1 Introduction

The interpretation of sentences in which negation appears above certain verbs like think and want is typically stronger than expected. Such sentences generally license an inference not just that the individual in question fails to have a positive attitude, but also that the individual has the corresponding negative attitude (Horn 1978, among many others). For instance, a sentence like (1a) is generally interpreted in the same way as (1b).

(1) a. James doesn’t think that Marie will be hired.
   b. $\sim \sim$ James thinks that Marie will not be hired.

The traditional name for this phenomenon is neg-raising. Neg-raising readings are generally the most prominent, but not the only, available reading; thus, (1a) could be followed by He doesn’t think that she will not be hired either; he just doesn’t know whether she will be, in which case (1a) will clearly not be interpreted in the same way as (1b). If we combine a standard Hintikkan semantics for neg-raising predicates like think with a classical treatment of negation, we only predict that a sentence like (1a) will have an agnostic reading, and we do not account for its stronger reading on which it licenses the inference to (1b). Accounting for neg-raising is an enduring challenge at the intersection of semantics, syntax, and pragmatics.

As is well-known, neg-raising is not possible with all attitude predicates. For instance, is certain interacts with negation in the way we would expect from a classical point of view: (2a) has only an agnostic reading, not a neg-raised reading.

(2) a. James is not certain that Marie will be hired.
   b. $\sim$ James is certain that Marie will not be hired.

Another crucial feature of neg-raising predicates is that, when negated, they generally license strong negative polarity items (NPIs), like until tomorrow or in years/days. By contrast, non-neg-raising predicates do not license strong NPIs (e.g., Lakoff 1969).

Many thanks to Chris Collins, Jon Gajewski, Paul Postal, and two Linguistic Inquiry reviewers for very helpful comments.

1 Neg-raising suggests a syntactic analysis, but we will follow the recent literature in using this as a name for the phenomenon without suggesting a particular analysis of it. Strong NPI licensing is sometimes treated as definitive of neg-raising, but we will assume the more traditional and simpler definition: neg-raising is simply the phenomenon whereby certain predicates license unexpectedly strong inferences when negated: “the collapsing (Zusammenfall) of the distinction between contrary and contradictory readings of negation” (Horn 1989:310). Relatedly, Kiparsky and Kiparsky (1971) claim that neg-raising and factivity are incompatible. But they do so because they assume a syntactic approach to neg-raising—which, as we discuss below, is indeed incompatible with treating like-verbs as neg-raisers. We think, by contrast, that adopting a relatively broad definition of the phenomenon in question makes it possible to investigate it without prejudging the question of whether neg-raised attitude verbs can always be paraphrased with a low-scope negation, and whether they always license strong NPIs.
(3) a. James doesn’t think that Marie has been here in years.
    \*b. James isn’t certain that Marie has been here in years.

Traditional theories of strong NPIs and neg-raising are formulated to predict a tight connection between the two phenomena. In particular, most approaches predict that neg-raised predicates always license strong NPIs.

More recently, however, Gajewski (2011) and Chierchia (2013) have proposed a theory of strong NPIs on which, at least in principle, they may fail to be licensed by neg-raising constructions. The gist of the idea is that strong NPIs, like all other NPIs, are licensed only in downward-monotonic environments. However, the calculation of monotonicity properties for strong NPIs, but not weak NPIs, is sensitive to non-truth-conditional components of meaning like presupposition and scalar implicature. Going back to the contrast in (3), the reason why (3a) but not (3b) licenses strong NPIs is that the latter gives rise to a positive implicature (viz., that James leaves it open that Marie has been here in recent years), which disrupts the downward monotonicity of the context in which \textit{in years} appears. This means that in this theory the alignment between neg-raised predicates and strong NPI licensing is only indirect: neg-raised predicates generally license strong NPIs because they do not give rise to non-truth-conditional meanings that would disrupt monotonicity, whereas non-neg-raisers typically do give rise to such non-truth-conditional meanings. But nothing in this approach excludes the possibility of there being a predicate that is neg-raising but gives rise to a presupposition or implicature that disrupts strong NPI licensing. In fact, given that non-truth-conditional meanings are pervasive in natural language, one might indeed expect there to be such a class of predicates, given this approach.

In this squib, we show that there is indeed a class of predicates that give rise to neg-raising inferences but do not license strong NPIs: namely, factive emotives like \textit{appreciate}, \textit{be glad}, \textit{be happy}, and \textit{like}. This is a striking fact that we believe provides support for the Gajewski-Chierchia theory of NPI licensing, together with a semantic approach to neg-raising.

2 Gajewski and Chierchia on Strong NPIs

We begin by briefly rehearsing Gajewski’s (2011) and Chierchia’s (2013) theory of strong NPIs, which is based on the idea that strong NPIs are sensitive to non-truth-conditional meanings. In brief, the idea is that both weak and strong NPIs are licensed only in downward-entailing environments, but that while we can ignore presuppositions and implicatures in calculating monotonicity properties relevant for the licensing of weak NPIs, we cannot do so when calculating monotonicity properties relevant for the licensing of strong NPIs. To see this, consider the contrast between (4) and (5), which shows that a strong NPI like \textit{until tomorrow} can appear in the scope of negation (4), but cannot appear felicitously in downward-entailing contexts like the restrictor of a universal quantifier (5).
(4) Mary won’t leave until tomorrow.
(5) *Every student who will leave until tomorrow will miss the class.

On the present approach, the relevant difference between (4) and (5) is that the latter has a presupposition that the intersection of the domain of quantification and the restrictor clause is nonempty; if this presupposition is taken into account in calculating monotonicity properties, the restrictor of the quantifier in (5) is no longer downward-entailing, since \( \neg \text{Something is } p \text{ and everything that is } p \text{ is } q \) does not entail \( \neg \text{Something is } (p \text{ and } r) \text{ and everything that is } (p \text{ and } r) \text{ is } q \).

3 Neg-Raising and Strong NPIs

Let us turn now to neg-raising. Consider again the contrast in (3), repeated here:

(3) a. James doesn’t think that Marie has been here in years.
   b. *James isn’t certain that Marie has been here in years.

Given the Gajewski-Chierchia approach, what explains the fact that strong NPIs are licensed in the scope of the attitude predicate in (3a) but not in (3b) is a difference between their not-at-issue contents (implicatures or presuppositions). (6) generally gives rise to the implicature in (6a) but not the neg-raising inference in (6b), while (7) does not give rise to the corresponding implicature in (7a), and instead gives rise to the neg-raising inference in (7b) (see Romoli 2013).

(6) John isn’t certain that Mary was here.
   a. → John leaves open that Mary was here.
   b. ¬→ John is certain that Mary wasn’t here.

(7) John doesn’t think that Mary was here.
   a. ¬→ John leaves open that Mary was here.
   b. ¬→ John doesn’t leave open that Mary was here.

In the Gajewski-Chierchia approach, the question of whether strong NPIs are licensed in the scope of the attitude predicates in (6) and (7) is the question of whether those attitude predicates, together with their scalar implicatures and presuppositions, create downward-entailing environments. It is easy to see that the possibility inference of certain disrupts the downward-entailment of its scope, for essentially the same reason as in the case of universal quantification. Abstractly, in the case of not certain we have an environment with the form \( r \rightarrow \Box_j(\neg) \land \Diamond_j(\neg) \) (conjoining at-issue content and the openness implicature that projects through the negation), whereas in the case of doesn’t think we have instead an environment with the form \( r \rightarrow \Box_j(\neg) \land \Diamond_j(\neg) \) (conjoining at-issue content with the neg-raising inference). \( _{\neg} \) is a downward entailment in the latter, since \( r \rightarrow \Box_j(p) \land \Diamond_j(\neg p) \) entails \( r \rightarrow \Box_j(p \land q) \land \Diamond_j(\neg (p \land q)) \), but not in the former, since \( r \rightarrow \Box_j(p) \land \Diamond_j(p) \) does not entail \( r \rightarrow \Box_j(p \land q) \land \Diamond_j(p \land q) \).
Note that in this system, strong NPI licensing does not follow directly from the fact that a predicate has a neg-raising inference. Rather, the connection is more general and more indirect: in particular, while the neg-raising inference of neg-raising predicates leaves the downward-entailingness of the environment intact, the existential inference typical of non-neg-raising predicates disrupts it, so that only the former license strong NPIs in their complements.

4 *Like*-Verbs

Abstractly speaking, however, nothing in the Gajewski-Chierchia approach excludes the existence of a neg-raising predicate that does not license strong NPIs. In this section, we will argue that some emotive factives exhibit just this behavior. In particular, consider emotive factives such as *like, be glad, be happy, appreciate*, and so on, with propositional complements. Unlike most factive attitude predicates, these are neg-raising predicates: that is, the typical interpretation of a sentence like (8) is not one on which Fred is indifferent about Marie’s being hired, but one on which Fred is unhappy about Marie’s being hired (Horn 1989:341).

(8) Fred [doesn’t like/doesn’t appreciate/isn’t happy/isn’t glad] that Marie was hired.

Just as for other neg-raising predicates, an indifference reading of (8) is possible; it can be brought out by following up (8) with something like *He doesn’t dislike that she was hired either; he is indifferent about it*. But this reading is certainly not the most prominent interpretation: on the most prominent interpretation, (8) is felt to express that Fred dislikes that Marie was hired.

Crucially, however, these predicates do not license strong NPIs when negated, unlike the standard neg-raising predicates discussed above, as witnessed by the contrast between (9a) and (9b–c).

(9) a. *Fred doesn’t like that Marie has seen her mother in years.
   b. Fred likes that Marie hasn’t seen her mother in years.
   c. Fred doesn’t think that Marie has seen her mother in years.

At first glance, then, these emotive factives—call them *like*-verbs as a shorthand—seem to witness exactly the theoretical possibility that the Gajewski-Chierchia account makes available: namely, neg-raising predicates that do not license strong NPIs.

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2 Horn (1989:341) writes, “‘I don’t like it that he was reelected’ can convey (by litotes) a strong negative reaction to his reelection (= I dislike it . . . ), but it cannot convey satisfaction with his defeat.”

3 Thanks to Chris Collins and Paul Postal (pers. comm.) for first bringing this point to our attention.
5 Motivating the Inference

Before exploring in more detail the predictions the Gajewski-Chierchia account makes about our data, we will do more to motivate our claim that like-verbs should be classed as neg-raisers. Motivating this involves two steps. The first is to argue that an indifference reading of negated like-verbs is available—in other words, that not like does not logically entail dislike. This can be brought out, again, by the coherence of sequences like Fred doesn’t like that Marie was hired. He doesn’t dislike it either; he’s completely indifferent, as well as similar sequences like Fred doesn’t like that Marie was hired. In fact, he positively dislikes it or Fred isn’t happy that Marie was hired. He’s not unhappy about it either. He really has no opinion at all, and so on. To bring out the coherence of these sequences, compare them to ones with binary predicates, like I’m thinking of a certain natural number. It’s not even. It’s not odd either or It’s not even. In fact, I would even say it’s odd. Such sentences are plainly incoherent, by contrast with our target ones. These contrasts suggest that not like does not logically entail dislike. Of course, as we discuss presently, the inference from the former to the latter is very natural, and so it can require some effort to hear the coherence of these sentences; but the crucial point for our purposes simply is that there is a clearly coherent reading of these sentences, and thus that not like does not logically entail dislike.

The second part of motivating our claim is the observation that a strengthened, nonindifference reading of not like is very natural—even if not logically entailed. In other words, as a default, sentences like (10a) are generally interpreted as equivalent to (10b).

(10) a. Fred doesn’t like that Marie was hired yesterday.
   b. Fred dislikes that Marie was hired yesterday.

This claim is very intuitive and does not obviously require further motivation. However, given that the truth conditions of (10b) are intuitively stronger than the literal meaning of (10a), (10a) is always compatible with a situation in which (10b) is true, so caution is required before concluding that (10a) really licenses the inference to (10b), as opposed to merely being compatible with it (see Gajewski 2005, Meyer and Sauerland 2009 for related discussion). The licensing of strong NPIs is often used as a diagnostic reinforcing the existence of neg-raising. However, in this case we cannot use that diagnostic, since we are precisely calling into question whether neg-raising predicates always license strong NPIs. A different argument that the inference from (10a) to (10b) is robust is the following, building on Chierchia, Fox, and Spector 2012. Consider a sentence like (11), which embeds (10a) in the first disjunct.

(11) Either Fred doesn’t like that Marie was hired yesterday or he doesn’t care.

If the first disjunct had only a weak indifference reading, then the second disjunct would entail the first. Then we would expect (11) to
be a violation of Hurford’s constraint (Hurford 1974) and to strike us as being as infelicitous as (12).

(12) #Either Jane is in France or she is in Paris.

The fact that (11) is felicitous thus suggests that (10a) indeed has a reading on which it communicates something more than indifference—in fact, that it communicates what (10b) does.

6 Universal Inferences and Partial Cyclicity

Even if like-verbs give rise to surprisingly strong readings, some might still resist counting them as neg-raisers. In particular, those who take the licensing of strong NPIs to be diagnostic of neg-raising could argue that like-verbs are not neg-raisers; as we will show, those who advocate a syntactic approach to neg-raising must likewise argue that these are not neg-raisers. They might instead point out that when these predicates take nominal complements, they give rise to an inference sometimes called the “inference to the antonym.” That is, a sentence like (13a) gives rise to the inference in (13b).

(13) a. Jane doesn’t like apples.
    b. ¬¬Jane dislikes apples.

One might argue that the sentential cases above are not cases of neg-raising after all, and instead should be treated as inferences to the antonym (Kripka 2007; see also Heim 2008, Ruytenbeek, Verheyen, and Spector 2017). We are sympathetic to this response, but we would take it in a different direction: it looks plausible to us that we might give a unified account of neg-raising in general and of the phenomenon in (13). Part of the motivation for this is general considerations of theoretical simplicity. Part comes from the fact that, as we will show, the Gajewski-Chierchia approach already predicts the lack of strong NPI licensing under negated like-verbs in the context of a semantic approach to neg-raising, which can be naturally extended to cases like (13). Here we will make another point, which is that inferences to the antonym, and like-verbs, share some characteristic patterns with neg-raising: all three give rise to universal inferences under negative quantifiers (as in (14) and (15)) and (partial) cyclicity (as in (17) and (18)), just like the classical neg-raisers in (16) and (19).4

(14) a. Nobody likes apples.
    b. ¬¬Everybody doesn’t like apples.

(15) a. Nobody likes that Marie was hired.
    b. ¬¬Everybody dislikes that Marie was hired.

(16) a. Nobody thinks that Marie was hired.
    b. ¬¬Everybody thinks that Marie wasn’t hired.

4 See Gajewski 2007 and Romoli 2013, among others, for discussion of these cases with classical neg-raising predicates. Thanks to an anonymous reviewer for suggesting these data to us.
7 Gajewski-Chierchia on Like-Verbs

We show now that the Gajewski-Chierchia approach to strong NPI licensing neatly predicts that neg-raised like-verbs do not license strong NPIs. The reason for this is that like-verbs are factive: they presuppose the truth of their complement. For instance, (20) presupposes that Marie was hired; we can confirm this by embedding (20) in standard projection environments and seeing that this inference projects.

(20) John likes that Marie was hired.

And this factivity presupposition disrupts the downward monotonicity of the environment in which the strong NPI appears. If we ignore the presupposition of likes, then \( \text{\textendash} \text{Fred doesn't like that p} \) is downward-entailing in its scope. But once we take into account the presupposition of like in calculating monotonicity, we do not have a downward-entailing environment, and strong NPIs are predicted not to be licensed. Schematically, if we think about ‘likes’ as a presuppositionless necessity operator corresponding to \( F \text{ likes} \) —essentially, ‘has a pro-attitude toward’—then \( \Box \) is downward-entailing in (21a) but not (21b).

(21) a. \( \Box \Box \text{likes}(\Box) \)
   b. \( \Box \Box \text{likes}(\Box) \land \Box \)

This is because for any necessity operator \( \Box \): \( r \Box \Box p \) entails \( r \Box \Box (p \land q) \), but \( r \Box \Box (p) \land p \) does not entail \( r \Box \Box (p \land q) \land (p \land q) \). More intuitively, Fred doesn’t like that Marie was hired yesterday intuitively does not entail Fred doesn’t like that (Marie was hired yesterday and Jane was hired yesterday), since the latter presupposes something that the former doesn’t, namely, that Jane was hired yesterday.

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5 We assume an upward-entailing semantics for like that would make its negation downward-entailing. See von Fintel 1999 for discussion of an upward-entailing semantics for be glad, which can be extended to like, appreciate, and their kin. On the other hand, if we adopt a non-upward-entailing semantics for these attitude predicates, then this could provide an independent explanation of why their negations will not license strong NPIs, though it would not explain the licensing of weak NPIs under not like in the present theory; see Rothschild 2006 and Chemla, Homer, and Rothschild 2011 for discussion of NPI licensing in nonmonotonic contexts.
So, if we take into account presuppositions in calculating the monotonicity properties relevant to the licensing of strong NPIs, the scope of *doesn’t like* is not downward-entailing. Thus, if we follow Gajewski and Chierchia, we predict that strong NPIs are not licensed in the scope of negated *like*-verbs. This makes them unlike standard neg-raising predicates like *think*, which are not factive and thus do not have a presupposition that blocks downward monotonicity in a parallel way.

By contrast, since presuppositions are not taken into account in calculating weak NPIs, the Gajewski-Chierchia approach predicts that weak NPIs will still be licensed by negated *like*-verbs, which seems correct to us: (22a) seems substantially better than (22b) (though perhaps not perfect; intuitions here seem somewhat unclear).

(22) a. John doesn’t like that Marie ever went to Paris.
   b. *John doesn’t like that Marie has been to Paris in weeks.

Taken together, these facts are, we think, a striking point in favor of the Gajewski-Chierchia approach. That approach opens up a theoretical possibility (one not to our knowledge previously discussed): namely, that we could have neg-raising predicates that do not license strong NPIs, provided those neg-raising predicates have presuppositions or implicatures that prevent their scope from being downward-entailing. This possibility seems indeed to be realized by *like*-verbs.

8 Syntactic Neg-Raising

This is all to the good for Gajewski’s and Chierchia’s theory of strong NPIs. We have not yet said anything about how to actually account for the neg-raising inferences of negated *like*-verbs. In the rest of the squib, we will turn to this topic. We will show that it is not clear how to provide a unified account for the cases above within a syntactic approach to neg-raising; while a semantic approach (Gajewski 2007, Romoli 2013) also faces challenges, it can be more readily extended to provide such an account.

The syntactic approach to neg-raising originated in Fillmore 1963 and Horn 1971 and was recently taken up and revived by Collins and Postal (2014, 2017). The basic idea is that at some level of syntactic representation, a sentence like (23a), on its neg-raising reading, has a negation actually present in the embedded clause, as in (23b), and that this level of syntactic representation feeds into semantic interpretation. This negation then moves out and appears in the main clause.6

(23) a. James doesn’t think that Marie will be hired.
   b. James NEG thinks that [Marie will ⟨NEG⟩ be hired]

6 Collins and Postal’s (2017) account differs in some details, but the differences are not relevant for our purposes.
The non-neg-raising readings are those in which the negation is interpreted in the same place where it appears in surface form. The syntactic approach is generally linked to a theory on which strong NPIs require a local licensor; the silent low negation acts as this licensor for neg-raising readings (e.g., Linebarger 1987; see Gajewski 2005, 2007, Romoli 2013 for critical discussion).7

This approach cannot be extended to account for the neg-raising behavior of like-verbs. The first problem is that this kind of approach does not, as far as we can tell, have the resources to explain why negated like-verbs do not license strong NPIs. The second problem, one of truth-conditional adequacy, is much more basic. On this approach, superficially high-negation neg-raising sentences are predicted to be semantically equivalent (on their default readings) to their low-negation counterparts. If we were to extend this approach to like-verbs, then a sentence like (24a) is predicted to have a syntactic level of representation like (24b) where negation is interpreted in its lower position. Thus, (24a) (on its neg-raising interpretation) and (24c) are predicted to be semantically equivalent.

(24) a. Fred doesn’t like that Marie was hired yesterday.
   b. Fred neg likes that [Marie was (NEG) hired yesterday]
   c. Fred likes that Marie was not hired yesterday.

But this is plainly wrong: (24a) is not equivalent to (24c) on any reading. At a theoretical level, the problem is that like-verbs presuppose the truth of their complement; so if negation is in the embedded clause for the purposes of semantic interpretation, we would expect the presupposition of (24a) to include that negation—in other words, to presuppose that Marie was not hired yesterday.

A syntactic approach to neg-raising thus cannot be extended to account for the behavior of like-verbs. Defenders of the syntactic approach can, of course, maintain that, superficial similarities aside, the behavior of negated like-verbs should not be assimilated to neg-raising. We cannot say anything to rule out this option definitively. However, a unified approach should be preferred if possible, both for general theoretical reasons and because of the similarities brought out above. And as we will show in the next section, a semantic approach to neg-raising, coupled with the Gajewski-Chierchia theory of strong NPIs, provides just such an option.

9 Semantic Neg-Raising

The semantic approach to neg-raising treats it as arising from an excluded-middle inference of neg-raising predicates. This inference can be derived either as a presupposition (Bartsch 1973, Heim 2000, Gajewski 2005, 2007, Homer 2015) or as a scalar implicature (Romoli 2013).
The idea is that a sentence like *James thinks that Marie will be hired*, schematized as $\textit{think}(p)$, gives rise to the excluded-middle, or opinionatedness, inference (presupposition/implicature) in $\textit{think}(p) \lor \textit{think}(\neg p)$ (which we can paraphrase as ‘James has an opinion as to whether Marie will be hired’). The positive case is not interesting, because the excluded middle is entailed by the assertion. However, when we negate this sentence and assume that the negation is interpreted in situ above the attitude verb, then, assuming this excluded-middle inference projects through negation, from $\neg \textit{think}(p)$ and $\textit{think}(p) \lor \textit{think}(\neg p)$ we can conclude $\textit{think}(\neg p)$. On these views, the excluded-middle inference will project through negation as a default, but can also fail to project, accounting for the availability of non-neg-raising readings (agnostic readings). If we couple this approach with the Gajewski-Chierchia theory of strong NPIs (as Romoli (2013) suggests), this approach predicts that strong NPIs are licensed under most neg-raised predicates, but not under like-verbs, for the reasons we have already shown.9

The semantic approach to neg-raising can be extended to like-verbs, but requires some tweaks. This has to do with the presuppositional nature of like-verbs (we will focus on like, but everything we say here generalizes). Suppose that like licenses an excluded-middle inference of the kind semantic approaches posit for neg-raising predicates. Then, schematically, $\textit{likes}(p)$ will license the inference to $\textit{likes}(p) \lor \textit{likes}(\neg p)$. The problem is that, as noted earlier, likes presupposes the truth of its complement. On standard theories of presupposition projection, (24b) will then presuppose $\neg p \land \neg p$, leading to incoherence.10 In other words, the excluded-middle inference, which is meant to do the heavy lifting in semantic theories of neg-raising, will be incoherent when the predicate in question presupposes its complement.

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8 Recent work (see especially Križ 2015) identifies this kind of inference as one out of many homogeneity effects attached to a wide range of phenomena. Some of that work suggests that the inference is neither a presupposition nor a scalar implicature, but rather some other kind of inference. This question does not have a direct bearing on our main points here; we will assume it is a presupposition, but other assumptions are consistent with our basic points.

9 Note that adding an excluded-middle inference does not block downward-monotonicity properties, since $\neg \textit{think}(p) \land (\textit{think}(p) \lor \textit{think}(\neg p))$ entails $\neg \textit{think}(p \land q) \land (\textit{think}(p \land q) \lor \textit{think}(\neg (p \land q)))$, assuming a standard quantificational semantics for think.

10 There is some controversy about how presuppositions project out of disjunction. On one approach (e.g., Geurts 1999), a disjunction presupposes everything that either disjunct presupposes; then obviously $\textit{likes}(p) \lor \textit{likes}(\neg p)$ will presuppose $\neg p \land \neg p$. On a different approach (e.g., Groenendijk, Stokhof, and Veltman 1996), a disjunction $\neg p \lor q$ presupposes the presuppositions of $p$, together with $\neg p \supset r$, where $r$ is the conjunction of the presuppositions of $q$. On this approach, $\neg \textit{likes}(p) \lor \textit{likes}(\neg p)$ presupposes $\neg p \land (\neg \textit{likes}(p) \supset \neg p)$. Together with the asserted content of $\neg \textit{likes}(p)$, this will again entail $\neg p \land \neg p$. 

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However, there are ways around this problem. One is to assume that the excluded-middle inference of (23) should not be formulated as above, but as in (25).

\[(25) \text{likes}_i(p) \vee \text{dislikes}_i(p)\]

It is easy to see that once we combine \(r^-\text{likes}_i(p)\) with (25), we correctly predict the neg-raising inference \(r^-\text{dislike}_i(p)\), without any problematic incoherent presuppositions. In other words, on its most prominent reading, *Fred doesn’t like that Marie was hired yesterday* will be interpreted like *Fred dislikes that Marie was hired yesterday*.

One challenge for this approach is what to do for verbs that do not lexicalize a negative version—including other factive neg-raisers, like *appreciate*, as well as nonfactive neg-raisers like *want* or *think*. This is a tricky issue; one way to address this challenge, suggested to us by an anonymous reviewer, is the following. To begin with, note that the predicates we focused on above are gradable, as evidenced by contrasts like the following:

\[
(26) \begin{align*}
\text{a.} & \quad \text{John very much likes that Marie was hired.} \\
\text{b.} & \quad \ast \text{John very much thinks that Marie was hired.}
\end{align*}
\]

\[
(27) \begin{align*}
\text{a.} & \quad \text{John appreciates that Sue arrived more than he appreciates that Alan did.} \\
\text{b.} & \quad \ast \text{John thinks that Sue arrived more than he thinks that Alan did.}
\end{align*}
\]

Standard theories of gradable predicates involve predication over degrees; in the positive case, a silent morpheme \(\text{pos}\) binds the degree variable (e.g., von Stechow 1984, 2005, Heim 2000, 2008, Kennedy and McNally 2005). If we go this way, we can associate a homogeneity presupposition with \(\text{pos}\), even when no antonym is lexicalized. In other words, focusing on *like*, let us assume that *like* has a degree semantics as in (28).

\[
(28) \llbracket \text{like} \rrbracket = \lambda d_0, \lambda p, x. [\text{LIKE}(x, p) > d]
\]

A positive sentence like *John likes that Marie was hired* then will have the LF ‘\(\text{pos}[\lambda d[\text{John } d \text{ likes } \text{that Marie was hired}]]\)’. Loosely following von Stechow (1984, 2005), we assume that the scale associated with a gradable predicate \(P\) is divided into three parts: a positive interval \(P^+\), a negative one \(P^-\), and a neutral band \(P^N\). Given these assumptions, what \(\text{pos}\) is saying is that all degrees are above the neutral band of the predicate. We can build on this idea to attach a homogeneity presupposition to \(\text{pos}\)—namely, that all degrees in the neutral band satisfy \(P_{(d,t)}\) or that none do—as follows:

\[
(29) \llbracket \text{pos} \rrbracket = \lambda P_{(d,t)} : \forall d \in P^N[P(d)] \vee \forall d \in P^N[\neg P(d)] . \forall d \in P^N[P(d)]
\]

This would capture the neg-raising effects of verbs such as *like* in the way suggested above: *not like* will say that not all degrees in the neutral range are such that \(x \text{ likes } p\) more than that degree; given the excluded-middle presupposition, it will follow that *no* degrees in the
neutral range have that property, and thus that $x$ dislikes that $p$. Importantly, however, now the presupposition is introduced by POS and is therefore independent from whether a particular verb lexicalizes its antonym. This approach seems promising to us;\(^\text{11}\) note among other things that this approach readily generalizes in principle to the cases with nominal complements exemplified in (13), thereby promising a unified account of classical neg-raising cases and like-verbs, with sentential or nominal complements.

### 10 Conclusion

The Gajewski-Chierchia theory of strong NPI licensing predicts that, while neg-raising predicates will typically license strong NPIs, there will be exceptions to this rule if the negated predicate has implicatures or presuppositions that block downward monotonicity. Like-verbs have exactly this property and, as predicted, do not license strong NPIs. This striking fact provides support for the Gajewski-Chierchia theory and for an accompanying semantic approach to neg-raising.

### References


\(^{11}\) This approach only works for gradable predicates; if we found a non-gradable predicate without a lexicalized antonym, it would stand as a challenge.


