Double Negation in a Negative Concord Language: An Experimental Investigation
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Abstract

This paper investigates the interpretation and processing of simple transitive Catalan sentences with multiple negative expressions experimentally. Our results provide empirical confirmation that Negative Concord (NC) is the preferred and faster interpretation for negative sentences that either omit or contain the overt negative marker *no* ‘not’. However, they also reveal that, in contrast to traditional descriptions of Catalan and independently of particular favoring contexts, a non-negligible amount of Double Negation (DN) readings arises, mainly when the negative marker co-occurs with pre-verbal Negative Concord Items (NCIs), and when these NCIs have a complex DP structure. Our results further suggest that two populations could be distinguished: one for whom the negative marker is optional and leaves the favored NC reading essentially unaffected, and another where the co-presence of *no* significantly increases DN readings. We account for these findings within a micro-parametric approach that features ambiguous NCIs (non-negative vs. negative) and a possible ambiguous negative marker *no* (negative vs. expletive) variably available for Catalan speakers. The nuanced

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empirical NC landscape that our experimental work reveals serves to stress the importance of taking DN readings into consideration for a better understanding of the nature of negative constructions in Catalan and cross-linguistically.

Keywords: Negative Concord, Double Negation, experimental approach, micro-parametric account, ambiguous Negative Concord Items, Catalan

1. Introduction

Within the charted landscape of Negative Concord (NC) languages, Catalan is often cast as a misfit because it presents the peculiarity of optionally allowing the co-presence of a sentential negative marker no ‘not’ with pre-verbal Negative Concord Items (NCIs)\(^1\) (Fabra 1912, 1918, 1956; Badia i Margarit 1962, 1994; Solà 1973; Quer 1993; Vallduví 1994; Espinal 2000a, 2002). The central goal of the present paper is to report the results of an experimental research that sought to test when, and to what extent, native speakers of Catalan prefer to interpret negative sentences of various types with a single negation interpretation as a Negative Concord (NC) reading, and whether, in some circumstances, with specific syntactic combinations of Negative Concord Items (NCIs), with and without a sentential negative marker, a Double Negation (DN) reading could emerge in simple transitive clauses as it has been claimed to emerge in other NC languages like Romanian.

We report on two experiments that aimed at investigating the following four questions. First, we tested whether it is correct, as standardly assumed by Catalan

\(^1\) In this paper we opt to use the descriptive term Negative Concord Item (NCI) (Watanabe 2004) instead of the more frequently used term *n-word* (Laka 1990) to refer to expressions that can participate in Negative Concord constructions, sharing the semantic property of being licensed both in negative and in non-negative contexts and of appearing sometimes negative by themselves. This choice seeks to steer away from the cultural connotations that the term *n-word* has taken on in the language of North-Americans.
grammarians, that NC is systematically and consistently the default interpretation for sequences of multiple negative terms; second, we asked whether the processing of negative sequences in Catalan could be overall faster, and hence presumably easier to parse, under a NC reading than under a DN one. The latter is commonly assumed to be cross-linguistically marked (Corblin et al. 2006, de Swart 2010, Puskás 2012), but has recently been shown, in equivalent experimental settings, to be sometimes equally fast, and even sometimes faster in distinct languages; third we verified whether the co-presence of the sentential negative marker no with pre-verbal NCIs could influence the readings of negative sequences and increase DN readings and fourth, we investigated whether the morpho-syntactic nature of the NCIs involved in a negative sequence could influence the readings preferred by native speakers, increasing or decreasing a putative preference for a NC vs. DN reading.

Regarding the first question, we aimed at investigating to what extent the default nature of NC readings in Catalan can be confirmed, and whether Catalan sequences of NCIs in simple transitive clauses are essentially always unambiguous, radically favouring NC readings in neutral discourse and prosodic contexts across native speakers, as expected from the literature.\(^2\)

Regarding the second question, we aimed to experimentally test whether speakers process NC readings more easily and faster than DN readings, and whether the common belief that DN readings have a higher degree of parsing complexity than NC / single negation readings can be correlated with a longer reaction time.

Finally, regarding the third and fourth questions, our experiments were designed to explore whether native speakers of Catalan have a preference for NC readings

\(^2\) See references above.
irrespectively of the co-presence or absence of a sentential negation marker with pre-
verbal NCIs. One of our goals in raising this precise question was to seek to establish an 
experimental base line for further investigation of the properties of Catalan NC, and in 
particular of the factors that can bring about the emergence of DN readings, if any. A 
second goal was to provide an experimental assessment of the strength of NC 
interpretations in Catalan, for the purpose of cross-linguistic comparison with other 
Romance languages, such as French, Italian, Portuguese and Spanish. A third goal was to 
investigate the effects, if any, of the morpho-syntax of DP NCIs on the interpretation of 
negative sequences. In this respect, we considered simple NCI pronominal forms vs. full 
DPs (with both partitive and non-partitive forms), and their parallel vs. non-parallel 
distribution in subject and object position.

The paper is organised as follows. Section 2 presents a summary of the relevant 
background facts about the interpretation of negative sequences in Catalan, centring on 
the properties of this language as a NC one, and on the contexts where the negative 
marker no seems to be optional. We then present some theoretical accounts of these 
known facts from the literature, focusing more specifically on the required ingredients of 
a micro-parametric approach to Catalan NC. In Section 3, we present our experimental 
design and methodology. Section 4 details the results of our experiments. Finally, Section 
5 discusses these results and assesses their consequences within a general theory of NC.

2. Background

2.1. Catalan as an NC language
Negative doubling (den Besten 1986), in which multiple occurrences of morphologically negative constituents are interpreted as a single logical negation, is a common synchronic phenomenon in Catalan. Characteristic Catalan examples provided in (1) contain both n-words (Laka 1990) (ningú ‘nobody’, res ‘nothing’), here referred to as NCIs (see footnote 1) and the negative marker (no ‘not’):

(1) Ningú (no) pensa res.

nobody not thinks nothing

‘Nobody is thinking anything.’

As is well known, no ‘not’ is optional with NCIs in pre-verbal position but must be present with post-verbal ones, as the examples in (2), from Fabra (1956: 83), with an unaccusative predicate and a pre-verbal (2a) and post-verbal subject (2b) illustrate here:

(2) a. Cap d’ells (no) ha vingut.

none of them not has come

‘None of them has come.’

b. *(No) ha vingut cap d’ells.

not has come none of them

‘None of them has come.’

This well-known asymmetry has long fuelled the on-going debate on the status of Catalan NCIs as negative quantifiers (2a) or as polarity items (2b). In their ability to express a negative meaning alone when occurring in pre-verbal position (2a), or as fragment answers to questions (3), Catalan NCIs show clear similarities with English negative quantifiers.

(3) A: On vas?
where go.2sg?

‘Where do you go?’

B: Enlloc.

nowhere

‘Nowhere.’

In post-verbal positions, however, Catalan NCIs have a polar behaviour (Linebarger 1987; Progovac 1994; Giannakidou 1998, 2000; Martins 2000), as they are sensitive to the non-veridical (Zwarts 1995) property of a c-commanding licenser or of the contexts in which they felicitously occur.

(4) a. No ha comprat cap dels llibres. (negation)

not has bought none of.thePL books

‘(S)he has not bought any of the books.’

b. Ha comprat cap dels llibres? (question)

has bought any of.thePL books

‘Has (s)he bought any of the books?’

c. Si ha comprat cap dels llibres, jo ho hauria de saber. (conditional)

if has bought any of.thePL books I it should of know

‘If (s)he has bought any of the books, I should know it.’

According to traditional descriptive Catalan grammars, the combination of NCIs with other NCIs or minimizers (Vallduví 1994) –otherwise known as negative spread, (with or without no)– always leads to a single negation / NC reading and never to a cancellation of negations into a positive meaning (Horn 1989), in contrast to what is usually found with negative quantifiers for languages such as Standard English.
This contrastive interpretation of sequences of negative expressions in languages like Catalan (5) vs. languages like English (6) that embodies the difference between Negative Concord (NC) and Double Negation (DN) has been taken under some approaches (Zeijlstra 2004 among others) to be the core factor of a parametric divide between NC languages like Catalan, French, Italian, Portuguese and Spanish, on the one hand, and DN languages like Standard English, Dutch and German, on the other hand. On this view, the question arises whether DN interpretations of sequences of negative expressions are ever possible in NC languages, and particularly of what, if anything, can license them. In other approaches to NC (de Swart and Sag 2002), NC vs. DN readings are taken to be the two ambiguous faces of the same negative sentences and thus predicted to occur in all languages.

According to traditional descriptive Catalan grammars, DN readings are only possible and in fact required when two sentential negations occur in different clauses (cf. the Law of Double Negation, Horn 1989), as in (7):

(7)  *No vull que no vingui.*

not want that not come_{SUBJ}

(5)  a. *Ningú pensa res.* (=1b)  NC
    nobody thinks nothing
    ‘Nobody is thinking anything.’
  
  b. *Enlloc es veu ni una ànima.*  NC
    nowhere CL sees not a soul

(6)  a. *Nobody is thinking nothing.*  DN
  
  b. *Not a soul can be seen nowhere.*  DN
‘I don’t want him not to come.’ (=I want him to come)

Yet DN is sometimes observed in single clauses under particular syntactic conditions, such as for instance (8a), where an adjunct PP ambiguously allows both DN and single negation/NC readings (Tubau and Espinal 2012). The ambiguity disappears when a second no precedes the NCI in the PP adjunct, as in (8b).

(8) a. *No lluiten per res.* (DN and NC in Catalan)

not fight for nothing

‘They don’t fight for nothing. / They don’t fight for anything.’

b. *No lluiten per no res.* (DN in Catalan)

not fight for not nothing

‘They don’t fight for nothing.’

Otherwise, special conversational, prosodic and gestural conditions are generally claimed to be necessary for DN readings to emerge, be it for sequences of multiple negative terms in single clauses or with isolated NCIs. Espinal and Prieto (2011), Prieto et al. (2013), and Espinal et al. (in press) experimentally investigated some of the prosodic and gestural factors that favour DN in Catalan and Spanish. Regarding conversational conditions more particularly, Catalan DN readings were argued to emerge only in discourse contexts that allow an accessible negative proposition (or presupposition) –either explicitly contained in the previous discourse, or inferred from it– to be denied (Dryer 1996, Prince 1992, Geurts 1998, Espinal and Prieto 2011). In these respects, Catalan is not assumed to much differ from other NC languages, where the role

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3 For Tubau and Espinal (2012) this type of clause internal DN results from the presence of an abstract negative operator NEG, triggered by the NCI that checks its negative morpho-syntactic feature within this special PP construction, in combination with the overt negative marker no.
of contextual and prosodic factors such as prosodic phrasing, stress, contrastive focus, and intonation have also been highlighted as potential DN triggers (Corblin 1995, 1996; and Déprez 1999, 2000 for standard French; Vinet 1998 for Québec French; Corblin and Tova 2003 for French and Italian; Molnár 1998 and Puskás 2006, 2012 for Hungarian; Zanuttini 1991, 1997, Godard and Marandin 2007, and Penka 2007 for Italian; Falaus 2007 for Romanian; Huddlestone 2010, Biberauer and Zeijlstra 2012 for Afrikaans, see also de Swart 2010). Pragmatic factors can also influence the availability of DN readings in some languages. For example, a DN reading is generally favoured in the following French example in (9) and also possible in other languages such as Spanish, Italian and Romanian:

(9) a. Personne ne commet aucun péché.
   no one NEG commits no sin
   ‘No one commits no sin.’

b. Personne ne meurt jamais.
   no one NEG dies never
   ‘No one never dies.’

Comparable facts, however, do not seem to obtain readily in Catalan NCI sequences.

In sum, although NC readings are generally thought to be the default reading for sequences of negative expressions, DN readings are also sometimes possible, but generally argued to emerge only under a narrow set of circumstances not yet fully understood but quite generally held to be exceptional in some ways.

2.2. The role of no
This section focuses on the role of the sentential marker no ‘not’ in Catalan negative sentences. As a preliminary, note that first and foremost, the Catalan sentential negative marker no is the linguistic form that encodes the monadic negative operator ¬ and expresses an interpretable negative formal feature.

In sentences containing NCIs in pre-verbal positions, as noted above, no is always possible, but not systematically required. The source of this optionality remains unclear. On the one hand, traditional prescriptive grammars of Catalan encourage the use of no with pre-verbal NCIs to distinguish non-negative uses of NCIs from negative ones as in the following examples from Fabra (1912: 218), since the presence of no here appears to make a meaning difference.

(10)a. Si mai vinguéssiu, què farien ells?
   if ever comeSUBJ what doCOND they
   ‘If you ever came, what would they do?’

b. Si mai no vinguéssiu, què farien ells?
   if ever not comeSUBJ what doCOND they
   ‘If you never came, what would they do?’

On the other hand, descriptive grammars of contemporary Catalan claim that, if pre-verbal NCIs are focalized (the capital letters stand for emphasis), then no is preferably explicit (Espinal 2002: 2766, exs, (106b,c) and (107b,c)).

(11)a. Ningú (no) ha vist res.

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\footnote{As will be clear later in the paper, it turns out that traditional and descriptive grammars of Catalan only describe one of the varieties encountered in our empirical investigation, namely the variety we will label Variety A, whose speakers mainly use polar NCIs and have a non-negative use of no. As explicit in our Results section, the current paper also considers the empirical facts and theoretical soundness of a different variety, Variety B, whose speakers use negative quantifiers in focalized positions and have a regressive use of non-negative no.}
nobody not has seen nothing

‘Nobody has seen anything.’

b. NINGÚ no ha vist res.

nobody not has seen nothing

‘Nobody has seen anything.’

(12)a. Enlloc (no) es veia ni una anima.

nowhere not CL saw not a soul

‘Nowhere was a soul to be seen.’

b. NI UNA ÀNIMA no ha vist.

not a soul not has seen

‘Not a soul has (s)he seen.’

Espinal (2002: 2767) further states that the negativity of a sentence is intensified when the negative marker is explicit, (13). Moreover, she also notes that the tendency to prefer an overt negative marker increases as the distance between the pre-verbal NCI and the verb gets larger (14).

(13) De cap manera no vull que em deixis diners.

of no way not want that meDAT lend money

‘By no means do I want you to lend me money.’

(14) Cap de les plantes que vam deixar a la banyera abans de marxar de vacances no sembla que s’hagi mort.

none of the plants that PAST leave in the bathtub before leave of holidays not seem that CL.hasSUBJ died
'None of the plants that we left in the bathtub before leaving on holidays seems to have died.'

These facts suggest that the prosodic phrasing of the pre-verbal NCI along no may be of relevance in influencing its presence. Notwithstanding the precise conditions of its appearance, the sentential negative marker no is quite generally assumed to have no polar semantic effect on the overall interpretation of these type of sentences. In particular, no in such contexts is not taken to contribute an additional semantic negation.

In sum, while prescriptive grammars recommend the use of a negative marker no in pre-verbal position of negative sentences generally, descriptive grammars acknowledge that native speakers hesitate on the use of no after pre-verbal NCIs (Solà 1973: 97, Espinal 2002: 2767). The reasons of this hesitation are not well understood, but could well reflect sociolinguistic factors, such as age, language dominance of the speaker’s area of living, and percentage of use of Catalan in daily life. According to Vallduví (1994: 273, note 8), the optionality of no “is a matter of register”. And indeed, the current tendency in spoken Catalan and in the media-variety is to omit the negative marker.

Espinal (2007) interestingly observed that a comparable optionality and lack of polar semantic effect in the use of the negative sentential marker no is also found in other Catalan sentence types, namely in contexts of so-called expletive negation (EN). EN “refers to a pleonastic (paratactic or redundant) use of negation that does not modify the truth value of the proposition in which it appears (Jespersen 1917; Vendryes 1950; Martin 1984; Muller 1991)” (Espinal 2007: 51). Characteristic Catalan examples are given in (15), with the optional expletive negative marker in parentheses and the lexical trigger of EN in italics:
(15)a. Abans que (no) arribi l’amfitrió, deixeu que em presenti.

‘Before our host arrives, let me introduce myself.’ (Espinal 2007: 50, ex. (1a))

b. La policia evità que (no) hi hagués un accident.

‘The police prevented an accident.’

c. Gasta més ell en tres mesos que (no) tu en tot l’any.

‘He spends more in three months than you in a year.’

(Espinal 2002: 2777, ex. (136a))

d. Va prometre que s’esperaria fins que el seu xicot (no) tornés de la guerra.

‘She promised to wait until her boyfriend came back from the war.’

(Espinal 2002: 2777, ex. (136b))

For Espinal (1991, 1992) and van der Wouden (1994a, 1994b), expletiveness is a semantic effect that obtains in Logical Form when the semantic property of specific syntactic constituents (either the negative marker no or an NCI) is absorbed by the semantic contribution of another expression in the context. As illustrated in (15), expletive no is licensed under non-veridical contexts, under conditions that quite parallel those of polarity licensing. As Espinal suggests the expletive negation of (15) may well be a type of polarity dependency comparable to the one observed in (16) with NCIs.
(16)a. *Abans que ningú digui res, deixeu-me donar-vos la benvinguda.*

   before that nobody say_{SUBJ} nothing let.me give.you the welcome

   Before anyone says anything, let me welcome you.’

   (Espinal 2007: 50, ex. (1b))

b. *La policia evità que hi hagués cap accident.*

   the police stopped that CL had_{SUBJ} any accident

   ‘The police prevented that an accident.’

Espinal further observes that the conditions of use of the Catalan expletive *no* strikingly parallel those of the optional *no* with pre-verbal NCIs. There is comparable optionality, and the hesitation or register variety of use observed in the Catalan population seems to cross both of these constructions equally, and presumably along the same patterns. This commonality of occurrence clearly suggests that both phenomena should profitably receive a parallel account. In particular both the optionality of *no*, when in co-occurrence with pre-verbal NCIs, and the expletiveness of *no* in the context of specific lexical triggers suggest that Catalan could manifest two homophonous distinct lexical variants of *no*, one semantically negative and the other not, akin to the lexical distinction found in French between the semantically negative marker *pas* and the expletive negative marker *ne*. This is indeed what Espinal and Tubau (to appear) propose, as is further discussed below. The existence of two distinct lexical negations is also defended for Afrikaans by Biberauer (2008, 2009, 2012). Biberauer (2013) gives the following list of properties distinguishing the two:

<table>
<thead>
<tr>
<th>Property</th>
<th>Nie₁</th>
<th>Nie₂ = expletive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omission → meaning change (polarity reversal)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Modifiability</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>-----------------------</td>
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<td>----</td>
</tr>
<tr>
<td>Substitution by emphatic negator</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Stressability</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 1. Properties to distinguish between semantically negative and expletive *nie* in Afrikaans

These properties, which are clearly reminiscent of those of the two distinct negation markers found in French, *pas* and *ne*, also obtain in Catalan.

In an attempt to explain away the optionality of *no*, Van der Wouden and Zwarts (1993: 216-7) were to our knowledge the first to hypothesize the existence of a dialectal variation. According to them, “there exists one dialect of Catalan that parallels French (or Afrikaans) in the sense that a doubling element *no* (that may express negation on its own) is always obligatory whenever negative elements show up in the sentence, and another dialect that behaves like Italian, with doubling only from post-verbal positions”.

According to this description, in one dialect (Variety I) *no* is always obligatory, whereas in the second one (Variety II) *no* is only obligatory to license post-verbal NCIs.

However, contrary to these claims, recent work by Espinal and Tubau (2014) concluded (i) that Variety I does not exist, since there is no variety of Catalan for which *no* is always obligatory, and (ii) that Variety II does not characterize any dialect at all, since all post-verbal NCIs, PIs and minimizers, can be licensed by the negative marker, or by an NCI in pre-verbal position. We take up this issue further in our discussion section, after the results of our experiment have been presented. But first, we briefly summarize recent theoretical approaches that propose an account for this specific issue, as well as for the other properties of Catalan NC described above.
The literature on NC is vast, with two main issues traditionally articulating the discussion. One is the negative force of NCIs; the other is their quantificational status. NCIs have been claimed to be universal quantifiers, both negative (Zanuttini 1991, Haegeman and Zanuttini 1991, among others) and non-negative (Giannakidou 2000), non-negative polarity items (Bosque 1980, Laka 1990, among others), and indefinites, both negative (Suñer 1995) and non-negative (Ladusaw 1992, 1994, Zeijlstra 2004, Tubau 2008, among others). Other accounts have cast NCIs as numerals of cardinality zero (Déprez 1997b, 2000, and following; Espinal 2000a) with underspecified quantificational force, or as items that are ambiguous between weak negative polarity items and strong negative polarity items (Martins 2000), or ambiguous between polarity items and negative quantifiers, either lexically (Herburger 2001) or structurally (Déprez 1997b, 2000, 2011a, b; Déprez and Martineau 2004). Theoretical approaches to NC are always narrowly linked to the status proposed for NCIs, but as a proper review of this abundant literature would take us too far afield, here we restricted our focus on the most prominent recent accounts that have made a specific proposal regarding Catalan NC. Before presenting the micro-parametric approach to NC recently developed in Espinal and Tubau (to appear), we oppose two views, namely the macro-parametric account in Zeijlstra (2004) and subsequent work, and the polyadic quantification approach of de Swart and Sag (2002).

### 2.3.1. A macro-parametric account: Zeijlstra (2004)

For Zeijlstra (2004 and subsequent work) the phenomenon of NC is nothing but the realization of a syntactic agreement (formalized under Chomsky’s (1995) Agree
operation) between a single negative operator (which can be overt or abstract) carrying an interpretable negative formal feature, [iNeg], and one or more elements carrying an uninterpretable negative feature, [uNEG]. For him, NCIs are semantically non-negative indefinites that carry an uninterpretable negative feature [uNEG] that must be checked by an interpretable negative feature [iNEG] on a semantic negation. Zeijlstra (2004, 2008) further argues that NC languages are distinguished from DN languages by a macro-parameter that states that the former have a formal negative feature, while in the latter the negative feature has no formal status but is purely semantic. This macro-parametric variation is formalized as in (17):

(17) 

\[
\begin{align*}
\text{a. NC: } & [\text{iNEG}] X \\
\text{No NC: } & [\text{NEG}] X
\end{align*}
\]

To further distinguish among varieties of NC languages, such as Strict and Non-Strict NC languages (Giannakidou 1998), Zeijlstra assumes that negative markers can differ as negative expressions do in DN vs. NC languages, in being either semantically negative (i.e., [iNeg]) in Non-Strict NC languages, or semantically non-negative (i.e., [uNeg]) in Strict NC languages. This yields the typology in Table 2.

<table>
<thead>
<tr>
<th>Negative markers semantically negative</th>
<th>n-words (=NCI) semantically negative</th>
<th>n-words (=NCI) semantically non-negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN languages:</td>
<td>Dutch, German, Swedish</td>
<td>Non-strict NC languages:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spanish, Italian, Portuguese</td>
</tr>
<tr>
<td>Negative markers semantically non-negative</td>
<td>Afrikaans A</td>
<td>Strict NC languages:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Czech, Serbo-Croatian, Greek,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Afrikaans B</td>
</tr>
</tbody>
</table>

Table 2. Biberauer and Zeijlstra’s (2012) typology of NC and DN languages

With respect to this typology, as Zeijlstra (2004) notes, Catalan appears to be a
misfit because of the optional occurrence of its negative marker, which is neither obligatory as in Strict NC languages, nor limited to co-occur with only post-verbal NCIs as in non-Strict NC languages. In an effort to reduce this Catalan misfit to the NC patterns observed elsewhere, Zeijlstra (2004) follows Van der Wouden and Zwarts (1993: 216-7) in claiming that the Catalan negation optionality flags the existence, side by side, of two distinct varieties. For him, Variety I, on the one hand, has Strict NC characterized by the obligatory presence of *no* for NCIs in all syntactic positions, in similarity with Greek and Romanian. Variety II, on the other hand, must disallow *no* with pre-verbal NCIs, as it features Non-Strict NC, in similarity with Italian and Spanish. On this view, the optionality of *no* is illusory.

Zeijlstra’s approach makes very clear empirical predictions. First and foremost, it predicts that in a NC language, DN should simply not arise. Furthermore, for Catalan in particular, speakers of Variety I should find sentences lacking *no* with pre-verbal NCIs to be as ungrammatical as they are in other Strict NC languages. For speakers of Variety II, in contrast, sentences featuring a pre-verbal NCI with *no* should be ungrammatical or have a systematic DN reading, as reported for in Non-Strict NC languages. These predictions, however, do not accord with the traditional descriptions of Catalan summarized above where sentences with pre-verbal NCIs that lack *no* are considered grammatical for all speakers and where the co-presence of *no* is quite generally assumed to leave the solid NC interpretation of sentences with NCIs fully unaltered. Our experiments meant to verify these predictions.

2.3.2. The polyadic quantification approach of de Swart and Sag (2002)
In contrast to Zeijlstra (2004 and following), de Swart and Sag (2002) and de Swart (2010) take NCIs to always be negative quantifiers. For them, NC corresponds to one interpretation that is afforded by the interaction of these negative quantifiers in a polyadic quantifier framework (van Benthem 1989; Keenan and Westerståhl 1997). On this approach, there is no parametric distinction between NC and DN languages, since every sentence involving multiple negative elements can receive both a resumptive and an iterative interpretation. The first corresponds to a NC reading, the second to a DN reading. However, while NC / DN ambiguities for multiple negative constructions are well attested in French and Romanian (i.e., languages for which independent resumption analyses were respectively proposed by Déprez 1997b, 2000; Falaus 2007; and Iordâchioaia 2010), in other languages commonly exhibiting NC, no comparable systematic ambiguity has so far been reported, and DN readings are quite generally thought to only arise under restrictive and unusual contextual conditions, as discussed above for Catalan. Thus, for a resumption analysis to be able to account for cross-linguistic variations in NC, an additional mechanism must be assumed. To tackle NC typological differences, de Swart (2010) proposes to embed her resumptive analysis in a bidirectional optimality framework. Her analysis of Catalan involves the interaction of five constraints presented below:

- MaxNeg: Mark the argument of a negative chain.
- NegFirst: Negation is pre-verbal (Jespersen 1917, Horn 1989).
- MaxSN: A negative clause must bear a marker of sentential negation.
- *Neg: Avoid negation in the output. (Markedness constraint).
- InterpretNeg (IntNeg): Interpret all neg expressions in the input as contributing a
We reproduce here the crucial OT tableaus that pertain to Catalan (de Swart 2010:173-174). The order from right to left in the tableau reflects the ranking of the constraints. Note that, in the tableau in (18), it is the high ranking of the NegFirst constraint that enforces the obligatory presence a pre-verbal marker of sentential negation with post-verbal Catalan NCIs (de Swart’s n-words), as in Italian, Spanish or Brazilian Portuguese.

(18)

Tableau 9  Generation of Catalan/Brazilian Portuguese with postverbal n-word

<table>
<thead>
<tr>
<th>Meaning</th>
<th>Form</th>
<th>MAXNEG</th>
<th>NegFirst</th>
<th>MAXSN</th>
<th>*Neg</th>
<th>IntNEG</th>
</tr>
</thead>
<tbody>
<tr>
<td>¬V∃x</td>
<td>V_neg</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>¬∃x V_neg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

With pre-verbal NCIs, in contrast, looking at the tableau in (19), since it is the NCI that satisfies the NegFirst constraint, the output is derived through the competition between the lower ranked constraints MaxSN and *Neg. If MaxSN and *Neg are unranked with respect to each other, as indicated here by the doted vertical line in the tableau in (19) below, the grammar generates two optimal outputs. This is what is assumed to derive the optionality of no with pre-verbal NCIs described by traditional Catalan grammars.

(19)

Tableau 10  Generation of Catalan/Brazilian Portuguese with preverbal n-word

<table>
<thead>
<tr>
<th>Meaning</th>
<th>Form</th>
<th>MAXNEG</th>
<th>NegFirst</th>
<th>MAXSN</th>
<th>*Neg</th>
<th>IntNEG</th>
</tr>
</thead>
<tbody>
<tr>
<td>¬∃x V Neg</td>
<td>neg V_neg</td>
<td>*</td>
<td>*</td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>¬∃x V Neg</td>
<td>neg sn V_neg</td>
<td></td>
<td></td>
<td>***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

De Swart (2010) also argues that the possibility of two distinct dialects is derivable on her approach if, instead of being unranked, MaxSN and *Neg are ranked. If MaxSN dominates *Neg, then no will be obligatory with the input or tableau (19) as in the
Variety I described by Zeijlstra (2004). The reverse domination of these two constraints produces a dialect were no is disallowed again as in Zeijlstra’s Variety II. We note here that although this approach predicts both the optionality of no described by traditional Catalan grammars and the possibility of the two dialects distinguished by Zeijlstra and Van den Wouden, it does not, however, predict what to expect with respect to the distribution of DN vs. NC readings in either of the two varieties. Regarding interpretation, De Swart states that in her account, both dialects are NC ones with the ranking *Neg >> IntNeg in the semantics, so that sentences with and without a marker of sentential negation are interpreted as conveying single negation under both grammars. In short, de Swart predicts a variety of possible grammatical outputs for Catalan, but does not match these distinct outputs to distinct interpretations.

2.3.3. The micro-parametric approach

In contrast to de Swart and Sag (2002) and de Swart (2010, and following), Déprez (1997b, 2000, and ff.) and Déprez and Martineau (2004) argue that the resumption analysis proposed in May (1990) for English negative sequences is a restricted form of NC that can be available only in constructions or languages in which NCIs are true negative quantifiers. But, importantly, Déprez argues that this type of resumptive analysis should not be generalized across all NC constructions or languages, since NCIs, like all other types of indefinite expressions can have distinct semantic and syntactic nature and, consequently, be subject to various interpretative and licensing conditions. Déprez (1997b) posits the existence side by side of two basic types of NC that form the opposite extremes of the cross-linguistic spectrum of possibilities, one, being a pure resumption type, and the other essentially equivalent to NPI licensing (non-veridical licensing). Both
types can entertain mixed and complex interactions in distinct NC constructions, within single languages or cross-linguistically, depending on the nature of the NCIs involved in particular negative sequences. This approach derives a non-uniform, intricate and nuanced landscape for NC dependencies, with variations expected within and across languages, according to the nature of the NCIs. See in particular Déprez (2011b) for a recent development of this approach. In short, Déprez proposes to combine the semantic ingredients of the above discussed two approaches within a micro-parametric framework where the choice of one or the other type of NC, resumption or NPI licensing (with NPIs of possibly distinct strength), is determined by the nature and the internal morpho-syntax semantic mapping of the NCIs that a particular language or negative sequence comprises.\textsuperscript{5}

A specific micro-parametric approach that takes into account the possibly variable nature of the negative elements involved in a negative sequence has independently been developed for Catalan in the works of Espinal (2000) and, more recently, Espinal and Tubau (to appear). In this section we present the ingredients of this micro-parametric approach to Catalan NC. This approach suggests that the difference between the two varieties of Catalan presented earlier (namely Variety I and Variety II) is based on ambiguity, not only, with respect to the nature of NCIs, but also regarding the negative marker.

As mentioned above, to account both for the possibility of EN and the optional occurrence of the sentential marker no with pre-verbal NCIs, Espinal and Tubau propose that Catalan has two homophonous lexical variants for the sentential negative marker no.

\textsuperscript{5} More specifically, Déprez (1997a, b, 2000) and Déprez and Martineau (2004) link variation in NC to the internal structure of NCIs, arguing that the closer an NCI occurs to the edge of the constituent that contains it, for instance a DP-shell, the stronger its negative force.
(20) a. *no*: semantic negation; formally specified [iNEG] (Zeijsstra 2004, ff.).

b. *no*: expletive negation; formally specified with a strong [+σ] feature that is characteristic of polar items and characterizes semantically dependent items (Chierchia 2006, Labelle and Espinal 2014).6

Moreover, along with previous ambiguity accounts for NCIs (Déprez 2000, and ff.; Martins 2000; Herburger 2001), they further propose that Catalan NCIs come in two varieties as well, a dependent NCI type and a negative quantifier, each specified as follows:

(21) a. NCI1: polarity indefinite meaning characterized [+σ].

b. NCI2: indefinite negative quantifiers meaning ¬∃.

Espinal and Tubau (2014) additionally posit two varieties of Catalan that respectively have the following distribution of negative markers and NCIs. In Variety A, where the negative marker is optional with pre-verbal NCIs, NCIs are most often polarity items assumed to be endowed with a semantic feature, [+σ], which induces domain-widening and needs to be licensed by an appropriate semantic operator (Chierchia 2006, Labelle

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6 A reviewer is especially interested in the semantic contribution of EN within Catalan NCI sequences in comparison to other syntactic contexts. Espinal (1992, 2000b, 2007) defends that in EN contexts (e.g. the Catalan verb *dubtar* ‘to doubt’, the preposition *abans* ‘before’) the licenser is an expression whose logical instructions force to consider a negative state of affairs, and the licensed constituent is either a negative marker of the weak type (Catalan and Spanish *no*, French *ne*) or a PI (pure PIs and NCIs). More specifically, Krifka (2010) and Delfitto (2013) defend that so-called EN is in fact negatively interpreted under the scope of German *bevor* ‘before’, since it yields the complement of the set of times that represents the unnegated proposition. Similarly, in Delfitto and Fiorin (2014) the authors hypothesize that the role of the negation occurring in exclamatives and rhetorical questions is to impose an order of informativity upon a hierarchical structure of accessible propositions: only when negation is high (e.g., clitic negation in Paduan) it conveys a biased interpretation and reverses the order of informativity, in such a way that the proposition that is more likely to be true is the one that is as close as possible to the top of a propositional hierarchical structure (that is, they express some sort of universal quantification). It should be pointed out, however, that EN is also common in Catalan wh-exclamatives, even though this language lacks clitic negation. In Espinal (1992, 2000b, 2007) it is hypothesized that EN in any syntactic context can be analysed as a regular negative marker that can be logically absorbed when a set of lexical and structural conditions are met. At this moment, we acknowledge that different analyses of EN and various phenomena associated with EN are available in the linguistic literature, but motivating which alternative is more appropriate for the negative marker that occurs with pre-verbal NCIs in Catalan is beyond the scope of the paper.
Espinal and Tubau (to appear) further argue that these can participate in NC structures because they undergo a process of word syntax that allows the feature [uNeg] to merge with their root specified as [+σ]. Once [uNeg] is part of a polar NCI, it requires a licensor specified as [iNeg] to Agree with. Alternatively, in Variety A, NCIs may also be existential negative quantifiers, but this seems to be an emergent possibility that is less common than the use of non-negative NCIs. Finally, Variety A distinguishes two negative markers, one which is inherently negative, specified with the formal feature [iNeg], and another one which is expletive and carries also a polarity [+σ] feature (Espinal and Tubau to appear).

In Variety B, in contrast, the negative marker is fundamentally semantically negative and, hence, specified as [iNeg]; the expletive negative in this variety is basically non-existent (and hence specified as ‘regressive’ in Table 3). Furthermore, in this variety there are also two different lexical entries for NCIs, as postulated in (21), which are in competition. As negative existential quantifiers, NCIs are endowed with an inherent Focus feature [uFoc], which (following Déprez 2011b) is assumed to require DP internal movement of the NCI to the left periphery of the DP. Espinal and Tubau’s (2014, to appear) assumptions for Catalan NCIs and negative marker(s) are summarised in Table 3.

<table>
<thead>
<tr>
<th>Catalan</th>
<th>NCIs in negative contexts</th>
<th>Negative marker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variety A</td>
<td>1. [+σ] 2. ¬∃, [uFoc] (emergent)</td>
<td>1. [iNeg] 2. [+σ]</td>
</tr>
</tbody>
</table>

Table 3. Lexical variation in NCIs and the negative marker in Catalan

Having surveyed various formal accounts of Catalan we now turn to discuss our

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Footnote: Following Espinal and Tubau (to appear) what this means is that polar NCIs are assumed to be semantically non-negative, but syntactically active to participate in NC structures. Polar NCIs start as roots defined [+σ], and, in the course of the derivation, these roots can merge with a [uNeg] feature to build a complex item.
experimental design before we consider the results of our two experiments.

3. Methods

Recall from the introduction that we designed two experiments aimed at exploring four questions; first, whether NC is always the default preferred interpretation for sequences of multiple negative elements in Catalan; second, whether the processing of NC is faster than that of DN; third, whether the co-presence of the negative marker *no* could influence the readings of NCI sequences and boost DN readings, as predicted by Zeijlstra (2004), and fourth, whether morpho-syntactic conditions and syntactic order could influence the emergence of DN readings. Overall, these questions can be understood as pertaining to the general issue of whether semantically non-compositional NC readings have a general unmarked status for the interpretation of sequences of negative expressions as compared to compositional DN readings.

To investigate our four questions, we designed two experiments in which subjects had to match a verbal stimulus with a visual one. In Experiment 1, the sentential negative marker *no* was absent after pre-verbal NCIs whereas in Experiment 2 the critical items as well as one of our control conditions (the control NPI condition) had the negative sentential marker *no* ‘not’ after pre-verbal NCIs. Thus the verbal stimuli submitted to the participants of the two experiments only differed in absence vs. presence of *no* ‘not’ in the set of critical items and the NPI control condition. Speakers were asked to choose between two pictures representing distinct scenes the one that best corresponded to the meaning of the sentence they were presented with in written form on a computer screen.
The design was a preference test and the task a picture selection one. This section of the paper details our experimental protocol.

Section 3.1 presents the participants. Section 3.2 describes the materials used in our experimental design, as well as the structure of the design. Section 3.3 explains the procedure with which the experiment was run. Finally, Section 3.4 presents the statistical model that was used to analyse our results.

3.1. Participants

70 native speakers of Catalan (58 women and 12 men, aged between 19-61 with a majority between 20-23), mostly students and staff at the Universitat Autònoma de Barcelona, participated in the two experiments. Our subjects were mostly from the Barcelona area, but some of them were from other parts of the Catalan-speaking territories. To take into consideration potential dialectal variations, speakers were asked to answer a brief sociolinguistic questionnaire at the end of the experiment. In this questionnaire, participants were asked about sex, age, place of birth and living area for the past 10 years and their daily use of Catalan. Our sample population, however, was not balanced for these factors. Answers to these questions were coded as follows:

(22)a. Regular use of Catalan in daily life: yes, no

b. Percentage of Catalan use: plus 75%, minus 75%

c. Sex: male, female

d. Age: 18-24, 25-34, more than 35

d. Birthplace: Central (CEN), Occidental (OCC), and Other (OTH)
d. Current living area: Central Metropolitan (CENMET), Central non-Metropolitan (CENnotMET), and Other (OTH)

It should be pointed out that Catalan speakers know both Catalan and Spanish, and show different degrees of dominance of the two languages. In our subject population, Catalan dominance (understood as the self-perceived amount of use of Catalan in the speaker’s daily life) was reported to be over 75% for 70% of our subjects, 50-75% for 27.14 % of our subjects, and between 20-50% for only 2.86%. In sum, the great majority of our participants predominantly used Catalan in their daily interactions.\(^8\)

Subjects were randomly assigned to one of the two experiments. 35 speakers took Experiment 1 without no ‘not’ (31 women and 4 men, aged between 20-59), and 35 speakers (27 women and 8 men, aged between 19-61) took Experiment 2 with no ‘not’.

3.2. Materials

The experimental material comprised 96 stimuli sentences matched to two pictures each subdivided into 8 conditions: 4 critical conditions, 4 control conditions and 4 different filler conditions. There were 8 token sentences for each condition, totalling 32 critical items, and 32 control items. In addition, 32 filler items were also presented. Each verbal stimulus was matched with two pictures representing scenes between which the subjects were asked to select, by mouse clicking, which one best represented the meaning of a sentence visually presented on a computer screen.

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\(^8\) A reviewer asked whether it would have been possible to test separately Catalan speakers from those that also speak Spanish. As Spanish is part of the education system of Catalan speakers and widely present in the media, it is virtually impossible to find native speakers of Catalan with no knowledge of Spanish.
The order of presentation of the verbal and visual stimuli was pseudo-randomized to obtain a balanced item presentation and avoid (i) ordering effects, (ii) stimuli repetition, whether visual or verbal, and (iii) left-right effects for the choice of pictures. 8 distinct lists of 8 blocks with 12 distinct stimuli sentences each were created. In each list, the order of presentation of the 8 blocks was distinct. Each block of 12 sentences was further subdivided into 4 sub-blocks each containing 3 sentences, with random ordering between 1 critical, 1 control and 1 filler sentence.

The speakers were presented with two scenes, each representing a situation that corresponded to a distinct reading of the sentence. A sample visual stimulus is given in Figure 1 for Experiment 1 (without no), and in Figure 2 for Experiment 2 (with no).

Figure 1. Slide used in Experiment 1 (without no). The text translates literally as ‘nobody sings none of the songs’. The image on the right is true for the NC or single negation interpretation of the sentence, the one on the left represents the DN reading.
Figure 2. Slide used in Experiment 2 (with no). The text translates literally as ‘nobody not sings none of the songs’. The image on the right corresponds to a NC or single negation interpretation of the sentence (i.e., ‘Nobody sings any of the songs’) and the one on the left to a DN reading cancelling out to a positive statement (i.e., ‘Nobody doesn’t sing none of the songs’; that is, Everybody sings some song).

For Figure 1 and 2, we expected speakers interpreting the target sentence as meaning ‘Nobody sings any of the songs’, i.e., an NC reading, to click on the right picture, and speakers interpreting it as ‘Nobody sings none of the songs’, i.e., an DN reading to click on the left picture.

The sentences used in the two experiments were organised as follows: four critical conditions, which featured sequences of two NCIs that vary in internal syntactic complexity (simple pronouns –encoded Pro– vs. full noun phrases –encoded DP–), their syntactic position (pre-verbal or post-verbal), and parallelism (same NCI type in pre-verbal and post-verbal position, distinct NCI type in both positions). This yielded the following four combinations: critical DP DP, critical Pro Pro, critical Pro DP and critical DP Pro.
Items exemplifying these four critical conditions contained the four different combinations of NCI\textsc{ss} listed and illustrated in (23), where DP means that the NCI has both a prenominal Specifier and a noun phrase or a partitive complement, and \textit{Pro} means that the NCI is a one-word pronominal form. Since sample sentences in Experiment 1 (without \textit{no}) and Experiment 2 (with \textit{no}) only differed with respect to the presence vs. absence of the sentential negative marker \textit{no} ‘not’, this is indicated in (23) by means of parentheses.

(23) \textit{Critical DP DP} (parallel complex)

\begin{itemize}
  \item a. \textit{Cap} dels \textit{alumnes} (\textit{no}) \textit{legeix cap llibre}.
  \item b. \textit{Cap} dels \textit{nens} (\textit{no}) \textit{beu res}.
  \item c. \textit{Ningù} (\textit{no}) \textit{canta cap de les cançons}.
  \item d. \textit{Ningù} (\textit{no}) \textit{trenca res}.
\end{itemize}

\begin{itemize}
  \item none of the students (not) reads no book
  \item none of the children (not) drinks nothing
  \item nobody (not) sings none of the songs
  \item nobody (not) breaks nothing
\end{itemize}

‘None of the students reads any book.’

‘None of the children drink anything.’

‘Nobody sings any of the songs.’

‘Nobody breaks anything.’
The four control conditions are listed and illustrated in (24). The control DN condition was introduced to test the capacity of speakers to produce DN readings in unambiguous biclausal sentences containing two sentential negative markers. We reasoned that speakers that could not get DN readings in these unambiguous cases would not get DN readings in our critical conditions. As it turns out, one of our participants in Experiment 2 failed this control (with a 100% error) and was removed from further analysis.

The control Universal Quantifier was introduced to test the capacity of speakers to interpret sentences with universal quantifiers in subject position in combination with existential quantifiers in post-verbal position; we reasoned that DN readings can logically correspond to Universal Quantifier readings (i.e., if there is something that none of the characters in the pictures do not do, then this is something that all of them in fact do). Thus, we needed to check that participants could independently get such readings. Sentences exemplifying this control were judged as true of a pictorially represented situation where a specific action was performed by all the characters in the picture.

The control Negative Quantifier set of sentences aimed to check the capacity of native speakers to associate a single negation reading to sentences with only one pre-verbal NCI. Both Experiment 1 (with no) and Experiment 2 (without no) shared the same set of sentences.

Finally, control NPI aimed to check the interpretation associated with pre-verbal NCIs followed by an indefinite expression, without no ‘not’ in Experiment 1 and in combination with no ‘not’ in Experiment 2. Both are equally described as conveying a
single negation interpretation in traditional and descriptive grammars of Catalan, where

no is described as simply optional.

(24) Control DN

a. No és el cas que els turistes no pesquin cap peix.
   not is the case that the tourists not fish no fish
   ‘It is not the case that the tourists did not catch any fish.’

Control Universal Quantifier

b. Tothom mou alguna cosa.
   everybody moves some thing
   ‘Everybody moves something.’

Control Negative Quantifier

c. Ningú perd les claus.
   nobody loses the keys
   ‘Nobody loses the keys.’

Control NPI

d. Ningú(no) neteja alguna cosa.
   nobody not cleans some thing
   ‘Nobody cleans something.’

A set of the 32 filler sentences (four fillers per critical sentences) meant to distract

the participants from focusing on negative sentences. A sample of these items is given in

(25), with various combinations of nominal expressions in pre-verbal and post-verbal

position of a transitive verb: with definite or indefinite articles, demonstratives, bare

plurals, positive indefinite quantifiers, and a few more sentences with universal
quantifiers as objects.

(25) a. Els nens miren un programa.
the children watch a programme
‘The children watch a programme.’

b. Aquests convidats beuen sucs.
these guests drink juices
‘These guests drink juice.’

c. Uns turistes pesquen aquests peixos.
some tourists fish these fish
‘Some tourists catch these fish.’

d. Cada home tiba una caixa.
every man pulls a box
‘Every man pulls a box.’

3.3. Procedure

Participants were individually seated in a quiet computer room at the Universitat Autònoma de Barcelona. The stimuli presentation used the Neurobehavioral Systems’ Presentation 17.0 software. Participants were presented with a set of instructional slides, the body of the experiment, and a final sociolinguistic questionnaire on their age, sex, birthplace, current place of living, and amount of Catalan use. Participants were instructed to read aloud the stimulus sentences as naturally as possible, and then press the space bar to display the relevant two pictures on the screen. The reading was recorded
and the stimulus sentence remained on the screen to prevent confusion. Picture choice was made by mouse click on the centre of the picture. Mouse trajectory and time to picture choice were measured, starting from the moment when the pictures appeared to the choice click. From time to time (approximately every 10 pictures) participants were asked to explain their choice orally responding to the question: why this choice? The experimenter listened to these responses. A total of 6,624 responses were obtained, 3,360 for Experiment 1 (32 critical + 32 controls + 32 fillers x 35 participants), and 3,264 for Experiment 2 (32 critical + 32 controls + 32 fillers x 34 participants). Each of the experiments lasted approximately between 10 and 15 minutes.

3.4. Measures and analyses

The responses were analysed using a Generalized Linear Mixed Model fit by maximum likelihood (R packages lme4, Bates et al. 2014a, 2014b, and multcomp, Hothorn et al., 2008) with a logistic regression (logit). Picture choice was recorded with two measures: mouse tracking (trajectory) from centre point, and mouse clicking (the final choice). The

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9 The reading was recorded to allow for subsequent prosodic analysis. Note that since in our design, the presentation of stimuli sentences was visual, participants were free to produce the prosodic contour they thought best fit the interpretation they chose. It is thus expected that the prosodic realisation of NC vs. DN readings could differ as a reflection of the interpretation given by participants to the sentence stimuli. A pitch track analysis of the prosodic contour produced by our subjects could thus turn out to be particularly revealing for the question of whether interpretation correlates with prosody, since it would allow us to compare the prosody of NC choices to that of DN. At present, however, since this analysis is not completed, discussion of the prosodic realisation must be left for further research. It must be noted, however, that in our design, prosody can in no way alter the results reported here. It could reflect our participants’ choice of interpretation (and it hopefully does), but it could not be the source of it or influence it, since it was not given to our participants, but it was produced by them as a function of their chosen interpretation.

In addition, no information was given to the participants regarding the pragmatic setting against which the sentence could be interpreted. That is, the experiment did not contain any explicit contextual information that deliberately favoured the emergence of DN readings. Clearly, as noted by a reviewer, the fact that we provided no context does not entail that participants did not make one up for themselves. But in this respect our experimental design does not differ from any experimental setting in which speakers are asked to evaluate sentences without a context.
time between picture appearance (after bar-pressing) and picture choice (by mouse clicking on the picture chosen) was also recorded.

In the next section we report our results on picture choice (NC / single negation vs. DN interpretation for our critical items, and true vs. false for the control conditions and fillers), as well as on the time that the choice took for distinct readings. A prosodic analysis of the recorded readings and a quantitative analysis of the mouse trajectory have been left for future analysis.

4. Results

In this section, we start by considering responses to our control items represented in Figure 3.

Figure 3. Percentage of error in the expected interpretation of control conditions in Experiment 1 (without no) and Experiment 2 (with no).

Figure 3 shows the percentage of errors participants made under the control conditions described in Section 3.2 above. Considering the overall results of the two experiments together, the total percentage of errors on control items amounted to 6.88%
of the responses. For the Negative Quantifiers control the percentage of errors was at 5.10%. For the Universal Quantifier control it was 0.73% and for the Double Negation control (i.e., those with the complex double proposition structure in (24a)) it was 3.18%. Notably, this control was entirely failed by one of our participants (100% error), who was then removed from all further analyses. Finally, for the NPI control, we note that the rate was distinctly higher with 17.94% of errors.

This much higher error rate requires clarification. Recall that the above results put together the controls for the two experiments, since in both cases, the assignment of speakers to Experiment 1 (without *no*) or Experiment 2 (with *no*) was random, so that no group difference was expected, and the tested items were all identical, except for the NPI control. Concerning the NPI control, for Experiment 2 (with *no*), we opted to add *no* ‘not’ to the NPI control sentences.\(^{10}\) This choice was guided by the following reasoning: without *no* our NPI sentences, which sports a single NCI in pre-verbal position followed by an indefinite in post-verbal position, like *Cap serventa trenca un gerro* (lit. no servant breaks any vase), are unambiguous and only have a single negation reading. As described by traditional Catalan grammars, and as is the case for our native speaker co-authors, the addition of the sentential negation marker *no* to such sentences should leave their meaning unaffected. On this view, then, the addition of *no* should have left the validity of our unambiguous control unaffected. As it turns out, however, this was clearly not the case in our experiment. Thus while in Experiment 1 (without *no*) the percentage of errors on NPI control was a low 2.90%, as expected, confirming the unambiguity of such sentences, it was an unexpected high 32.50% in Experiment 2 (with *no*). The addition of *no* in fact strongly affected the speakers’ choice, allowing a DN reading to surface from

\(^{10}\) This was not done for the other control items, as it was not pertinent.
the combination of the pre-verbal NCI with the added *no* and creating an ambiguity, such that the NPI sentence type could no longer be considered a control item. Rather than errors, indeed, it turned out that our participants’ choice of picture reflected a clear DN reading, where the negation of the pre-verbal NCI was cancelled by sentential *no*, contrary to the predictions drawn from traditional Catalan descriptions. We return to this important point in more detail below, where we opted to consider this condition along with our other critical conditions.

Returning to Figure 3 above, it is important to note that when the results for control NPI receive separate consideration, the overall percentage of errors drops to 3.20%. This is an overall low rate that clearly shows that the task was well understood by the participants, who had little difficulty picking the picture representing the relevant meaning of the sentences they were presented with. Even if the sentences containing NCIs had a more elevated rate of errors than the Universal Quantifier control condition, it remains low enough to validate the experimental design.

Let us now turn to considering our overall results on critical items in both Experiment 1 (without *no*) and Experiment 2 (with *no*). Consider first Figure 4, which shows the percentage of NC vs. DN interpretation overall, all critical conditions confounded.
Figure 4. Total percentage of NC / single negation readings vs. DN readings in Experiment 1 (without no) and Experiment 2 (with no) confounded.

Figure 4 shows clearly that the choice for NC / single negation is undoubtedly the preferred reading for simple transitive sentences with two argument NCI{s} in Catalan. Taking into account all critical items for both experiments, 84.56% of the responses show a choice for the NC reading. The comparison between NC / single negation readings vs. DN readings indicate the rate of prominence of NC choice in a solid NC language. Choice for a DN interpretation was, overall, 15.44% and is thus clearly the dis-preferred interpretation choice. It is worth emphasising, however, that beyond this clear preference, our results also indicate that DN readings are far from being entirely absent in either experiment, an observation that we detail below.

Figure 5 shows that DN readings emerge somewhat differently in all our critical conditions, which feature simple transitive sentences that contain negative expressions of different syntactic complexity distributed in pre-verbal and post-verbal positions. This figure again collapses the results of both Experiment 1 (without no) and Experiment 2 (with no) together. Eyeballing Figure 5 as compared to Figure 4, it is rather clear that the amount of DN in both experiments largely exceeds the amount of errors in our control conditions. A Wilcoxon rank sum test shows that the overall proportion of DN is greater than the proportion of errors in Fillers (p<0.001). The choice for DN, then, cannot merely be attributable to errors.
Figure 5. Percentage of NC / single negation interpretation and DN interpretation in critical conditions with different syntactic complexity in Experiment 1 (without *no*) and Experiment 2 (with *no*) confounded.

It should be noted, however, that across both experiments, 23 of our 69 participants (4 in Experiment 2) never chose a DN reading in any and all the critical conditions plus the NPI control. Such results clearly provide overwhelming empirical support to the claims in the literature that DN is a marked interpretation for Catalan NCI sequences.

When considering the results of both experiments separately, we find that in Experiment 1 (without *no*) only a small number of DN readings (6.34%) were obtained for all our critical items overall. This result does not appear to strongly differ from the rate of errors noted in our control conditions and, thus, could plausibly be attributed to mistakes. To confirm this, we conducted pairwise comparisons using a Wilcoxon rank sum test with Holm correction. The comparison of DN responses in our critical
conditions to the number of errors in the controls and fillers lead no statistically significant difference with a p=1 value.

Notably, however, the presence of the sentential negative marker *no* severely increased DN interpretations in Experiment 2 (with *no*), with the percentage of DN reading climbing to 24.29% across the four critical conditions. This figure is far too high to be attributable to error.

A GLMM analysis was run over our entire data set with perceived DN as the dependent variable. The random factors were ‘subject’ and ‘sentence’. The fixed factors were ‘Experiment’ (without *no* vs. with *no*) and ‘Condition’ (critical DP DP, critical Pro Pro, critical DP Pro, critical Pro DP). First and foremost, a massive effect of the presence of *no* was observed (p<0.001).

In Experiment 1 (without *no*), the random factor ‘Sentence’ had little effect (Variance = 0.1754), whereas the effect of the factor ‘Subject’ was higher (Variance = 3.9156). Comparing the four critical conditions with the control NPI yielded significant effects in two conditions: these were critical DP Pro (p<0.00206) and critical Pro Pro (p<0.00504). This indicates that these are the conditions that most favoured DN readings when tested items only contained interacting NCIs but no sentential negative marker. Concerning these effects, however, it needs to be kept in mind that overall the level of DN in Experiment 1 (without *no*) is not significantly different from the level of errors in our control conditions as noted above.

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11 In this GLMM analysis, the control NPI was taken as the reference of comparison because it was formally the closest to the critical conditions in that the items in this control were not combined with a pre-verbal *no* in Experiment 1 (without *no*) but were in Experiment 2 (with *no*), in similarity with the critical items.
Comparing the critical conditions among themselves by means of Tukey Contrasts Multiple Comparisons of Means (Tukey 1953), we obtained significant effects between critical DP Pro and critical Pro DP (p=0.0174), as well as, between critical Pro Pro and critical Pro DP (p=0.0398). Additionally, the contrast between critical DP DP and critical DP Pro is significant at p<0.1. This indicates an overall DN enhancing effect of DP in pre-verbal position as compared to Pro.

For Experiment 2 (with no) there was little effect of the random factor ‘Sentence’ (Variance = 0.003822), as in Experiment 1 (without no), whereas for the factor ‘Subject’, the effect was much higher (Variance = 4.528526). This indicates that the variation among subjects was higher, a point we return to below when discussing subject data.

Statistical significant effects were obtained in three critical conditions when these were compared with the control NPI: critical Pro DP (p<0.001), critical Pro Pro (p<0.001), and critical DP Pro (p<0.001). This indicates that these are the conditions that most differed from the control NPI in terms of how they influenced the rate of DN response. Critical Pro DP was the condition that resulted in the least amount of DN responses, as compared to control NPI that manifested the highest rate, followed by the critical Pro Pro condition and the critical DP Pro condition. After NPI, the condition that most favoured DN was DP DP, which showed no significant difference with the control NPI.

We further conducted a Tukey Contrasts Multiple Comparisons of Means (Tukey 1953) analysis to compare the four critical conditions among themselves with the aim of finding out which one favoured a DN reading more in Experiment 2 (with no). The output of this test was that the critical conditions that yielded a significant difference were critical Pro DP as compared to the condition critical DP DP (p=0.04616). In this
case, the latter condition was the one that showed the most DN readings. This suggests
that a complex DP in pre-verbal position is a significant factor that favours DN readings.

Consider now Figures 6 and 7, which provide the results of DN readings obtained for
the critical conditions in Experiment 1 (without no) and in Experiment 2 (with no),
respectively, as compared with the NPI condition. For Experiment 1 (without no), the
condition that produced the most DN readings is the critical DP Pro, followed by critical
Pro Pro, critical DP DP and finally critical Pro DP. Recall, however, that the low levels of
DN in this experiment are not significantly different from error rates in the control
conditions.\footnote{A finer analysis (GLMM over Experiment 1 alone) showed a significant effect only when comparing the DP Pro condition and the Pro Pro condition against the control Universal Quantifier condition, which was the control in which the speakers had the least amount of error. No significant effect is obtained when comparing to the control DN or even the control Negative Quantifier.}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure6.png}
\caption{Percentage of DN interpretation in critical conditions in Experiment 1 (without \textit{no}) as compared to the NPI control.}
\end{figure}
In Experiment 2 (with *no*) the highest rate of DN is found in the NPI control. As compared to this control, the next highest rate of DN is observed in the critical DP DP condition, followed by the critical DP Pro condition, the critical Pro Pro condition and the critical Pro DP condition. This leads an apparent effect in favor of increased DN when the subject of the transitive sequence is a DP.

![Bar graph showing the percentage of DN interpretation in critical conditions in Experiment 2 (with *no*) as compared to the NPI control.](image)

**Figure 7.** Percentage of DN interpretation in critical conditions in Experiment 2 (with *no*) as compared to the NPI control.

For Experiment 2 (with *no*) a further binomial comparison was conducted to compare sequences with parallel morpho-syntactic structures, i.e., conditions that had two NCI's of the same morpho-syntactic structures (parallel), to sequences with non-parallel NCI's. Figure 8 compares the critical conditions DP DP and Pro Pro (=parallel) together to the critical conditions Pro DP and DP Pro (=non-parallel). The effects of parallelism were not found to be significant. For clarification, this comparison was conducted because it was suggested in May (1990), that parallel sequences of quantifiers may favour a resumptive quantification reading. This suggestion was not confirmed in our data,
presumably because of the otherwise DN enhancing effect of DP in pre-verbal position (see below), which in all likelihood interfered in the above comparison.

Figure 8. Parallelism effect in the responses to critical conditions (critical DP DP and critical Pro Pro) in Experiment 2 (with no).

A further analysis was conducted to determine the effect of the complexity of the negative expression in both pre-verbal (Figure 9) and post-verbal (Figure 10) positions. Figure 9 reveals that the complexity of negative expressions in pre-verbal position clearly favors DN readings. A t-test comparison reveals that the difference between conditions in which a DP is in pre-verbal position (DP DP and DP Pro) significantly increases the rate of DN in comparison to conditions in which Pro is in pre-verbal position (Pro DP, Pro Pro) (p< 0.001).
Figure 9. Complexity effects of negative expressions in pre-verbal position in Experiment 2 (with no).

By contrast, the complexity of negative expressions does not matter in post-verbal position as shown in Figure 10.

Figure 10. Complexity effects of negative expressions in post-verbal position in Experiment 2 (with no).
Let us finally turn to individual subject results. Figure 11 reports the percentage of DN responses per subject in the critical and NPI conditions of Experiment 2 (with *no*). This Figure reveals that 4 subjects had no DN interpretation at all, that 15 participants had between 1-10% of DN responses, 5 between 10-25% DN readings and that 11 participants had between 40 and 90% DN responses. The overall picture appears to be one in which there are essentially two populations, one (the largest) with participants hardly or infrequently responding with a DN choice and the other where the DN choice represents a clear option that cannot be ignored.

*Figure 11.* Distribution of number of DN readings with respect to number of subjects in Experiment 2 (with *no*).

A final remark is of interest concerning our subject data. Recall from the Methods section that our subjects filled up a small questionnaire at the end of their participation concerning their place of birth, current living location, age range, sex and percentage of
Catalan use in their daily life. In general, the overall population was not sufficiently balanced for any of these factors to produce a significant effect on the linguistic results. Nevertheless, one factor that had a suggestive effect nearing significance was the percentage of Catalan use in daily life. As the figure below reveals, there was overall less DN interpretation in Experiment 2 (with no) for subjects that used Catalan in their daily life between 75% of the time or more. This suggests that the speakers that used Spanish more frequently in their daily lives were also the ones who tended to have more DN interpretations. But to be confirmed, such a tendency would need to be examined in an experiment with a balanced subject population.

Figure 12. Effect of percentage of use of Catalan on DN choice in Experiment 2 (with no)
A final result takes into account our processing factor. Consider Figure 13.

Figure 13. Reaction time (in seconds) between display of the images and the participants’ click on the chosen image.

Wilcoxon rank sum tests with Holm correction revealed significant differences between False vs. True responses in the control conditions (p<0.001). True responses were faster than False ones (on average, 3.13s for True and 4.95s for False). Significant differences were also found between DN vs. NC / single negation responses in the critical conditions (p<0.001). The Figure clearly indicates that NC / single negation responses are processed faster than DN ones (on average, 3.41s for NC and 5.35s for DN).
5. Discussion

In this section, we return to the four initial questions that our experiment was designed to investigate concerning, first, whether, as standardly assumed by Catalan grammarians, NC is systematically and consistently the default interpretation for sentences with multiple NCIs; testing this possibility was important both to probe the nature of Catalan NCIs with regards to whether or not they could be negative expressions, as de Swart (2010), among many others, hypothesized, and to establish a baseline for further manipulations. Our choice of a preference test was guided by an aspiration to find out not only whether NC is indeed a default reading but also to what extent, if at all, DN readings could arise as a possible interpretation of Catalan NC sequences in monoclausal transitive negative sentences. Second, to deepen this question, we further asked whether NC could be easier to process than DN readings, as hypothesized by Corblin et al. (2006), DN being quite generally assumed to be cross-linguistically more marked than NC (de Swart 2010, Puskás 2012). Third, we explored whether the co-presence of the negative marker no could influence the readings of NC sequences and boost DN readings, as predicted by Zeijlstra (2004) if Catalan has a variety with Non-Strict NC, such as Spanish or Italian, but contrasting with the traditional description of Catalan. Finally, we sought to examine whether the morpho-syntactic make-up of NCIs (DP vs. Pro) and their syntactic position could influence the reading of Catalan negative sequences, favoring NC or DN as was suggested to be the case for other NC languages (Italian, French) (Acquaviva 1995, 1997; Déprez 2000, 2011a, b). This question also aims at probing both the nature of Catalan NCIs, surveying in particular whether their morpho-syntactic composition can
affect the reading they trigger in a negative NCI sequence, and the nature and stability of the Catalan concord dependency across a variety of negative expressions.

The section is organized as follows. We begin by summarizing the experimental results that bear on the question of the default nature of Catalan NC, and then turn to consider what our processing results bring to this issue. We then move to considering the DN boosting effects that the co-presence of no had on Catalan NCI sequences, assessing how proposals in the literature fare in view of our experimental results. Finally, we turn to the properties of NCIs that our results have revealed, the consideration of their effects in influencing the interpretation of NCI sequences, and how these could be explained in current theoretical approaches to NC.

5.1. NC as a default reading in Catalan

Turning to our first question on the default nature of NC readings, it is evident that first and foremost, our results, with 84.56% NC preferred choice in both experiments confounded, bring conclusive experimental confirmation that NC is indeed uncontroversially the prevalent interpretation in Catalan for negative sequences of all the types considered here, namely monoclausal transitive sentences with NCIs in both pre-verbal and post-verbal positions with and without no. In this respect, our experimental findings, which fully accord with the abundant traditional and theoretical literature on Catalan negative dependencies (see references in the Introduction), is evidently, not novel. It is worth noting, however, that a fully comparable experimental protocol yielded quite different results for another presumed uncontroversial NC language, namely French, in which Déprez (2014) found no comparable NC prevalence. Thus, our Catalan
results are not as trivial as it may appear, as they establish—for the first time, to our
knowledge—an experimental base line of how prevalent the choice of an NC
interpretation can be in an undisputable NC language, thus providing an informative basis
for further cross-linguistic comparison of NC vs. DN preference.

Just as clearly, but surely more surprisingly, our experimental results further show
that DN readings can in fact arise in simple transitive Catalan clauses, with a certain
amount of variability that depends essentially on two central factors: (i) the overt
presence of pre-verbal *no* ‘not’, shown to be massively significant in inducing possible
and preferred DN readings, and (ii) the complex vs. non-complex nature of NCIs and
their position, which also clearly influenced the availability of DN readings, though to a
lesser degree. We return to a more detailed discussion of the significance of each of these
factors and their combinations below.

Briefly, however, let us here comment on the rather surprising observation that DN
interpretation arose at all in simple Catalan monoclusal transitive sentences with two
NCIs, in the absence of sentential negation or any explicit favoring context (see Figure 6
for Experiment 1). This possibility evidently raises the question of where the two
conflicting semantic negations required for a DN reading could come from. Clearly, a
first semantic negation must be triggered by the presence of an NCI in pre-verbal
position, which, as is otherwise known, suffices to produce a negative sentence. The
second semantic negation, however, could just as clearly, only come from the post-verbal
NCI. As such, this appears to provide a first piece of evidence that Catalan NCIs cannot
simply always be non-negative indefinites, as they must—at least sometimes—have the
possibility of being semantically negative on their own or of triggering the presence of an
additional abstract negative operator. In Section 5.3 below, we further discuss how exactly such a DN reading can arise in the grammar of Catalan, as several possibilities are imaginable, including lexical variants (Herburger 2001), syntactic variants (Déprez 2000), or a difference in feature composition (Martins 2000; Labelle and Espinal 2014; and Espinal and Tubau 2014, to appear). Here we wish only to underscore the mere existence of these DN readings in neutral contexts, as this possibility, unexpected in a language in which NC is clearly the default interpretation, is predicted to be excluded from the start by traditional and descriptive grammars of Catalan and under a strict macro-parametric approach to NC. But of course, it must be kept in mind that, if surprising, this observation only concerns a rather small proportion of responses in Experiment 1 (without no), namely only 6.34%, which although slightly larger than the overall proportion of errors in our most challenging control, the Negative Quantifier control (5.10%), is not statistically significantly different. In this regard, although suggestive, this observation surely cannot constitute firm evidence that Catalan NCIs must be negative, as these DN readings could, in principle, mostly be due to errors. Below, however, additional evidence in support of this possibility is examined.

To sum up, although our experimental results basically uphold the overall traditional picture of Catalan as a strongly NC language, they also paint a more nuanced picture that is not entirely compatible with the predictions of formal syntactic approaches casting NC as the direct consequence of a rigorous macro-parametric choice. In the upcoming sections, we focus our discussion on exploring possible explanations for why certain factors (i.e., the overt presence of pre-verbal no, the structural complexity and the distribution of negative expressions) should matter at all in eliciting DN interpretations in
Catalan, given that this language is primarily an uncontroversial NC language. We also focus on understanding what this reveals about the nature of Catalan negative dependencies. Before we turn to these points, however, we examine the impact of the processing results in our experiments, which revealed a significant difference between NC and DN.

5.2. Processing NC vs. DN

As was shown in Figure 13 above, our experimental results demonstrate that Catalan speakers clearly required less time to choose a picture corresponding to a NC reading and more time to choose a picture corresponding to a DN one, in both Experiment 1 (without no) and Experiment 2 (with no) confounded. Moreover, in Experiment 1 the time to NC choice is essentially the same as the True choice for our control items, clearly suggesting that monoclausal transitive negative sentences are processed easily under an NC reading. Although the measure we recorded (time to picture choice) is not fully comparable to that of a more standard reading time, since it involves conscious choice rather than an unconscious reading speed, it nonetheless records a measure of reaction. In this regard, we conjecture that this measure can be revealing of the comprehension process that is taking place in the speaker’s mind after reading the relevant sentence. Understood as such, the significant difference we found here in Catalan between NC and DN choice appears to provide strong support for Corblin’s (1996) hypothesis that NC is easier to process than DN. This, along with the observation that languages featuring NC are usually more frequent in the world’s cross-linguistic landscape (cf. Dryer and Haspelmath 2013) than those featuring DN, and with Bickerton’s (1983) well-known
remark that NC is common to all creole languages, further appears to strengthen the
already commonly held view that NC could be universally a more natural default reading
for sequences of negative expressions than DN (de Swart 2010 among others). Should
NC turn out to be easier to process than DN quite generally, then these cross-linguistic
generalizations could perhaps even be rethought in processing terms.

However, it must be kept in mind that surprisingly little is in fact known about the
processing of either NC or DN constructions cross-linguistically. Furthermore, although
simple negative sentences are quite generally thought to take longer to process than
positive ones, recent work by Deutsch et al. (2009) shows, in contrast, that negation can
be processed unintentionally and very quickly. Similarly, an analysis of negative
dependencies in English using an experimental protocol similar to the one used in our
study shows that in English, DN readings are in fact processed faster than NC ones and
about as fast as control items (Déprez 2014). In addition, note that while Corblin’s (1996)
ease of NC processing conjecture was originally offered to explain NC preferences in
French, it turns out that as Déprez (2014) shows also on the basis of experimental results
obtained in conditions fully parallel to the ones discussed here, French, in fact, manifests
no comparable speed advantage for NC over DN choices. That is, in French, contrary to
Catalan, both DN and NC choices took essentially the same time, with no statistically
significant difference between the two. Thus, ease of processing for NC seems in fact to
be language relative, with possible cross-linguistic variation, and not a fully general
characteristic of DN across languages.

Furthermore, note that if ease of processing were a general NC processing
characteristic, as conjectured by Corblin, the facts observed here, namely that DN
interpretations seem sensitive to the syntactic complexity of NCIs and to their syntactic position (DP vs. Pro in pre-verbal position) would be rather unexpected. The logic of Corblin’s argument indeed should lead to the reverse expectation, at least considering complexity. To see that, consider a sequence of NCIs with a certain complexity. Assuming with Corblin (1996) that speakers choose an NC reading to ease its processing, it would be expected that if the sequence is made syntactically more complex, the pressure to pick a reading easier to process should increase. Our results, however, show the opposite tendency. Increased complexity in the NCI sequence, i.e., at least the presence of DP NCIs vs. the simpler Pro in pre-verbal position, favors an increase in DN readings, not NC. Hence, what both this language-internal observation and the cross-linguistic difference between French and Catalan NC processing suggest is that ease of processing may not be a factor that generally favors NC readings, but rather it could be the processing speed that depends on the choice of NC. If so, our processing results for Catalan here can be said to uphold Corblin’s (1996) hypothesis, but with a twist, namely that ease of processing could be a consequence of a grammatical or semantic pressure for NC in Catalan, and not a motivation underlying the NC choice. Note furthermore, that if NC readings had different sources cross-linguistically, i.e., if they derived from distinct semantic processes such as variable binding (NPI licensing) or resumptive quantification in different languages or in different negative sentence types (Déprez 1997 and following), then it may well be that ease of processing could characterize some of the semantic processes that derive NC, but not others. Thus, for instance, if in French, but not in Catalan, NC results from resumptive quantification (Déprez 2000, de Swart and Sag
2002), then cross-linguistic variation and even language-internal variation in the processing ease of NC could be expected.

5.3. The role of no: are there two NC varieties for Catalan?

In this section, we turn to what is perhaps both the most unexpected and the most interesting result of our experiments, namely the massive increase in DN readings that arose in NCI sequences in the co-presence of the sentential negation marker no. Although as noted above, DN readings are by and large statistically undistinguishable from errors on our controls in Experiment 1 (without no), this is not at all the case in Experiment 2 (with no), where overall, a solid 24.29% of DN –highly significantly different from error rate on controls– is observed. It is, hence, clear that the increase in DN here is not due to error. In this section, we discuss possible explanations for this result, and their relation to the existence of two competing varieties for Catalan NC.

Recall from Section 2.2 that in the linguistic literature, the optionality of no in Catalan has been related to the existence of two NC dialects (van der Wouden and Zwarts 1993, Zeijlstra 2004). In these approaches, the optionality of no is taken to be essentially illusory as it results from the interaction of two distinct varieties, unclearly distributed in the population. According to Zeijlstra (2004), in the variety identified as Catalan I above, the presence of the sentential marker should be as obligatory as in Strict NC languages such as Greek, or Romanian, and have no effect on an unambiguous NC interpretation. In the variety identified as Catalan II, in contrast, the presence of the sentential marker should essentially be disallowed with pre-verbal NCIs, and when enforced, should lead to
an obligatory DN interpretation, as in Non-Strict NC languages such as Spanish or Italian.

If we focus on our sentence data, it seems clear that the overall results of our Experiment 2 (with no) fail to support traditional Catalan descriptions, which basically suggest the existence of a single variety where –after pre-verbal NCIs– no is optional and makes no contribution to the sentential meaning. As our results show, there is little doubt that the presence of no significantly affected the interpretation of negative sentences, as indicated by the sharp increase of DN choice.

However, if instead we focus on our subject data, we observe that the effect of no is unevenly distributed in our population. Going back to Figure 11, note first that there are at least some speakers (actually 4) for whom the co-presence of no with pre-verbal NCIs makes no difference at all. These subjects simply never chose a DN reading in any of our critical condition as well as in the NPI control, which as explained above, was parallel in this regard to our critical conditions in Experiment 2. To these subjects, one could add some more speakers that produce an amount of DN that essentially hovers around the amount of errors in our control items (see the Results section). But the exact number and cut is far from clear, as it partly depends on the control items taken as referent, and the leniency adopted for inclusion in this group. Nevertheless, what is of interest in Figure 11 is that overall, we observe an essentially bimodal distribution of our subjects, with a larger group of 24 speakers choosing DN between 0-25% of the time, and a smaller group of 11 speakers choosing DN almost half of the time or more.

These data may indeed suggest, as hypothesized by Zeijlstra (2004) among others, that there are two varieties of Catalan, one with a largely negligible amount of DN
readings and the other for which DN readings are clearly a possible option; for this second group of subjects, DN is chosen from 40% of the time up to almost all the time (90%), depending on the subjects. As it turns out, however, neither of these two populations appears to pattern in complete accordance with Zeijlstra’s predictions for Catalan. Recall from Experiment 1 (without no), that all speakers clearly interpreted NCI sequences without no massively as NC and that they made this choice as fast as that of correct responses to our controls. This strongly confirms the traditional grammar view that Catalan sentences with pre-verbal NCIs and without no are fully acceptable for all speakers. Hence, these data show unequivocally that there is no variety of Catalan equivalent to a Strict NC language where the co-presence of sentential negation is compulsory with pre-verbal NCIs. Thus, if there are indeed two varieties of Catalan, as seems likely in view of the bimodal distribution of subjects observed, the first variety is one in which no is optional and leaves the preferred NC interpretation essentially unaffected, exactly as described by traditional Catalan grammars.

Note that for this variety, Zeijlstra’s macro-parametric model is problematic. Recall that in his typology, Strict NC languages are characterized by a semantically non-negative ([uNeg]) sentential marker, and semantically non-negative ([uNeg]) NCIs. Yet, for Zeijlstra’s model to correctly predict the obligatory co-occurrence between NCIs and the sentential negation marker in Strict NC languages, the latter must be the only element able to trigger/license the presence of an abstract [iNeg] operator, so that pre-verbal NCIs correctly fail to be able to license post-verbal ones. But this makes incorrect predictions for his Catalan Variety I. To account for the Catalan Variety I, in which no is optional and leaves the NC interpretation unaltered, there are essentially two possibilities. First,
Catalan V could have pre-verbal NCIs that are semantically negative (or equivalently, trigger an abstract negative operator) and a sentential negation marker that is semantically non-negative, i.e., an expletive negation. Recall from the Introduction that Espinal (2007) and Espinal and Tubau (to appear) argue that such a marker is independently needed in Catalan to account for the phenomenon of expletive negation and is essentially a strong NPI-like element. Second, pre-verbal NCIs in the Catalan Variety I could be ambiguous between semantically negative expressions able to occur alone in pre-verbal positions, and polar NCIs, requiring the co-presence of negation even when in pre-verbal subject position (i.e., a special kind of NPI expressions equivalent to, for instance, the Hindi NPI expressions in Lahiri’s 1998 work). On this alternative view, positing an expletive negation is not needed, but it must be assumed that the Catalan polar NCIs can be licensed in pre-verbal positions by a negation that may fail to strictly c-command them, at least in their Spell-Out position. Several proposals along these lines have been developed, offering distinct accounts on what licenses these NPI-like expressions pre-verbally (Martins 2000; Déprez 2000, to appear; among others). \(^{13}\) We return to such a proposal in section 5.3 where we discuss the nature of Catalan NCIs.

The second variety that Figure 11 revealed is one in which the presence of *no* significantly increases DN readings, but, in which, crucially, DN readings are not

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\(^{13}\) Recall that for Martins (2000) a distinction is made between weak NPIs and strong NPIs. In order to account for the Catalan facts she must assume the following: if *no* is explicit, a weak NPI must have been selected, whereas if *no* is not overt, a strong NPI must have been selected. What exactly enforces this choice remains to be clarified.

In relation to this issue a reviewer raises the question of what the difference is between assuming that *no* is an expletive and assuming that *no* is a standard negative marker that does not necessarily undergo phonological realization. The semantic markedness of negation in natural languages seems quite indisputable, and so does the fact that the non-affirmative nature of the meaning (input) is reflected in the linguistic form of the output (cf. Faithfulness to negation, Hendricks et al. 2010). This notwithstanding, the semantic content of a negative marker has been argued to be submitted to a process of logical absorption when certain logical and structural conditions are met (Espinal 1992, 2000b).
obligatory, since NC remains overall the favored interpretation for negative sequences, even in Experiment 2 (with no). Here Zeijlstra’s (2004) macro-parametric model also encounters difficulties. In this model, the presence of pre-verbal no, assumed to be always semantically negative in Non-Strict NC languages such as Spanish and Italian, is predicted to always yield DN. Given that Zeijlstra’s Catalan II is described as Non-Strict, the existence of a group of speakers for whom DN is the only choice for pre-verbal NCIs followed by no is expected, but this is not what we found. For this second variety, we thus have to conclude that either a non-negative no is also part of this variety, but need not be used whenever it is licensed, or, alternatively, that pre-verbal polar NCI licensing by a non-c-commanding negation has become more costly.

Assuming that Catalan has two lexically distinct (but homophonous) sentential negative markers no₁ and no₂ as proposed in (20) (Espinal and Tubau to appear), and two lexical variants of NCIs: NCI₁, which is a polar variant that can trigger an abstract negative operator, and NCI₂, a negative existential quantifier, as proposed in (21) (Espinal and Tubau 2014), the distinction between the two varieties we observed can be accounted for as follows. In Variety A, whenever no is present, speakers automatically use the expletive form whenever it is locally c-commanded by a non-veridical licensing element. This correctly predicts that only the expletive form can be used with pre-verbal NCIs, but not with post-verbal ones, since in this case, the expletive no would itself not be appropriately licensed. This variety appears to be characterized by a constraint that requires that only the highest potentially negative element in a chain be associated with an actual semantic negation, either overtly or covertly (characterized [iNeg]), and precludes all the following potentially negative elements in a chain to be semantically
negative ones. This is a form of Neg-first constraint, though distinct from the one proposed by de Swart (2010)\(^\text{14}\), since it concerns negative interpretation, rather than morpho-syntactic marking. For some of these speakers, we suggest that the residual small amount of DN found could presumably arise from errors or from the interaction of two (possibly negative) NCIs, as seen in Experiment 1 (without no) (see Figure 6), but not from the presence of no.

In Variety B, in contrast, the use of the expletive form of the negator is not enforced under c-command by an [iNeg] element. Speakers instead may use freely either the semantically negative sentential marker or the expletive one, with a lot of intra-speaker variability, and with the latter option being regressive and becoming less and less common.\(^\text{15}\) This accounts for the fact that the massive DN-triggering-no-effect observed is largely driven by this smaller group. However, here as well, Zeijlstra’s Catalan II is not strictly realized, although it seems apparent that some speakers are transitioning to it. Note that these observations provide support for the view defended in Section 2.2 that contemporary Catalan has two different lexical entries for no, one no\(_1\) which is semantically negative, and one no\(_2\) which is semantically non-negative, i.e., expletive. Recall that in this regard, Catalan appears similar to Afrikaans, for which Biberauer (2013) similarly recently concluded that a strong macro-parametric model such as the one proposed by Zeijlstra (2004, and subsequent work) made incorrect predictions.

\(^{14}\) Recall that this Optimality Theory constraint specifies that “Negation precedes the finite verb” (de Swart 2010: 96).

\(^{15}\) It is interesting to note that in this respect, Catalan is also rather similar to Québece French in which both negative markers, ne and pas can participate in NC constructions. Strikingly, however, as observed by Daoust-Blais (1975), Muller (1991), Di Sciullo and Tremblay (1996), and Déprez and Martineau (2004), among many others, only ne can surface in sentences with pre-verbal NCIs, while pas is excluded or leads to DN readings. In recent work, Burnett and Tremblay (2014) show additionally that there is much variation in the co-occurrence of pas with distinct types of NCIs. The subject variability that we observe here in Catalan with respect to the effect of no does clearly not seem to be unique to this language.
It is therefore interesting to note in regards to the variety here distinguished, that our results suggest that there seems to be a tendency for the speakers of Variety A to be in the class of speakers that use Catalan more than 75% of the time in their daily lives, as the following table reveals.

<table>
<thead>
<tr>
<th>Percentage of subjects</th>
<th>minus 75% Catalan</th>
<th>plus 75% Catalan</th>
</tr>
</thead>
<tbody>
<tr>
<td>%DN &gt; 25%</td>
<td>14.28%</td>
<td>17.14%</td>
</tr>
<tr>
<td>%DN ≤ 25%</td>
<td>14.28%</td>
<td>54.28%</td>
</tr>
</tbody>
</table>

Table 4. Correlation between percentage of DN readings and percentage of use of Catalan in daily life.

Observe that 54.28% of our subjects use Catalan more than 75% of the time in their daily lives and have less than 25% of DN. These are the subjects closest to what traditional grammars describe. But the cut is not as sharp as one could wish, since in this category of 75%-of-Catalan users, there are still 17.14% who chose DN between 40% to 90% of the time. To confirm the tendency here observed, a follow-up study that would properly balance the sampled population for age, use of Catalan in daily life, region and socio-economic factors would be needed. If confirmed, this would demonstrate that the Catalan speakers that deviate from the model described by traditional grammars are speakers that may be more under the influence of their second native language, namely Spanish, a textbook characteristic Non-Strict NC language.\(^{16}\)

\(^{16}\) As pointed out by one reviewer, this discussion raises the following interesting cross-linguistic query: do Strict NC languages tend to allow more EN than Non-Strict NC languages? We observe that, as a Non-Strict NC language, Spanish clearly manifests a reduced use of EN as compared to Catalan (see footnote 6, above). Thus concerning Catalan Variety B (see Table 3), we do not predict full absence of EN from all contexts that usually allow it, but, crucially, diminished frequency of use as compared to the Catalan Variety A (with EN perhaps lacking altogether for only some speakers). We further observe here that along with our predictions, Greek and Romanian, two Strict NC languages, manifest an extensive use of EN in
In sum, the complex profile of the NC and DN distribution that our results revealed is one that only partially fits the predictions of either the traditional view of Catalan or of Zeijlstra’s proposed model. With respect to the use of no, we conclude that no is optional in all varieties of Catalan and there is no variety in which it is either systematically required, or systematically rejected. Yet, with respect to the existence of two NC varieties, our data indeed suggest that they are attested, and we suggest that whereas for one population an expletive no most often (optionally) co-occurs with pre-verbal NCIs, in another population this is a regressive option and both the negative and the expletive variants are variably allowed. Hence, the presence of no is increasingly associated with DN readings, as it is interpreted as semantically negative to a varying extent.

5.4. The nature of Catalan NCIs

While it is clear that the most important factor triggering potential DN readings in Catalan is the co-presence of no with NCIs, Experiment 2 (with no) also provided strong evidence that the differing morpho-syntactic nature of NCIs matters in influencing the interpretation of negative sentences and fostering DN readings. In particular, our results showed that complex NCIs, i.e., DPs with full NP complements, or partitive DPs, in contrast to simple Pronominal NCIs, have the effect of significantly raising the number of DN choices that speakers made, particularly when they occur in pre-verbal positions. Concerning the types of negative sequences we tested, we observed specifically that in

the canonical EN contexts. However, more thorough verification of the correlation put forward in this paper between the occurrence of a negative marker with pre-verbal NCIs and the extensive use of EN beyond NC contexts must remain a topic of future research. We would like to thank Elena Ciutescu and Ana Maria Falaus for informing about Romanian, and Artemis Alexiadou, Anastasia Giannakidou, Dimitra Lazaridou and Melita Stavrou for informing about Greek. See also Pană Dindelegan (2013) for Romanian, and Makri (2013) for EN beyond Romance.
Experiment 2 (with *no*), our Control NPI sequences most increased the choice for DN, followed by DP DP sequences, DP Pro sequences, Pro Pro and finally Pro DP sequences (cf. Figure 7).\(^\text{17}\) In this section, we examine how these results bear on what has always been a core question about NC, namely the nature of the dependent negative items that participate in it.

Before we turn to a more detailed account of the specific influence of NCI types on DN vs. NC choice, it is worth stressing here that the mere existence of such effects is unpredicted under a macro-parametric approach to NC. Clearly, a macro-parameter that regulates whether or not a language has a formal negative feature [+/- u/iNeg] has nothing to say about why certain types of NCIs can induce more DN / NC readings than others within the same language. A proper account of how the nature of NCIs can differently affect NC / DN choice requires attention to the internal micro-parametric make-up of the NCIs themselves and not just to the general nature of the dependency, as strongly advocated in Déprez’s works (1997-2011). These type of data, then, demonstrate that languages are not homogeneously of NC or DN types, as expected under a macro-parametric approach, but feature, rather, NC inducing vs. DN inducing negative structures and expressions that can be similar or not across languages and that can differ or not language-internally. Thus the variation in interpretation, uncovered here, that is induced by diverse NCI types within a single language provides an important

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\(^\text{17}\) A reviewer noted that for him/her and other Italian speakers, sequences of NCIs with full DPs predominantly give rise to DN readings, in apparent contrast to our Catalan data, and asks why this should be so. In this regard, we first point out that in our Experiment 2 (with *no*) Critical DP DP gave rise to 28.21% of DN, higher than other NCI sequences (cf. Pro Pro in contrast). The trend does thus not seem to be absent for Catalan. Yet, before comparative conclusions could be drawn with regards to such NCI sequences in other Romance languages, it seems important to experimentally verify native speakers’ interpretations, as judgements for DN readings are notoriously unstable, and the discussion of such facts in the literature is rather thin. At this point, we note that in comparable experimental settings, Déprez (2014) observed a similar increase in DN rate for French. The Italian data are also currently in the process of being investigated with the same experimental protocol.
experimental confirmation for a micro-parametric inside out approach to variation in NC, historical, cross-linguistic or language-internal (Déprez 2000, 2011b, 2014; Déprez and Martineau 2004; Labelle and Espinal 2014).

Returning to the question of NCI types, recall that, by and large, four families of approaches to the nature of NCIs have been commonly distinguished in the literature. The first one considers NCIs as non-negative indefinite expressions that depend on negation (or non-veridical operators) to be licensed (Ladusaw 1992, 1994; Zeijlstra 2004; Penka 2011; among others); in the second one NCIs are always negative quantifiers (Zanuttini 1991, Haegeman and Zanuttini 1991, de Swart and Sag 2002, among others) and NC obtains through resumptive quantification; in the third one, NCIs are wide scope universals that outscope their licensing negation (Giannakidou 2000); and in the fourth one, NCIs are ambiguous between the first and second type (Herburger 2001). On the first and third views, NCIs are essentially dependent polar expressions that require specific contexts to be licensed. For Catalan, recall from our Introduction that in Espinal and Tubau’s (2014, to appear) model, the polar variety of NCIs is characterized with a semantic strong [+σ] feature, following Chierchia’s (2006) characterization of NPIs, and with a morpho-syntactic [uNeg] feature. However, Catalan NCIs cannot just be of this type, lest the DN readings that we see arising in both Experiment 1 (without no) and Experiment 2 (with no) would remain unaccounted for.\footnote{Puskás (2012) provides an interesting account of why DN could arise in a symmetric NC language like Hungarian under particular contextual circumstances. It is however unclear how her proposal could transpose to the cases under considerations here, particularly for Experiment 1 (without no) since there is no sentential negation involved. Moreover, even for Experiment 2 (with no), the sentences here considered are not embedded in the contexts that Puskás assumes to be necessary for a DN interpretation to arise in Hungarian.} NPIs indeed, even of the strongest type, never lead to DN readings, even in denial contexts (otherwise known to
favor the felicity of such readings). To allow for DN readings to arise at all outside of any particular facilitating contexts (cf. Experiment 1), it must be assumed that Catalan NCIs can also either systematically trigger the appearance of their own abstract negative operator, or have the ability to be semantically negative by themselves. In other words, our results support the view that Catalan NCIs must be ambiguous, allowing both for a non-negative polar-like variant in sentences with an NC interpretation and for a semantically negative one to allow DN readings (cf. (21) in the Introduction section).

The idea that NCIs are ambiguous is of course not new, as it has been repeatedly proposed in different versions at different times. Among the first to argue for such an ambiguity was Longobardi (1987), but perhaps the best known defense of this type of analysis is that of Herburger (2001), who argued that Spanish NCIs are lexically ambiguous between a negative and a non-negative type, and that of Martins (2000), who argued for a typology of polarity items in Romance based on the well-established weak/strong distinction. Déprez (1997a, b, 1999, 2000) and Déprez and Martineau (2004) offer yet another ambiguity proposal, arguing that NCIs can be morpho-syntactically ambiguous, with each interpretation corresponding to a different internal morpho-syntactic structure. In these studies, it is proposed that NCIs with negative force occupy a high position in their nominal structure, while those that are non-negative indefinites occupy a low DP internal position. Recently, Déprez (2011b) argued that semantically negative NCIs occupy a (contrastive) topic/focus position within their internal DP structure (see for instance Ticio 2005 among others for such a position in the DP) that can either be derived via a DP-internal displacement (Kayne 2005) or be grammaticalized as a result of historical evolution. Schematically, the morpho-syntactic distinction can be
represented as follows:

(26) negative NCI:  \[[\text{Top/Foc} \quad \text{NCI} \quad [\text{DP} \ldots [\text{NumP} \quad [\text{NP} \quad \text{[\ ]}]]]]\]

non-negative NCI:  \[[\text{Top/Foc} \quad [\text{DP} \ldots [\text{NumP} \quad [\text{NP} \quad \text{NCI}].Parcelable]]\]

Assuming DP to be a phase (Chomsky 2000), Déprez (2011b) proposes that the negative feature of NCIs can become accessible at the sentence level (i.e., at a higher phase level of computation) and hence semantically interpretable only if NCIs occupy the edge of their constituent, i.e., here the highest structural position in the DP in these cases. Otherwise, when buried deep inside the DP constituent, the negative feature remains uninterpretable at the sentence level, so that NCIs are interpreted as non-negative.\(^{19}\)

Yet another proposal for NCI ambiguity is offered in Labelle and Espinal (2014) and Espinal and Tubau (2014, to appear). These authors argue that NCIs can have a different feature make-up, and that it is their distinct feature composition that is responsible for their differing interpretation. One lexical variant is a polarity item (defined as \([+\sigma]\) following Chierchia (2006)), which may acquire a syntactic formal feature \([uNeg]\) in syntax that requires an Agree dependency to be established with an \([iNeg]\) constituent; the other is a lexical variant that is a negative existential quantifier \((¬\exists)\) endowed with an uninterpretable Focus feature, \([uFoc]\). Such a proposal is in line with Déprez’s (2011b) proposal that negative NCIs that are semantically negative occupy a Focus position within their DP structure.

Arguing for a choice among these alternative proposals for the ambiguity of Catalan NCIs lies beyond the scope of this particular paper. Of relevance to our purpose here is the idea that, in Catalan, the NCIs, as well as perhaps the sentential negative marker \textit{no},

\(^{19}\) For an earlier formulation of this Feature Accessible Condition and its applicability to domains other than negation, see Déprez (1998, 2007).
can have distinct variants that compete within the same language. Let us now turn to consider what possibilities these assumptions offer in regards to our experimental findings.

In comparison with Zeijlstra’s (2004) macro-parametric view, the micro-parametric approach here advocated, which takes into account the possible ambiguous make-up of the Catalan negative marker, and of the Catalan NCIs, clearly offers more flexibility. It predicts that Catalan should allow for at least the following possibilities. The combination of a semantically negative sentential marker with NCIs that are semantically non-negative evidently leads an NC reading, which is comparable to the reading obtained in polarity dependencies. As we have seen, this is clearly a possibility in Catalan, and, perhaps, the most common one featuring a dependency between a sentential negation and a post-verbal NCI. To obtain this combination, we suggest that the semantically negative version of the sentential negative marker is its default interpretation, shared by all speakers of Catalan, in all variants. For NCIs, in contrast, we take the non-negative variant to be the default one. Concerning the two Catalan variants discussed above, we suggest that speakers of Variety A use the expletive no1 when the optional negation is commanded by a negative NCI. Moreover, they only allow pre-verbal NCIs to trigger an abstract negative operator. 20 This allows for the optionality of no without affecting the preferred NC reading of the sequences. Post-verbal NCIs, in turn, are licensed either like pre-verbal ones (by an abstract negative operator triggered by a pre-verbal NCI), or by negation.

Let us now turn to consider the variety in which DN readings are clearly a possibility. Here we suggest that DN readings emerge from the combination of a negative

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20 We discuss below where this restriction may come from.
NCI in pre-verbal position and the semantically negative sentential negation marker, accounting for the massive effect of *no* that our data have uncovered. Additionally, we conjecture that for the same type of speakers, the possibility of DN readings in NCI combinations without *no* is also allowed to emerge from the possibility of having negative existential quantifier NCIs both in pre-verbal and in post-verbal positions. Evidently, this second possibility also arises in the presence of *no*, and also leads to a DN reading. For all varieties, additionally, the presence of either a negative NCI in pre-verbal position or a negative sentential negation marker and non-negative NCIs in post-verbal position leads to the preferred NC reading that is observed overall.

Table 3, repeated here as Table 5 for convenience, summarizes the options our proposal has made available. A question that remains to be answered at this point is: when are these variants allowed or fostered?

<table>
<thead>
<tr>
<th>Variety A</th>
<th>NCIs in negative contexts</th>
<th>Negative marker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. [+σ]</td>
<td></td>
<td>1. [iNeg]</td>
</tr>
<tr>
<td>2. ¬∃, [uFoc]</td>
<td></td>
<td>2. [+σ]</td>
</tr>
<tr>
<td>Variety B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. [+σ]</td>
<td></td>
<td>1. [iNeg]</td>
</tr>
<tr>
<td>2. ¬∃, [uFoc]</td>
<td></td>
<td>2. [+σ] (regressive)</td>
</tr>
</tbody>
</table>

*Table 5. Lexical variation in NCIs and the negative marker in Catalan*

Concerning the non-negative negation marker, it has been hypothesized in Espinal (2007) and Espinal and Tubau (2014, to appear) that speakers that have this variant of *no* also use it in so-called expletive negation constructions. This makes the clear prediction that speakers who chose a NC reading in sentences that combine two NCIs with the sentential negative marker *no* (Variety A) are also the ones who will otherwise manifest a relatively frequent use of expletive negation in the relevant constructions. Vice versa, speakers who chose a DN reading for these negative sequences (Variety B) will also lack or tend to reject expletive negative constructions. We aim to conduct further experimental
work to verify this prediction.

Note, however, that the two Catalan varieties uncovered in our results can also receive an alternative account that would locate their difference solely in the variable nature of their NCIs, thus possibly doing away with the contribution of an expletive negation.\(^{21}\) Relying on suggestions made in Déprez (to appear), such an account would go as follows. Recall that, descriptively, Catalan Variety A is a variety in which the sentential negation *no* optionally co-occurs with pre-verbal NCIs without affecting the NC interpretation. This can obtain, as discussed above, if the negative force is located in or triggered by the pre-verbal NCI and absent from the sentential negation, which is then an expletive negative dependent item. Alternatively, however, it can also logically obtain if the negative force is located in the sentential negation marker only, being then absent from the pre-verbal subject NCI. This option, however, is rarely explored in the literature, in view of the well-known fact that English-type NPIs require c-command by negation in their Spell-Out position. In turn, this type of c-command requirement, whose effect is to exclude English NPIs from pre-verbal subject positions, is commonly thought to generalize to all NPI expressions. Suppose, however, that there existed a type of negative dependent expressions for which this requirement could be relaxed. That is, suppose that for these Catalan preverbal items, c-command by negation of one of their copies –not necessarily the final Spell-Out one– could be sufficient for licensing. Given the so-called vP-Internal Subject Hypothesis (Koopman and Sportiche 1991), whereby pre-verbal subjects are derived by movement from a vP-internal position, such relaxed negative

\(^{21}\) Such an account is also suggested in Martins (2000), who proposes a feature specification for Catalan NCIs distinct from their Spanish and Italian counterparts in a feature underspecification system adapted from Rooryck (1994).
dependent expressions could occur in pre-verbal subject positions as long as overt negation c-commanded their vP-internal copy. (27) illustrates this proposal:

\[
(27) \quad [\text{TP NCI}_{\text{NegP}} \left[ \text{no} \quad [T' \left[ T \left[ vP \text{NCI} \quad V \left[ \text{VP} \ldots \right] \right] \right] \right] \right] ]
\]

With option (27) in hand, Catalan Variety A would then be accounted for as follows. First, assuming ambiguous NCIs that either lack or have negative force, pre-verbal NCIs lacking negative force would require the co-presence of sentential negation to be licensed, but with this licensing allowed in their base position (i.e., Spec, vP for subjects or VP for objects) under a single negation reading. By contrast, the NCI with negative force would occur pre-verbally, without no, and, in turn, license dependent post-verbal NCIs. In Variety A, the presence of no would trigger the choice of the negative dependent expression lacking negative force both in subject and object position.

Variety B would then differ from Variety A as follows: in Variety B, pre-verbal NCIs that lack negative force would come to disallow licensing by negation in their base position, turning into English-like NPIs that require c-command by negation in their overt derived position. That is, option (27) becomes regressive. As a consequence, gradually, only NCIs with negative force are allowed in pre-verbal position, with the co-occurrence with no then leading to increasing DN readings. In post-verbal position, however, NCIs that lack negative force are still properly licensed by a c-commanding negation, accounting for the growing subject-object asymmetry. On this view, as well, since the distinction in Variety B leads to a closer resemblance to the asymmetric Spanish / Italian NC type, the tendency to regard speakers of Variety B as more sensitive to the influence of Spanish remains.
Let us finally concern ourselves with the availability of DN readings with the negative variant of NCIs. Here several possibilities can be entertained, which ultimately depend on what the exact source of NCI ambiguity turns out to be. One interesting point deserves further attention. Recall that our data showed that the complexity of DP structure matters in fostering DN readings. As it turns out, most of the complex DP in our experimental material and particularly those in pre-verbal positions were partitive DPs (like for instance cap dels alumnes ‘none of the students’). In recent work on Catalan partitive DPs, Martí i Girbau (1999) argued that these complex DPs involve DP-internal movement (predicate inversion) to a high position in the DP structure, as shown in (28):

(28)a. molts dels llibres
   many of the PL books
   ‘many of the books’

   b. \[DP\text{ molts}_{i} [DP_{PP} \text{ de } [DP_{el}s [FP_{NP} \text{ llibres } [FP_{XP} t_{i}].Interval]]]]

When associated with Déprez’s structural proposal on NCI ambiguity, which relates the strength of the negative force of NCIs to a high position in DP structure, Martí i Girbau’s (1999) structure for partitives suggests an interesting explanation for the increase in DN readings observed in our experimental results with full DPs that are mostly partitive NCIs.\(^{22}\) The significant increase in DN reading observed with partitives provides strong support for the proposal that the internal structure of NCIs matters for their interpretation and more specifically, that their negative force correlates with the high

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\(^{22}\) Sleeman and Kester (2002) propose an alternative analysis of partitive constructions in French without DP-internal predicate inversion. They argue for a clausal analysis in which the numeral/quantitative part of the partitive occupies a high position in the DP as in (i):

(i) deux pro, [FP t, F^C [PP t, de P^O ses amis]]
   two of his friends

Given the similarity between numerals and NCIs proposed in Déprez (1997, 2000) and Espinal (2000), such an analysis naturally extends to partitive NCIs.
position of NCIs within their structure (Déprez 1997a, b, 1999, 2000, 2011b; Déprez and Martineau 2004).

Note, furthermore, that, as is rather well known, subject DPs are far more often topics than object DPs (Prince 1992). If sentential DP topics are also DPs in which a DP internal (contrastive) topic/focus movement is fostered, this again hints at a plausible avenue to explain why DN readings should be particularly favored by complex DPs in pre-verbal subject positions. That is, the idea here is that the DN reading is fostered under a kind of structural parallelism between a DP occurring in a higher sentential edge position (topic/focus in Rizzi’s 1997 sentential structure) and NCIs occurring in their higher edge DP-internal position, the edge position in both serving to enhance the visibility / interpretability of the negative feature in the sentential domain. Here too, further experimental verification that targets partitive NCIs and topic structure/focus structure within the DP and in the larger sentential domain is called for to solidify these novel conjectures.

But independently of these particular conjectures, it is clear that what our current experiment results have shown is that the internal structure of NCIs matters for the overall interpretation of negative sentences. Note that this is exactly what a micro-parametric approach such as the one advocated in independent work (Déprez and Martineau 2004; Déprez 2011b; Espinal and Tubau to appear, 2014) predicts. We therefore conclude that the complex empirical landscape of the distribution of DN and NC interpretation that our experiment has uncovered provides solid support for a micro-parametric approach to NC. Such an approach takes into account possible lexical variants in the interpretation of the sentential negation marker but especially in the structure and
interpretation of NCIs, which can vary and compete within a single language.

6. Conclusion

To conclude, this paper has presented experimental work that explored the interpretation of NCI sequences in Catalan with and without the co-occurrence of the negative marker no. Our results have shown that the empirical landscape of these constructions is far more complex than standardly assumed in the literature. Clearly, and unsurprisingly, our results have first and foremost confirmed experimentally that NC readings are overall the favoured reading of NCI sequences in Catalan, both with and without the co-presence of the negative marker no, hence establishing an experimental base line useful for further cross-linguistic experimental investigation of NC constructions. But beyond this empirical confirmation, our results have also shown that in contrast to the traditional description of Catalan, the co-presence of the negative marker no with pre-verbal NCIs clearly affects the interpretation of NCI sequences as it can sometimes elicit DN readings in simple sentences outside of any particular favouring contexts. Interestingly, however, such DN readings are not elicited for all our subjects. As hypothesized by Zeijlstra (2004), the existence of two variants of Catalan that co-exist in the native speaker population seems to be supported by the near bimodal distribution of DN readings we observed in our sample population. The two variants, however, did not entirely pattern as predicted under Zeijlstra’s model, as Catalan clearly does not feature a variant with Strict NC, but only a variant in which the co-presence of the negative marker is indeed optional, as described by traditional Catalan grammars. For the second variant, DN readings, which are generally not obligatory, are mostly elicited by the co-presence of no but were also
shown to increase with the particular structure of NCIs, and more specifically for complex DP NCIs such as partitive NCIs in pre-verbal position. To account for these facts, we argued for a micro-parametric approach to Catalan NC that features both a possibly ambiguous negative marker – semantically negative or expletive, the latter option being readily available for the speakers of Variety A, and regressive for the speakers of Variety B–, and ambiguous NCIs, non-negative and negative, variably available for all Catalan speakers. Alternatively, the option of licensing polar NCIs under c-command by negation of their base-merged copy, while solid in Variety A, would become regressive in Variety B, leading to a gradual ban for polar NCIs to occur in pre-verbal position. The paper further offers conjectures as to why certain types of NCI structures (complex or partitive DPs) can foster an increase in DN interpretation and why the pre-verbal position also matters. Overall, one of the central points of our experimental work is the demonstration of how crucial taking into account the elicitation of possible DN readings can be, for a better understanding of the nature of negative constructions in Catalan, and cross-linguistically. In this regard, we hope that our work will encourage the experimental exploration of the interesting variable emergence of DN readings in the cross-linguistic landscape of NC constructions.

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