The grammatical representation of expletive negation

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Abstract

Expletive negation refers to constructions where a negator in the complement of certain lexical items does not change the polarity of the complement proposition. Jin & Koenig (2021) show that expletive negation occurs rather widely in languages of the world and in very similar environments. They propose a language production model of why such apparently illogical uses of negation arise in language after language. But their study does not address the grammatical status and representation of expletive negation. In this paper, we argue that expletive negation is part of the lexical knowledge speakers have of their language and that the negator in expletive negation constructions contributes a negation to a non-at-issue content associated with expletive negation triggers. We provide a Lexical Resource Semantics analysis of how triggers combine in a non-standard manner with the standard semantic content of their complements: the negation (and in some cases an additional modal operator) of the content of their complement is part of the trigger's non-at-issue content while the scope of the negation is an argument of the trigger's MAIN content. Finally, we suggest that the expletive use of the French negator *ne* includes a lexical constraint that requires it to modify a verb that reverse selects for an expletive negation trigger.

Sentence (1) illustrates expletive negation, a construction where a negator, *no*, appears in the complement of a verb, but does not seem to correspond to a negation semantically. The speaker's fear in the Catalan example in (1) is that a new director will be elected, not that a new director will *not* be elected. The negator appears redundant or pleonastic, terms that have also been used to describe the use of *no* in (1). We use the term *negator* to refer to the form and reserve the term *negation* for the semantic content of the negator, *argument proposition* to refer to the semantic content of the clause or VP where the expletive negator occurs; we use the expression *expletive negation trigger* or *trigger* for the lexeme or collocation that selects for the argument proposition, *temo* in (1).

(1) Em temo que no escullin nou director.
me.CL am.afraid that NEG elect.SBJV.3PL new director
'I'm afraid that a new director would be elected.' (Espinal, 2000, 54)

The occurrence of expletive negation has been noticed for a long time by Romance grammarians, particularly French grammarians. One of the earliest—if not the earliest—grammarian to mention expletive negation is d'Olivet in the mid 18th century:

> "J'avoue que cette particule prohibitive paroît rédondante en notre Langue."
> *I confess that this prohibitive particle appears redundant in our language.*
> (d'Olivet, 1767, 304)

But, although expletive negation has been noticed for a long time in Romance languages and is most often mentioned in that context, it is by no means confined to Romance languages. Jin & Koenig (2021) and Jin (2021) show that expletive

negation occurs rather widely. In Jin's 1,142 language sample it occurred in 128 languages, on all continents, and in 63 genera. Moreover, as both Jin & Koenig and Jin show, expletive negation is grossly underreported in reference grammars. Out of the 45 languages for which both research papers and reference grammars were consulted, expletive negation was mentioned in research papers but not grammars in 27 languages, suggesting that expletive negation most likely occurs in many more languages in Jin's sample: expletive negation is a relatively widespread phenomenon and certainly not an oddity of Romance languages.

Not only does expletive negation occurs in all areas of the world, the contexts where it occurs are similar: the same operators and predicates recur as triggers in language after language: expletive negation occurs in the argument propositions of semantically similar triggers like BEFORE or FEAR, for example (we use small caps for semantic predicates). Jin & Koenig (2021) show that expletive negation occurs in basically the same environments in the five languages they carefully looked at, Januubi Arabic, English, French, Mandarin, and Zarma-Sorai. The similarity of expletive negation triggers suggests a common conceptual or semantic cause to its occurrence. And this is indeed what Jin & Koenig argue. Simplifying somewhat, they suggest that expletive negation triggers entail a proposition that contains a negation (or strongly contextually imply such a proposition) and that it is this inference (what we label *the negative inference*) that causes the occurrence of a negation. Thus, the predicate denoted by *temo* in (1), FEAR, entails that the speaker wants the event described by the argument proposition not to occur (that a new director would be elected). In somewhat informal terms, there are two distinct propositions associated with (1), **fear'(sp, rain')** and **want'(sp, ¬ rain')**, the former entailing the latter. (2) is a more general informal representation of the inference pattern typical of expletive negation triggers, according to Jin & Koenig. (3) summarizes the terminology we are using throughout this paper.

(2) **fear'(x, p)** $\models_C$ **want'(x, ¬p)**

(3) a. **fear'(x, p)**: at-issue semantic content
    b. **p**: positive (argument) proposition
    c. **¬p**: negative proposition
    d. **want'(x, ¬p)**: non-at-issue negative inference

To explain why expletive negation occurs in similar contexts and in so many languages despite the fact that it is often deemed a performance error in some languages (see Horn 2010), Jin & Koenig (2019, 2021) propose a language production model of the emergence of expletive negation based on Dell (1986). Because triggers entail (in some cases strongly contextually imply) a proposition that contains the dual of the trigger's argument proposition, the negation that is part of this entailment is strongly activated. This strong activation explains that speakers sometimes express a negation: the negation is part of the negative inference, although it is not part of the argument proposition. For example, because **fear'(a, p)** entails **want'(a, ¬p)**, **¬p** becomes activated and sometimes ¬ is lexicalized as a negator (*no* in (1)). As

mentioned, we call the entailment (sometimes, strong contextual implication) that includes the dual of the lexical item's argument proposition the *negative inference*. Jin & Koenig's account thus models the production of expletive negation as the result of a semantic interference between the intended message and an inference (most often an entailment) of the message. This model predicts a general propensity for expletive negation to occur across languages in speech production. Jin & Koenig suggest that differences in how frequently expletive negation occurs in spontaneous speech is a matter of entrenchment variation (Langacker, 1987): languages and triggers may vary as to how routinized the production of expletive negation is.

Jin & Koenig's model leaves open how expletive negation is represented in native speakers' grammars. It could remain a performance phenomenon—no matter how frequent it is—or it could be part of native speakers' competence in some languages, but not others, or for some triggers, but not others. Their model is agnostic on this point. In this paper, we argue that expletive negation should be included in native speakers' grammatical competence and that the negative inference is a non-at-issue content that is part of an alternate lexical entries of expletive negation triggers (see Potts 2005 for the notion of non-at-issue semantic content). We then use Lexical Resource Semantics (Richter & Sailer, 2004) and semantic underspecification to model how this entry interacts with the compositional meaning of the complement of the triggers to ensure the right at-issue and non-at-issue content for the clause headed by the trigger.

We present two arguments to support our claim that the occurrence of expletive negation is part of speakers' representation of triggers, i.e. is part of the grammar of their language. The first is that speakers' propensity to interpret a negator expletively is language and trigger dependent. So, for some triggers and some languages, a negator is very likely to be interpreted expletively, but for other triggers and other languages an expletive interpretation is unlikely. In Jin & Koenig's terms, degree of entrenchment is a language and trigger specific property. A negator's propensity to be interpreted expletively when occurring in the argument proposition is thus part of speakers' knowledge of their language. The second argument we present in favor of the grammatical representation of expletive negation is that whenever an expletive negation occurs in a language that has several negators, the choice of negator is licensed by the negative inference, not the at-issue content. For speakers to choose the appropriate negator, they must therefore represent the negative inference and analyze the negator as an instance of expletive negation. We now detail both arguments.

To establish that expletive negation is not just a performance phenomenon and is part of speakers' representations of triggers, we ran four similar experiments in English, French, Mandarin, and Spanish. An example stimulus set for our English experiment is provided in (4). For reasons of space we do not discuss in detail each experiment and refer the interested reader to Jin (2021) for details about the English, French, and Mandarin experiments and Jin & Koenig 2020 for the English experiment. Stimuli across the three languages were kept maximally similar (after translation from English to French, Mandarin, and Spanish), with a few necessary

adjustments to make sure the stimuli contained culture-specific proper names or to take into consideration slight idiosyncratic differences in particular expletive negation triggers. Participants in each experiment saw a small text followed by a target sentence (in red in (4) for clarity's sake) headed either by an expletive negation trigger or not. Participants had to judge whether the target sentence was consistent with the preceding text. Logical accuracy and decision latencies were recorded. So, participants who saw stimulus (4a) would have to decide whether *So I started not eating meat* is consistent with the preceding three sentences (in this case, the expected answer was *No*).

To ensure an equal expected number of *Yes* and *No* answers, the expected answer was half of the time that the target sentence was inconsistent with the preceding context and half of time consistent with the preceding context, except for the French experiment. In that experiment, expletive negation trigger stimuli were divided in two halves, one half containing *ne* (a dedicated marker of expletive negation, Muller 1991) and the other half containing *ne …pas*, which can but is not very frequently used expletively (Larrivée, 1996). As the number of expletive negation triggers is limited, the addition of a negator form condition in the French experiment (*ne* vs. *ne …pas*) required us to drop the consistency manipulation: all stimuli were logically inconsistent with the preceding context, if the negator (*ne* or *ne …pas*) was interpreted as logical negation.

(4) a. **Non-EN-trigger + logically inconsistent negation**
I used to be a strict vegetarian. Last year, I was diagnosed with iron-deficiency anemia, a disease caused by not eating enough meat. My doctor strongly recommended that I eat meat. So I started not eating meat.

b. **EN-trigger + logically inconsistent negation**
After learning that being vegan can prevent the exploitation of animals and promote a greener life on our planet, I decided to become vegan. So I quit not eating meat.

c. **Non-EN-trigger + logically consistent negation**
After learning that being vegan can prevent the exploitation of animals and promote a greener life on our planet, I decided to become vegan. So I started not eating meat.

d. **EN-trigger + logically consistent negation**
I used to be a strict vegetarian. Last year, I was diagnosed with iron-deficiency anemia, a disease caused by not eating enough meat. My doctor strongly recommended that I eat meat. So I quit not eating meat.

Our experiments followed the semantic interference logic of Glucksberg et al. (1982) according to which people take longer to make a semantic judgement (and might make more errors) when stimuli support two distinct answers. Consider the two stimuli in (4b) and (4d). If the negator *not* in the target sentence of (4b) is interpreted as logical negation, the sentence is inconsistent with what precedes. But if *not* is interpreted expletively, the same continuation is consistent with what precedes. Thus,

depending on how the negator is interpreted (logically or expletively), the appropriate answer is different. The converse is true for (4d). The existence of two distinct potential answers in the case of expletive negation triggers (*Yes* and *No* for both (4b) and (4d) depending on the interpretation of the negator) does not extend, of course, to non-expletive negation triggers such as *started* in (4a) and (4c) where only one interpretation of the negator is possible, and therefore only one answer is appropriate (*No* for (4a) and *Yes* for (4c)). If both possible interpretations of a negator in the scope of an expletive negation trigger are activated in the mind of participants, the two competing answers should lead to a slow down (an increase in decision latencies) and an increase in "errors". We use scare quotes around the word "error", as saying *Yes* in (4b) is only an "error" if we assume a logical interpretation of the negator. The point is that an expletive negation interpretation of the negator should lead to an answer that is the dual of what should be the answer if the negator was interpreted logically and this what we measure in our "error" numbers.

To sum up, we predicted that if a negator is interpreted expletively after an expletive negation trigger, participants should make more logical errors and take longer to decide if the target is consistent with the context, as the ambiguity of the negator (it may express expletive or logical negation) should make it harder for participants to decide whether the target sentence coheres with the preceding context. Table 1 summarizes the results of the experiments for all four languages whereas Table 2 compares the results for French expletive negation trigger stimuli (and corresponding non-expletive negation trigger stimuli) that contained *ne* and *ne …pas*, respectively.

	English		French		Mandarin		Spanish	
	−EN	+EN	−EN	+EN	−EN	+EN	−EN	+EN
% of logical errors	7.35%	22.5%	9.35%	55.6%	9.7%	58.3%	9.5%	27.7%
Decision latency	3930	5673	3944	6143	5163	5949	4334	7155

Table 1: Percentages of logical errors and decision latencies for expletive negation and non-expletive negation triggers in English, French, Mandarin, and Spanish.

	ne		*ne …pas*	
	−EN	+EN	−EN	+EN
% of logical errors	9.49%	82.04%	9.2%	29.05%
Decision latency	4128	5163	3761	7124

Table 2: Percentages of logical errors and decision latencies for expletive negation and non-expletive negation triggers in French when the negator after an expletive negation trigger is *ne* vs. when it is *ne…pas*.

Overall, we found, as predicted, that participants in all four languages made significantly more logical errors and took significantly longer (marginally longer in Mandarin) to decide whether the target sentence was consistent with the preceding context when the target sentence's matrix clause contained an expletive negation trigger than when it did not. We also found an interaction between the $\pm$ expletive negation trigger condition and language: French, Mandarin, and Spanish speakers made significantly

more logical errors than English speakers when the matrix verb, adposition, or adverb was an expletive negation trigger, but not when it was not an expletive negation trigger, which is expected given the different status of expletive negation in the respective languages' reference grammars. We also found an interaction between language and negator form in French. French expletive negation trigger stimuli which included *ne* as negator lead to significantly more logical errors, compared to the corresponding English, Mandarin, and Spanish stimuli. French expletive negation trigger stimuli which included *ne…pas* as negator did not lead to significantly more logical errors than the corresponding English or Spanish stimuli but lead to significantly less logical errors than the corresponding Mandarin stimuli.

Different triggers led to more errors than others: English expletive negation trigger *prevent* led to 40.2% errors across all our participants, whereas English *forget* leads to only 24.5% errors. More importantly for our purposes, which expletive negation triggers led to more or less errors (what we call *expletive negation propensity*) was a language specific property, as shown by the fact that there was no rank order correlation between the orders of triggers by percentage of errors for any pair of languages in the four languages we conducted experiments on (for all pairs of languages, the Kendall rank correlation had $p > .05$). (5)-(9) list the partial order of triggers (all triggers to the right of the scale covered by … did not significantly differ from each other in number of errors participants made; see Jin 2021 for the list of expletive negation triggers used in the English, French, and Mandarin experiments).

(5) English: without > prevent > give up, since > too > deny > beware, forget > fear > stop, before > doubt, …

(6) Mandarin: avoid > doubt > beware, question, stop > give up, prevent > deny > refuse > before, fear …

(7) French *ne …pas*: doubt, too, beware, hide > forbid, forget, deny > give up > stop

(8) French *ne*: without > impossible > almost > before …

(9) Spanish: without > beware > impossible > prevent > before …

Finally, there was a near-high correlation ($r = .66$) between the percentage of logical errors after individual expletive negation triggers and the percentage of expletive negations produced after the corresponding triggers in two Google-based corpus studies in both English and Mandarin (see Jin & Koenig 2021 and Jin 2021 for details about the search patterns and analyses of hits for both the English and Mandarin corpus studies).[1]

[1] A reviewer expressed concerns about our use of Google searches on grounds of replicability, citing Kilgarriff (2007). While there are indeed aspects of Google searches that are not optimal, we detail in the work cited why we chose these corpora. More importantly, the issue of replicability is, we believe, a red herring. Replicability in experimental sciences does not mean other researchers could run the same experiment on the same sample. For experimental psycholinguistics it would mean the same participants, which is both impossible due to anonymity required by regulations and the fact that participants' behavior would be affected by a second run through an experiment. In a biological context (e.g., cell

The results of our experiments and corpus studies suggest that speakers of individual languages store with each expletive negation trigger how likely it is to actually trigger expletive negation: the relative propensity of individual lexemes to trigger an expletive interpretation of a negator is what explains differences in number of errors and response latencies in Tables 1 and 2. Furthermore, the absence of correlation between the ordering of triggers by expletive negation propensity across languages (see the partial lists in (5)-(9)) confirms that expletive negation propensity is a language specific and lexeme specific property that is part of what speakers must know about individual lexemes. We thus suggest that native speakers store with each expletive negation trigger its expletive negation propensity very much like Ford et al. (1982) and Trueswell & Kim (1998) argue that speakers store with each verb its relative preference for one subcategorization frame or another.

The preceding experiments suggest that whether a lexeme is an expletive negation trigger or not as well as its expletive negation propensity is a lexical property that is part of native speakers' grammars. But they do not speak to whether or not the negator contributes a semantic negation or is simply a formative without semantic content. In other words, they do not help us decide whether a negative inference along the lines of (3d) is part of the semantic representation of sentences such as (1). We now turn to the need to include in the lexical description of individual triggers not only their propensity to co-occur with an expletive negation *form*, but also the *semantic* contribution of the expletive negation. Critical evidence supporting this further claim comes from the form of expletive negators in languages that have more than one negator. We discuss Mandarin here, but similar data from Januubi Arabic and Zarma-Sonrai can be found in Jin & Koenig (2021) and Jin (2021). Mandarin has at least three negators, *bù*, *méi*, and *bié* (Li & Thompson, 1981). Simplifying somewhat, *bù* is a neutral negation typically used when the described event is still not completed even later than reference time, whereas *méi* is the negation used when the described event is not completed at reference time. *Bié*, on the other hand, is used in imperatives and negative wishes. What is of particular interest for our purposes is that constraints on the choice of negator do not pertain to the expression of the at-issue content, but to that of the negative inference: properties of the negative inference is what governs the choice of negator. Thus, *bié* is used after predicates expressing **fear'**, as shown in (10) because the negative inference pertains to negative wishes. If the negative inference was not part of the representation of *shēngpà* 'fear', the choice of *bié* would be left unexplained: it is the negative inference that consist of a negative wish that licenses the use of *bié*.[2]

biology), this view of replication is even more impractical, as cells have died prior to the publication of experiments. What replicability means is that other researchers could run the same experiment/corpus study on another random or pseudo-random sample and our corpus studies are indeed replicable in that sense. The same search patterns we used can be applied to another sample of English or Mandarin.

[2]The data from Chinese also supports the claim that it is the negative inference informally represented in (3d) that licenses the expletive negation, as *bié* is only appropriate in the context of imperatives and negative wishes.

(10) xǔduō rén zài wèile xuéyè hé shìyè nǔlì-zhe, shēngpà zìjǐ
many people PROG for study and career work.hard-PROG fear self
bié bèi shìjiè táotài-diào.
IMP.NEG PASS world eliminate-COMPL
'Many people are working hard in their studies and careers for fear that they might be out of step with the world.'

Similarly, the form of the negator for *qián* 'before' differs depending on whether the negation is expletive or logical, as predicted by the rules for choice of negator. Consider (11) and (12). The negation in (11) is expletive, so the sentence means that the export had not started at reference time (this is the negative inference) and the negator must therefore be *méi*. The negation in (12), on the other hand, is logical, so the sentence means that the end of the exports will take place later than reference time and the negation must be *bù*. The Chinese data in (10)-(12) supports the claim that expletive negation must be part of the representation of individual triggers, as the meaning that is relevant for the selection of negator (e.g., *bié* in (10)) depends on the specific negative inference triggered by the matrix verb. *Shēngpà* 'fear'—not *qián* 'before'—entails a negative inference that is a negative wish that provides the appropriate context for the use of *bié*. Conversely, only for the complement clause of *qián* 'before'—not that of *shēngpà* 'fear'—does the issue of when the described event does not hold makes sense.

(11) (Context: Since we started exporting our products to the US last year, our profits have quadrupled)

qíshí, hái **méi** chūkǒu qián wǒmen jiù néng yùjiàn zhège
in.fact still PRF.NEG export before we already can predict this
jiéguǒ le.
result PFV

'In fact, we could already predict this result before we exported.' (Not exporting is true at reference time = past of argument proposition of *before*)

(12) (Context: Since we stopped exporting our products to the US because of the trade war, our profits have plummeted greatly)

qíshí, **bù** chūkǒu qián wǒmen jiù néng yùjiàn zhège jiéguǒ
in.fact IPFV.NEG export before we already can predict this result
le.
PFV

'In fact, we could already predict this result before we stopped exporting.' (Not exporting is what will happen in future of reference time)

The data we just presented (and similar data from other languages) argues in favor of the view that negative inferences must be part of the semantic representation of sentences containing expletive negations. Taken together with the results of

our four experiments, it supports the hypothesis that expletive negation is part of the knowledge speakers have of individual triggers and contributes a negation to the semantic representation of clauses headed by triggers. In the rest of this paper, we show how semantic underspecification (in particular, Lexical Resource Semantics Richter & Sailer 2004; henceforth LRS) and structured meaning approaches (von Stechow 1991 and, more relevantly Potts 2005) make it relatively easy to state the constraints on the lexical description of triggers so that the negation contributed by expletive negations is not part of the argument proposition, but of the negative inference.

There are many possible ways of implementing the basic ideas we discuss below within LRS and, at this point, it is both unclear which one would fit best within the spirit of LRS and whether there is empirical data to choose between these implementations. We therefore outline the leading ideas and one possible implementation and simply allude to other options. Our analysis relies on several assumptions we explicate below. First, we treat the negative inference as a non-at-issue content, following Potts (2005) (see Hasegawa & Koenig 2011 and Sailer & Am-David 2016 for some previous work in Lexical Resource Semantics that tackles non-at-issue content). Such an assumption is required to avoid incoherence: the speaker of (1) cannot both fear that a new director will be elected and that a new director will not be elected. By separating at-issue content, what the speaker fears, and non-at-issue content (what (s)he wishes were not the case), we eschew ascribing incoherence to the speaker.

The second assumption we make is that semantic composition within the argument proposition proceeds as expected. So, the meaning of the complement clause *que no escullin nou director* 'that they would not elect a new director' in (1) is the same as it would be were it the complement of a non-expletive negation trigger. Our main motivation for this second assumption is that since the semantic oddity of expletive negation lies in the trigger itself, we can minimize changes to standard semantic composition by restricting those changes to the trigger and respect assumptions of locality and context-freeness of semantic composition within the trigger's complement: semantic composition within the complement does not have to "know" the complement's meaning serves as an argument of an expletive negation trigger.

Our third assumption is that expletive negation triggers come in two forms, one where they behave as expletive negation triggers and the second where they do not. This assumption is motivated by the fact that expletive negation is never required in the languages we focus on in this paper (although it is in some environments and in some languages as Jin 2021 discusses). So, we need to allow for so-called expletive negation triggers not to trigger expletive negation in some case and take argument propositions that contain a *logical* negation. In other words, a negation in the complement of a trigger is no necessarily expletive. Given the lexicalist stance of HPSG, this means that there are two variants of the lexeme for *temo* 'I fear' in Catalan, one that takes an expletive negation and the other that does not. Our lexical treatment of the alternation between expletive and non-expletive uses of triggers is corroborated by the lexical nature of the frequency with which expletive negation is produced in our English and Mandarin corpus studies or the frequency of expletive negation interpretation of negators occurring in the complement of triggers in our four exper-

iments. Different verbs have different preferences for expletive negation uses and these preferences are both language and lexeme specific. The upshot of our two lexeme variants assumption is that we need to distinguish *the class of expletive negation triggers*, i.e. the set of verbs that license the occurrence of an expletive negation in their complement, and *expletive negation uses of these triggers* in sentences where an expletive negation actually occurs.

To model the alternation between expletive negation and non-expletive negation uses of triggers as well as the difference between non-triggers and triggers (only the latter can have expletive negation uses and are subject to the special semantic composition rule we detail below), we propose that expletive negation triggers have a non-atomic lexical identifier (LID) value, as shown in (13), where the sort *en-trigger* is a property of expletive negation triggers and the EN feature specifies whether a particular occurrence of a trigger includes an expletive negation or not. In other words, $\left[\text{EN } -\right]$ means that the complement of a trigger does not include an expletive negation whereas $\left[\text{EN } +\right]$ does. Triggers in all languages we discuss in this paper are unspecified for the EN feature.

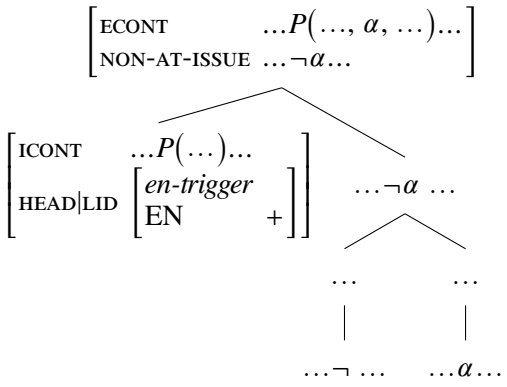
(13) $\begin{bmatrix} \textit{en-trigger} \\ \text{EN } \textit{boolean} \end{bmatrix}$

As mentioned, we assume that semantic composition proceeds as usual within the argument proposition and that there is a special composition rule for the combination of a trigger and its complement. The leading idea of this special composition rule is given in (14), where $\neg\alpha$ is (the relevant part of) the external semantic content of the complement.

(14) When composing $\ldots\neg\alpha\ldots$ with a trigger, α is the argument proposition of the trigger's MAIN content and $\neg\alpha$ is part of a non-at-issue proposition.

The effect of this special composition rule is provided in (15), where *P* stands for the predicate or operator denoted by the trigger. Intuitively speaking, the entry for triggers that are used expletively takes apart the content of their complement, with the negation becoming part of a non-at-issue content and the scope of the negation being the argument of the predicate denoted by the trigger (the value of MAIN).

(15)



The sort for expletive negation tiggers *qua* triggers is provided in (16).

(16)
$$\begin{bmatrix} \textit{EN-trigger-lxm} & \\ \textsc{head|lid} & \begin{bmatrix} \textit{en-trigger} \\ \textsc{en} \quad + \end{bmatrix} \\ \textsc{synsem|local|cat|arg-st} & \langle \ldots, \begin{bmatrix} \textsc{econt} & \neg\alpha \end{bmatrix}, \ldots \rangle \\ \textsc{cont|main} & P \\ \textsc{sem} & \begin{bmatrix} \textsc{icont} & \beta \\ \textsc{ni-cont} & \langle \ldots, \gamma, \ldots \rangle \end{bmatrix} \end{bmatrix}$$
$$P(\ldots, \alpha, \ldots) \lhd \beta, \neg\alpha \lhd \gamma$$

The + value of the EN feature means that the lexeme is used expletively. The entry says that the external content of one of the syntactic arguments of the lexeme much be of the form $\neg\alpha$. The constraints below the AVM ensure that only α (not the negation) is the argument of the predicate *P* denoted by the lexeme and that $\neg\alpha$ is part of the non-at-issue content γ. The entry in (16) ensures that although the negation is part of the external content of the complement, it is not part of the at-issue semantic content of the sentence headed by the trigger, but is part of its non-at-issue content.

Note that the lexeme description in (16) violates the feature geometry argued for in Sailer (2004) who splits the content of an expression—which is part of the value of the SYNSEM attribute—and its semantics, the value of an additional SEM attribute—which is not part of the value of SYNSEM, as shown in (17) (we follow more recent terminology, see Iordăchioaia & Richter 2015, and use the feature name SEM rather than LOGICAL-FORM that Sailer used).

(17)
$$\begin{bmatrix} \textsc{synsem} & \begin{bmatrix} \textsc{local} & \begin{bmatrix} \textsc{content} & \textit{content} \end{bmatrix} \end{bmatrix} \\ \textsc{sem} & \begin{bmatrix} \textit{lrs} & \\ \textsc{ext-cont} & \textit{me} \\ \textsc{int-cont} & \textit{me} \\ \textsc{parts} & \textit{list}(\textsc{me}) \end{bmatrix} \end{bmatrix}$$

The feature geometry represented in (17) does not make the external content of the complement "visible" to the trigger lexeme, as it is not part of the SYNSEM of that complement. While the lexical treatment of the special composition rule associated with expletive negation triggers seems warranted, it is not the only possibility. An alternative approach to the revised feature geometry we assume in (16) would be to add a clause to the Semantics Principle of LRS that would target phrases headed by an expletive negation trigger. While we do not know of major obstacles to this alternative approach to composing the meaning of triggers with that of their complements, the lexical treatment we provide is somewhat simpler, as there are several different kinds of negative inferences for different classes of triggers, as we show below, and any additional clause of the Semantics Principle would have to distinguish between these various lexical subclasses, i.e. to replicate that lexical classification.

Jin & Koenig (2021) show that different negative inferences are associated with different classes of triggers. From a semantic composition perspective, we need to distinguish at least three broad classes of negative inferences. For one class of triggers, the negative inference is simply $\neg\alpha$ in (16). For another class of triggers $\neg\alpha$ is a

proper subpart of the negative inference and the part that is distinct from $\neg\alpha$ is part of the meaning of the complement. Finally, for yet another class of triggers $\neg\alpha$ is a proper subpart of the negative inference, but the part that is distinct from $\neg\alpha$ is not part of the meaning of the complement; it is contributed by the trigger itself. We consider each case below.

For many triggers the negative inference *is* the negative proposition $\neg p$. For those triggers, the non-at-issue content is simply the negation of the trigger's argument proposition. *Before* in English and other languages is such a trigger. (18) represents the relevant information of the + and − EN variants of *before*. Critically, these two variants differ on the value of the attribute EN, which encodes whether *before* occurs in an expletive negation context or not and whether the argument of **before'** is part of a negated non-at-issue content ($\neg\alpha$) or not. (We ignore representation of reference time for ease of exposition.)

(18)
$$\left[\begin{array}{ll} \textit{before1} & \\ \textsc{head}|\textsc{lid} & \left[\begin{array}{ll}\textit{en-trigger} & \\ \textsc{en} & -\end{array}\right] \\ \textsc{sem} & \left[\textsc{icont}\ \ldots\textsf{before'}(\alpha)\ldots\right]\end{array}\right]\left[\begin{array}{ll} \textit{before2} & \\ \textsc{head}|\textsc{lid} & \left[\begin{array}{ll}\textit{en-trigger} & \\ \textsc{en} & +\end{array}\right] \\ \textsc{sem} & \left[\begin{array}{ll}\textsc{icont} & \ldots\textsf{before'}(\boxed{1}\alpha)\ldots \\ \textsc{ni-cont} & \langle\ldots, \neg\boxed{1}, \ldots\rangle\end{array}\right]\end{array}\right]$$

For other triggers the negative inference properly includes the negative proposition. If we informally represent the negative inference as $Op(\ldots\ \neg p\ \ldots)$, two options are possible. For one subclass to which *fear* and its corresponding lexical items in other languages belong (lit 'not-want'), *Op* remains unexpressed (even if it matters for the choice of negator, as we saw in the case of Mandarin). Thus, the main predicate of the trigger's complement is a proper part of the positive proposition, but **want'** is not. The + and − EN variants of *fear* are provided in (19).

(19)
$$\left[\begin{array}{ll} \textit{fear1} & \\ \textsc{head}|\textsc{lid} & \left[\begin{array}{ll}\textit{en-trigger} & \\ \textsc{en} & -\end{array}\right] \\ \textsc{sem} & \left[\textsc{icont}\ \ldots\textsf{fear'}(\textsf{a},\alpha)\ldots\right]\end{array}\right]\left[\begin{array}{ll} \textit{fear2} & \\ \textsc{head}|\textsc{lid} & \left[\begin{array}{ll}\textit{en-trigger} & \\ \textsc{en} & +\end{array}\right] \\ \textsc{sem} & \left[\begin{array}{ll}\textsc{icont} & \ldots\textsf{fear'}(\boxed{2},\boxed{1}\alpha)\ldots \\ \textsc{ni-cont} & \langle\ldots,\textsf{want'}(\boxed{2},\neg\boxed{1}),\ldots\rangle \\ \textsc{parts} & \langle\ldots\neg,\ \boxed{1},\ \neg\boxed{1},\textsf{want'},\ldots\rangle\end{array}\right]\end{array}\right]$$

Finally, for some triggers, the part of the negative inference that is not the negative proposition (*Op*) *is* expressed within the complement. Consider sentence (20). Jin & Koenig (2021) analyze the negative inference for this verb and other verbs in the same semantic class as conveying that the argument proposition α violates the attitude holder's behavioral standards: α is not the case in all possible worlds consistent with the attitude holder's behavioral standards (*bs*) (it shouldn't have happened) (we assume an analysis of attitude verbs along the lines of Heim 1992).

(20) I always thought he was the one for me and at this point of time I really regret that I shouldn't have gone for him.
(Retrieved from: `https://www.quora.com/What-is-the-craziest-thing-youve-done-for-love-and-do-you-re`

gret-it-even-if-it-didnt-work-out, accessed 20 October 2019)

Interestingly, in all five languages we looked in detail at (Arabic, English, French, Mandarin, and Zarma-Sonrai, although the situation is more complex in the case of French), verbs that denote **regret'** or similar predicates can only co-occur with an expletive negation when their complement includes a modal verb or adverb that expresses the strong deontic modality which Jin & Koenig (2019, 2021) suggest are part of the negative inference. In (20), for example, the deontic operator denoted by *shouldn't* is not part of what the speaker regrets, as the overall context for (20) makes clear: what the speaker regrets is having gone for her boyfriend of four years. Thus, in this example, the part of the negative inference that is not part of $\neg\alpha$, namely the deontic operator ($\Box_{bs}$) is expressed within the complement clause, in fact it is the main predicate of the EN trigger's complement. This means that the deontic operator included in the complement's external content, just like the negation, does not contribute to the at-issue content of the clause headed by the trigger. It only contributes to the non-at-issue negative inference associated with the trigger.

The expletive negation variant of *regret* is provided in (21). The verb's complement includes both the negation and the modality operator as per our assumption that semantic composition within the complement proceeds ordinarily. The external content of *I shouldn't have gone for him* in (20) includes both the negation and the modal necessity operator and takes the form $\Box_{bs}\neg\boxed{1}$ in (21). But, the modal operator and the negation both become part of the non-at-issue content of *regret* and only the negation's argument ($\boxed{1}$) is included in the internal content of the verb.

(21)
$$\begin{bmatrix} \textit{regret2} & \\ \textsc{head}|\textsc{lid} & \begin{bmatrix} \textit{en-trigger} & \\ \textsc{en} & + \end{bmatrix} \\ \textsc{sem} & \begin{bmatrix} \textsc{icont} & \ldots\textsf{regret'}(\textsf{a}, \boxed{1})\ldots \\ \textsc{ni-cont} & \langle \ldots, \Box_{bs}\neg\boxed{1}, \ldots \rangle \end{bmatrix} \\ \textsc{arg-st} & \langle \textsc{np}, [\textsc{sem}\ [\textsc{econt}\ \Box_{bs}\neg\boxed{1}]] \rangle \end{bmatrix}$$

Jin (2021) mentions that examples of expletive negation uses of *complain* in English behave like *regret* in including the deontic operator (as well as the expletive negation) in the complement clauses. Interestingly, the complement clause of *pà* 'fear' in Mandarin can include another negator than *bié*, namely *bú-yào* (lit. 'not-want'), as shown in (22). We analyze such examples like we did *regret*: the predicate **want'** is part of the external content of the complement clause, but is constrained to become part of the trigger's non-at-issue content similarly to what happens with the entry for *regret* in (21).

(22) wǒ dàoshì bú-yàojǐn, pà nǐ bú-yào bèi wǒ liánlèi.
I though NEG-it.matters fear you NEG-want PASS I get.involved
'It doesn't matter to me. I'm just afraid that I might get you involved (in my thing).'

(From an online novel; retrieved from: http://www.zhuzhudao.org/book/55976/24090305.html)

The previous discussion has outlined how semantic composition works for three major classes of triggers identified by Jin & Koenig, those where the negative inference is the negation of the trigger's argument proposition, those where the negative inference includes additional material contributed by the trigger that remains unexpressed (some kind of operator incorporation—to extend the use of the notion of lexical semantic incorporation discussed in Jackendoff 1990), and finally those where the negative inference also includes additional material contributed by the trigger but that additional material is expressed within the complement. Critical to our analysis of all three cases is the assumption that the external content of the trigger's complement is picked apart and some of it becomes part of the trigger's at-issue internal content and some part of the trigger's non-at-issue content. This is what the semantic composition rule specific to expletive negation-trigger included in the sort in (16) ensures.

We now turn to a rather unique case, that of French *ne* and show how our analysis easily extends to that unusual case. Although French is typically cited when discussing expletive negation, it is unique. First, French uses two negators expletively. One is the modern French negation *(ne) …pas* (we put parenthesis around *ne* as it is not required, in fact rarely if ever present in colloquial spoken French, see Abeillé & Godard 2021, Chapter 10): *(ne) …pas* can be used expletively as argued for by Larrivée (1996) and confirmed by our experiment. The other is the old French negator *ne*. What is unique and, to our knowledge, unattested outside of French is that *ne* when it appears on its own in the complement of triggers is dedicated to marking expletive negation (see Muller 1991 for some other uses of *ne* in modern French outside of the scope of expletive negation triggers). The fact that French has a negator mostly dedicated to marking expletive negation explains that expletive negation has been noticed and discussed by French grammarians since the middle of the 18th century.

(23) J'ai peur qu'il ne pleuve.
I have fear that it NEG rain.SBJV
'I fear that it will rain.'

Other than the fact that *ne* is a dedicated marker of expletive negation when occurring on its own within the complement of expletive negation triggers, French *ne* behaves just like negators in other languages we looked at both in terms of the triggers that license its occurrence or the modal expressions sometimes required for its occurrence (see Jin & Koenig 2021 and its Appendix for details). We therefore propose to locate the idiosyncrasy of French *ne* in the lexical properties of the negator itself. To capture the fact that this use of *ne* must co-occur with an expletive negation trigger (and the negation it contributes must thus be part of a non-at-issue content associated with the trigger), we employ the REV-SEL feature which has been used (sometimes under different names) whenever an expression is restricted to occur as dependent of a particular class of signs (see Bonami 2015 for its use to model periphrasis and

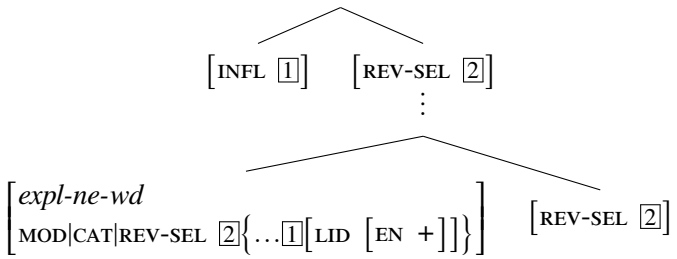
Aguila-Multner & Crysmann 2020 for its use to model causatives in French). In other words, we propose that *ne* is lexically specified as modifying a verb that reverse selects for an expletive negation trigger (an expression whose LID contains the information [EN +]). Since REV-SEL is a head feature, modifying a verb that reverse selects for an expletive negation trigger means that the complement clause itself reverse selects for an expletive negation trigger.[3]

The simplified entry in (24) provides the relevant part of the lexical entry for expletive *ne*. We assume this use of *ne* is a specific lexeme (hence its *expl-ne* LID). Critically, it is lexically specified to modify a verb that reverse selects a trigger that occurs in an expletive negative context (i.e., that is [EN +]). As the REV-SELECT feature is a head feature, the clause headed by the verb expletive *ne* modifies itself reverse selects for a [EN +] trigger. The Reverse Selection Principle proposed in Bonami (2015, 107) and provided in (25) ensures that the complement co-occurs with a word that includes [LID [EN +]] in its inflectional feature set. An informal representation of how the lexical specification of a REV-SEL feature in the entry for expletive *ne* in (24) ensures it occurs as part of the complement of a trigger that is used expletively is provided in (26).

(24)
$$\begin{bmatrix} \textit{expl-ne-wd} \\ \textsc{cat} & \begin{bmatrix} \textsc{head} & \begin{bmatrix} \textsc{lid} & \textit{expl-ne} \end{bmatrix} \\ \textsc{mod} & \begin{bmatrix} \ldots|\textsc{rev-select} & \left\{ \ldots, \begin{bmatrix} \textsc{lid} & \begin{bmatrix} \textit{en-trigger} \\ \text{EN} + \end{bmatrix} \end{bmatrix}, \ldots \right\} \end{bmatrix} \end{bmatrix} \\ \textsc{content} & \begin{bmatrix} \textsc{main} & \neg \end{bmatrix} \end{bmatrix}$$

(25) "*Reverse Selection Principle*:
If a word *w* carries a reverse selection requirement *s* in its REV-SEL, then *s* must be token-identical to the INFL value of a word *w′* selecting for a projection of *w*." (Bonami, 2015, 107)

(26)



Nothing else needs to be said about French expletive *ne*, since aside from its restricted context of occurrence (and its consequent overwhelming expletive inter-

[3]Berthold Crysmann (p.c.) points out that many scholars assume *ne* to be an affix. Under such an analysis, the presence of the REV-SELECT feature on the complement clause's main verb would be the result of a lexical rule that introduces the negative meaning together with the relevant morphosyntactic features on the complement clause's verbal head. Nothing substantial depends on the choice of a morphological or syntactic analysis of French expletive *ne*.

pretation by participants in our experiments), expletive uses of French *ne* are just like expletive uses of English *not*.

Jin & Koenig (2021) have shown that expletive negation occurs rather widely in languages of the world and in very similar environments. They propose that a negative inference from, typically, the lexical meaning of a verb, preposition, or adposition/adverb acts as the licensor of expletive negation. In this paper, we examined whether and how negative inferences—and, more generally, expletive negation—is represented in the grammar of natural languages. We first provided two pieces of evidence that expletive negation is part of the lexical representation of triggers in individual languages and that it is treated as a true negator, not some semantically vacuous formative. The results of four experiments in English, French, Mandarin, and Spanish showed that native speakers of these languages differ in how likely they are to interpret expletively a negator in the complement of a trigger and that different triggers lead to different likelihood of being interpreted expletively. Both facts suggest that speakers of individual languages associate with each trigger something like the frequency of an expletive interpretation of negators occurring in the complement, just as they associate with verbs the relative frequency of individual syntactic frames. The data on the choice of negators in languages like Mandarin also shows that expletive negation must be treated as a negation, as properties of the negative inference (which contains a negation operator) motivate the form of the expletive negation.

In the second part of this paper, we have outlined an analysis of expletive negation within HPSG using Lexical Resource Semantics. We proposed an expletive negation trigger specific composition rule whereby only the argument of the negation included in the external content of the trigger's complement becomes the argument of the trigger's MAIN content and the negation becomes part of the non-at-issue negative inference associated with each trigger. We discussed three classes of triggers that differ in both the nature of the negative inference and whether material that is only part of the negative inference (aside from the negation) appears in the complement or not. Finally, we provided an analysis of French expletive *ne* whereby it reverse selects (through modification of the complement's main verb) for an expletive negation trigger, thus explaining its dedicated use to mark expletive negation when occurring on its own in the complement of triggers.

Stepping back from the particulars of our analysis, we offer a couple of concluding remarks. First, it is worth pointing out that the semantic rule we propose for composing the meaning of triggers and the meaning of their complements depends on the descriptive stance of Lexical Resource Semantics—i.e., the idea that semantic constraints are descriptions of formulas rather than formulas (an idea shared by most if not all approaches to semantic underspecification). A descriptive stance is critical here because our analysis requires "shipping" the negation that is part of the complement's content to the non-at-issue content of the trigger and having the rest of the (external) content of the complement become the argument of the predicate denoted by the trigger: the entry for triggers must therefore be able to make reference to parts of formulas. The same is true for the part of the negative inference which is included

in the complement but is not part of the at-issue content, such as *shouldn't* in (20).

Second, despite its success in modeling expletive negation, our analysis leaves several questions unanswered that the data we have at our disposal do not allow us to answer. We only mention one in closing for reasons of space. Manfred Sailer (p.c.) asked why we do not include the negative inference in the external content of expletive negation triggers (and the clause they head) along the lines of the analysis of definite descriptions proposed in Sailer & Am-David (2016). If we were to follow Sailer & Am-David's proposal, the external content of clauses headed by expletive negation triggers would be of the form informally represented in (27) where **Neg_inf** stands for the negative inference and **At_issue** is the at-issue content of triggers (and the clause they head).

(27) **Neg_inf** ∧ **At_issue**

We know of no issue with such an approach as long as **Neg_inf** does not interact with scopal operators within the at-issue content, which seems straightforward to achieve given the principles for retrieval of non-at-issue content proposed in Sailer & Am-David. Such an extension of the analysis we propose would have the added benefit to make it easier to maintain the relation between semantic parts and external content according to which "every element of the utterance's PARTS list is a subexpression of the EXCONT value" (Richter & Kallmeyer, 2009, 47). We did not include a constraint within entries for expletive negation triggers that the external content of trigger is of the form in (27), as whether this is the way to go depends on how to model non-at-issue content within LRS. To cite but one of the issues that would have to be resolved and that we do not wish to take a stand on, Sailer & Am-David conjoin conventional implicatures with at-issue content rather than assume with Potts (1975) (and Karttunen & Peters 1979) that conventional implicatures are part of another dimension of meaning. Additionally, the exact status of negative inferences—aside from their being non-at-issue—is unclear to us. In most cases, negative inferences are entailments due to the meaning of triggers and thus do not behave like traditional conventional implicatures. More importantly, since **At_issue** in (27) entails in most cases **Neg_inf**, we are not sure what the point of the conjunction would be, aside from maintaining the current understanding of the External Content Principle. Until questions we just raise are answered, we think it better to not commit to how–if at all—the at-issue and non-at-issue content of expletive triggers combine.

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