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### **Title**

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### **Permalink**

<https://escholarship.org/uc/item/7x53x7x2>

### **Journal**

Proceedings of the Annual Meeting of the Cognitive Science Society, 42(0)

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### **Publication Date**

2020

Peer reviewed

# English Speakers Produce and Understand Expletive Negation

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## Abstract

Romance languages are well known for their use of expletive negation (henceforth, EN), i.e., the occurrence of a negator in the complement clause of certain verbs, adpositions or adverbs that is “illogically” not part of the meaning of the sentence. This study explores the hypothesis that such “illogism” that recurs across languages must be due to universal properties of the message to be encoded and the language production system. Jin & Koenig (2019) proposed a language production model to account for the striking similarity of EN-triggers between two unrelated languages (French and Mandarin). Their model makes several predictions which our paper tests: (i) languages like English where EN is purported not to occur should in fact include the same range of EN-triggers; (ii) English speakers can understand a negator within the scope of an EN-trigger expletively; (iii) the likelihood a speaker of English will understand a negator expletively is correlated with how frequently she has encountered an expletive interpretation of negators for that particular trigger. To test the first prediction, we conducted a corpus study of unrehearsed English speech on Google. To test the second prediction, we conducted a semantic Stroop-like comprehension experiment where participants’ semantic judgements (both logical accuracy and response time) was dependent on whether a negator was interpreted logically or expletively. Overall, this paper suggests that EN is by no means specific to Romance languages and that expletive uses of negators occur in the same contexts in both production and comprehension in languages where EN is not conventionalized to the same degree it is in Romance. Overall, our results support the claim that “illogical” properties of natural languages that recur across languages of the world reflect universal properties of the language production system.

**Keywords:** expletive negation; language production; speech error; language comprehension; semantics

## Introduction

Sometimes natural languages seem illogical. Consider expletive negation (henceforth, EN) in Romance languages (e.g., Del Prete, 2008; Espinal, 1992; Muller, 1991; Vázquez Molina, 2006), a construction where the presence of a negator in a complement clause, triggered by the meaning of predicate or operator in the main clause, does not change the meaning of the proposition that contains it. EN differs from negative concord in that negative concord is not triggered by particular lexical items (e.g., verbs) and involves two morphological or syntactic negators but a single logical negation. EN is illustrated in (1a-b).

(1a) Catalan (Espinal, 2000: 54)

*Em temo que no escullin nou director.*  
me I.fear that NEG elect.SBJV new director  
'I'm afraid that a new director would be elected.'

(1b) French

*Je crains qu'il ne vienne.*  
I fear that.he NEG come.SBJV  
'I fear that he might come.'

Note: French is unique among the more than 700 languages Jin & Koenig (in press) have looked at in that the form of one of the expletive negators, *ne*, is, as a result of historical changes, distinct from the form of modern standard French negation, (*ne*)... *pas*. Importantly, all of the properties of *ne* are not specific to French, as Jin & Koenig (2019, in press) show, and standard modern French negation (*ne*)...*pas* can also be used expletively, as Larrivée (1996) shows.

Although the negator *no* appears in the complement clause of *temo* (“I fear”), what is feared by the speaker is the proposition that *a new director is elected* rather than its dual *a new director is not elected* as would be expected if *no* had its usual logical negation interpretation. A speaker of (1a) (or (1b)) thus seems to be literally saying the opposite of what she is saying. Crucially, this “illogism” only occurs in the complement clause of certain verbs, adpositions or adverbs. If we replace *craindre* in (1b) by *espérer* (“to hope”) in (2), the presence of *ne* is no longer possible (the same is true in Catalan), which suggests that the licensing of EN *ne* in French depends on the meaning of particular lexical items, what we call EN-triggers. *Craindre* is an EN-trigger in French, *espérer* is not.

(2) French

*\*J'espère qu'il ne viendra.*  
I.hope that.he NEG come.FUT  
'Intended: I hope that he might come.'

Crucially, EN occurs in many unrelated languages and in very similar contexts (i.e., after similar triggers), as Jin and Koenig (in press) show. Jin & Koenig investigated 722 languages and found EN to occur in 74 of these languages. The fact that the “illogism” of EN occurs in many unrelated languages and in similar contexts suggest that EN must be due to some general properties of the language production system and properties of EN-triggers. Speakers of unrelated

languages are unlikely to randomly mean the opposite of what they are literally saying in the same set of environments. In this paper, we explore the hypothesis that EN is the by-product of general properties of language production and the meaning of EN-triggers and test two of its predictions. The first prediction is that EN should be observed in languages not widely reported to have EN, since its occurrence is caused by properties of language production and particular concepts, neither of which are specific to particular languages. The second prediction is that EN should occur in very similar sets of environments, i.e., after a very similar set of triggers. We test both predictions through a corpus study (production) and a semantic judgement study (comprehension) using English as a test case as comprehensive reference grammars of English do not mention EN (e.g., Huddleston, Huddleston & Pullum 2002; Quirk, Greenbaum, Leech & Svartvik 1985).

### Compiling a list of EN triggers

Jin & Koenig (2019) conducted a near-exhaustive investigation of EN in Mandarin and compared the list of Mandarin EN triggers they found to the list of French EN-triggers reported in the literature (e.g., Larrivé, 2004; Muller, 1991). They found a striking similarity in the range of EN-triggers between these two unrelated languages. Their comparison led them to find quite a few hitherto unreported triggers in both languages by assuming that a particular trigger reported in one language but not the other also has the potential to trigger EN in the other language. Furthermore, the triggers Jin & Koenig (in press) found in their cross-linguistic study of 722 languages all had correspondents in the list of EN-triggers mentioned in Jin & Koenig (2019).

Jin & Koenig (2019) also provided 8 attested examples of English EN (see (3a-c)). These examples include some of the same EN-triggers found in French and Mandarin. But they differ from their French or Mandarin counterparts in that they sound either non-standard or like speech errors to native speakers. Their observation is not surprising as Horn (2010: 125-127) already suggested that EN “occurs in English parole” (i.e., not in the English *language*) and that there seems to be a parallel between some of the contexts that license EN in French and where one finds EN in English parole.

(3a) Then the worst happened. He **forgot not** to pick up after placing a pizza order, and there, on the other end of the line, was the whisky voice of the sister, H, down in Palo Alto. (COCA, cited from Jin & Koenig 2019: 179)

(3b) This facilitated my work more **than** you will **never** know. (Cited from Jin & Koenig 2019: 180)

(3c) Then at the end of the night we found out that we didn't play Karma and that felt so weird. It has been such a long time **since** we **didn't** play that song. (Cited from Jin & Koenig 2019: 180)

## A production model of EN

To account for the striking similarity in the range of EN-triggers between French and Mandarin as well as the fact that EN also occurs in English but manifests itself as speech errors, Jin & Koenig (2019, in press) proposed a language production model of EN that has three components: (i) the semantic entailments of EN-triggers, (ii) the concurrent activation of the proposition expressed by the trigger's complement clause *p* and its dual *not p*, (iii) different degrees of entrenchment/grammaticalization of EN across triggers and languages (see Langacker 1987 for the notion of relative entrenchment in natural languages' grammars). Jin & Koenig argued that EN triggers lead to the concurrent activation of a proposition (*p*) and its dual (*not p*) (in different possible worlds or at different time intervals) because of the meaning of EN-triggers. For example, if someone fears *p*, she wants *not p* to be the case (see Jin & Koenig 2019 and in press for a semantic analysis of all EN triggers). This is why when trying to express her fear that *p*, the conceptualization that a speaker does not want *p* to be true might be concurrently activated. That concurrent activation of *not p* is, according to Jin & Koenig, what causes the production of a negator that is not part of the intended message, i.e., the speaker's fear in (1a-b) (see Dell 1986 for the view that inferences associated with one's intended message can lead to speech errors). In other words, the fact that *fear p* entails *want not p* causes the activation of *not p*, which in turn causes the erroneous production of *not p* rather than the intended *p*. Since *not p* is not part of the intended message, it is a speech error. But, because the activation of *not p* is caused by the meaning of EN triggers, these speech errors are more likely to recur than other kinds of speech errors. This is why, although EN starts out as a speech error (e.g., the encoding of the entailed negative desire rather than the intended positive fear), it can become highly entrenched (or grammaticalized) after some triggers so that speakers no longer notice the “illogical” nature of the negator (that the speaker does not fear his *not* coming, but rather his coming in (1b)). There is therefore nothing special about EN in French/Romance languages (or Mandarin) and there is nothing surprising about the fact that EN occurs in English parole. What differentiates the two classes of languages (high vs. low entrenchment EN languages) lies in the degree to which EN uses have become entrenched.

### Predictions from Jin & Koenig's model

Jin & Koenig's model views EN as caused by the meaning of triggers and general properties of language production. As a result, it makes several predictions:

(i) The same range of EN-triggers they found in French and Mandarin should trigger EN in other languages including those where EN is believed not to exist (or manifests itself as speech errors), e.g., English;

(ii) Speakers of languages where EN is believed not to exist (or manifests itself as speech errors) not only produce EN with some frequency but can understand a negator in the scope of an EN-trigger expletively because EN-triggers

activate both *p* and *not p* when they read a sentence that includes an EN trigger;

(iii) The more frequent a negator is used expletively in the scope of an EN-trigger within a particular language, the more likely a speaker is to interpret expletively a new occurrence of that negator for that trigger.

To test the first hypothesis, we conducted a detailed corpus study of unrehearsed English speech. This is the first attempt in the literature to systematically explore EN production in a language not often reported to include EN. Both Horn’s paper and Jin & Koenig (2019) listed a few English EN examples and claimed (or suggested in the case of Horn) that the same range of EN-triggers should trigger EN in languages like French or English. The goal of our first study was to test this

prediction that *every* trigger proposed in Jin & Koenig’s study of French and Mandarin can trigger EN in English. A second goal of this corpus study was to establish how frequently negators are interpreted expletively (rather than logically) after each trigger in English.

To test the second prediction, we conducted a comprehension experiment where participants were asked to make semantic judgments on the consistency of particular sentences given a paragraph they just read. The goals of this study were to determine whether native speakers of English sometimes understand negators after EN triggers as French or Mandarin speakers do (i.e., expletively) and to further determine whether the likelihood they do so correlates with the production data gathered from our corpus study.

Table 1: Search strings used for each potential English EN-trigger

Trigger	Search string	# of relevant hits	# of EN uses	% of EN uses
ALMOST	“almost don’t”	204	0	0.00%
DIFFICULT	“difficult not to”	210	0	0.00%
HIDE	“hide that <i>pronoun</i> don’t”	133	0	0.00%
IMPOSSIBLE	“impossible that <i>pronoun</i> don’t”	134	0	0.00%
UNLESS	“unless <i>pronoun</i> don’t”	670	17	2.54%
TOO...TO	“too exhausted/short/happy/thrilled/scared to not”	252	11	4.37%
FEAR	“fear that <i>pronoun</i> don’t”	151	7	4.64%
FORGET	“forget not to”	137	10	7.30%
REFUSE	“refuse not”	144	12	8.33%
BEFORE	“before <i>pronoun</i> don’t”	35	3	8.57%
AVOID	“avoid not”	45	9	20.00%
RARELY	“rarely don’t”	110	22	20.00%
CANNOT WAIT	“cannot wait not to”	87	18	20.69%
ADVISE AGAINST	“advise against not”	113	26	23.01%
PREVENT	“prevent <i>pronoun</i> from not”	490	187	38.16%
STOP	“stop/stops/stopped not”	13	5	38.46%
DENY	“deny that <i>pronoun</i> don’t”	52	29	55.77%
SINCE	“since <i>pronoun</i> haven’t”	25	16	64.00%
WITHOUT	“without <i>pronoun</i> not”	29	19	65.52%
THAN	“than <i>pronoun</i> never”	36	29	80.56%
REGRET	“regret that <i>pronoun</i> shouldn’t”	21	21	100.00%
COMPLAIN	“complain that <i>pronoun</i> shouldn’t”	323	323	100.00%
BARELY	“couldn’t barely”	181	181	100.00%
DESPAIR	“despair/despairs/despaired of not”	103	103	100.00%
DELAY	“delay/delays/delayed not”	0	0	NA

### A corpus study of English EN

In order to see whether all the triggers collected from French and Mandarin can also trigger EN in English, we conducted a corpus study using Google searches. The reason we decided to use Google rather than other well-known corpora (e.g., BNC, COCA, Wikipedia, etc.) is that EN “occurs in English parole” as Horn (2010: 125) puts it and Google provides us with reliable English parole data from a diverse range of popular social media or networking sites. All the EN-triggers listed in Table 1 above are taken from Jin & Koenig (2019).

The search strings we used for each trigger are also listed in the table. There was a total of 8,362 hits across our all our searches (we kept both hits that had the same content as long as these hits appeared on different websites); after elimination of syntactically irrelevant hits (hits where, e.g., the lemma was not a verb or the syntactic structure was not the intended structure) and hits that included grammatical mistakes that clearly indicated they were not written by native speakers, 3,698 relevant hits remained. Table 1 indicates the number of relevant hits and the frequency of EN uses of the

negator that occurred in the complement clause for each trigger.

Several remarks regarding our search strings are in order. First, our search strings across all EN-triggers were as consistent as we could make them but limited: only citation forms are used for most triggers and only pronouns are considered for triggers that require NPs in search strings. Our search strings thus cover only a small subset of the set of possible English sentences that include a particular trigger and whose complement clause includes a negator. But, the relatively high frequency of EN interpretations of *not* after many triggers in Table 1 provides initial support for our contention that the encoding of a negative proposition rather than the intended positive proposition is much more frequent than typical speech errors. *Pronoun* in Table 1 is a shorthand for 7 possible English pronouns (I, you, he, she, it, we, they); in other words, for all search strings that include *pronoun*, we did 7 separate searches, one for each pronoun. In the case of REGRET and COMPLAIN, the deontic modal *should* was added, as we did not find a single example of EN without it. This was expected as the need for a deontic modal to be present in the complement clause holds for other languages as well, e.g., French and Mandarin. In the case of THAN, we used the emphatic negative marker *never*, as the string “than *pronoun* never” yielded more relevant hits with EN interpretations than the string “than *pronoun* don’t”. Likewise, for BARELY, we used “couldn’t barely” rather than “barely don’t”. For the discontinuous collocation TOO...TO, the use of a wildcard \* in the string “too \* to not” yielded too few relevant hits to draw conclusions; we therefore randomly selected five adjectives *exhausted*, *short*, *happy*, *thrilled* and *scared* to see if EN occurred with these adjectives in the context TOO...TO. For DELAY, DESPAIR and STOP, we had to use the citation forms as well as the third person singular and past tense forms because the search strings with only citation forms yielded too few relevant hits. Because our search strings covered a limited range of possible sentences, the percentages of EN uses listed in Table 1 should not be understood to be properties of the triggers in general, but properties of the more specific contexts we used in our searches.

## Results

Table 1 shows that the great majority of EN triggers found in French and Mandarin can also trigger EN in English. It also shows that the percentage of EN interpretation across potential EN triggers varies greatly, as it ranges from 0% to 100%. This result confirms Jin & Koenig’s claim that entrenchment is a property of individual triggers for particular languages.

The mean percentage of EN interpretation for all the EN-triggers in our corpus study is 28.34. Thus, even though EN is often judged a speech error or ungrammatical by native speakers, EN occurs relatively frequently in English for something that originates as a speech error (the concurrent activation of *not p* alongside *p*). This relatively high frequency of EN uses for what originated as a speech error is, we surmise, due to the fact that what causes the occurrence

of the negator in the complement clause is the semantic *entailments* of triggers, i.e., systematic inferences.

Note that the fact that we did not find EN for ALMOST, DIFFICULT, IMPOSSIBLE, HIDE and DELAY does not mean that EN never occurs with these triggers. When the search patterns were narrowed further by using strings like “almost didn’t die”, “delay not paying”, examples of EN uses could be found for all of them, as shown in (4a-c).

(4a) This reminds me of the time my son **almost didn’t** die from Hanta Virus. (Retrieved from: [https://www.facebook.com/jennythebloggers/posts/10156012428421511?comment\\_id=10156012521011511](https://www.facebook.com/jennythebloggers/posts/10156012428421511?comment_id=10156012521011511), accessed January 28, 2020)

(4b) Perry’s embarrassing attempt to run for president last year probably sealed his political career. It is not **impossible** that he **won’t** try it again in 2016, but let’s hope not. (Retrieved from: <https://www.clarendonlive.com/?p=14150>, accessed January 28, 2020)

(4c) In short if people can **delay not** paying, they do not pay and this is why when you examine rates and taxes within the system you do not only find that it is abysmally low in relation to the services to be provided but the collection rate is low. (Retrieved from: <http://www.kaiteurnewsonline.com/2013/07/25/the-present-local-government-structure-inhibits-modernization/>, accessed January 28, 2020)

Finally, the fact that the negator found after triggers like DESPAIR (in *despair of not*), BARELY (in *couldn’t barely*), REGRET (in *regret that X shouldn’t*) and COMPLAIN (in *complain that X shouldn’t*) always had an EN interpretation (see (5a-c)) suggests that these EN might have already become fossilized for some speakers for these triggers.

(5a) Many beekeepers **despair of not** being able to find queens. Make this the year you are going to improve your queen finding skills and start practicing this spring. (Retrieved from: <http://www.uoguelph.ca/honeybee/education-queens.shtml>, accessed January 28, 2020)

(5b) 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-regret-it-even-if-it-didnt-work-out>, accessed January 28, 2020)

(5c) “I boarded the plane on holiday in June 2015 to Turkey with two of my friends but to my horror — I **couldn’t barely** squeeze my bum into the plane seat,” she remembers. (Retrieved from: <https://www.foxnews.com/lifestyle/woman-sheds-140-pounds-becomes-gym-manager-after-airplane-seat-shock>, accessed January 28, 2020)

In sum, despite the fact that descriptive grammars of English (e.g., Huddleston, Huddleston & Pullum 2002; Quirk, Greenbaum, Leech & Svartvik 1985) make no

mention of EN, it occurs rather widely in “parole” and it occurs in the same contexts where EN is found in languages where EN is more entrenched/grammaticalized (French or Mandarin). The disparity between what English grammars say and what occurs in English parole suggests that EN is highly likely to be underreported in other languages as well and that there is likely to be much more similarity in the range of EN-triggers cross-linguistically than what grammars lead us to believe.

### A comprehension experiment on English EN

Our corpus study showed that English native speakers produce instances of EN with some frequency in the same set of environments where it is found in French or Mandarin, consistent with Jin & Koenig’s hypothesis that EN is caused by the meaning of EN triggers and general properties of the language production system. But, one could still see the

English data we provided as merely performance errors. To further test the hypothesis that speakers of English have developed some representation of expletive uses of negators after EN triggers, we designed a comprehension experiment. The overall goal of this experiment was to determine whether English native speakers would understand negators in the complement clause of EN triggers as EN. The semantic component of Jin & Koenig’s model predicts they should since EN-triggers always activate both their argument proposition  $p$  and their dual  $not\ p$ , as this concurrent activation is a matter of meaning (i.e., the meaning of triggers). The entrenchment component of their model further predicts that the more frequent the expletive interpretation of a negator in the scope of an EN-trigger is in production (as measured by our corpus study), the more likely a speaker is to interpret expletively a new occurrence of that negator for that trigger.

Table 2: A stimulus set

Condition	Paragraph	Continuation
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.
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.
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.
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.

## Methods

**Experimental design and materials.** Our experimental design was inspired by Glucksberg, Gildea & Bookin’s (1982) study that investigated how people understand metaphorical expressions like *some jobs are jails*. The goal of their study was to determine whether people derive the non-literal meaning *after* getting the literal meaning or *simultaneously* process both meanings. Participants were asked to make decisions about the literal truth of sentences. There were three types of sentences: unambiguously true (*some birds are robins*), unambiguously false (*some birds are tables*), and literally false, but metaphorically true (*some birds are flutes*). If participants simultaneously process both meanings, they reasoned, they should fall prey to a Stroop-like effect with sentences that are *literally false* but *metaphorically true*, as the metaphorical truth of the sentence should interfere with the correct answer.

We designed a similar semantic Stroop-like comprehension experiment for EN. In our experiment, participants were required to read short paragraphs (2-3 sentences) and their continuations (1 sentence). All continuations involved a verb, adposition or adverb and a

complement clause where a negator was included. The verb, adposition or adverb was either an EN-trigger or non-EN-trigger verb or adverb, and the negator in the complement clause either made the continuation logically consistent or logically inconsistent with the paragraph participants just read. We chose 20 triggers from the list of triggers in Jin & Koenig (2019) and created 20 stimulus sets. Our stimulus sets and experimental design were reviewed and approved by our local IRB. Table 2 uses QUIT as an example and shows what our experimental materials looked like. Participants were asked to indicate whether the continuation (henceforth, target sentence) was consistent or inconsistent with the paragraph that was just read. Both the logical accuracy of their judgments (*relative to the interpretation of the negator as a logical negation*) as well as response time were measured. An ANOVA test on the average character length of target sentences in the 4 conditions showed that there was no significant difference in the length of target sentences across conditions ( $F = 0.117, p = .95$ ).

**Participants** The experiment was set up on Ixex Farm. 280 participants were recruited through Amazon Mechanical Turk. Sentences were counterbalanced across four

presentations lists such that each participant saw only one sentence for each of the 20 experimental items. We excluded participants who were not native speakers of English, spent less than 10 minutes finishing the experiment (average time = 28 min), or had less than 75% filler accuracy. Data from the remaining 204 participants were analyzed.

**Prediction** We predicted that if a negator in the scope of EN-triggers is interpreted logically, people should be equally fast and make the same number of “logical errors” in the EN-trigger and non-EN-trigger conditions, since the negator would consistently be interpreted logically. But if the negator in the scope of EN-triggers can be interpreted *both* expletively and logically, people should be slower and make more “logical errors” in the EN-trigger than non-EN-trigger conditions since the expletive interpretation of *not* should interfere with its logical interpretation.

## Results

Table 3 provides mean accuracy and mean response times across the 4 experimental conditions. Response times included both the time spent reading target sentences and the time spent judging whether target sentences were logically consistent with their contexts.

Table 3: Mean accuracy and response time

Trigger	Logical consistency	Mean accuracy	Mean RT (SD)
non-EN-trigger	Logically inconsistent	0.91	3856.54 (2592.13)
EN-trigger	Logically inconsistent	0.78	5746.28 (4695.9)
non-EN-trigger	Logically consistent	0.94	4003.51 (4749.92)
EN-trigger	Logically consistent	0.77	5600.19 (4581.1)

For response time, a linear mixed-effect regression (LMER) model was fit with Trigger, Consistency and List as fixed effects and items and subjects as random effects, using the lme4 package (Bates, Maechler, Bolker, & Walker, 2014). We found a significant effect of Trigger ( $\beta = 1796.53$ ,  $SE = 296.27$ ,  $p < .001$ ), but not Consistency ( $\beta = -0.44$ ,  $SE = 114.85$ ,  $p = .99$ ) on participants’ response time. Participants took longer to respond in the EN-trigger conditions than the non-EN-trigger conditions (5673 ms vs. 3930 ms).

For logical accuracy, a logistic linear mixed-effect regression model was fit with Trigger, Consistency, and List as fixed effects, and items and subjects as random effects. Again, we found a significant effect of Trigger ( $\beta = -1.48$ ,  $SE = 0.26$ ,  $p < .001$ ), but not Consistency ( $\beta = -0.09$ ,  $SE = 0.10$ ,  $p = .36$ ) on the logical accuracy of participants’ responses. Participants were less logically accurate and made more logical errors in the EN-trigger conditions than the non-EN-trigger conditions (77.5% vs. 92.6%).

The results from both accuracy and response time show that native speakers of English understand a negator in the scope of an EN-trigger both expletively and logically: the conflicting answers that participants should make depending on whether they understood the negator logically or expletively slowed down their responses and lead them to make more logical errors for target sentences whose main clauses included an EN-trigger.

We then tested our second prediction that the more expletive interpretations of a negator a speaker had encountered (for a particular EN-trigger), the more likely she was to interpret expletively a new occurrence of that negator for that trigger. On the assumption that our corpus frequencies are a rough estimate of the frequency of expletive negation uses that our participants had encountered, we conducted a correlation test between the mean percentage of errors for each EN trigger and the percentage of EN interpretations for that trigger. We predicted and found that the more times a negator was used expletively for a trigger in our corpus, the more likely a participant in our comprehension experiment was to make logical errors when judging target sentences ( $r = .66$ ,  $p < .01$ ).

## Conclusion

Although extensively discussed in the Romance literature, EN is by no means restricted to the Romance languages and this paper shows through a corpus study and an on-line comprehension experiment that in languages like English where EN is often believed not to exist, native speakers can still produce and understand EN. Jin & Koenig’s (2019) production model of EN predicts that the same range of triggers leads to EN uses in English and that how frequently one encounters EN for a trigger influences how she interprets a negator in the scope of an EN trigger in reading. Both predictions were supported by our corpus study and comprehension experiment. The studies we report on in this paper thus support our overall hypothesis that recurring “illogism” in natural languages must be rooted in some universal properties, in the case of EN, properties of the meaning of EN trigger verbs and properties of language production (systematic inferences of the message to be encoded can lead to speech errors).

## References

- Bates, D., Maechler, M., Bolker, B., & Walker, S. (2014). lme4: Linear mixed-effects models using ‘Eigen’ and S4. Retrieved from <http://CRAN.R-project.org/package=lme4> (R package version 1.1-7)
- Del Prete, F. (2008). A non-uniform semantic analysis of the Italian temporal connectives *prima* and *dopo*. *Natural Language Semantics*, 16(2), 157-203.
- Dell, G. S. (1986). A spreading-activation theory of retrieval in sentence production. *Psychological review*, 93(3), 283-321.
- Espinal, M. T. (1992). Expletive negation and logical absorption. *The linguistic review*, 9(4), 333-358.

- Espinal, M. T. (2000). Expletive negation, negative concord and feature checking. *Catalan Working Papers in Linguistics*, 8, 47-69.
- Glucksberg, S., Gildea, P., & Bookin, H. B. (1982). On understanding nonliteral speech: Can people ignore metaphors?. *Journal of verbal learning and verbal behavior*, 21(1), 85-98.
- Horn, L. R. (2010). Multiple negation in English and other languages. In L. R. Horn (Ed.), *The expression of negation*. Berlin & New York: Mouton de Gruyter.
- Huddleston, R., Huddleston R. D., & Pullum, G. K. (2002). *The Cambridge Grammar of the English Language*. Cambridge: Cambridge University Press.
- Jin, Y., & Koenig, J. P. (2019). 'Expletive Negation in English, French, and Mandarin: A Semantic and Language Production Model'. In C. Pinon (Ed.), *Empirical Issues in Syntax and Semantics 12*. Paris: CSSP: Paris.
- Jin, Y., & Koenig, J. P. (in press). A cross-linguistic study of expletive negation. *Linguistic Typology*.
- Langacker, R. W. (1987). *Foundations of cognitive grammar: Theoretical prerequisites* (Vol. 1). CA: Stanford university press.
- Larrivé, Pierre. 1996. Pas explétif. *Revue Romane* 31. 19-28.
- Larrivé, Pierre. 2004. *L'association négative: depuis la syntaxe jusqu'à l'interprétation*. Geneva: Librairie Droz.
- Muller, C. (1991). *La négation en français*. Geneva: Librairie Droz.
- Quirk, R., Greenbaum S., Leech G., & Svartvik, J. (1985). *A Comprehensive grammar of the English language*. London: Longman.
- Vásquez Molina, J. F. (2006). *La negación expletiva en francés*. Spain: Logroño.