a single_{NPI} exam that Mary does <expect to pass>.

This sentence is interpreted with the typical Neg-Raising reading however, two problems arise if we assume that the negation is below *expect* at LF. The first problem is that if negation scoped below *expect* in the LF of (11), the object DP containing the NPI would be forced to scope in the complement of the matrix VP as well. Such an LF would not allow for the deletion of the matrix VP in the relative clause given that the object DP must scope within the matrix VP to license the NPI, forcing an antecedent containment configuration, as in (12).

(12) [John_j_{VP}[expect [not [a single exam_i [Mary_m_{VP}[expect [PRO_m to pass t_i]]_E]]_k [PRO_j pass t_k]]]_A]

In order to license both the ellipsis and the NPI, the LF for (11) must be as in (13). Here the negation takes widest scope, the object DP hosting the NPI and elided VP scopes immediately below the negation and the matrix VP scopes below the object DP and the negation.

- (13) [not [[a single exam_i [Mary_m did_{vp}[expect [PRO_m to pass t_i]_E]]]_k [John_j
_{vp}[expect [PRO_j pass t_k]]_A]]

This is the LF that corresponds to the surface scope of (11). The question then is whether this LF coupled with the EM presupposition of *expect* yields the correct truth conditions for (11).¹ To start, a scenario that illustrates the truth conditions of (11) is shown in (14).

- | | |
|---|--|
| (14) <u>John's expectations</u>
John will fail the biology exam
John will fail the literature exam
John will fail the history exam | <u>Mary's expectations</u>
Mary will pass the biology exam
Mary will pass the literature exam
Mary will pass the history exam |
|---|--|

An important aspect of the interpretation of (11) is that it involves universal quantification. That is, all of the exams that Mary expects to pass are such that John expects not to pass each of them. This aspect of the meaning does not fall out of the LF in (12). For instance, this LF would be true in a case where Mary expected to pass a fourth exam, algebra, and John wasn't taking the algebra class and thus didn't have an opinion on the exam. On a non-syntactic approach, using an EM presupposition and the LF in (13), the presupposition must feature universal quantification as shown in (15a), with the negated existential interpretation of the assertion, as in (15b).

- (15) a. Presupposition of (11):
 $\forall x. [\text{exam}(x, w) \ \& \ \forall w'. \text{expects}(m, w') \rightarrow \text{pass}(m, x, w')] \rightarrow$
 $[[\forall w'' \text{expect}(j, w'') \rightarrow \text{pass}(j, x, w)] \vee [\forall w'' \text{expect}(j, w'') \rightarrow \neg \text{pass}(j, x, w'')]]$
 = 'For every exams that Mary expects to pass, John either expects to pass it or expects not to pass it.'
- b. Assertion of (11):
 $\neg \exists x. \text{exam}(x) \ \& \ \forall w'. \text{expect}(m, w') \rightarrow \text{pass}(j, x, w') \ \& \ \forall w'. \text{expect}(j, w') \rightarrow$
 $\text{pass}(m, x, w')]$
 = 'It's not the case that there is a class that Mary expects to pass and John expects to pass.'

¹ There is another EM presupposition associated with the embedded *expect* in the relative clause. This won't be relevant here so it will be ignored.

² Gajewski adds to this account a step of F(unction)-projection, in which the NPI projects a label that results in lambda abstraction of over a propositional variable that replaces a constituent containing the NPI. This serves to simplify the process of checking for DE-ness of the containing environment.

³ To simplify the tests, only one direction of the AA equivalence is represented, the one that is relevant to determining the stronger AA status. The opposite direction illustrates entailment from sets to subsets, hence indicating the weaker DE status that is taken for granted to hold of these environments.

⁴ Gajewski (2005) considers the multiple NPI cases and suggests that they can be accounted for without making use of a Neg movement operation. Gajewski attributes the inability to not license both NPIs in (50) to the projection behavior of the EM in the presence of *ever*. It's proposed that the EM presupposition of *think* projects existentially through the high NPI, yielding a statement

Such a universal interpretation of the presupposition has been discussed in the context of Neg-Raising by Gajewski (2007 p.310) who makes use of the proposal of presupposition projection from Heim (1983). Heim argues that presuppositions project universally through negated existentials. Gajewski discusses cases of universal projection of an EM presupposition from Neg-Raising predicates through Negative DPs. The same process can be proposed for the case in (11) which similarly features negation scoping immediately above an existential quantifier. The assertion in (15b) is equivalent to the expression in (16).

$$(16) \forall x.[\text{exam}(x,w) \ \& \ \forall w'.\text{expects}(m,w') \rightarrow \text{pass}(m, x, w')] \rightarrow [\neg \forall w'.\text{expects}(j,w') \rightarrow \text{pass}(j, x, w')]$$

= ‘For every exam that Mary expects to pass, it’s not the case that John expects to pass it.’

From (15) and (16) we can derive the conditions in (17) which, by the reasoning in (5), yield the correct interpretation.

$$(17) \forall x. \text{exam}(x) \ \& \ \forall w'. \text{expects}(m,w') \rightarrow \text{pass}(m, x, w') \rightarrow [\neg \forall w'. \text{expects}(j,w') \rightarrow \text{pass}(j, x, w')] \ \& \ [[\forall w'' \text{expect}(j,w'') \rightarrow \text{pass}(j, x, w')] \vee [\forall w'' \text{expect}(j,w'') \rightarrow \neg \text{pass}(j,x,w'')]]]$$

= ‘For every exam that Mary expects to pass, it’s not the case that John expects to pass it and John either expects to pass it or expects not to pass it.’

The truth conditions in (17) then require some means of deriving a universal interpretation of the quantifier binding the object variables without there being such a universal quantifier present in the LF. There is no apparent means by which the syntactic account of Neg-Raising can capture this reading. Thus, the syntactic account fails to explain the simultaneous NPI and ACD licensing in (11), which raises a more severe issue of non-identity than (7), and additionally fails to capture the interpretation of the expression. However, despite taking for granted that Neg-Raising readings can be derived without Neg movement, the next section will argue that Neg movement is nonetheless evident in certain Neg-Raising contexts.

2.2 Neg-Raising and strong NPIs

The discussion in this section will be centered around a well known correlation between Neg-Raising and strong NPI licensing. Lakoff (1969) originally pointed out the contrast between (18) and (19), both featuring a strong NPI in an embedded clause. The minimal pair indicates that the strong NPI *until Thursday* can only be interpreted as modifying the snowing event described by the preadjacent when the matrix predicate is a Neg-Raising predicate.

(18) John didn’t think that it would snow until tomorrow.

(19) *John didn’t say that it would snow until tomorrow.

Lakoff proposed that strong NPIs have a locality condition requiring them to be clausemates with a sentential negation. Taking Neg-Raising to be a syntactic phenomenon, the locality condition is satisfied when the negation is covertly interpreted below *think* after Neg movement applies, yielding (18). In the case of (19) on the other hand, the Neg movement step in the derivation is blocked by the non-Neg-Raising predicate *say*. This prevents the covert low interpretation of negation at LF and thus prevents the NPI from being licensed.

There have been recent attempts to derive the contrast without the use of Neg movement and a clausemate condition on strong NPIs. Two such explanations of the contrast between (18) and (19) will be discussed below that are associated with two non-syntactic approaches to the strong/weak distinction. Both accounts will be argued to be insufficient, concluding that Lakoff's original analysis of the contrast was correct.

2.2.1 Neg-Raising, NPIs and Anti-Additivity

Gajewski (2005, 2007) offers a purely semantic account of the contrast in (18) and (19) that relies on two crucial assumptions relating to NPI licensing. The starting point of the proposal is the influential account of NPIs attributed to Fauconnier (1975) and Ladusaw (1979), which maintains that NPIs must be in the scope of an operator that yields downward entailing (DE) inferences.

(20) Fauconnier/Ladusaw: NPIs must be in the scope of a DE operator.

Downward-entailment: a function F is DE iff for all A, B in the domain of F ,
Such that $A \rightarrow B$, then $F(B) \rightarrow F(A)$.

Gajewski (2005/7) accepts that downward entailment is relevant to NPIs but re-thinks the environment that must support DE inferences. Specifically, Gajewski proposes replacing the role of operator scope with a notion of function containment. That is, the function that results from replacing an NPI or a constituent containing it with a variable and lambda abstracting over that variable must yield DE inferences for the NPI to be licensed. This supplementary function is shown in (21) for some constituent α of type σ contained within a constituent β , where α is either an NPI itself or contains an NPI and is replaced by a variable v .²

(21) Licensing function: $\lambda x. [[\beta[\alpha/v_\sigma]]]^{g[v \rightarrow x]}$

To illustrate, consider the sentence in (22) which features the NPI *any*. The LF of this expression is shown in (23a) and the function licensing the NPI is shown in (23b). The NPI determiner *any* is replaced with a variable of the quantificational determiner type $\langle\langle e, t \rangle, \langle\langle e, t \rangle, t \rangle\rangle$. This variable is then bound by a lambda operator to create a DE function relative to that variable, licensing the presence of *any* in that LF position.

² Gajewski adds to this account a step of F(unction)-projection, in which the NPI projects a label that results in lambda abstraction of over a propositional variable that replaces a constituent containing the NPI. This serves to simplify the process of checking for DE-ness of the containing environment.

- (22) Mary didn't fail any classes.
 (23) a. [not [[any classes]_i [Mary fail t_i]]]
 b. $\lambda x. [\text{not } [[\text{any}/v_{\langle\langle e, t \rangle, \langle\langle e, t \rangle \rangle} \text{dog}]_i [\text{Mary } t_i]]]^{g[v \rightarrow x]}$

The second key assumption for Gajewski relates to the more restrictive licensing conditions on strong NPIs. Following Zwarts (1998), Gajewski assumes that strong NPIs are licensed by a more restrictive class of DE functions that yield Anti-Additive (AA) inferences. Anti-additivity is defined by the following equivalence.

- (24) Anti-Additivity: $f(x \vee y) \leftrightarrow f(x) \& f(y)$

To illustrate, we can observe that the intuitive inference judgements in (25) and (26) show *not a single student* to create an AA environment while *not every* does not.³

- (25) Not a single person sang and not a single person danced. \rightarrow AA
 Not a single person sang or danced.
 (26) Not every person sang and not every person danced. \nrightarrow not AA
 Not every person sang or danced.

LFs of the form $[\neg[\exists_]]$ are then taken to provide an AA environment with respect to the position $_$ and LFs of the form $[\neg[\forall_]]$ are taken to not provide an AA environment with respect to the position $_$. The licensing of strong NPIs patterns according to the AA hypothesis, as shown by the contrast between (27) and (28) with the strong NPI *until midnight*.

- (27) Not a single student arrived until midnight.
 (28) *Not every student arrived until midnight.

In light of (27) and (28), Gajewski (2005/7) takes the licensing conditions on strong NPIs to be as stated in (29).

- (29) A strong NPI α is licensed in a sentence S if there is a constituent β containing α in S such that β is AA with respect to the position of α , after applying variable replacement and lambda abstraction to β .

Gajewski shows that this condition can naturally explain the contrast in (18) and (19). With the standard assumption that attitude predicates are universal quantifiers ranging over worlds, the expression featuring the non-Neg-Raising *say* in (19) features negation scoping over a universal quantifier.

³ To simplify the tests, only one direction of the AA equivalence is represented, the one that is relevant to determining the stronger AA status. The opposite direction illustrates entailment from sets to subsets, hence indicating the weaker DE status that is taken for granted to hold of these environments.

$$(30) [[\text{not}]]([\text{claim}]](p)(x)) = 1 \text{ iff } \neg \forall w. \text{claim}_x(w) \rightarrow p(w)$$

Such an LF was shown by the example in (28) to not provide an AA environment and thus should not license the strong NPI in the embedded clause. To confirm this, the expression fails the test for anti-additivity shown in (31).

$$(31) \text{John didn't say that it would snow \& John didn't say that it would rain.} \rightarrow \text{John didn't claim that it would snow or rain.}$$

The crucial property distinguishing (18) from (19) is that (18) features *think* which is associated with an EM assumption. The strengthening effect that results from the EM creates an environment that supports AA inferences, as required by the strong NPI. The truth conditions that result from strengthening by EM are represented in (32).

$$(32) [[\text{not}]]([\text{think}]](p)(x)) = 1 \text{ iff } \forall w. [\text{think}_x(w) \rightarrow \neg p(w)]$$

These conditions are equivalent to an LF with negation scoping over an existential, which was established to be AA in (27). That (32) provides the licensing AA environment is confirmed by the intuitive test in (33).

$$(33) \text{John didn't think that it would snow \& John didn't think that it would rain.} \rightarrow \text{John didn't think that it would snow or rain.}$$

Gajewski thus shows that the independently supported theory of strong NPIs from Zwarts (1998) allows for an explanation of the contrast between (18) and (19) without any reference to a locality condition or a Neg movement operation. In the next section, problems that have been noted in the literature for Zwarts' anti-additivity account will be discussed along with a more recent proposal for the strong/weak NPI distinction offered by Gajewski (2011) and Chierchia (2013).

2.2.2 *Neg-Raising NPIs and scalar implicatures*

Gajewski (2011) and Chierchia (2013) point out a number of problems for the anti-additivity account. Though a range of data points have illustrated the inadequacies of the anti-additivity account, the sentences in (34) and (35) will suffice here. In these expressions the restrictors of the subject quantifiers provide environments that license weak NPIs, do not license strong NPIs and yet do support anti-additive inferences (left for the reader to test).

$$(34) \text{*Everyone who has arrived until Midnight is still here.}$$

$$(35) \text{*No one who has seen Mary in years recongized her.}$$

Given that the anti-additivity account expects these expressions to be acceptable, this must not be the correct account of strong NPIs. Collins & Postal (2014) point out a similar sentence to (35) as a counterexample to the anti-additivity account. This sentence differs from (35) in a crucial way that will be discussed further in Section 2.2.4.

Drawing on insights from von Stechow (1999), Chierchia (2004) and Krifka (1995), Gajewski (2011) and Chierchia (2013) reject anti-additivity and argue that the strong/weak distinction should be understood in terms of non-truth conditional aspects of meaning. The proposal is that while downward entailment is necessary in licensing both strong and weak NPIs, non-truth-conditional aspects of meaning (scalar implicatures, presuppositions) factor into the licensing of strong NPIs but not weak NPIs. Along with von Stechow (1999), it's assumed that the relevant notion of entailment for weak NPIs is Strawson downward entailment, which is entailment from sets to subsets when all relevant presuppositions are assumed to be satisfied in the context. To illustrate, under the Gajewski/Chierchia account, the unacceptability of (35) is attributed to the presupposition triggered by the relative clause of the negative subject quantifier. This presupposition is an existential statement equivalent to 'there are students who have seen Mary in weeks'. Given that strong NPIs are sensitive to presuppositions, this interferes with DE inferences in this environment and prevents the strong NPI from being licensed. Compare this to the acceptable expression in (36), which features a weak NPI *ever* being licensed in the restrictor of the negative quantifier.

(36) No one who has ever met Bill speaks badly of him.

This follows under the Gajewski/Chierchia account given that the weak NPI is sensitive to strawson downward entailment which prevents the presupposition in (36) from interfering with the NPI licensing.

Gajewski (2011) and Chierchia (2013) do not discuss NPI licensing in the context of Neg-Raising but Romoli (2013) argues that this theory of NPIs can explain the contrast between (18) and (19) when accepting a scalar implicature-based account of the Neg-Raising phenomenon.

2.2.3 Romoli (2013)

Romoli (2013) offers an alternative to the presuppositional approaches of Bartsch (1973) and Gajewski (2005, 2007), which treats the Neg-Raising effect as the result of a scalar implicature (SI), similar to Horn (1978, 1989). This account is primarily motivated to explain more naturally the ability to cancel Neg-Raising readings in certain contexts, a property that is not typical of the canonical presuppositions. However, the focus of the next two subsections will be on Romoli's account of the contrast between (18) and (19) and the ungrammaticality of (35).

Romoli's account of Neg-Raising makes use of the grammatical theory of SIs proposed in Fox (2007). This account features an exhaustivity operator *Exh* that applies to propositions and their alternatives. The job of *Exh* is to affirm the input proposition and negate all 'excludable alternatives', i.e. those propositions which can be negated without contradicting the asserted proposition. These are formalized in (37) and (38).

$$(37) \text{Excl}(p, \text{Alt}(p)) = \{q \in \text{Alt}(p) : \lambda w. \neg q(w) \cap \neq \emptyset\}$$

$$(38) [[\text{Exh}]](\text{Alt}(p))(p)(w) = 1 \text{ iff } p(w) \ \& \ \forall q \in \text{Excl}(p, \text{Alt}(p)). \neg q(w)$$

The focus here will be on SIs observed with universal quantification. Many universal quantifiers are assumed to be associated with an existential alternative: *every/some*,

necessarily/possibly. When an expression featuring a universal quantifier is negated, the result is an SI which implies the truth of the weaker existential statement, as illustrated in (39) with *every* and *some*.

- (39) Assertion: Not every student failed.
 SI: Some students failed.

The alternatives of the assertion in (39) are shown in (40) and the truth conditions derived from the LF featuring Exh are shown in (41).

$$(40) \text{Alt}([\text{not every student failed the exam}]) = \left\{ \begin{array}{l} \neg \forall x. \text{student}(x) \rightarrow \text{failed}(x, \text{the exam}) \\ \neg \exists x. \text{student}(x) \ \& \ \text{failed}(x, \text{the exam}) \end{array} \right\}$$

$$(41) \text{[[Exh]] ([[not every student failed the exam]])} = 1 \text{ iff} \\ \neg \forall x. \text{student}(x) \rightarrow \text{failed}(x, \text{the exam}) \ \& \\ \neg \neg [\exists x. \text{student}(x) \ \& \ \text{failed}(x, \text{the exam})]$$

Exh yields the correct interpretation of the SI by negating the negative existential alternative, which is equivalent to the SI shown in (39).

Romoli proposes extending this picture of SIs to instances of negated attitude predicates and assumes that all such expressions are interpreted with an SI of some kind. A key distinction is made between the kinds of alternatives that Neg-Raising and non-Neg-Raising predicates associate with. Assuming the standard treatment of attitude predicates as universal quantifiers, Romoli proposes that non-Neg-Raising predicates are associated with an existential alternative. Taking the non-Neg-Raising predicate *be certain* as an example, this predicate associates with a weaker predicate expressing possibility according to the subject through existential quantification over worlds. The alternative set of a proposition featuring *be certain* is shown in (42).

$$(42) \text{Alt}(\text{be-certain}(p)(x)) = \left\{ \begin{array}{l} \text{be certain}(p)(x) = \forall w. \text{certain}_{x,w}(w) \rightarrow p(w) \\ \text{be-possible-for}(p)(x) = \exists w. \text{certain}_{x,w}(w) \rightarrow p(w) \end{array} \right\}$$

The LF of the assertion in (43) featuring *be certain* contains the Exh operator which yields the affirmative existential SI in (43) by the same means that it yielded the existential SI for (39) with the conditions in (41).

- (43) Assertion: John is not certain that it will snow.
 SI: According to John, it is possible that it will snow.

Turning to Neg-Raising predicates, for Romoli these crucially differ from non-Neg-Raising predicates in that they are not associated with an existential alternative but rather an alternative equivalent to an EM statement. The alternatives of *think* are shown in (44).

$$(44) \text{ Alt}(\text{think}(p)(x)) = \left\{ \begin{array}{l} \text{think}(p)(x) = \forall w. \text{think}_{x,w}(w) \rightarrow p(w) \\ \text{has-an-opinion-} \\ \text{on}(p)(x) = \forall w. \text{think}_{x,w}(w) \rightarrow p(w) \vee \\ \quad \forall w. \text{think}_{x,w}(w) \rightarrow \neg p(w) \end{array} \right\}$$

Exh asserts the weaker wide-scope negation reading and negates the negative EM alternative, which creates the equivalence of an affirmative EM statement as in (45). This allows for the inference of the stronger narrow-scope negation reading from the conjunctive truth conditions produced by Exh.

(45) John doesn't think it will snow.

$$\begin{aligned} & [[\text{Exh}]](\neg \forall w. \text{think}_{j,w}(w) \rightarrow \text{will-snow}(w)) = 1 \text{ iff} \\ & \neg \forall w. \text{think}_{j,w}(w) \rightarrow \text{will-snow}(w) \quad \& \\ & \neg \neg [\forall w. \text{think}_{j,w}(w) \rightarrow \text{will-snow}(w) \vee \forall w. \text{think}_{j,w}(w) \rightarrow \neg \text{will-snow}(w)] \end{aligned}$$

$$\text{Inference: } \forall w. \text{think}_{j,w^*}(w) \rightarrow \neg \text{will-snow}(w)]$$

Romoli argues that the process in (45) has advantages over the presuppositional account developed in Gajewski (2005/7) however, the focus here is on whether it fares better with the strong NPI data.

Turning to cases of (18) and (19), the contrast follows from Romoli's account coupled with the Gajewski/Chierchia account of strong NPIs given the different kinds of SIs that arise in each case. The interpretation of (18) including the SI from the EM alternative of *think* yields DE inferences, as previously established with the intuitive test for anti-additivity in (33), which is a DE property. On the other hand, the non-Neg-Raising predicate in (19) associates with an existential alternative, according to Romoli. This alternative gives rise to an SI parallel to the one in (43) that blocks DE inferences for that environment and prevents the strong NPI from being licensed. This is corroborated by the intuitive DE test shown in (46), where the meaning contributed by the SI is shown in parenthesis.

(46) John isn't certain that he will pass one of his exams
(and it's possible according to John that he will pass one of his exams). \nrightarrow

John isn't certain that he will pass his biology exam
(and it's possible according to John that he will pass his biology exam).

The entailment in (46) doesn't go through because it could be that the weaker antecedent statement is true—John thinks he could pass one of his exams but he's not certain that he will—while the stronger consequent statement is false—for example, John might think that it's impossible for him to pass his biology exam. Thus, Romoli's SI treatment of Neg-Raising can make use of the more successful Gajewski/Chierchia account of strong NPIs in deriving the contrast between (18) and (19) on purely semantic grounds. In the

next two sections counterexamples to the Gajewski/Chierchia approach will be discussed which will be taken to indicate that a purely semantic account of strong NPIs is insufficient.

2.2.4 *Collins & Postal sentence*

The first key point against the Gajewski/Chierchia approach to strong NPIs comes from Collins & Postal (2014, p. 94). The sentence was not originally offered as an argument against this approach but rather as an argument against the anti-additivity account as developed in Gajewski (2007). In defense of Lakoff's clausemate condition (and consequently a Neg movement operation), Collins & Postal introduced a sentence of the kind in (47) which features a strong NPI in an environment that supports AA inferences yet does not license the NPI. Compare this to the sentence in (48), which features an appropriately licensed weak NPI in the same environment.

(47) *John doesn't know a person who has seen Sue in years.

(48) John doesn't know a person who has ever met Sue.

The strong NPI appears in the relative clause of an existential quantifier phrase scoping below a sentential negation which, as shown above, supports anti-additive inferences. (47) is of a similar semantic form to (35), which was already shown to be a counterexample to Zwarts' account of strong NPIs. Both expressions feature a negative element scoping over an existential quantifier, creating an AA environment. As discussed above, the Gajewski/Chierchia account can explain the unacceptability of (35) on account of the existential presupposition of the relative clause in the negative subject quantifier. This interferes with the DEness of that environment and thus interferes with the strong NPI licensing. In (47), however, there is no presupposition or SI that interferes with the DEness of the environment containing *in years*. The DE test in (49) corroborates this.

(49) Mary doesn't know a person who plays an instrument. →
Mary doesn't know a person who played the piano.

The sentence in (47) then illustrates a problem for not only the anti-additivity account, as pointed out by Collins and Postal, but for the non-truth-conditional account of strong NPIs as well. As was the original aim of Collins and Postal's point, the inability for the Gajewski/Chierchia approach to strong NPIs provides evidence in favor a locality condition on strong NPIs. The separation of the high sentential negation and the embedded strong NPI by the relative clause boundary creates a violation of the locality aspect of the NPI's licensing conditions. Weak NPIs on the other hand do not have a clausemate condition, thus *ever* is licensed in (48). In the next section an additional problem will be shown to arise for the Gajewski/Chierchia account as applied by Romoli (2013) to the Neg-Raising data.

2.2.5 *High NPI data*

Lakoff (1969) discusses a contrast between the acceptable case of (18) and unacceptable sentences like (50) that feature an additional NPI in the matrix domain, in this case the weak NPI *ever*.

(50) *John didn't ever think that Bill would arrive until Tuesday.

Assuming that both *ever* and *until tomorrow* must be in the scope of the negation, the unacceptability of (50) is accounted for by Lakoff's proposal for a clausemate condition on strong NPIs with Neg movement. If the negation is interpreted below the Neg-Raising predicate *think* to satisfy the locality requirement on *until tomorrow*, it cannot license the high NPI *ever*.

The case in (50) was not discussed in Romoli (2013) and is problematic for the Gajewski/Chierchia proposal.⁴ Assuming that the negation only appears high at LF, Gajewski/Chierchia would expect that the strong NPI is not licensed because of some non-truth-conditional element of the meaning that interferes with the DENess of the environment. However, the only difference between the bad (50) and the good (18) is the presence of the high weak NPI *ever*. This item is not expected to trigger any non-truth-conditional propositions that could interfere with the DENess of the expression. The intuitive test for DENess in (51) corroborates this.

(51) John didn't ever think that Bill would visit Europe. →
John didn't ever think that Bill would visit Portugal.

Given that the required DE inferences are supported in this environment, this sentence is a problem for the Gajewski/Chierchia account of strong NPIs and thus a problem for Romoli (2013). It will be assumed here that Lakoff's original treatment of (50), (18) and (19) is correct. However, as concluded in Section 2.1, the purely syntactic account of Neg-Raising endorsed in Lakoff (1969) is not correct. In fact, a strong argument against the syntactic account can be found in a close variant of (50).

Consider the acceptable expression in (52) which is minimally different from (50) in that which features only the high NPI.

(52) John didn't ever think that Bill would visit Europe.

If the high NPI *ever* must be in the scope of the negation at LF, then the Neg-Raising reading of (52) cannot be derived from a low negation given that the negation would not be able to license the NPI, as in LF₁ of (53). The NPI can only be licensed in a structure like LF₂ of (53).

(53) LF₁: *John [ever [think [not [Bill would visit Europe]]]]
LF₂: John [not [ever [think [Bill would visit Europe]]]]

⁴ Gajewski (2005) considers the multiple NPI cases and suggests that they can be accounted for without making use of a Neg movement operation. Gajewski attributes the inability to not license both NPIs in (50) to the projection behavior of the EM in the presence of *ever*. It's proposed that the EM presupposition of *think* projects existentially through the high NPI, yielding a statement of the form $\exists \neg _$ that does not yield anti-additive inferences. Whether or not this account can be maintained within the anti-additivity account, the examples offered by Gajewski (2011) were shown to dismiss the relevance of anti-additivity with strong NPIs.

In addition to not licensing the high NPI, LF₁ does not yield the correct interpretation; the existential temporal quantifier scoping over the negation creates truth conditions that are too weak. LF₂ must then be the correct LF given that it licenses the NPI and derives the correct truth conditions, which means that there must be a non-syntactic means of deriving the Neg-Raising interpretation of (52).

To all previous accounts of Neg-Raising, the cases in (50) and (52) appear contradictory, where (50) supports the syntactic approach and (52) supports a non-syntactic approach. However, these sentences together support precisely the stance taken here, which accepts both (a) a locality condition on strong NPIs coupled with a Neg movement operation and (b) a non-syntactic means of creating the Neg-Raising effect. In the next section, another minimal pair will be introduced that further supports this combined approach to the Neg-Raising data.

2.2.6 VP ellipsis with strong NPIs

Using VP ellipsis again as a diagnostic for LF structure, we can design a test for the syntactic position of the negation in Neg-Raising expressions featuring a strong NPI. With (7) it was shown that a purely syntactic account of Neg-Raising is not possible given that a low-scope negation at LF would block the ellipsis that is licensed. If we make the minimal change to (7) of adding a strong NPI in embedded clause of the antecedent VP, then we can test for whether or not the negation must be low at LF to license the strong NPI. If there is a clausemate condition on strong NPIs, then the negation would necessarily be situated low to satisfy the locality condition on strong NPIs which should prevent ellipsis. A key requirement in designing the test is that the featured NPI permits the phenomenon known as Vehicle Change (VC). This is illustrated in (54) where a VP is deleted that contains an item semantically equivalent to the existential NPI *any* in the antecedent VP but is not an NPI itself.

(54) John didn't take any classes but Sue did <take some classes>.

In the creating the test sentence, we must use a strong NPI that can do VC and *in years* is such an expression, as shown in (55). The interpretation of the elided temporal adverb semantically equivalent to *in years* is a vague non-NPI expression represented below as *in recent years*.

(55) John hasn't been to Boston in years but Sue has <been to Boston in recent years>.

The test sentence will involve a negated antecedent VP headed by a Neg-Raising predicate that contains the embedded strong NPI *in years* and is predicted by the current proposal to be unacceptable. The sentence in (56) is such an expression and the prediction is born out.

(56) ??Mary doesn't think that John has been to Boston in years but Sue does <think that John has been to Boston in recent years>.

The infelicity of (56) will be taken here to indicate a forced low scope of the negation in the embedded clause to license the strong NPI. Taken together, (7) and (54) corroborate the stance proposed here that there is both a non-syntactic means of deriving the Neg-Raising readings as well as a clausemate condition on strong NPIs with Neg movement available in the syntax. Given that weak NPIs are assumed here to not carry the clausemate condition, we predict that substituting the strong NPI in (56) with a weak NPI acceptable with VC will result in an acceptable expressions. This seems to be the case, as illustrated by (57).

(57) Mary doesn't think that John has ever been to Boston but Sue does <think that John has been to Boston>.

Assuming a clausemate requirement on strong NPIs, it will be useful at this point to take stock in the picture of their licensing conditions established so far.

2.2.7 *A partial picture of strong NPIs*

The discussion so far has led to a partial treatment of strong NPIs, which were argued to carry a clausemate condition as proposed in Lakoff (1969). However, there is clear evidence that locality cannot be the only condition on strong NPIs. Consider the contrast between (58) and (59).

(58) Not a single student arrived until Tuesday.

(59) *Not every student arrived until Tuesday.

As discussed in Gajewski (2005), these cases disprove a purely syntactic account of strong NPIs given that there is no syntactic difference between the two to license yet there is a contrast in their ability to license the strong NPI *until Tuesday*. The difference must then be due to the violation of lack of a semantic condition, presumably involving downward Entailment. The the Gajewski/Chierchia proposal can explain the contrast given that (59) carries a scalar implicature created from the negation of the universal determiner that blocks DE inferences. With (58) there is no interfering implicature. This suggests that there is both a downward entailment requirement sensitive to scalar implicatures as well as a locality requirement between the licensing operator and the strong NPI. Though these two assumptions are not incompatible, accepting them together means accepting a peculiar picture in which this class of items is licensed only if two separate conditions on the semantic and syntactic properties of the containing expression are simultaneously satisfied. This issue is taken up in Crowley (in prep a) in which the locality effect observed with Strong NPIs is derived as result from how the downward entailment requirement on NPIs is satisfied.

2.2.8 *Arguments against the proposal*

In this section, various data points will be discussed that have been offered in the literature against both syntactic and non-syntactic approaches to Neg-Raising.

2.2.8.1 Neg DP problem for clausemate condition

As pointed out by Horn (1978), sentences like (60) illustrate a problem for a clausemate condition on strong NPIs with Neg DPs.

(60) No one thinks that John arrived until Tuesday.

No one is typically assumed to be composed of a negation and existential quantifier. The quantifier as a whole cannot be interpreted in the embedded domain to license the NPI given that it must bind a subject variable in the matrix domain. In an attempt to defend a locality condition on strong NPIs, we might suggest that the negation alone is interpreted in the embedded domain with the quantificational component of the argument interpreted in the matrix domain. However, as pointed out by Gajewski (2005, p. 41), this would not derive the correct truth conditions. To do this would require the Neg DP to be composed of a high universal quantifier and a lower negative component. This treatment of Neg DPs has been independently shown to be problematic, making (60) a problem for a clausemate condition on strong NPIs assumed here.

Some judgements on (60) were collected for this paper which expressed that the sentence not acceptable as originally discussed by Horn. The judgements indicated that the meaning of the sentence is unintelligible, despite sounding grammatical. This will not be taken as a conclusive point on the issue. More empirical work will need to be done before we can determine the status of (60) and whether or not it is problematic for a locality condition on strong NPIs.

2.2.8.2 A case of undergeneration

Gajewski (2005, p. 45) argues that sentences like (61) featuring the negation of the predicate *allow* indicate cases of undergeneration for the clausemate condition on strong NPIs.

(61) An applicant is not allowed to have left in at least three years.

The predicate *allowed* is standardly treated as an existential quantifier over worlds. In the case of (60), if the negation were low in the LF to license the strong NPI, we would have different truth conditions, equivalent to: *An applicant is allowed not to have left in at least three years*. Gajewski says that a reviewer points out that this sentence gets bad when *at least* is gone, which is marked by Gajewski with a single question mark.

(62) ?An applicant is not allowed to have left in years.

Gajewski's explanation of the badness of (62) is that it is due to *in years* being vague and informal and thus not appropriate in the context which is describing a formal rule.

However, *at least three years* is equally inappropriate for this kind of statement.

Such a rule should state the minimal time frame that applicant is not allowed to have left within in an exact sense, without acknowledging that this is a lower bound as with *in at least three years*. For example the phrases *in three years*, or *in the past three years* would be appropriate for stating the rule. When we test these two possible ways of stating the same rule, the first case is bad and the second is acceptable.

(63) ??An applicant is not allowed to have left in three years.

(64) An applicant is not allowed to have left in the past three years.

The reason why (63) is bad must be because *in three years* it is a strong NPI and has a clausemate condition that is not satisfied. The reason why (64) is good is because *in the past three years* is not an NPI. When we design a similar example using the strong NPI phrase *until Tuesday*, which is not phonologically and semantically similar to non-NPI phrases, the sentence is clearly bad on the embedded reading of the NPI.

(65) *An applicant is not allowed to leave until Tuesday.

The expressions with *allowed* thus pattern along with all other cases of non-Neg-Raising predicates in the present of strong NPIs in not licensing the NPIs. These cases are then not problematic for a clausemate condition on strong NPIs.

2.2.8.3 Collins & Postal (2012)

Collins & Postal (2014) discuss a collection of new data points offered against a non-syntactic account of Neg-Raising. This data will not be discussed here however, in light of the cases in (7), (8), (11) and (52) discussed above, a purely syntactic account of the data is assumed not to be tenable. The task of accounting for the cases discussed by Collins and Postal in a way that is consistent with the combined approach to the data taken here will be left for future work.

2.2.9 On the nature of the Neg-Raising phenomenon

The combined approach to the data argued for above is mysterious in that the distribution of the Neg movement operation patterns exactly with the presence of the EM assumption. Accepting these two features then calls for an account that links them appropriately. As a starting point, the generalization in (66) will be assumed here, which interprets the connection as a condition on Neg movement.

(66) *Neg movement generalization*: Neg movement only applies past predicates associated with an Excluded Middle.

Given that the presence of the EM presupposition precludes the ability to apply Neg movement according to this generalization, the Neg-Raising effect is seen as a purely pragmatic phenomenon. In the Neg-Raising expressions with strong NPIs that are taken here to feature a covertly low negation at LF, the Neg-Raising reading is directly determined from the LF without pragmatic strengthening. However, in light of (66), the EM licenses the Neg movement step that allows for the expression in which the negation is pronounced high and interpreted low. Thus, even when the Neg-Raising reading is determined directly from the syntax, this is still a result of the EM presupposition.

The generalization in (66) is mysterious in that it describes the dependancy of a syntactic operation on an extra-grammatical element of the meaning. Such items as presuppositions are not typically expected to influence operations in the narrow syntactic domain. This issue will be discussed separately in Crowley (in prep b), where an account

of (66) will be offered that derives the dependency from a more widely observable pragmatic process. Next, the details of the syntactic derivations involving Neg movement will be laid out.

3 The syntax of Neg movement

In the first part of this section, some architectural assumptions will be set in place. The key assumption will be the Copy Theory of Movement which will allow for the covert low scope of negation needed to explain the acceptability of embedded strong NPIs in Neg-Raising contexts. A novel ellipsis puzzle will then be introduced that will be shown to directly relate to the Neg-Raising phenomenon. A solution to the puzzle will be offered which makes use of the syntactic assumptions established for the strong NPI cases as well as an EM presupposition. The picture of Neg movement developed below will be argued to provide further insights into the syntax of negation as well as the nature of movement more generally.

3.2 Copy Theory and covert movement

3.2.1 Copy Theory

The Copy Theory of Movement maintains that an application of the operation Rmerge results in a lexical element being fully represented in multiple positions (Chomsky 1993). Chomsky points to cases of subject reconstruction like (67) as evidence for this, where an interaction between the indefinite subject quantifier *a New Yorker* and the intensional predicate *likely* results in semantic ambiguity.

(67) A New Yorker is likely to win the lottery.

On one reading, a particular New Yorker is believed to be likely to win the lottery, which corresponds to the wide scope of the existential over the intensional quantifier *likely*. On the other reading, it is expected that whoever wins the lottery will probably be from New York, which corresponds to the narrow scope of the existential under the intensional operator.

With Copy Theory we can derive the ambiguity from an optionality that arises at the semantic interface regarding the interpretation of the subject chain. Assuming that only one link can be interpreted, there are two options. On one option, the higher copy in the overt subject position is interpreted, giving it wide scope over *likely* and on the other option, the lower copy in the embedded subject position is interpreted, giving it narrow scope under *likely* (Chomsky 1993, Hornstein 1995). The alternative copy that is not interpreted at LF is deleted.⁵ This results in two possible <PF, LF> pairs that can be

⁵ Fox (2002) points out that it is necessary to assume, along with a copy deletion rule, an additional chain interpretation rule at the LF interface in cases of object quantifier chains. A problem arises for Copy Theory with quantifiers in object position given that Copy Theory assumes a fully-represented quantifier should occupy the object position of a transitive verb, in order to uphold the Theta Criterion (Chomsky 1981). However, Quantifier Phrases (QPs) of type <<e,t>t> are not of the correct type to integrate with transitive verbs of type <e<e,t>> by Functional Application. Fox (2002) proposes the interpretation rule Trace Conversion which converts the low copy of a quantificational DP chain into an e type definite description containing a variable bound by a higher QP copy.

derived from a common narrow syntax containing the subject chain. These are shown in (68), with the wide-scope indefinite interpretation derived from (68a) and the low-scope indefinite interpretation derived from (68b).

- (68) (a) PF: [A New Yorker_i [is likely [~~A New Yorker~~_i...]]]]
 LF: [A New Yorker_i [is likely [~~A New Yorker~~_i...]]]]
- (b) PF: [A New Yorker_i [is likely [~~A New Yorker~~_i...]]]]
 LF: [~~A New Yorker~~_i [is likely [A New Yorker_i...]]]]

This picture simplifies the syntax by deriving the ambiguity from independently motivated factors, and thus getting rid of the scope-shifting operation Quantifier Lowering (May 1977). This operation was previously assumed to create the inverse-scope reading by reinstating a raised subject quantifier into a previously occupied position. Additional theoretical advantages to the Copy Theoretic view of reconstruction effects have been noted in the syntax (see for example Chomsky 1993, 1995, Fox 1999).

This picture of interface optionality has been argued to have applications to a range of other data with the addition of another architectural assumption, relating to the ordering of operations in the course of a derivation. A number of authors have argued that instances of scopal ambiguity associated with covert movement can be analyzed in a similar way to (68b). In these cases a covert movement operation, e.g. QR, is assumed to apply before spell-out to the phonology rather than after, as in the Y-model of Chomsky & Lasnik (1977). The resulting narrow syntactic structure contains a quantificational DP chain that is interpreted by both the PF and LF components. The phonology of English is then required to interpret the lower copy whereas the semantics can interpret either (Brody 1995, Bobaljik 1995, Pesetsky 1998, Bobaljik 2002). On this model of the grammar, sometimes called the single-output model, the covert/overt distinction is seen as a difference in chain interpretation instructions at the PF interface. We will see now how copies in a single-output model along with Neg movement can derive the Neg-Raising expressions featuring embedded strong NPIs.

3.2.2 *Creating and interpreting Neg chains*

A similar picture to the subject reconstruction process illustrated in (68b) will be assumed for case of (18), restated as (69), which was argued to require Neg movement.

- (69) John didn't think it would snow until tomorrow.

This expression is taken to be derived from a narrow syntactic structure of the form in (70) containing a Neg chain created by applying Neg movement across a Neg-Raising verb.

- (70) [...[Neg_i ...[V [Neg_i...]]]]

Assuming that the phonological and semantic components are each presented with an option of deleting one or the other Neg copies, the structure in (70) yields the four <PF, LF> pairs shown (71).⁶

- (71) (a) PF: [...[Neg_i...[V [~~Neg_i~~...]]]] (b) PF: [...[~~Neg_i~~...[V [Neg_i...]]]]
 LF: [...[Neg_i...[V [~~Neg_i~~...]]]] LF: [...[~~Neg_i~~...[V [Neg_i...]]]]
 (c) PF: [...[Neg_i...[V [~~Neg_i~~...]]]] (d) PF: [...[~~Neg_i~~...[V [Neg_i...]]]]
 LF: [...[~~Neg_i~~...[V [Neg_i...]]]] LF: [...[Neg_i...[V [~~Neg_i~~...]]]]

The expression in (69) is taken to be of the form in (71c), which allows for covert satisfaction of the locality condition on the strong NPI while the negation is pronounced high. In the next section, it will be argued that the other pair in (71) indicating covert displacement, *viz.* (71d), is attested in English.

3.2.3 *Imparallel VP ellipsis*

This section will discuss a novel VP ellipsis phenomenon. The simplest examples of the phenomenon, referred to here as Imparallel VP Ellipsis (IVPE), involve instances of big VP ellipsis like (72) and (73), which are judged by a majority of speakers to be acceptable. An obligatory feature of these expressions is that they have prosodic accenting as indicated with CAPS.

- (72) MARY is planning NOT to attend the lecture but JOHN IS <planning to attend the lecture>.
 (73) BILL expects NOT to pass the exam but SUE DOES <expect to pass the exam>.

The problem with these expressions is that on the surface there is a clear lack of identity between the antecedent and the elided VPs, where a negation is pronounced in the antecedent VP that is not interpreted in the ellipsis site. All accounts of the licensing conditions on ellipsis—syntactic or semantic—require strict identity between the antecedent and elided VPs and thus predict that ellipsis should not be possible in the contexts of (72) and (73).

The imparallelism effect is not observed with all matrix predicates. Consider the expressions in (74) and (75) featuring *pretend* and *promise*, which speakers judge to be unacceptable.

- (74) ??SUE is pretending NOT to have seen the movie but PETER IS <pretending to have seen the movie>.
 (75) ??JOHN promises NOT to sing at the party but MARY DOES <promise to sing tonight>.

A key observation here is that (72) and (73) feature Neg-Raising predicates while (74) and (75) feature non-Neg-Raising predicates. From this it will be assumed that the IVPE

⁶ This brings up a question of why EPP movement and Neg movement in English are treated differently at PF. This question won't be addressed here.

effect is only observable with Neg-Raising predicates.⁷ With this generalization in place, the picture of Neg movement established in the previous section provides an analysis of (72) and (73) that is consistent with the assumption that ellipsis requires some notion of strict identity.

The first conjunct of the expressions in (72) and (73) will be proposed to be derived from a narrow syntax of the form in (70), which yields the four pairs of the form in (71) after chain interpretation. The first conjunct of the IVPE expressions is taken to be of the form in (71d). In this <PF, LF> pair, the phonology interprets the low copy of the Neg chain and the semantics interprets the high copy. Taking (72) as an example, the resulting LF of the full expression is shown in (76), with both copy deletion and ellipsis marked with ~~striketrough~~. Assuming that the identity conditions on ellipsis apply either to the LF or the semantic representations, an appropriate antecedent for VP_E in the second conjunct is provided by the first conjunct, in which negation is covertly situated outside VP_A.

(76) LF: Mary_F is [not_F VP[planning ~~not~~_F to attend the lecture]_A] but
John_F is VP[~~planning to attend the lecture~~]_E

With the negation interpreted in the matrix domain of the first conjunct at LF, the inference illustrated in (5) can be derived given the EM of *plan*, creating the Neg-Raising reading of that clause. As for the obligatory accenting in (76), this property also follows from the imparalel interpretation of the Neg chain by the phonological and semantic components. It will be assumed here that accenting indicates F-marking in the syntax that is licensed when a proposition containing the F-marked element has a salient antecedent that is a member of that expression's focus semantic value, as in Rooth (1992). Additionally, it's assumed here that there is a covert affirmative element in the second conjunct that contrasts with *not* (Chomsky 1957, Laka 1990). In order not to stray from the primary concerns of this paper, it will be left to the reader to see how these assumptions along with the structure in (76) appropriately derive the accenting in (72).⁸

Given that the IVPE effect necessarily involves Neg movement, it won't be observable in environments like (74) and (75) where Neg movement is prevented from applying past non-Neg-Raising predicates. If this is the correct analysis of the IVPE

⁷ Though the majority of informants find (71) and (72) to be fully acceptable, a number of informants have expressed that they find these sentences slightly marked and have a clear preference for the PF form in which the Negation is pronounced as if it is in the matrix domain. We will come back to this issue however, the important fact here is that even where informants express a slight discomfort with (71) and (72), the sentences in (74) and (75) are judged to be clearly worse.

⁸ Assuming the theory of focus in Rooth (1992) for this context is not arbitrary. This is motivated by the fact that a problem arises in the primary alternative to Rooth's account in the literature offered in Schwartzchild (1999). Schwartzchild proposes that the relevant relation between an antecedent and the F-marked expression is one of semantic entailment rather than set membership, like in Rooth (1992). The problem for Schwartzchild's account involves licensing accenting on *not* and *is* in (72). Licensing accenting like this under a relation of semantic entailment yields a tautological relation that trivially licenses focus in all expressions where F-marking is found on these items. See Krifka (2004) for the details of this problem.

effect, then these expressions are cases where the processes of both Neg movement and strengthening by EM occur in a single derivation.

3.2.4 Linear distance paradigm with IVPE

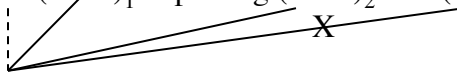
The examples of the IVPE phenomenon discussed above all involve instances where the complement of the matrix verb is a non-finite clause. However, we are assuming that Neg movement can raise a Neg out of both non-finite and finite clauses, given that the instances where strong NPIs are licensed in contexts with finite compliments. We would then expect that the IVPE effect be possible in these kinds of expressions however, this doesn't appear to be the case. For example, the expression in (77) is reported to be marked.

- (77) ??JOHN thinks that Bill is NOT going to the party but MARY DOES <think that Bill is going to the party>.

It will be proposed here that the data point in (77) is part of a paradigm observable with IVPE expressions. This effect will be tied to the linear distance between the PF positions occupied by the items *not* in the antecedent clause and *is* in the ellipsis clause. The paradigm is illustrated by the cases in (78)-(82)

- (78) John is NOT expecting to pass the exam but SUE IS <expecting to pass the exam>.
(79) John is expecting NOT to pass the exam but SUE IS <expecting to pass the exam>.
(80) (?)John is expecting to NOT pass the exam but SUE IS <expecting to pass the exam>.
(81) ?(?)John is expecting Bill NOT to pass the exam but SUE IS <expecting Bill to pass the exam>
(82) ??/*John is expecting for Bill to NOT have passed the exam but SUE IS <expecting for Bill to have passed the exam>.

This paradigm appears to show that the more phonological material is placed in between the surface positions corresponding to the two accented items, the more marked the expression is. It will be assumed here that when two items are associated by accenting, speakers prefer those items to appear in parallel positions in the surface form. However, a certain degree of imparalelism must be tolerated by all speakers of English. The affirmative counterpart to sentential negation assumed to exist in English is not phonologically realized. The F-marking of this item is then phonologically realized on the local progressive auxiliary *is*. This means that, even when the negation is pronounced in the matrix domain, it is not parallel to the *is* associated by accenting given that there is a correlate auxiliary alongside the negation in the first conjunct. This is illustrated in (83).

(83) John is (NOT)₁ expecting (NOT)₂ ... (NOT)₃ pass the exam but

 Sue IS <expected to pass the exam>.

The IVPE data indicates that the large majority of speakers accept positions 1 and 2 for *not* in (83) and thus tolerate a certain degree of imparallelism more than the minimum necessary.⁹

3.2.5 Connecting the data

A benefit of this treatment of the strong NPI expressions and the IVPE expressions is that the two problematic phenomena can be derived from the same assumptions. For instance, we could imagine another means of deriving the coverly high scope of negation in the IVPE expression by positing a covert high negative operator that is associated with a phonological exponent realized as *not*. This is exactly what is proposed in Zeijlstra (2004) in a treatment of the negative concord phenomenon. In Zeilstra's account, the relationship between the silent operator and the morphological exponent is one of syntactic agreement. The same process could be used to derive the IVPE effect however, we would lose the explanation of the strong NPI cases. These cases would require developing a new process which calls for the reverse syntactic relation between the phonological exponent and the negative operator. This would call for a new process all together given that the Agree relation presumably couldn't also hold in the reverse direction between the same two items.

The proposed analyses of the two problematic expressions are essentially one analysis. Assuming that optionality in chain interpretation arises at both interfaces when interpreting a Neg chain, then the two expressions are predicted to derive from a narrow syntax. In the next section, questions about the nature of Neg movement will be discussed.

3.3 On the syntax of negation

Positing a kind of movement raises two connected questions: (a) what are the mechanism involved with that movement? and (b) why is that movement available in the system? This section will be concerned with trying to answer these two questions with respect to Neg movement. It will be argued that the distribution of Neg movement provides answers that shed light on the syntax of negation and movement more generally.

3.3.1 How does Neg movement happen?

First, we'll consider question of what syntactic mechanisms are involved with Neg movement. A common stance in the literature is that there are two types of movement. One is feature-driven movement, which is taken to be motivated by the needs of a higher functional head. That head carries an uninterpretable feature that can be checked by

⁹ This paradigm could explain why some speakers have a clear preference for *not* to appear in the initial position in (83) and find IVPE expressions to be slightly degraded. These speakers would be taken to have a stronger preference for parallelism between the accented items than speakers who accepted negation in both the initial and the second position of (83).

merging the appropriate item to the head's specifier position. To do this the head can search downwards in the structure and attract the object with the appropriate feature to its specifier position (Chomsky 2000, 2001). Examples of this are EPP movement and Wh-movement. The other kind of movement is carried out by scope-shifting operations, which place a scope-taking operator in a different c-command position for semantic purposes. The standard case of this is QR which raises QPs to a higher c-command position, merging them to t type nodes and integrating them via lambda abstraction (May 1977, Heim & Kratzer 1998). In structures featuring object quantifier phrases, QR is obligatory and in all other cases, it is assumed to be optional. Fox (2000) proposes that QR is restricted by an economy constraint, called Scope Economy, informally stated in (84).

- (84) Scope Economy: scope-shifting operations cannot be semantically vacuous.
(Fox 2000, p. 3)

This constraint has the effect of blocking unnecessary instances of QR based on whether or not a given application yields an effect on the resulting truth conditions.¹⁰

Accepting that there are only these two kinds movement, the question now is which category does Neg movement belong to. Given that Neg is a scope-taking operator, Neg movement is in a literal sense a scope-shifting movement, i.e. it always places the Neg operator in a different c-command position. The question then is if changing the c-command position of Neg for semantic effect is the purpose of the movement, as in the case of QR. It was established above that negation can only raise past predicates that carry an EM presupposition. This means that Neg movement only applies in cases where it has no effect on the interpretation of the expression, given that the the high-Neg LF is equivalent to the low-Neg LF due to strengthening by the EM. This means that the distribution of Neg movement is the opposite of what is predicted if it were constrained by Scope Economy. We should then conclude that the ability to displace Neg in the syntax must not be semantically motivated. Even if scope-shifting operations were not restricted by a constraint like Scope Economy, Neg movement still could not be viewed as semantically motivated given that it should at least have a semantic effect in some of the environments where it applies, if not in all of them.

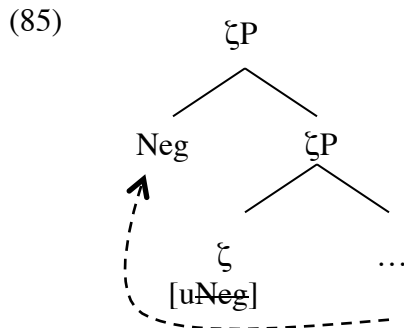
Alternatively, if we think of Neg movement as feature-driven movement, its distribution is not problematic (though still mysterious). It will then be assumed that Neg

¹⁰ This result is formally achieved by positing an apparatus active in the syntactic domain that determines whether or not a given application of QR (or QL) is licensed by checking for a relation of non-commutativity between the target QP and another scope operators in the structure. Commutativity is defined as an equivalence between two functions such that the order in which two functions apply has no effect on the output. The definition of commutativity between two QP arguments of a transitive predicate is shown in (1).

$$(1) \langle QP_1, QP_2 \rangle \text{ are scopally commutative iff for every } \phi \in D_{\langle e, \langle e, t \rangle \rangle}, \\ [[QP_1]](\lambda x. [[QP_2]](\lambda y. \phi(y)(x))) = [[QP_2]](\lambda y. [[QP_1]](\lambda x. \phi(x)(y)))$$

Under Scope Economy, QR is assumed to only be licensed if the target QP is moved past a scope operator that is non-commutative with that QP.

is associated with a head, called here ζ , which has an uninterpretable $u\text{Neg}$ feature that is checked by placing a Neg in the $[\text{Spec } \zeta\text{P}]$ position. The process by which this happens through movement is illustrated in (85).



Under this conception of Neg movement, it's viewed as a possible solution to a problem in the derivation created by introducing the functional head into the structure. The other solution assumed to be available is to select a Neg from the numeration and directly merge it into the high $[\text{Spec } \zeta\text{P}]$ position. This option will be discussed further in the next two sections. Assuming that Neg movement always involves the process in (85), the question then is what the purpose of this movement is beyond the narrowly construed task of satisfying the functional needs of ζ .

3.3.2 Why is *Neg* movement available?

Granting that Neg movement must be feature-driven, the question then is why would a functional head like ζ exist in the lexicon? Assuming that no functional elements exist solely for the sake of having their features checked, we might expect that the movement is available for the sake of creating a useful effect in the phonological or semantic output.

We've already established that Neg movement is always semantically vacuous. We should then consider whether Neg movement could be motivated for phonological reasons. However, Neg movement in the cases discussed above creates no unique phonological effect. If it did, the effect would be observable in cases of overt movement, which in a single-output grammar is the result of the PF component interpreting the higher copy of a chain. However, even in the cases where the higher copy of a Neg chain is pronounced—cases of the kind in (71a) and (71c)—the Neg movement step is still in a sense covert. The landing site of the raised Neg in these expressions is between the auxiliary and matrix verb which is also a position in which a Neg can presumably be base-generated. This follows from the fact that we can pronounce and interpret the negation high in environments where Neg movement is assumed not to be possible, i.e. when the matrix predicate is non- Neg -Raising. A kind of overt movement would only be phonologically motivated if it created PFs that were unattainable without it. For example, consider cases of object fronting where an object is raised in the derivation to a high position where it gets linearized sentence-initially. The object cannot be base-generated in the high position given that it must first be merged into a theta position to satisfy the Theta Criterion (Chomsky 1981). Thus, object-fronting movement is necessary to create the output PF that presumably has information-structural value. Given that all PFs

resulting from Neg movement are attainable without applying that step, we must assume that Neg movement is not phonologically motivated.¹¹

If the motivation for Neg movement is not semantic or phonological then what can it be? It was established in the previous section that where Neg movement is apparent, it's serving to resolve a functional problem in the derivation, *viz.* the existence of an uninterpretable feature in the structure. It will be proposed here that this is the sole purpose of Neg movement. Once ζ is merged into the structure, the syntax has two options for checking its uNeg feature; it can either select a Neg from the numeration or it can select a Neg that was already integrated into the structure. Assuming that neither of these two options is more costly than the other, both are equally available. On this view, it is not necessary for Neg movement to ever create any uniquely observable effects on the phonological or semantic outputs.¹² It exists solely as a solution to a mechanical problem in the narrow syntactic derivation. The question that this account then faces is why does ζ exist in the lexicon. A hypothesis will be proposed in the next section.

3.3.3 A uniform treatment of negation

Assuming that Neg can occupy the specifier position of the functional head ζ , we should consider whether Neg is always situated in [Spec ζ P] or if it occupies a different position when it is initially merged into the structure. The simplest scenario would be that Neg is always playing the same syntactic role in every position it occupies. With respect to the

¹¹ The data set considered here is small. It may be that there are other cases of overt Neg movement where it does create PFs that are otherwise unattainable. If there are such cases maybe a phonological motivation could be found for Neg movement, creating some effect useful for communication. The assumption then would be that, although the availability of Neg movement is phonologically motivated, it is not necessary that all applications of Neg movement must have an effect on the phonology. A search for cases like this will be left for later work.

¹² The existence of a movement operation that is both phonologically and semantically vacuous contradicts proposals that have been made relating to how considerations of economy affect movement. One such constraint has already been discussed, *viz.* Scope Economy of Fox (2000). Fox further suggests, building on insights of Chomsky (1995) and Krifka (1998), that Scope Economy is a component of an overarching economy principle governing all optional movement, including overt movement. This is referred to as Output Economy and is stated in (1).

(1) Output Economy: optional operations must affect the output.

Fox (2000, p.75)

If the data discussed above is correctly analyzed as involving Neg movement, then these sentences provide counterexamples to a constraint like in (1) given that the Neg movement is phonologically and semantically vacuous in all cases. Although the Scope Economy theory was developed to constrain what were introduced above as 'optional scope-shifting operations', under the Copy Theory picture of movement the constraint would not distinguish between optional movement that was feature-driven and non-feature-driven, as discussed in Fox (2000, p. 75, footnote 64). All movement creates chains and with them an optionality at the LF interface which determines the scope of that moved item. This means that if a constraint like (1) existed, Neg movement would be among the kinds of movement sensitive to it and thus would be a problem for (1). The situation is more complicated than this, however in light of how Scope Economy works in light the optionality that arises with Copy Theory and a single output grammar. This won't be discussed further here but see Crowley (in prep b).

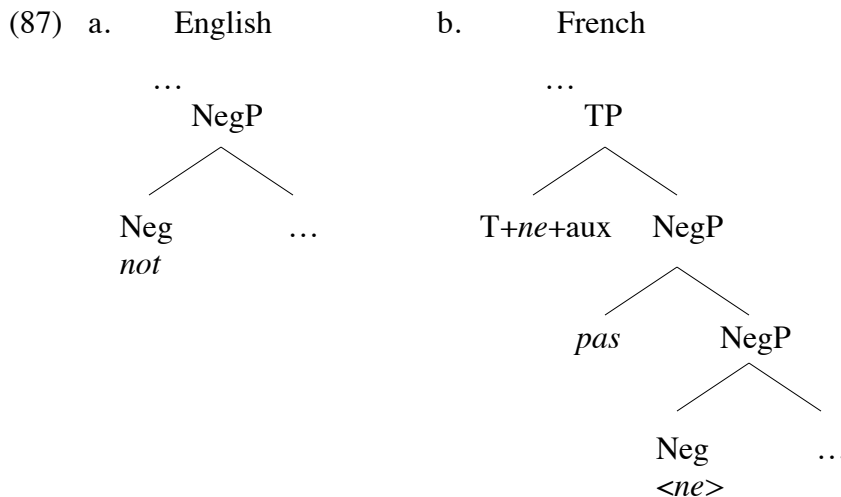
view proposed here, this means that Neg always occupies a [Spec ζ P] position. Below, it will be suggested that this is the correct treatment of negation.

Since Pollock (1989), *not* in English has been treated as the head of its own NegP projection. Pollock argues for the existence of NegP in both English and French based on movement blocking effects associated with negation in both languages. Pollock proposes that the blocking should be attributed to a NegP layer that acts as an inherent barrier. Without discussing the relevant data here, we will consider the two different analyses of negation offered by Pollock for French and English.

Sentential negation is treated differently in French from English in that a negative clitic *ne* is pronounced before a verb that is followed by the sentential negation *pas*, as shown in (86).

- (86) Pierre n' a pas manger.
 Pierre *ne* has not eaten.
 'Pierre hasn't eaten.'

Pollock proposes that the NegP in French is headed by the clitic *ne* while the sentential negation occupies the [Spec NegP] position. The clitic *ne* is assumed to raise T, as is typical of clitics in French, creating the structure in (87b). This differs from English in which the sentential negation is assumed to project the NegP itself with no clitic head, as in (87a).



Pollock's analysis of the NegP layer in French is very close to the structure in (85) suggested to result from feature-driven Neg movement. It will be assumed here that negation always occupies a [Spec ζ P] position in both French and English in all positions that it occupies throughout a derivation. The only difference between French and English is that English lacks a morpheme like the French *ne*, which is interpreted here as the realization of the functional head ζ .

This view allows for uniformity on two levels, where both within a given language and across languages negation is always merged into the same position of any layers that feature it. This is a more desirable picture not only in that it is simpler but it

avoids mysterious aspects of the view in (87) relating to cross-linguistic variation. Whether or not a given element projects its features is not an issue expected to be subject to parametric variation. If we have reason to believe that Neg doesn't project and occupies the Spec position of a functional head, then it would presumably be behaving in this way across all languages. Thus, we should avoid a picture in which two semantically equivalent items have different syntactic categories in different languages. Additionally, in the picture in (85) is mysterious in that the two items *not* in English and *ne* in French are of the same category, projecting the same syntactic label, despite being semantically distinct (indeed, *ne* is semantically vacuous). The uniform treatment assumed here avoids this issue however, this proposal is not original. Pollock's choice to treat Neg in English as a head was, as Pollock says, somewhat arbitrary. In fact, despite proposing that *not* is the head of NegP in English, Pollock notes in the conclusion of the paper that an analysis of negation parallel to French could be possible for English (Pollock 1989, p 421). That is, NegP in English could be headed by a null head with *not* occupying the [Spec NegP] position. This is precisely what is assumed to be the case here, the only adjustment being that sentential negation is of the category Neg in both languages and the functional projection hosting Neg is of a different category, called ζ here. Testing the stronger hypothesis that negation is treated in this way in all languages beyond French and English will be left for future work.

As mentioned above, Pollock's motivation for the proposal of a NegP layer in English and French came from the fact that there are intervention effects associated with negation in these languages. Parallel effects were observed in Italian by Kayne (1987) and other intervention effects were discussed by Beck (1996) with wh-movement. This data won't be discussed here but this suggests a possible explanation for the existence of ζ in the lexicon. In contemporary theory, barrierhood is often interpreted as an effect of cyclical derivation (Chomsky 2000, 2001), which suggests that ζ is a cyclical head. Exploring this hypothesis will be left for future work.

4 Conclusion

The core proposal of this paper was that the Neg-Raising data can only be fully explained by assuming both a non-syntactic means of deriving the Neg-Raising reading (via an Excluded Middle presupposition) as well as Neg movement in the syntax. The arguments in favor of a non-syntactic source of Neg-Raising readings came from novel VP ellipsis and high NPI data. The arguments in favor of a Neg movement operation involved a revival of two key arguments from Lakoff (1969) involving strong NPIs in Neg-Raising contexts. These expressions were argued by Lakoff to indicate a clausemate condition on strong NPIs as well as a Neg movement operation which allowed for the licensing of strong NPIs in Neg-Raising contexts. Recent non-syntactic accounts of this data were shown to be inadequate, concluding that Lakoff's proposal was at least partially correct. On this issue, the paper stopped short of a full account of the licensing conditions on strong NPIs. Crowley (in prep a) will pick up where the discussion was left to propose a means of deriving the fact that both downward entailment and locality are relevant to strong NPIs, while only downward entailment is relevant to weak NPIs.

Despite arguing for both a non-syntactic and syntactic means of deriving the Neg-Raising effect, it was argued that the effect should be thought of as a purely pragmatic phenomenon. This came from the generalization that the Neg movement operation only

applied past predicates carrying an EM presupposition. This raises an additional issue relating to the connection between the Neg movement operation and Excluded Middle presuppositions. This question is addressed in Crowley (in prep b) which proposes that the Neg movement pattern can be derived by a pragmatic blocking process motivated to reduce scope ambiguity.

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