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Detecting the meaning of French expletive negation *ne* in *avant*-clauses

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Abstract

In this article, we characterize the semantic contribution of the French negative marker *ne* in temporal clauses with *avant* ‘before’. Traditionally considered semantically vacuous, *ne* is an example of expletive negation (EN), a negative marker that has been assumed to be null in meaning as it seems like it is not contributing to the calculation of the sentence meaning. In line with recent work that offered alternative approaches to a vacuous account of negative markers in other languages (Krifka 2010, C epeda 2018b), we propose that EN *ne* plays a semantic role: it negates that Event A in the main clause holds while Event B in the *avant*-clause is taking place. Simply put, EN does express negation as it negates that A and B can overlap in time. We report on the preliminary results of two experimental studies designed to verify our hypothesis and show that EN does in fact have a negative semantics.

Keywords: expletive negation; *before*; semantics; French

1. Introduction

French sentences with *avant*-clauses (‘before’) like (1) and (2) have been considered identical in meaning even though the negative formant *ne* appears in the *avant*-clause in (2).

- (1) *La patiente d ecrira ses sympt omes sur ce formulaire [avant que le docteur l’ausculte].*
the patient will.describe her symptoms on this form before that the doctor her-examines
‘The patient will describe her symptoms on this form before the doctor examines her.’
- (2) *La patiente d ecrira ses sympt omes sur ce formulaire [avant que le docteur **ne** l’ausculte].*
the patient will.describe her symptoms on this form before that the doctor **NEG** her-examines
‘The patient will describe her symptoms on this form before the doctor examines her.’

French *ne* in *avant*-clauses has been assumed to be vacuous in meaning (Muller 1978; Larriv ee 1994; Rowlett 1998; Vogeleer 2001; a.o.) and a case of *expletive negation*. The label *expletive negation* is commonly used to refer to a negative morpheme that seems to be empty of negative meaning. French *ne* is one element of the complex discontinuous negation *ne...pas*; this complex is *ordinary negation* in French although the morpheme *pas* ‘not’ can carry negative meaning on its own and is never associated with a null interpretation. As *ne* is not accompanied by *pas* in sentences like (2), this negative marker has been regarded as weak or even spurious. Because of

the attribution of an empty meaning to *ne*, pairs of sentences like (1) and (2) have been described as having the same truth conditions.

In this article, we challenge this assumption. We argue that, although they can be compatible with the same situations, sentences like (1) and (2) do have different meanings. Therefore, the occurrence of *ne* is not without consequences. We provide an account of expletive negation (EN) as a full negative morpheme, assuming Postal's (2005) view of semantic negation as the complement function. In this view, negation is not just a propositional operator reversing the truth value of a proposition. It is an operator that can range over a variety of argument types and that derives the complement of its argument. Applying this view to EN, C  peda (2018b) proposes that EN is a negative morpheme that scopes over non-sentential elements modifying the truth conditions of a sentence. Here we specifically explore the meaning contribution of French EN *ne* in temporal clauses with *avant* and show that EN does contribute to the meaning of the sentence. We provide experimental results that uphold the hypothesis that the presence of French EN *ne* alters the meaning of a sentence. Thus, it expresses full negation, although not propositional negation.

This article is organized as follows. In section 2, we introduce EN. We examine its distribution crosslinguistically and the theories that have been proposed to account for its apparent empty semantics. Section 4 considers the interpretation of *before/avant* and restricts the discussion in the rest of the article to its temporal reading. In section 5, we review the intuitions French speakers have when interpreting *avant*-clauses with and without EN *ne*. Section 6 reports on the results of two experimental studies designed to identify the role EN *ne* plays when occurring in *avant*-clauses. We discuss the results and formalize a semantics for EN *ne* in that context. We also discuss how we view the semantic contribution of negation in general as well as in the specific case of expletive negation. We conclude the article with a summary of the discussion.

2. Notions of negation

In a classical logical approach, negation is defined as a one-place function that takes the truth value of a proposition and reverses it, producing true when the operand is false, and false when the operand is true (Frege 1919/1997). In this way, whenever sentence (3a) is false, sentence (3b) is true; likewise, whenever (3a) is true, (3b) is false.

- (3) a. *The patient described their symptoms.*
- b. *The patient didn't describe their symptoms.*

This approach, however, has been described as not very conducive to a proper understanding of negation in natural languages (Haspelmath 1997). A non-classical approach to negation holds that negation is not restricted to the propositional level, since as often observed negative oppositions are found in other domains as well. Take for instance the nominal domain where *no dogs* and *some dogs* are negations of each other (Ladusaw 1996). As Ladusaw notes, these relations are preserved so that "sentences containing these phrases are correctly predicted to have contradictory truth conditions". Consequently, "[t]here is no formal necessity of giving propositional negation primacy in linguistic analysis." Based on these observations, Postal (2005) endorses a view of

semantic negation as the complement function. In set theory, the complement of a set A in a model M corresponds to all the elements that do not belong to A in model M , as represented in Figure 1.

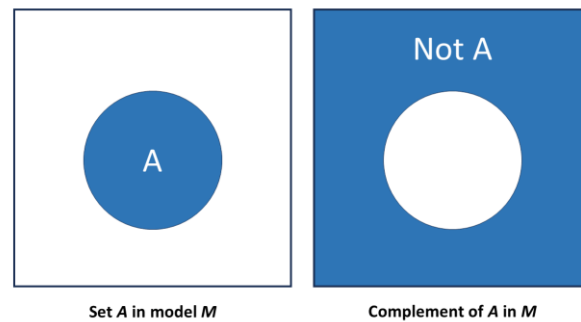


Figure 1. Set A and the complement of A

In a view of semantic negation as the complement function, negation is not restricted to the sentential level. In natural languages, there are common uses of negative forms that do not fit into the traditional approach to negation. Negative expressions are found in other parts of the grammar modifying nouns (e.g., *non-linguist*), adjectives (e.g., *unwilling*), and other linguistic elements beyond predicates. One of such cases, Cépeda (2017, 2018a, 2018b) argues, is the distribution of expletive negation.

3. Expletive negation

Interestingly, across languages, there are common uses of negative forms that do not fit into the traditional approach to negation. For example, an English sentence like (4) can be ambiguous for some English speakers, for whom the sentence may be compatible with both situations (4a) and (4b). For these speakers, sentences “I missed not seeing you” and “I missed seeing you” can describe the same situation and be both true at the same time. In this particular interpretation, the presence of the negative marker *not* does not reverse the truth value of the sentence in which it appears. For this reason, it may be tempting to assume that it is playing no role in the meaning of the sentence.

- (4) *I missed not seeing you last week.*
a. I wish I had not seen you last week.
b. I wish I had seen you last week.

This use of negation is commonly known as *expletive negation* (EN), where *expletive* means ‘vacuous’ or ‘null.’ EN is crosslinguistically common and appears in languages very different from one another, generally in subordinated clauses. In each of the languages where EN phenomena can be found, EN has a particular restricted distribution that depends on the type of syntactic conditions and licensing environments, which vary quite extensively from language to language. As an example of a syntactic condition, Déprez (2017) notes that, in Haitian Creole, the EN element *pa* (roughly, ‘not’) is subject to a finiteness constraint, that is, it is not allowed in infinitive clauses. This restriction is not universal though, as other languages (e.g., Greek) do allow EN elements in

infinitive clauses. Even though our theories of language so far cannot predict when or why a specific language will show EN cases, EN phenomena show similar distribution across languages. According to Cépeda (2018b), EN phenomena can be found in environments related to three types of semantic domains: time, degrees, and possible worlds. In the expression of time, EN typically occurs in clauses embedded by *until* (5), *before* (6), and *since* in time measure constructions (7). Note that, in these examples, sentences without EN (listed as a.) and with EN (listed as b.) have the same translation in English.

(5) Spanish (Cépeda 2018b)

- a. *Olga no se irá [hasta que Daniela cante el himno nacional].*
 b. *Olga no se irá [hasta que Daniela **no** cante el himno nacional].*
 Olga not CL will.go until that Daniela NEG sings.SUBJ the anthem national
 ‘Olga won’t leave until Daniela sings the national anthem.’

(6) German (Loebner 2013)

- a. [*Bevor du dein Zimmer aufgeräumt hast*], *darfst du nicht fernsehen.*
 b. [*Bevor du **nicht** dein Zimmer aufgeräumt hast*], *darfst du nicht fernsehen.*
 before you NEG your room fixed have, are-allowed you not watch-TV
 ‘Before you have fixed your room, you are not allowed to watch TV.’

(7) Korean (Yoon 1994)

- a. [*Nay-ka syawe-lul ha-nci*] *cham olay toyessta.*
 b. [*Nay-ka syawe-lul **an** ha-nci*] *cham olay toyessta.*
 I-NOM shower-ACC NEG do-since very long.time became
 ‘It has been a very long time since I took a shower.’

As for the expression of degrees, in comparative constructions with a subordinated clause, the comparative clause may contain EN in several languages. Note that, in the example in (8), the subordinated clause appears in the subjunctive.

(8) Italian (Napoli & Nespor 1976)

- Maria è più intelligente di quanto **non** sia Carlo.*
 Maria is more intelligent of how.much NEG be.SUBJ Carlo
 ‘Maria is more intelligent than Carlo.’

Finally, the expression of possible worlds allows the presence of EN in forms that may correspond to the English *wh-ever* series (9), in the complement clause of attitudinal verbs with some negative component (Jespersen 1917/1966; Horn 1989), like prohibition, doubt or apprehension (10), and in clauses headed by *unless* and *without* (11). These cases generally require a clause in the subjunctive.

(9) Hebrew (Eilam 2007)

- ma še-dani lo katav hitparsem ba-iton*
 what that-Danny NEG wrote was.published in.the-newspaper
 ‘Whatever Danny wrote was published in the newspaper.’

(10) French (Muller 1978)

- On craint qu’elle **ne** boive du vin en cachette*
 we fear that-she NEG drink PART wine in secret
 ‘We fear that she is drinking wine in secret.’

(11) Haitian Creole (Déprez 2017)

m soti san l(i) pa wè
I left without he NEG see
'I left without him noticing.'

3.1. Non-negative accounts of EN

In the literature describing EN, there are at least three types of conceptually distinct accounts of the nature of EN. In a first type of account, the negative morpheme has been considered logically vacuous, semantically null, or superfluous (Muller 1978; Espinal 1992, 2000; Larrivé 1994; Brown 1999; a.o.), which virtually makes it correspond to the identity function. Due to the surprising analysis of negation as the identity function, some have even called EN illogical negation (van der Wouden 1994). For languages in which EN uses the same negative marker as regular truth-conditional negation, this view implies that negation is ambiguous between a truth reversing function and the identity function. This is the approach that gives EN its name as *expletive*, in the sense of empty or null.

A second type of account assumes that the negative morpheme has been mistakenly considered negative. It looks like a negative morpheme, but it actually is something else. For some authors, EN is a kind of epistemic modality that affects the non-truth conditional layer of meaning and signals an attitude of the speaker towards the content of the sentence (Yoon 2011). Like the previous type of account, this view implies that, in certain contexts, a negative expression can be ambiguous between a truth reversing function and a modality element. The presumed ambiguity of negation in these two accounts makes them conceptually undesirable for a unified theory of negation.

3.2. A negative account of EN

A third account of the nature of EN does not assume the semantic ambiguity of a negative morpheme; rather, it considers that the negative marker always expresses negation. In this view, EN has a full negative semantics even though it may not be propositional negation (Krifka 2010; Cépeda 2017, 2018a, 2018b). As an alternative explanation to the “expletive” approach, this account of EN understands the label “expletive” as a nomenclature only (Abels 2005), not as descriptive term. This is the theoretical framework for the account of EN that we adopt in this article. Crucially, to understand the role of EN *ne* in French *avant*-clauses, we implement the ideas in Cépeda (2018b) for the analysis of EN in the expression of time.

Cépeda (2018b) analyzes Spanish sentences with *hasta*-clauses ‘until’ with and without EN, as the ones in (5) above, repeated below as (12). The *until*-clauses under examination are those called punctual *until*, interpreted as “event A [in the main clause] will occur when event B [in the *until*-clause] occurs,” which conveys that event A cannot take place before B takes place. Event A, then, can occur while event B is occurring (for an overlapping reading) or after B has concluded (for a non-overlapping reading). Based on this, Cépeda argues that *hasta*-clauses with accomplishments (i.e., events with internal duration and a defined ending point) can make the role of EN explicit, as

opposed to *hasta*-clauses with achievements (i.e., instantaneous, non-durative events with a defined ending point). Let us analyze sentences (12a) and (12b). Sentence (12a), without EN, is compatible with situation (13a), where the events in the main clause and in the *until*-clause overlap in time, and also with situation (13b), where the two events do not overlap. In comparison, sentence (12b), with EN, is compatible only with the situation in (13b), where there is no overlap between the two events. In other words, the event in the *hasta*-clause must be fully completed (from beginning to end) before the event in the main clause starts. This strong intuition leads Spanish speakers to attribute a conditional reading to the sentence containing EN.

(12) Spanish (Cépeda 2018b)

- a. *Olga no se irá [hasta que Daniela cante el himno nacional].*
- b. *Olga no se irá [hasta que Daniela **no** cante el himno nacional].*
Olga not CL will.go until that Daniela NEG sings.SUBJ the anthem national
 ‘Olga won’t leave until Daniela sings the national anthem.’

(13) Possible interpretations

- a. Olga leaves while Daniela is singing the national anthem.
- b. Olga leaves after Daniela has finished singing the national anthem.

Embracing Postal’s (2005) view of semantic negation as the complement function, Cépeda argues that the scope of EN is the temporal trace of the event expressed in the *hasta*-clause. Taking scope over this temporal trace, the presence of EN in the clause indicates that the event in the main clause will necessarily take place only in the *complement* of the interval in the *hasta*-clause, thus preventing overlap between the events in the main clause and the *hasta*-clause. In other words, the interpretation of the sentence with an *hasta*-clause containing EN is “event A [in the matrix clause] will occur when event B [in the *until*-clause] is *no longer* occurring”. As a result, event A in the main clause is expected to hold *after* the interval in the *until*-clause has ended (i.e., after event B has completely taken place, from beginning to end), that is, within the complement of such interval and no overlap between the two events is possible.

As we have seen, restricting the semantics of negation to only changing the truth conditions of a sentence has led to the explanations of EN as a non-negative element (e.g., semantically vacuous or expressing non-negative modality), which has posed limitations for our understanding of other negative phenomena in natural languages (e.g., negative morphemes at the non-propositional level), including the negative content of EN. In this article, we assume a theory of negation as the complement function. We believe this theory has desirable consequences. To begin with, it represents a unified theory of negation that can explain the different uses of negative forms in natural languages that do not fit into the traditional approach. In addition to this empirical advantage, this unified theory of negation is conceptually suitable as it does not assume ambiguity or negative morphemes as expressions of linguistic categories different from negation. Because of that, this unified theory of negation can sustain a simple explanation of the acquisition of negation, a linguistic property that appears early during language development (Reuter, Feiman & Snedeker 2018). It can easily accommodate previous experimental studies on the stages involved in the acquisition process. For example, Hebrew-speaking children acquire EN at age 4 (Eilam & Trueswell 2010), which seems to be shortly after they master the semantic processing of negation provided that the sentence is pragmatically felicitous, which has been reported to be age 3 for

English-speaking children (Reuter, Feiman & Snedeker 2018). For all these reasons, our analysis of French EN *ne* in *avant*-clauses endorses a theory of negation as the complement function.

4. The semantics of *avant*

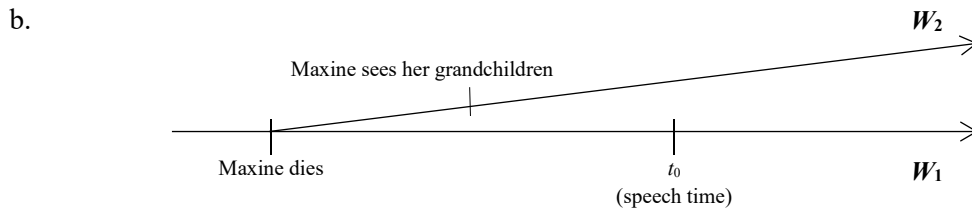
Before considering what the contribution of EN could be in French *avant*-clauses, we need to clarify what meanings the connective *avant* ‘before’ can assume. Le Draoulec (2005, 2015) distinguishes three major categories of meaning for *avant*: *preventing* (*avant que P* as “in order that not P” or “in such a way that not P”), *allowing* (*avant que P* as “in order that P”), and *deliberating* (*avant que P* as “in order to decide if P”). A perhaps more standard approach to the meaning of this connective (as in Dedková 2010) distinguishes more specifically two characteristic meanings: a so-called *counterfactual* one (under which both the preventing and deliberating meanings of Le Draoulec can be subsumed) and a *temporal* one. The former is illustrated here in (14a) and the latter in (14b). For immediate relevance to the main topic of this article, note that French EN *ne* occurs optionally with both the counterfactual and the temporal interpretations.

- (14) a. Counterfactual *avant*
Tu fermeras le robinet avant que la baignoire (ne) déborde
 you will-close the faucet before that the bathtub NEG overflows
 ‘You will close the faucet before the bathtub overflows.’
- b. Temporal *avant*
Jeanne est arrivée avant que la soirée (ne) finisse.
 Jeanne is arrived before that the evening.party NEG ended
 ‘Jeanne arrived before the evening party ended.’

The distinction between the two types of *avant*-clauses concerns the inferences that they trigger with respect to the realization of the event within the complement clause. In (14a), the meaning of *avant* is counterfactual as the event in the main clause is taking place in order to prevent the realization of the one in the *avant*-clause. In this sense, the counterfactual meaning of *avant* is linked to the negation of the presupposition that the event in the *avant*-clause will take place. In contrast, given the temporal interpretation of *avant* as in (14b), the *avant*-clause is associated with the presupposition that the event will in fact take place. As described by Vogeleeer (2000), “the connective *before*, like its French counterpart *avant que*, triggers the presupposition that the event referred to by the subordinate clause exists in space and time when (and because) the connective expresses a temporal relation.”

On all accounts, the core meaning of the *avant* connective is that of anteriority and, in this regard, the temporal meaning best represents this core meaning. The counterfactual meaning, in contrast, is taken on some accounts to be triggered by a lexically distinct but homophonic connective (Anscombe 1964) or by evoking a branching notion of time (Tedeschi 1981; Heinämäki 1978; Beaver & Condoravdi 2003; Le Draoulec 2015). The branching theory is assumed to open a timeline of an alternate world. As an illustration of this proposal, for a sentence like (15a), adapted from Le Draoulec (2015), the alternate timeline where Maxine is not dead (W_2) originates before the speech time (W_1), as represented in (15b).

- (15) a. *Maxine est mort avant de voir ses petits-enfants.*
 Maxine is dead before from see his grandchildren
 ‘Maxine died before seeing his grandchildren.’



As pointed out above, French EN *ne* occurs optionally with both the counterfactual and the temporal interpretations of *avant*. It seems to be more frequent in the former interpretation than in the latter, as reported by Tahar (2021) after examining the Frantext corpus of historical texts from French. Some may want to see a connection between the higher frequency of *ne* in counterfactual uses of *avant* and the inference that the event in the *avant*-clause does not take place in counterfactual readings. However, it is important to note that this inference is not directly linked to the presence or absence of EN *ne*. As Le Draoulec (2015) notes, the presence or absence of EN *ne* plays no role in distinguishing the two readings and there are several empirical arguments that clearly support this conclusion. Evidence that the presence of EN does not encode the counterfactual meaning of *avant* is supported by the fact that the negative inference remains even in the absence of *ne*, as in (14a) and (15a) above as well as in the example (16) below, from Le Draoulec.

- (16) *Tandis que son épouse l’attendait devant la gare, le grand-père est monté dans le train pour installer et dire au revoir à sa petite-fille; seulement, le train est parti avant qu’il redescende !* (Ouest-France, 8/25/2012)
 ‘While his wife was waiting for him in front of the station, the grandfather climbed into the train to place and say goodbye to his granddaughter; however, the train departed **before he got off!**’

Additionally, we further observe that this negative inference remains even in examples where the expletive *ne* is in fact ungrammatical. As indicated in section 3, in French, the expletive *ne* cannot occur in infinitive *avant*-clauses without triggering ungrammaticality. Even in these cases, where *ne* is absent in the sentence, the negative inference on the occurrence of the event in the infinitive *avant*-clause is preserved, as exemplified in (17).

- (17) *Le père de Paul Newman est mort en 1950, avant de *(ne) pouvoir assister au triomphe de son fils.* (Télérama, 10/8/2008)
 ‘Paul Newman’s father died in 1950 **before being able to witness his son’s triumph.**’

Finally, Le Draoulec (2015) notes that the two *avant* readings, while triggering opposite inferences, can be coordinated when modifying the same main clause and optionally allowing EN *ne*. In (18), while the event in the first *avant*-clause has never taken place, the one in the second one clearly did. Together, Le Draoulec’s observations and our remark on infinitive clauses provide

strong evidence that the role of *ne* cannot be to contribute the negative inference of the counterfactual meaning of *avant*, since this inference is clearly drawn even when *ne* is not used.

- (18) *Bob Kennedy a été assassiné [avant qu'il (ne) soit élu président]_{COUNTERFACTUAL} et [avant que son fils (ne) soit né]_{TEMPORAL}.*
 'Bob Kennedy was assassinated before he was elected president and before his son was born.'

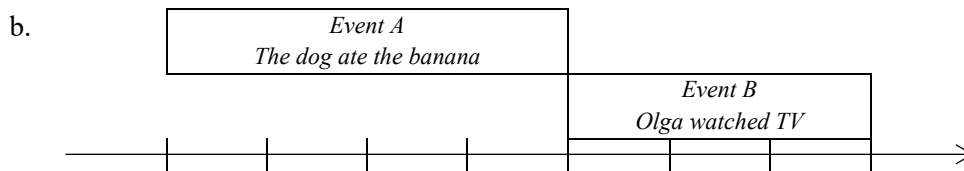
Since on all accounts the meaning of the connective *avant* is first and foremost that of anteriority, here we focus on the temporal interpretation of *avant*. That is, we will analyze non-counterfactual readings of *avant*, where the event in the *avant*-clause is in fact presupposed to be realized. As there is essentially no difference between the meaning of the French connective *avant* and of English *before* (save for the syntactic restriction that only *avant* is compatible with non-finite complements), for precision and correctness, we adopt Beaver & Condoravdi's (2003) and Condoravdi's (2010) semantics for *before* for our semantics of *avant*.

Beaver & Condoravdi (2003) postulate a temporal operator EARLIEST that takes an interval (i.e., a set of times) with a defined starting time and returns a definite time description corresponding to the leftmost time that precedes all other times in the interval. In their words, "a set T is left-bounded if there is $t \in T$ such that for all $t' \in T$, $t \preceq t'$ [where \preceq means precedes or is equal to]. For left-bounded T , we call that t , *earliest*(T)." With the EARLIEST operator, Beaver & Condoravdi (2003) define *before* as in (19), with A and B representing the time intervals in which their respective events take place. The entry in (19) states that A before B is true if there is some time at which the event A unfolds that precedes the earliest time at which the event B unfolds.

- (19) Semantics for *before* (Beaver & Condoravdi 2003; Condoravdi 2010)
 A before B is true iff $\exists t \in A [t < \text{EARLIEST}(B)]$

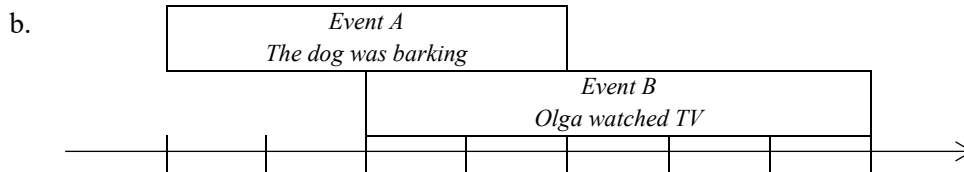
Thus, all that is needed for the semantics of *before* to be satisfied is the existence of some time in event A (the event in the main clause) that starts before the earliest time of event B (i.e., before the event in the *before*-clause starts). With this semantics for *before*, the aspectuality of the event in the main clause with respect of its internal duration (following Heinämäki 1978) makes at least two scenarios possible. In the first scenario, event A in its totality (i.e., all t in A , from beginning to end) precedes event B , and there is no overlap between the two events. The example in (20) illustrates this non-overlapping reading of *before*.

- (20) a. Non-overlapping reading of *before*
The dog ate the banana before Olga watched TV.



In the second scenario, event A starts before event B starts, and some but not all times in A precede the start of B, so that A continues taking place while B is also taking place. Here, there is a partial overlap between the two events. The example in 0) shows this overlapping reading of *before*.

- (21) a. Overlapping reading of *before*
The dog was barking before Olga watched TV.



Based on this semantics for *before*, we will review the intuitions speakers have when an *avant*-clause contains EN *ne*.

5. Intuitions behind *avant* + EN

Despite the accounts that have claimed that the presence of EN does not alter the meaning of the sentence, the truth conditions of a pair of sentences with and without EN are different, as we show below. A note of caution is needed here though. Intuitions for the use of EN seem to be rather fleeting for speakers across languages and French is no exception. First, not all French speakers seem to use EN in a systematic way, as they may use it in some cases where EN is habitually licensed in French and, at the same time, never use it in others. Second, as has been well studied, the use of *ne* in French in its most common context (i.e., in co-occurrence with the negation *pas*) has now become quite optional and is in fact rather little used by the younger generations (Armstrong & Smith 2002). Not surprisingly, this also has consequences on the use of expletive *ne*, which although not specifically focused on in current sociolinguistic studies, appears to be progressively disappearing in the speech of younger French speakers, so that younger speakers may only retain a passive competence on how EN is used and interpreted. That being said, some evidence that a certain level of competence regarding expletive *ne* is still retained can be observed in infinitive clauses. As previously noted, expletive *ne* is unacceptable in infinitive sentences with the connective *avant*, a judgment that remains rather sharp even for speakers who do not use the expletive *ne* in their daily speech. Consequently, it is likely that even speakers that do not use it may be sensitive to its syntax and its potential semantic effect, though less sharply.

With this caveat in mind, let us analyze the pair (1) and (2), repeated here as (22) and (23) for convenience:

- (22) *La patiente décrira ses symptômes sur ce formulaire [avant que le docteur l'ausculte].*
 the patient will.describe her symptoms on this form before that the doctor her-examines
 'The patient will describe her symptoms on this form before the doctor examines her.'

- (23) *La patiente décrira ses symptômes sur ce formulaire [avant que le docteur **ne** l'ausculte].*
 the patient will.describe her symptoms on this form before that the doctor **NEG** her-examines
 'The patient will describe her symptoms on this form before the doctor examines her.'

Consider a patient waiting at a doctor's office. She starts filling out the form with her symptoms, but the doctor calls her in before she finishes completing the form. In this context, according to the speakers' intuitions for sentence (22), both the description of the symptoms on the form (event in the main clause) and the doctor's examination (event in the *avant*-clause) are events that are likely to happen (the future tense gives no certainty) and, if they do, the symptoms description on the form will precede the doctor's examination. This precedence can take two forms. It can be full precedence, which means that there is no overlap with the doctor's examination (i.e., the whole task of describing the symptoms on the form is entirely finished before the examination). It can also be partial precedence, which means that there is some overlap with the doctor's examination (i.e., describing the symptoms on the form started before the doctor's examination but was not completed when the examination started and so kept on going). Thus, sentence (22) is ambiguous between a non-overlapping reading and an overlapping reading.

For sentence (23), speakers also understand that both the description of the symptoms on the form and the doctor's examination are events that are likely to happen given the future tense. However, they present a different set of intuitions for the specific meaning of the sentence. Speakers report that, since expletive *ne* is present in (23), there is a strong intuition that the doctor's examination (event in the *avant*-clause) will take place *only if* the description of the symptoms on the form (event in the main clause) is fully completed. If the description of the symptoms on the form does not occur or is not completed, the doctor's examination will not take place. Sentence (23) is, thus, perceived with a conditional reading—the filling out of the form is a pre-requisite, a condition that needs to be fully satisfied (i.e., the event is understood to occur from start to end and hence be completed) for the doctor to proceed with the examination. As a result, the presence of *ne* adjusts the relation between the two events that are ordered by the conjunction *avant*. Without *ne*, event A in the main clause must have started *before* event B in the *avant*-clause, but A does not need to be ended by the time B starts. In other words, overlap is possible, although of course not necessary. With *ne*, event A is a condition for event B, so it must be fully completed before B starts. Overlap in this case is simply not possible.

French EN *ne* also occurs in *avant*-clauses subordinated by a main clause that contains negation in it (i.e., *ne...pas*). Although the presence of the negation in the main clause complicates the event relations a bit, we felt that exploring it was important because in other languages such as German for instance, the presence of negation in the main clause is a prerequisite to the use of EN (Krifka 2010). Although this is not the case in French, since EN can occur in *avant*-clauses even if the main clause has a positive polarity as in (25) above, we felt that the effect of negation in the main clause on the use of EN was worth testing, particularly because some authors have claimed that it increases that use of EN in the *avant*-clause. For example, Muller (1978, 1997) considers the presence of EN *ne* as an echo or transfer of the negative sense from the main clause to the embedded clause. With this context in mind, let us analyze sentences such as (24) and (25). In virtue of the semantics of *avant*, event A in the main clause must precede event B in the *avant*-clause. However, when *avant* is under the scope of negation, as it is in both (24) and (25), the temporal order of the events A and B is inverted—now, event B in the *avant*-clause precedes event A in the main clause. For examples (24) and (25), the description of the symptoms on the form precedes the doctor's examination.

- (24) *Le docteur n'auscultera pas la patiente [avant qu'elle décrive ses symptômes sur ce formulaire].*
 the doctor NEG will.examine not the patient before that.she describes her symptoms on this form
 'The doctor won't examine the patient before she describes her symptoms on this form.'
- (25) *Le docteur n'auscultera pas la patiente [avant qu'elle **ne** décrive ses symptômes sur ce formulaire].*
 the doctor NEG will.examine not the patient before that.she NEG describes her symptoms on this form
 'The doctor won't examine the patient before she describes her symptoms on this form.'

Importantly, the speakers' intuitions about the interpretation of *avant*-clauses with and without expletive *ne* remain the same whether or not *ne...pas* is present in the main clause. Thus, only sentence (25), which contains EN *ne*, is attributed a conditional reading, according to which the description of the symptoms on the form (the event in the *avant*-clause) is a condition that needs to be fully satisfied from start to end for the doctor to proceed with examination (the event in the main clause).

As discussed above, situations with non-overlapping events are possible with and without EN. The core difference that the presence of EN makes lies in the enforcement of the non-overlap. Without EN, non-overlapping readings are available but not enforced, and overlapping readings are also possible. With EN, non-overlapping readings are enforced. Note that the possibility of non-overlapping readings in both cases makes it rather obscure for French speakers who use EN to easily provide judgments on its semantic import when asked on the fly. Indeed, the difference of meaning between sentences containing *avant*-clauses with and without EN is perceptible only if the event in the *avant*-clause has internal duration and a defined ending point (i.e., is an accomplishment). If the event in the *avant*-clause is an instantaneous event with no internal duration (i.e., achievement), the distinction cannot be perceived as the non-durative nature of the event makes it difficult to separate the overlapping and non-overlapping readings. This adds to the uncertainty French speakers may have when asked whether or not the presence of EN changes the interpretation of the sentences in which it occurs. Due to these factors, the distinction between overlapping and non-overlapping readings may be a matter of gradience in a preferred reading rather than a categorical distinction, which furthers already blurring intuitions. Thus, the analysis of grammatical judgments about the presence or absence of EN in *avant*-clauses needs to take all these factors into consideration.

6. Experimental study

As explained in the previous section, sentences with *avant*-clauses with and without EN are both compatible with non-overlapping readings. However, for sentences with an *avant*-clause and EN, the non-overlapping reading should be the *only* available reading. Reflecting on the fact that the distinction between sentences with *avant*-clauses with and without EN is gradient and not categorical for French speakers, we hypothesize that the presence of EN *ne* in *avant*-clauses would have the effect of increasing the preference for non-overlapping readings. To test this hypothesis, we designed two experimental studies with native speakers of French. Here we report on the pilot results of such studies.

6.1.Design of the studies

Two experiments were designed to test our hypothesis. For each experiment, participants were tasked with reading 20 pairs of sentences—first, they read a test sentence, which contained EN or not; then, they proceeded to read a verification statement, which conveyed the potential interpretation of the test sentence. Participants were asked to express whether they agreed or disagreed with the verification statement given the test sentence. Experiment 1 and Experiment 2 differed only regarding the polarity of the main clause in the test sentence—while in Experiment 1, the main clause had a positive polarity, in Experiment 2 the main clause contained the negative complex *ne...pas*. We decided to test negative polarity in the main clause to assess if this would influence the speakers’ intuitions about EN. A total of 63 participants were recruited from among students at the University of Paris and the University of Montpellier. 25 participants completed Experiment 1 (women n=17; men n=7; not indicated n=1) and 38 participants completed Experiment 2 (women n=25; men=9; not indicated n=4). We used Experigen (Becker & Levine 2013) as the platform to conduct our experiments. A sample of a screen is shown in Figure 2. On the figure, the test sentence (on top) translates as ‘The patient will describe her symptoms on this form before the doctor examines her’ and the verification statement (at the bottom) translates as ‘The patient must have finished before the doctor’s examination starts’. The top button says ‘Continue’ and the two buttons under the verification statement say ‘Agree’ and ‘Disagree.’

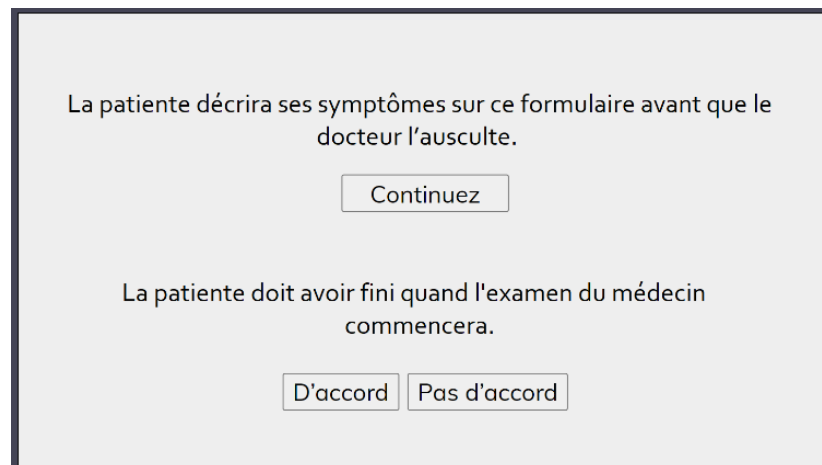


Figure 2. Experiment screen sample (in French)

Of the 20 pairs of test-verification statements in each experiment, 8 pairs were control items used as fillers whose appearance on the screen was randomized. The control items intended to make sure that speakers indeed use or interpret EN *ne* as a different grammatical element than the complex discontinuous negation *ne...pas*. Accordingly, control test sentences contained either *ne...pas* or EN *ne* in contexts different from *avant*-clauses where EN is also possible in French. An example is shown in (26a). As for control verification statements, these were designed in a way that a participant’s “Agree” answer would indicate that they distinguish the uses of *ne* as EN from the uses of complex negation *ne...pas*. An example appears in (26b). For the pair in (26), the use of EN sets up the expectation that Henry does not want Sylvie to win the election and the reverse is true with the full negation *ne...pas*. Hence agreement with the verification statement is what is expected if speakers correctly use EN. We determined that participants who responded “Agree”

for the control items 75% of the times would be considered as understanding the difference between EN and full negation and we called them *EN-using participants*.

- (26) a. Example of control test sentence
Henri refuse que Sylvie ne gagne (pas) les élections.
 Henri refuses that Sylvie NEG win not the elections
 ‘Henri refuses that Sylvie wins / doesn’t win the elections.’
- b. Example of control verification statement
Si Sylvie gagne les élections, Henri sera furieux.
 if Sylvie wins the elections Henri will.be furious
 ‘If Sylvie wins the elections, Henri will be furious.’

For the 12 pairs of test-verification statements in each experiment, the test sentences contained *avant*-clauses with or without EN. Let us recall that the test sentences in Experiment 1 contained positive polarity whereas in Experiment 2 they contained negative polarity. The *avant*-clauses were designed to have only events with internal duration and a defined ending point (i.e., accomplishments) to ensure that the possibility of an overlap was present. For Experiment 1, verification statements were all constructed following the template “event A must have finished when B starts,” where A is the event in the main clause and B is the event in the *avant*-clause. This template was intentionally designed to test the necessity of a non-overlapping reading. Choosing to respond “Agree” to the task would be indicating that the test sentence triggered a non-overlapping reading as preferred. For Experiment 2, given the presence of the negative marker *ne...pas* scoping over *avant*, the temporal order of events A and B is inverted. Consequently, verification statements followed the template “event B must have finished when A starts,” where A is the event in the main clause and B is the event in the *avant*-clause. Once again, this design allowed us to test whether a non-overlapping reading was enforced, thus responding “Agree” would reveal a preference for a non-overlapping reading. As our hypothesis was that the presence of EN *ne* in the *avant*-clause would increase the preference for non-overlapping readings, we predicted a higher percentage of agreement when EN is present as compared to when EN is not. Based on our hypothesis, here we report on the percentage of “Agree” responses for the test-verification statement pairs with *avant* in each of the two experiments.

6.2. Results of the studies

In Experiment 1, the main clauses of the test sentences had positive polarity (i.e., there was no negation in the main clause) and the *avant*-clauses either contained EN or not. Examples of Experiment 1 test sentences are (22) and (23), respectively. The experiment results show that, for all participants (n=25), the presence of EN *ne* increases the number of “Agree” responses (76% vs 89%) for a non-overlapping reading. A Pearson’s chi-square test conducted in RStudio (R Core Team 2022) showed that this association is statistically significant ($\chi^2(1) = 5.85, p = .016$). We also examined the results of the EN-using participants, that is, those who in the control items showed understanding of the uses of *ne* as EN as different from the uses of complex negation *ne...pas* (n=13). For this subset of participants, there is a larger distinction between “Agree” responses without and with EN (77% vs 98%). This represents a significant increase in the agreement responses for non-overlapping readings ($\chi^2(1) = 10.63, p = .001$), a result that is compatible with our hypothesis that the presence of EN *ne* in the *avant*-clause would increase the

preference for non-overlapping readings. The percentages of “Agree” responses are represented in Figure 3.

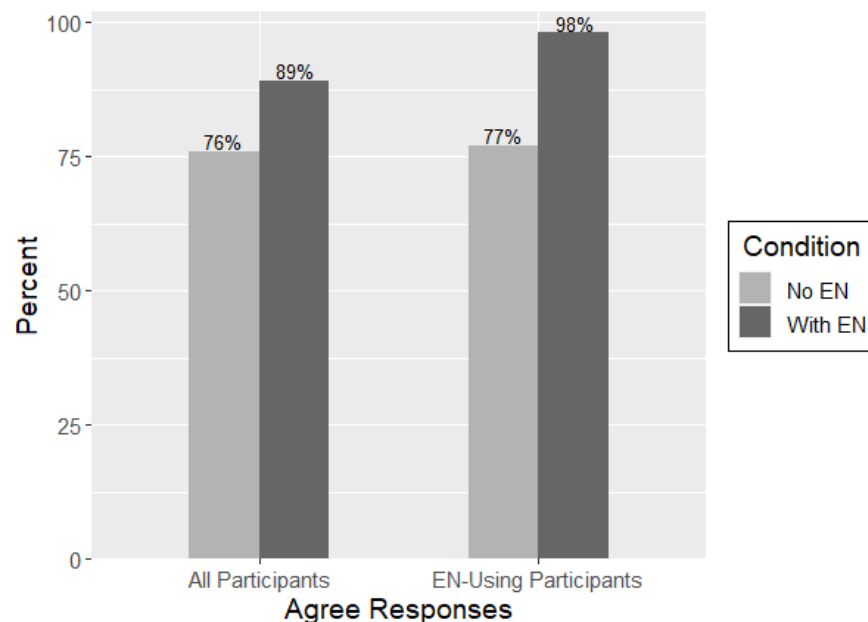


Figure 3. Overall Results of Experiment 1

In Experiment 2, the test sentences had a negative polarity, that is, they contained negation in the main clause (“*ne...pas*”) and *avant*-clauses contained or not EN. Examples of Experiment 2 test sentences appear in (24) and (25) above. We found that, comparable with Experiment 1, participants (n=38) were more likely to provide “Agree” responses for a non-overlapping reading in the presence of EN *ne* in the *avant*-clause (74% vs 82%). These results, however, do not indicate a significant association between “Agree” responses and the presence of EN ($\chi^2(1) = 3.24, p = .072$). Moving on to the EN-using participants (n=20), the gap between the “Agree” responses for items without and with EN is even larger (66% vs 90%), and these results are statistically significant ($\chi^2(1) = 13.20, p < .001$). Figure 4 shows these percentages of “Agree” responses for these two groups.

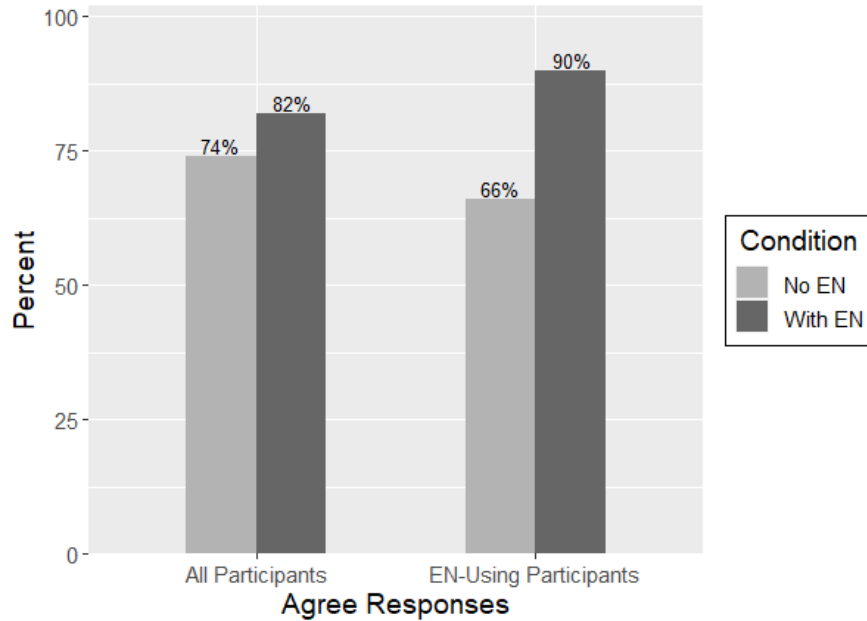


Figure 4. Overall Results of Experiment 2

6.3. Discussion

The results of the two experiments display an increased preference for non-overlapping readings in the presence of EN *ne* in *avant*-clauses. We note that there are also high percentages of “Agree” responses for a non-overlapping reading without EN. This indicates that effect of EN *ne* is often not consciously obvious for native speakers given that the semantics of *avant* allows them to choose non-overlapping interpretations anyway with or without EN. Nonetheless, it is remarkable that this subtle distinction, where presence of EN further significantly increases the preference for the non-overlapping reading, is actually discernable in our results. We found that the choice for a non-overlapping reading is not a categorical all-or-nothing effect, but a rather fine-grained gradient preference, which explains why, for most speakers, describing the contribution of EN explicitly is rather impossible. Our experimental results reflect clearly both a significant preference for the non-overlapping reading when EN *ne* is present and the fact that this non-overlapping reading is not exclusive of the presence of EN in sentences containing *avant*.

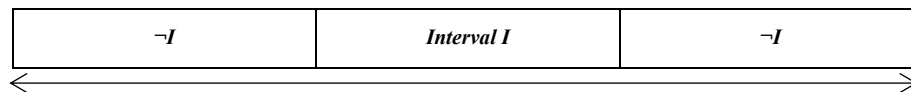
The presence of EN *ne* in *avant*-clauses strengthens the preference for non-overlapping readings— one event needs to be fully completed for the other to start occurring. We conjecture that this strengthening in the temporal sequencing of the events involved explains the conditional interpretation speakers have when EN *ne* is present in the *avant*-clause. As one event needs to be fully completed for the other to start occurring, the former is felt as a condition for the latter. Found in both Experiment 1 and Experiment 2, these effects appear to support the claim that EN denies the possibility of overlap between the events in the main clause and the temporal clause (analogous to Cépeda 2017, 2018a, 2018b). We thus advance the proposal that the contribution of EN is indeed

negative within the framework of negation as the complement function (as explained in Section 2).

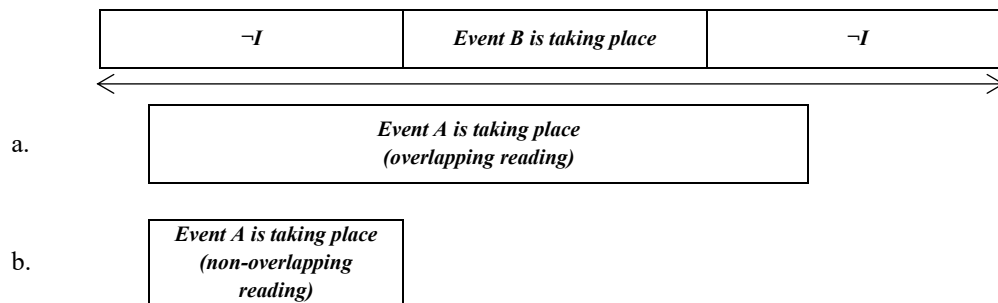
We also found that the presence or absence of negation in the main clause (i.e., whether *ne...pas* is present or not) does not alter the results. In both experiments, the use of EN significantly increased the choice of the non-overlapping reading. The lack of difference concerning the polarity of the main clause confirms that, for French, the presence of negation is not a significant factor. A negative main clause does not increase the use of EN in the *avant*-clause, nor does it seem to affect its interpretative effect. Why the presence of negation in the main clause is a factor that does matter for the occurrence of EN in some languages (e.g., German, Spanish) but is not for others is still a question to be pursued in further studies on EN. For now, we note that the presence or absence of negation does not affect the interpretability effect of French EN in temporal *avant*-clauses.

We now turn to explain how the notion of negation as the complement function helps understand our results and provides a possible semantics for the negative role of EN *ne* in French. Let us begin by assuming that *I* is the interval denoted by an event in a temporal clause headed by *avant*, for our purposes. Thus, *I* is the set of the times at which the event in the *avant*-clause is taking place. The set of times that precede and follow interval *I* in a contextually defined period of time is its *complement*, called $\neg I$. Keep in mind that $\neg I$ correspond to all the times that do not belong to interval *I*. We represent interval *I* and its complement $\neg I$ in (27). Consider now that the semantics for *avant* in (19) indicates a situation in which event A (the event in the main clause) must start before the earliest time of event B (i.e., before the event in the *avant*-clause starts). Note that this does not say anything about when event A should end. Accordingly, it could be the case that event A starts before event B starts, and some but not all times in event A precede the start of event B, so that A continues taking place while B is also taking place—this interpretation corresponds to the overlapping reading. In contrast, it could also be the case that event A in its totality (i.e., all the times in event A from beginning to end) precedes event B—this interpretation corresponds to the non-overlapping reading. These readings are represented in (28a) and (28b), respectively.

(27) Complement of interval *I*

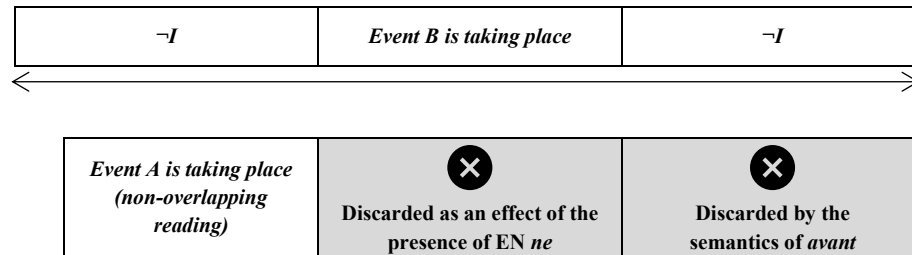


(28) Overlapping and non-overlapping readings of *avant*



Both cases (28a) and (28b) satisfy the semantics of *avant*, which only requires that some(s) time(s) in event A precede all the times in event B. Our results show that, when the *avant*-clause contains EN (e.g., sentence (23) above), essentially only non-overlapping readings are available. If negation expresses the complement function, then EN is negative. Applied to the temporal constructions with *avant*, this negative role of EN entails that event A must be entirely located in the complement of the set of times at which event B is occurring. The graphic in (29) illustrates what this means. The presence of EN *ne* enforces the occurrence of event A entirely in the complement set of the event B, so any potential overlap with B is discarded as an effect of the presence of EN. Also, *avant* requires that event A precede event B, so only the set of times that precede event B are relevant for the occurrence of event A. The set of times after B is, thus, discarded by the semantics of *avant*. The effect is strictly a non-overlapping reading because event A must occur from beginning to end in the complement to the set of times at which B occurs. As previously discussed, non-overlapping readings are possible with and without EN, but with EN this reading is enforced and the only one possible.

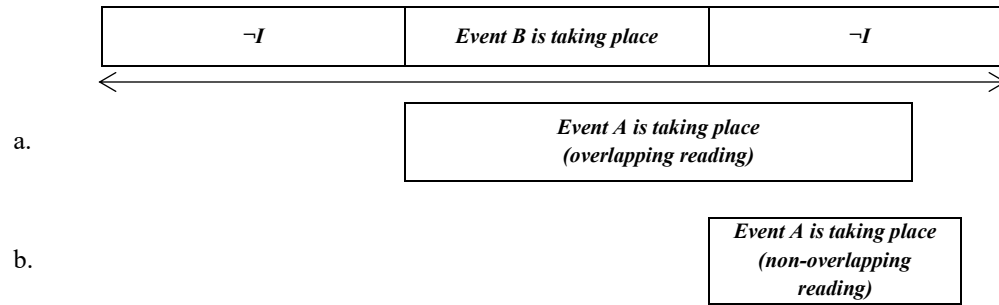
(29) Role of EN *ne* in sentences with *avant*-clauses like (23)



We have also examined sentences with the complex negative marker *ne...pas* in the main clause (e.g., sentences (24) and (25) above). This negation has wide scope, that is, it takes scope over the whole sentence, including the *avant*-clause. Accordingly, when the semantics of *avant* in (19) appears under the scope of negation, the interpretation is that it is not the case that event A in the main clause starts before the earliest time of event B in the *avant*-clause. Event A thus must start at or after the earliest time in B. A formalization of this interpretation is shown in (30). Note how the sequence of temporal relations has changed—under the scope of negation, event B in the *avant*-clause precedes event A in the main clause or takes places at the same time as event A. Just like sentences with positive polarity and *avant*-clauses, the semantics of *avant* under the scope of negation allows overlapping and non-overlapping readings. It could be the case that event A starts and takes place while event B is also taking place, which corresponds to an overlapping reading. In contrast, it could also be the case that event A starts after event B has fully occurred from beginning to end, which corresponds to a non-overlapping reading. These readings are represented in (31a) and (31b), respectively.

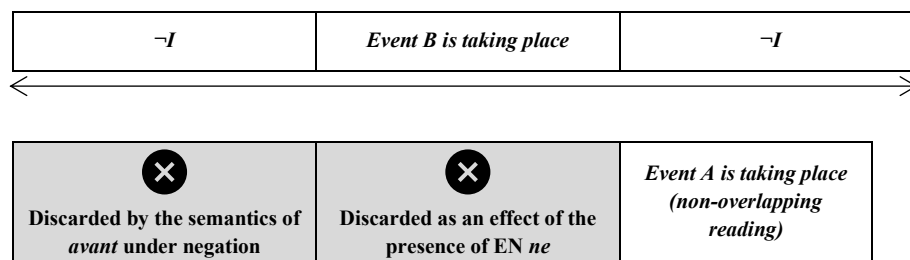
(30) *Avant* under the scope of negation
 $\neg [A \text{ before } B]$ is true iff $\forall t \in A [t \geq \text{EARLIEST}(B)]$

(31) Overlapping and non-overlapping readings of *avant* under the scope of negation



As explained above, in the presence of EN in an *avant*-clause, only non-overlapping readings are available, and this is the case even if the main clause contains *ne...pas* (as in (25)). Manifesting the complement function, EN *ne* negates the possibility of overlap, with the result that event A in the main clause is expected to occur in the complement of the set of times at which B in the *avant*-clause takes place. The graphic in (32) shows that the presence of EN *ne* makes the occurrence of event A entirely to be in the complement set of the event B, and this enforced reading discards any potential overlap with B. Also, being under the scope of negation, *avant* requires that event B precede event A, so only the set of times that follow event B are relevant for the interpretation of when event A must occur. Thus, the set of times preceding event B is discarded by the semantics in (30). Given that event A must occur in the complement to the set of times at which B occurs, EN *ne* has the effect of creating a strict non-overlapping reading. In both positive and negative sentences with *avant*, non-overlapping readings are possible with and without EN, but with EN the only reading available is the non-overlapping reading.

(32) Role of EN *ne* in sentences with *avant*-clauses under the scope of negation like (25)



As has been discussed, the semantic contribution of EN *ne* to the interpretation of *avant*-clauses is non-trivial. EN negates the possibility that the time of occurrence of the event in the main clause overlaps with the time of occurrence of the event in the *avant*-clause. In this way, by expressing the complement function, EN *ne* does convey negation restricting the occurrence of the event in the main clause to the complement of the times expressed in the *avant*-clause. Accordingly, EN plays a role in changing the size of the time interval at which an event is expected to hold (Cépeda 2018b). Therefore, the truth conditions of sentences with an *avant*-clause with and without EN *ne*

are different. As a consecutive effect, the absence of overlapping creates a dependence flavor perceived by native speakers as a conditional reading.

To account for the negative role of EN in the specific case of French *avant*-clauses, we expand Beaver & Condoravdi's (2003) semantics of *before*, which appeared above in (19) and is repeated here as (33) for convenient comparison. Let us recall that (33) allows overlapping and non-overlapping readings. French EN *ne* removes the times at which overlapping is possible and only allows non-overlapping readings, so this role needs to be added to the interpretation of *before* when EN is present. We propose the semantics in (34), where the contribution of EN *ne* is underlined. This addendum states that there is no time in A that is also a time in B, that is, there is no possibility of an overlap between the times at which A is taking place and the times at which B is taking place. Therefore, EN restricts the possibilities of time occurrence that *before* allows for an event.

(33) Semantics for *before* (Beaver & Condoravdi 2003; Condoravdi 2010)
 $A \text{ before } B$ is true iff $\exists t \in A [t < \text{EARLIEST}(B)]$

(34) Semantics for *before* + contribution of French EN *ne*
 $A \text{ before } \underline{ne} B$ is true iff $\exists t \in A [t < \text{EARLIEST}(B)]$ & $\neg \exists t' \in A [t' \in B]$

It is important to remember one more time that, although a non-overlapping reading is also available in the absence of EN *ne*, this interpretation is enforced as the only interpretation when EN *ne* is present.

7. Conclusions

In this article, we have discussed the phenomenon of the so-called expletive negation (EN), a negative marker that does not reverse the truth value of the sentence in which it appears and, therefore, it does not fit the traditional definition of negation in natural languages. After discussing its distribution crosslinguistically, we have examined some accounts of EN that assumed it to be either vacuous in meaning or to be expressing an attitudinal content, which is different from negation. Contrasting with such accounts, we follow Cépeda (2017, 2018b) in adopting an account of EN that preserves its negative meaning. Importantly, our account embraces an approach to negation in natural languages that goes beyond its truth reversal role, taking negation to express the complement function following Postal (2005). Accordingly, we offer an analysis of French EN *ne* as taking scope over the temporal trace of the events related by *avant* and negating the possibility of overlap between these two events.

We introduced an overview of the interpretations of *before/avant*, that is, its temporal and its counterfactual readings. We focused on the temporal reading and showed that, while expressing precedence, *before* allows overlapping and non-overlapping readings. We adopted Beaver & Condoravdi's (2003) semantics for *before* to describe the semantics of *avant*. In addition, we reviewed the intuitions French speakers have when interpreting *avant*-clauses with and without EN *ne*, whether this clause is embedded within a main clause that contains negation or not. These intuitions point to a conditional reading when EN *ne* is present in the *avant*-clause, which is further

explained as the need for one event to be fully completed for the other one to start happening, which is in line with a non-overlapping reading.

Based on the hypothesis was that the presence of EN *ne* in *avant*-clauses increases the preference for non-overlapping readings, we conducted two experimental studies with native speakers of French to better understand the role of EN *ne* in *avant*-clauses. The experiments consisted in a series of pairs of test sentences (with and without EN) and a verification statement expressing the non-overlapping reading. Experiment 1 tested test sentences without negation in the main clause, while Experiment 2's test sentences contained negation in the main clause. The analysis of the results indicates an overall preference for non-overlapping readings when EN *ne* is present in the *avant*-clause.

These effects led us to support our claim that EN is indeed expressing negation once we understand negation beyond its traditional polarity-inverting role and consider it as the complement function. We propose a semantics for the contribution of EN *ne* in *avant*-clauses, which states that EN is denying the possibility of overlapping between the events involved in the temporal relation. This absence of overlapping triggers the conditional reading, according to which one event must finished before the other starts. Our findings offer a new perspective on a classic problem in Romance linguistics and allow a better understanding of the role of negation in temporal clauses.

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