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1 **Double Negation in a Negative Concord Language: An Experimental Investigation**

2 **V. Déprez (U.Rutgers), S. Tubau (UAB), A. Cheylus (CNRS), & M.T.Espinal (UAB)**

3 **ACCEPTED FOR PUBLICATION IN *Lingua*.**

4

5 **Abstract**

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

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

23

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

26

## 27 **1. Introduction**

28 Within the charted landscape of Negative Concord (NC) languages, Catalan is often cast  
29 as a misfit because it presents the peculiarity of optionally allowing the co-presence of a  
30 sentential negative marker *no* ‘not’ with pre-verbal Negative Concord Items (NCIs)<sup>1</sup>  
31 (Fabra 1912, 1918, 1956; Badia i Margarit 1962, 1994; Solà 1973; Quer 1993; Vallduví  
32 1994; Espinal 2000a, 2002). The central goal of the present paper is to report the results  
33 of an experimental research that sought to test when, and to what extent, native speakers  
34 of Catalan prefer to interpret negative sentences of various types with a single negation  
35 interpretation as a Negative Concord (NC) reading, and whether, in some circumstances,  
36 with specific syntactic combinations of Negative Concord Items (NCIs), with and without  
37 a sentential negative marker, a Double Negation (DN) reading could emerge in simple  
38 transitive clauses as it has been claimed to emerge in other NC languages like Romanian.

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

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<sup>1</sup> 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.

41 grammarians, that NC is systematically and consistently the default interpretation for  
42 sequences of multiple negative terms; second, we asked whether the processing of  
43 negative sequences in Catalan could be overall faster, and hence presumably easier to  
44 parse, under a NC reading than under a DN one. The latter is commonly assumed to be  
45 cross-linguistically marked (Corblin et al. 2006, de Swart 2010, Puskás 2012), but has  
46 recently been shown, in equivalent experimental settings, to be sometimes equally fast,  
47 and even sometimes faster in distinct languages; third we verified whether the co-  
48 presence of the sentential negative marker *no* with pre-verbal NCIs could influence the  
49 readings of negative sequences and increase DN readings and fourth, we investigated  
50 whether the morpho-syntactic nature of the NCIs involved in a negative sequence could  
51 influence the readings preferred by native speakers, increasing or decreasing a putative  
52 preference for a NC vs. DN reading.

53       Regarding the first question, we aimed at investigating to what extent the default  
54 nature of NC readings in Catalan can be confirmed, and whether Catalan sequences of  
55 NCIs in simple transitive clauses are essentially always unambiguous, radically favouring  
56 NC readings in neutral discourse and prosodic contexts across native speakers, as  
57 expected from the literature.<sup>2</sup>

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

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

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<sup>2</sup> See references above.

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

75 The paper is organised as follows. Section 2 presents a summary of the relevant  
76 background facts about the interpretation of negative sequences in Catalan, centring on  
77 the properties of this language as a NC one, and on the contexts where the negative  
78 marker *no* seems to be optional. We then present some theoretical accounts of these  
79 known facts from the literature, focusing more specifically on the required ingredients of  
80 a micro-parametric approach to Catalan NC. In Section 3, we present our experimental  
81 design and methodology. Section 4 details the results of our experiments. Finally, Section  
82 5 discusses these results and assesses their consequences within a general theory of NC.

83

## 84 **2. Background**

### 85 *2.1. Catalan as an NC language*

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

91 (1) *Ningú (no) pensa res.*  
92 nobody not thinks nothing  
93 ‘Nobody is thinking anything.’

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

97 (2) a. *Cap d’ells (no) ha vingut.*  
98 none of them not has come  
99 ‘None of them has come.’  
100 b. *\*(No) ha vingut cap d’ells.*  
101 not has come none of them  
102 ‘None of them has come.’

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

108 (3) A: On vas?

109           where go.2SG?

110           ‘Where do you go?’

111       B: *Enlloc.*

112           nowhere

113           ‘Nowhere.’

114       In post-verbal positions, however, Catalan NCIs have a polar behaviour (Linebarger  
115 1987; Progovac 1994; Giannakidou 1998, 2000; Martins 2000), as they are sensitive to  
116 the non-veridical (Zwarts 1995) property of a c-commanding licenser or of the contexts in  
117 which they felicitously occur.

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

119           not has bought none of.the<sub>PL</sub> books

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

121       b. *Ha* comprat *cap* dels llibres? (question)

122           has bought any of.the<sub>PL</sub> books

123           ‘Has (s)he bought any of the books?’

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

125           if has bought any of.the<sub>PL</sub> books I it should of know

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

127       According to traditional descriptive Catalan grammars, the combination of NCIs with  
128 other NCIs or minimizers (Vallduví 1994) –otherwise known as *negative spread*, (with or  
129 without *no*)– always leads to a single negation / NC reading and never to a cancellation of  
130 negations into a positive meaning (Horn 1989), in contrast to what is usually found with  
131 negative quantifiers for languages such as Standard English.

132 (5) a. *Ningú* pensa *res.* (=1b) NC

133 nobody thinks nothing

134 ‘Nobody is thinking anything.’

135 b. *Enlloc* es veu *ni una ànima.* NC

136 nowhere CL sees not a soul

137 (6) a. *Nobody* is thinking *nothing.* DN

138 b. *Not a soul* can be seen *nowhere.* DN

139 This contrastive interpretation of sequences of negative expressions in languages like  
140 Catalan (5) vs. languages like English (6) that embodies the difference between Negative  
141 Concord (NC) and Double Negation (DN) has been taken under some approaches  
142 (Zeijlstra 2004 among others) to be the core factor of a parametric divide between NC  
143 languages like Catalan, French, Italian, Portuguese and Spanish, on the one hand, and DN  
144 languages like Standard English, Dutch and German, on the other hand. On this view, the  
145 question arises whether DN interpretations of sequences of negative expressions are ever  
146 possible in NC languages, and particularly of what, if anything, can license them. In other  
147 approaches to NC (de Swart and Sag 2002), NC vs. DN readings are taken to be the two  
148 ambiguous faces of the same negative sentences and thus predicted to occur in all  
149 languages.

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

153 (7) *No* vull que *no* vingui.

154 not want that not come<sub>SUBJ</sub>



155 'I don't want him not to come.' (=I want him to come)

156 Yet DN is sometimes observed in single clauses under particular syntactic  
157 conditions, such as for instance (8a), where an adjunct PP ambiguously allows both DN  
158 and single negation/NC readings (Tubau and Espinal 2012)<sup>3</sup>. The ambiguity disappears  
159 when a second *no* precedes the NCI in the PP adjunct, as in (8b).

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

161 not fight for nothing

162 'They don't fight for nothing. / They don't fight for anything.'

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

164 not fight for not nothing

165 'They don't fight for nothing.'

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

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<sup>3</sup> 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*.

176 of contextual and prosodic factors such as prosodic phrasing, stress, contrastive focus,  
177 and intonation have also been highlighted as potential DN triggers (Corblin 1995, 1996;  
178 and Déprez 1999, 2000 for standard French; Vinet 1998 for Québec French; Corblin and  
179 Tovina 2003 for French and Italian; Molnár 1998 and Puskás 2006, 2012 for Hungarian;  
180 Zanuttini 1991, 1997, Godard and Marandin 2007, and Penka 2007 for Italian; Falaus  
181 2007 for Romanian; Huddleston 2010, Biberauer and Zeijlstra 2012 for Afrikaans, see  
182 also de Swart 2010). Pragmatic factors can also influence the availability of DN readings  
183 in some languages. For example, a DN reading is generally favoured in the following  
184 French example in (9) and also possible in other languages such as Spanish, Italian and  
185 Romanian:

186 (9) a. *Personne ne commet aucun péché.*

187       no one   NEG commits no    sin

188       ‘No one commits no sin.’

189    b. *Personne ne meurt jamais.*

190       no one   NEG dies    never

191       ‘No one never dies.’

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

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

197

198 *2.2. The role of no*

199 This section focuses on the role of the sentential marker *no* ‘not’ in Catalan negative  
200 sentences. As a preliminary, note that first and foremost, the Catalan sentential negative  
201 marker *no* is the linguistic form that encodes the monadic negative operator  $\neg$  and  
202 expresses an interpretable negative formal feature.

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

209 (10)a. Si *mai* vinguéssiu, què farien ells?

210 if ever come<sub>SUBJ</sub> what do<sub>COND</sub> they

211 ‘If you ever came, what would they do?’

212 b. Si *mai no* vinguéssiu, què farien ells?

213 if ever not come<sub>SUBJ</sub> what do<sub>COND</sub> they

214 ‘If you never came, what would they do?’

215 On the other hand, descriptive grammars of contemporary Catalan claim that, if pre-  
216 verbal NCIs are focalized (the capital letters stand for emphasis), then *no* is preferably  
217 explicit (Espinal 2002: 2766, exs, (106b,c) and (107b,c)):<sup>4</sup>

218 (11)a. *Ningú (no) ha vist res.*

---

<sup>4</sup> 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*.

219 nobody not has seen nothing

220 ‘Nobody has seen anything.’

221 b. *NINGÚ no ha vist res.*

222 nobody not has seen nothing

223 ‘Nobody has seen anything.’

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

225 nowhere not CL saw not a soul

226 ‘Nowhere was a soul to be seen.’

227 b. *NI UNA ÀNIMA no ha vist.*

228 not a soul not has seen

229 ‘Not a soul has (s)he seen.’

230 Espinal (2002: 2767) further states that the negativity of a sentence is intensified

231 when the negative marker is explicit, (13). Moreover, she also notes that the tendency to

232 prefer an overt negative marker increases as the distance between the pre-verbal NCI and

233 the verb gets larger (14).

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

235 of no way not want that me<sub>DAT</sub> lend money

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

237 (14) *Cap de les plantes que vam deixar a la banyera abans*

238 none of the plants that PAST leave in the bathtub before

239 de marxar de vacances no sembla que s’hagi mort.

240 of leave of holidays not seem that CL.has<sub>SUBJ</sub> died

241           ‘None of the plants that we left in the bathtub before leaving on holidays seems to  
242           have died.’

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

248           In sum, while prescriptive grammars recommend the use of a negative marker *no* in  
249   pre-verbal position of negative sentences generally, descriptive grammars acknowledge  
250   that native speakers hesitate on the use of *no* after pre-verbal NCIs (Solà 1973: 97,  
251   Espinal 2002: 2767). The reasons of this hesitation are not well understood, but could  
252   well reflect sociolinguistic factors, such as age, language dominance of the speaker’s area  
253   of living, and percentage of use of Catalan in daily life. According to Vallduví (1994:  
254   273, note 8), the optionality of *no* “is a matter of register”. And indeed, the current  
255   tendency in spoken Catalan and in the media-variety is to omit the negative marker.

256           Espinal (2007) interestingly observed that a comparable optionality and lack of polar  
257   semantic effect in the use of the negative sentential marker *no* is also found in other  
258   Catalan sentence types, namely in contexts of so-called expletive negation (EN). EN  
259   “refers to a pleonastic (paratactic or redundant) use of negation that does not modify the  
260   truth value of the proposition in which it appears (Jespersen 1917; Vendryes 1950; Martin  
261   1984; Muller 1991)” (Espinal 2007: 51). Characteristic Catalan examples are given in  
262   (15), with the optional expletive negative marker in parentheses and the lexical trigger of  
263   EN in italics:

264 (15)a. *Abans* que (*no*) arribi l'amfitrió, deixeu que em presenti.  
265 before that not arrive<sub>SUBJ</sub> the.host let that me introduce<sub>SUBJ</sub>  
266 'Before our host arrives, let me introduce myself.' (Espinal 2007: 50, ex. (1a))

267 b. La policia *evità* que (*no*) hi hagués un accident.  
268 the police stopped that not CL had<sub>SUBJ</sub> an accident  
269 'The police prevented an accident.'

270 c. Gasta *més* ell en tres mesos que (*no*) tu en tot l'any.  
271 spends more he in three months that not you in whole the.year  
272 'He spends more in thres months that you in a year.'  
273 (Espinal 2002: 2777, ex. (136a))

274 d. Va prometre que s'esperaria *fins* que el seu xicot  
275 PAST promise that CL.wait until that the his boyfriend  
276 (*no*) tornés de la guerra.  
277 not come.back from the war  
278 'She promised to wait until her boyfriend came back from the war.'  
279 (Espinal 2002: 2777, ex. (136b))

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

287 (16)a. *Abans que ningú digui res, deixeu-me donar-vos la benvinguda.*

288 before that nobody say<sub>SUBJ</sub> nothing let.me give.you the welcome

289 Before anyone says anything, let me welcome you.’

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

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

292 the police stopped that CL had<sub>SUBJ</sub> any accident

293 ‘The police prevented that an accident.’

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

Property	Nie <sub>1</sub>	Nie <sub>2</sub> = expletive
Omission → meaning change (polarity reversal)	Yes	No

Modifiability	Yes	No
Substitution by emphatic negator	Yes	No
Stressability	Yes	No

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

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

312 In an attempt to explain away the optionality of *no*, Van der Wouden and Zwarts  
313 (1993: 216-7) were to our knowledge the first to hypothesize the existence of a dialectal  
314 variation. According to them, “there exists one dialect of Catalan that parallels French (or  
315 Afrikaans) in the sense that a doubling element *no* (that may express negation on its own)  
316 is always obligatory whenever negative elements show up in the sentence, and another  
317 dialect that behaves like Italian, with doubling only from post-verbal positions”.  
318 According to this description, in one dialect (Variety I) *no* is always obligatory, whereas  
319 in the second one (Variety II) *no* is only obligatory to license post-verbal NCIs.

320 However, contrary to these claims, recent work by Espinal and Tubau (2014)  
321 concluded (i) that Variety I does not exist, since there is no variety of Catalan for which  
322 *no* is always obligatory, and (ii) that Variety II does not characterize any dialect at all,  
323 since all post-verbal NCIs, PIs and minimizers, can be licensed by the negative marker, or  
324 by an NCI in pre-verbal position. We take up this issue further in our discussion section,  
325 after the results of our experiment have been presented. But first, we briefly summarize  
326 recent theoretical approaches that propose an account for this specific issue, as well as for  
327 the other properties of Catalan NC described above.

328



329 *2.3 Theoretical background*

330 The literature on NC is vast, with two main issues traditionally articulating the  
331 discussion. One is the negative force of NCIs; the other is their quantificational status.  
332 NCIs have been claimed to be universal quantifiers, both negative (Zanuttini 1991,  
333 Haegeman and Zanuttini 1991, among others) and non-negative (Giannakidou 2000),  
334 non-negative polarity items (Bosque 1980, Laka 1990, among others), and indefinites,  
335 both negative (Suñer 1995) and non-negative (Ladusaw 1992, 1994, Zeijlstra 2004,  
336 Tubau 2008, among others). Other accounts have cast NCIs as numerals of cardinality  
337 zero (Déprez 1997b, 2000, and following; Espinal 2000a) with underspecified  
338 quantificational force, or as items that are ambiguous between weak negative polarity  
339 items and strong negative polarity items (Martins 2000), or ambiguous between polarity  
340 items and negative quantifiers, either lexically (Herburger 2001) or structurally (Déprez  
341 1997b, 2000, 2011a, b; Déprez and Martineau 2004). Theoretical approaches to NC are  
342 always narrowly linked to the status proposed for NCIs, but as a proper review of this  
343 abundant literature would take us too far afield, here we restricted our focus on the most  
344 prominent recent accounts that have made a specific proposal regarding Catalan NC.  
345 Before presenting the micro-parametric approach to NC recently developed in Espinal  
346 and Tubau (to appear), we oppose two views, namely the macro-parametric account in  
347 Zeijlstra (2004) and subsequent work, and the polyadic quantification approach of de  
348 Swart and Sag (2002).

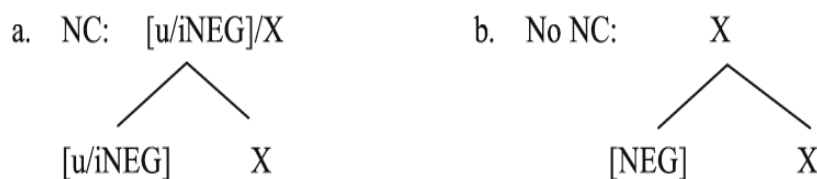
349

350 *2.3.1. A macro-parametric account: Zeijlstra (2004)*

351 For Zeijlstra (2004 and subsequent work) the phenomenon of NC is nothing but the  
352 realization of a syntactic agreement (formalized under Chomsky's (1995) Agree

353 operation) between a single negative operator (which can be overt or abstract) carrying an  
 354 interpretable negative formal feature, [iNeg], and one or more elements carrying an  
 355 uninterpretable negative feature, [uNEG]. For him, NCIs are semantically non-negative  
 356 indefinites that carry an uninterpretable negative feature [uNEG] that must be checked by  
 357 an interpretable negative feature [iNEG] on a semantic negation. Zeijlstra (2004, 2008)  
 358 further argues that NC languages are distinguished from DN languages by a macro-  
 359 parameter that states that the former have a formal negative feature, while in the latter the  
 360 negative feature has no formal status but is purely semantic. This macro-parametric  
 361 variation is formalized as in (17):

362 (17)



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

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

369 *Table 2.* Biberauer and Zeijlstra's (2012) typology of NC and DN languages

370 With respect to this typology, as Zeijlstra (2004) notes, Catalan appears to be a

371 misfit because of the optional occurrence of its negative marker, which is neither  
372 obligatory as in Strict NC languages, nor limited to co-occur with only post-verbal NCIs  
373 as in non-Strict NC languages. In an effort to reduce this Catalan misfit to the NC  
374 patterns observed elsewhere, Zeijlstra (2004) follows Van der Wouden and Zwarts (1993:  
375 216-7) in claiming that the Catalan negation optionality flags the existence, side by side,  
376 of two distinct varieties. For him, Variety I, on the one hand, has Strict NC characterized  
377 by the obligatory presence of *no* for NCIs in all syntactic positions, in similarity with  
378 Greek and Romanian. Variety II, on the other hand, must disallow *no* with pre-verbal  
379 NCIs, as it features Non-Strict NC, in similarity with Italian and Spanish. On this view,  
380 the optionality of *no* is illusory.

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

392

393 *2.3.2. The polyadic quantification approach of de Swart and Sag (2002)*

394 In contrast to Zeijlstra (2004 and following), de Swart and Sag (2002) and de Swart  
395 (2010) take NCIs to always be negative quantifiers. For them, NC corresponds to one  
396 interpretation that is afforded by the interaction of these negative quantifiers in a polyadic  
397 quantifier framework (van Benthem 1989; Keenan and Westerstahl 1997). On this  
398 approach, there is no parametric distinction between NC and DN languages, since every  
399 sentence involving multiple negative elements can receive both a resumptive and an  
400 iterative interpretation. The first corresponds to a NC reading, the second to a DN  
401 reading. However, while NC / DN ambiguities for multiple negative constructions are  
402 well attested in French and Romanian (i.e., languages for which independent resumption  
403 analyses were respectively proposed by Déprez 1997b, 2000; Falaus 2007; and  
404 Iordăchioaia 2010), in other languages commonly exhibiting NC, no comparable  
405 systematic ambiguity has so far been reported, and DN readings are quite generally  
406 thought to only arise under restrictive and unusual contextual conditions, as discussed  
407 above for Catalan. Thus, for a resumption analysis to be able to account for cross-  
408 linguistic variations in NC, an additional mechanism must be assumed. To tackle NC  
409 typological differences, de Swart (2010) proposes to embed her resumptive analysis in a  
410 bidirectional optimality framework. Her analysis of Catalan involves the interaction of  
411 five constraints presented below:

- 412 ❖ MaxNeg: Mark the argument of a negative chain.
- 413 ❖ NegFirst: Negation is pre-verbal (Jespersen 1917, Horn 1989).
- 414 ❖ MaxSN: A negative clause must bear a marker of sentential negation.
- 415 ❖ \*Neg: Avoid negation in the output. (Markedness constraint).
- 416 ❖ InterpretNeg (IntNeg): Interpret all neg expressions in the input as contributing a

417 negative meaning in the output.

418 We reproduce here the crucial OT tableaux that pertain to Catalan (de Swart 2010:173-  
 419 174). The order from right to left in the tableau reflects the ranking of the constraints.  
 420 Note that, in the tableau in (18), it is the high ranking of the NegFirst constraint that  
 421 enforces the obligatory presence a pre-verbal marker of sentential negation with post-  
 422 verbal Catalan NCIs (de Swart’s n-words), as in Italian, Spanish or Brazilian Portuguese.

423 (18)

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

Meaning $\neg V \exists x$	Form	MAXNEG	NEGFIRST	MAXSN	*NEG	INTNEG
	V neg		*	*	*	
$\curvearrowright$	SN V neg				**	

424

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

431 (19)

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

Meaning $\neg \exists x_1 V \exists x_2$	Form	MAXNEG	NEGFIRST	MAXSN	*NEG	INTNEG
$\curvearrowright$	neg V neg			*	**	
$\curvearrowright$	neg SN V neg				***	

432

433

434 De Swart (2010) also argues that the possibility of two distinct dialects is derivable on her  
 435 approach if, instead of being unranked, MaxSN and \*Neg are ranked. If MaxSN  
 436 dominates \*Neg, then *no* will be obligatory with the input or tableau (19) as in the

437 Variety I described by Zeijlstra (2004). The reverse domination of these two constraints  
438 produces a dialect where *no* is disallowed again as in Zeijlstra's Variety II. We note here  
439 that although this approach predicts both the optionality of *no* described by traditional  
440 Catalan grammars and the possibility of the two dialects distinguished by Zeijlstra and  
441 Van den Wouden, it does not, however, predict what to expect with respect to the  
442 distribution of DN vs. NC readings in either of the two varieties. Regarding  
443 interpretation, De Swart states that in her account, both dialects are NC ones with the  
444 ranking \*Neg >> IntNeg in the semantics, so that sentences with and without a marker of  
445 sentential negation are interpreted as conveying single negation under both grammars. In  
446 short, de Swart predicts a variety of possible grammatical outputs for Catalan, but does  
447 not match these distinct outputs to distinct interpretations.

448

### 449 *2.3.3. The micro-parametric approach*

450 In contrast to de Swart and Sag (2002) and de Swart (2010, and following), Déprez  
451 (1997b, 2000, and ff.) and Déprez and Martineau (2004) argue that the resumption  
452 analysis proposed in May (1990) for English negative sequences is a restricted form of  
453 NC that can be available only in constructions or languages in which NCIs are true  
454 negative quantifiers. But, importantly, Déprez argues that this type of resumptive analysis  
455 should not be generalized across all NC constructions or languages, since NCIs, like all  
456 other types of indefinite expressions can have distinct semantic and syntactic nature and,  
457 consequently, be subject to various interpretative and licensing conditions. Déprez  
458 (1997b) posits the existence side by side of two basic types of NC that form the opposite  
459 extremes of the cross-linguistic spectrum of possibilities, one, being a pure resumption  
460 type, and the other essentially equivalent to NPI licensing (non-veridical licensing). Both

461 types can entertain mixed and complex interactions in distinct NC constructions, within  
462 single languages or cross-linguistically, depending on the nature of the NCIs involved in  
463 particular negative sequences. This approach derives a non-uniform, intricate and  
464 nuanced landscape for NC dependencies, with variations expected within and across  
465 languages, according to the nature of the NCIs. See in particular Déprez (2011b) for a  
466 recent development of this approach. In short, Déprez proposes to combine the semantic  
467 ingredients of the above discussed two approaches within a micro-parametric framework  
468 where the choice of one or the other type of NC, resumption or NPI licensing (with NPIs  
469 of possibly distinct strength), is determined by the nature and the internal morpho-syntax  
470 semantic mapping of the NCIs that a particular language or negative sequence  
471 comprises.<sup>5</sup>

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

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

---

<sup>5</sup> 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.

483 (20)a. *no*<sub>1</sub>: semantic negation; formally specified [iNEG] (Zeijlstra 2004, ff.).  
484 b. *no*<sub>2</sub>: expletive negation; formally specified with a strong [+σ] feature that is  
485 characteristic of polar items and characterizes semantically dependent items  
486 (Chierchia 2006, Labelle and Espinal 2014).<sup>6</sup>

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

491 (21)a. NCI<sub>1</sub>: polarity indefinite meaning characterized [+σ].  
492 b. NCI<sub>2</sub>: indefinite negative quantifiers meaning  $\neg\exists$ .

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

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<sup>6</sup> 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.



498 and Espinal 2014). Espinal and Tubau (to appear) further argue that these can participate  
 499 in NC structures because they undergo a process of word syntax that allows the feature  
 500 [uNeg] to merge with their root specified as [+σ]. Once [uNeg] is part of a polar NCI, it  
 501 requires a licenser specified as [iNeg] to Agree with.<sup>7</sup> Alternatively, in Variety A, NCIs  
 502 may also be existential negative quantifiers, but this seems to be an emergent possibility  
 503 that is less common than the use of non-negative NCIs. Finally, Variety A distinguishes  
 504 two negative markers, one which is inherently negative, specified with the formal feature  
 505 [iNeg], and another one which is expletive and carries also a polarity [+σ] feature  
 506 (Espinal and Tubau to appear).

507 In Variety B, in contrast, the negative marker is fundamentally semantically negative  
 508 and, hence, specified as [iNeg]; the expletive negative in this variety is basically non-  
 509 existent (and hence specified as ‘regressive’ in Table 3). Furthermore, in this variety there  
 510 are also two different lexical entries for NCIs, as postulated in (21), which are in  
 511 competition. As negative existential quantifiers, NCIs<sub>2</sub> are endowed with an inherent  
 512 Focus feature [uFoc], which (following Déprez 2011b) is assumed to require DP internal  
 513 movement of the NCI<sub>2</sub> to the left periphery of the DP. Espinal and Tubau’s (2014, to  
 514 appear) assumptions for Catalan NCIs and negative marker(s) are summarised in Table 3.

Catalan	NCIs in negative contexts	Negative marker(s)
<b>Variety A</b>	1. [+σ] 2. ¬∃, [uFoc] (emergent)	1. [iNeg] 2. [+σ]
<b>Variety B</b>	1. [+σ] 2. ¬∃, [uFoc]	1. [iNeg] 2. [+σ] (regressive)

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

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

<sup>7</sup> 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.

517 experimental design before we consider the results of our two experiments.

518

### 519 **3. Methods**

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

530 To investigate our four questions, we designed two experiments in which subjects  
531 had to match a verbal stimulus with a visual one. In Experiment 1, the sentential negative  
532 marker *no* was absent after pre-verbal NCIs whereas in Experiment 2 the critical items as  
533 well as one of our control conditions (the control NPI condition) had the negative  
534 sentential marker *no* ‘not’ after pre-verbal NCIs. Thus the verbal stimuli submitted to the  
535 participants of the two experiments only differed in absence vs. presence of *no* ‘not’ in  
536 the set of critical items and the NPI control condition. Speakers were asked to choose  
537 between two pictures representing distinct scenes the one that best corresponded to the  
538 meaning of the sentence they were presented with in written form on a computer screen.

539 The design was a preference test and the task a picture selection one. This section of the  
540 paper details our experimental protocol.

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

545

### 546 *3.1. Participants*

547 70 native speakers of Catalan (58 women and 12 men, aged between 19-61 with a  
548 majority between 20-23), mostly students and staff at the Universitat Autònoma de  
549 Barcelona, participated in the two experiments. Our subjects were mostly from the  
550 Barcelona area, but some of them were from other parts of the Catalan-speaking  
551 territories. To take into consideration potential dialectal variations, speakers were asked  
552 to answer a brief sociolinguistic questionnaire at the end of the experiment. In this  
553 questionnaire, participants were asked about sex, age, place of birth and living area for  
554 the past 10 years and their daily use of Catalan. Our sample population, however, was  
555 not balanced for these factors. Answers to these questions were coded as follows:

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

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

558 c. Sex: male, female

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

560 d. Birthplace: Central (CEN), Occidental (OCC), and Other (OTH)

561 d. Current living area: Central Metropolitan (CENMET), Central non-  
562 Metropolitan (CENnotMET), and Other (OTH)

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

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

572

### 573 3.2. Materials

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

---

<sup>8</sup> 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.

581 The order of presentation of the verbal and visual stimuli was pseudo-randomized to  
582 obtain a balanced item presentation and avoid (i) ordering effects, (ii) stimuli repetition,  
583 whether visual or verbal, and (iii) left-right effects for the choice of pictures. 8 distinct  
584 lists of 8 blocks with 12 distinct stimuli sentences each were created. In each list, the  
585 order of presentation of the 8 blocks was distinct. Each block of 12 sentences was further  
586 subdivided into 4 sub-blocks each containing 3 sentences, with random ordering between  
587 1 critical, 1 control and 1 filler sentence.

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

591



592

593 *Figure 1.* Slide used in Experiment 1 (without *no*). The text translates literally as  
594 ‘nobody sings none of the songs’. The image on the right is true for the NC or single  
595 negation interpretation of the sentence, the one on the left represents the DN reading.

596



597

598 *Figure 2.* Slide used in Experiment 2 (with *no*). The text translates literally as ‘nobody  
599 not sings none of the songs’. The image on the right corresponds to a NC or single  
600 negation interpretation of the sentence (i.e., ‘Nobody sings any of the songs’) and the one  
601 on the left to a DN reading cancelling out to a positive statement (i.e., ‘Nobody doesn’t  
602 sing none of the songs’; that is, Everybody sings some song).

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

607 The sentences used in the two experiments were organised as follows: four critical  
608 conditions, which featured sequences of two NCIs that vary in internal syntactic  
609 complexity (simple pronouns –encoded Pro– vs. full noun phrases –encoded DP–), their  
610 syntactic position (pre-verbal or post-verbal), and parallelism (same NCI type in pre-  
611 verbal and post-verbal position, distinct NCI type in both positions). This yielded the  
612 following four combinations: critical DP DP, critical Pro Pro, critical Pro DP and critical  
613 DP Pro.

614 Items exemplifying these four critical conditions contained the four different  
615 combinations of NCIs listed and illustrated in (23), where DP means that the NCI has  
616 both a prenominal Specifier and a noun phrase or a partitive complement, and *Pro* means  
617 that the NCI is a one-word pronominal form. Since sample sentences in Experiment 1  
618 (without *no*) and Experiment 2 (with *no*) only differed with respect to the presence vs.  
619 absence of the sentential negative marker *no* ‘not’, this is indicated in (23) by means of  
620 parentheses.

621 (23) *Critical DP DP* (parallel complex)

622 a. *Cap* dels alumnes (*no*) llegeix *cap* llibre.

623 none of.the students (not) reads no book

624 ‘None of the students reads any book.’

625 *Critical DP Pro* (non-parallel complex subject)

626 b. *Cap* dels nens (*no*) beu *res*.

627 none of.the children (not) drinks nothing

628 ‘None of the children drink anything.’

629 *Critical Pro DP* (non-parallel simple subject)

630 c. *Ningú* (*no*) canta *cap* de les cançons.

631 nobody (not) sings none of the songs

632 ‘Nobody sings any of the songs.’

633 *Critical Pro Pro* (parallel simple)

634 d. *Ningú* (*no*) trenca *res*.

635 nobody (not) breaks nothing

636 ‘Nobody breaks anything.’

637 The four control conditions are listed and illustrated in (24). The control DN  
638 condition was introduced to test the capacity of speakers to produce DN readings in  
639 unambiguous biclausal sentences containing two sentential negative markers. We  
640 reasoned that speakers that could not get DN readings in these unambiguous cases would  
641 not get DN readings in our critical conditions. As it turns out, one of our participants in  
642 Experiment 2 failed this control (with a 100% error) and was removed from further  
643 analysis.

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

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

656 Finally, control NPI aimed to check the interpretation associated with pre-verbal  
657 NCIs followed by an indefinite expression, without *no* ‘not’ in Experiment 1 and in  
658 combination with *no* ‘not’ in Experiment 2. Both are equally described as conveying a



659 single negation interpretation in traditional and descriptive grammars of Catalan, where  
660 *no* is described as simply optional.

661 (24) *Control DN*

662 a. *No és el cas que els turistes no pesquin cap peix.*

663 not is the case that the tourists not fish no fish

664 ‘It is not the case that the tourists did not catch any fish.’

665 *Control Universal Quantifier*

666 b. *Tothom mou alguna cosa.*

667 everybody moves some thing

668 ‘Everybody moves something.’

669 *Control Negative Quantifier*

670 c. *Ningú perd les claus.*

671 nobody loses the keys

672 ‘Nobody loses the keys.’

673 *Control NPI*

674 d. *Ningú(no) neteja alguna cosa.*

675 nobody not cleans some thing

676 ‘Nobody cleans something.’

677 A set of the 32 filler sentences (four fillers per critical sentences) meant to distract  
678 the participants from focusing on negative sentences. A sample of these items is given in  
679 (25), with various combinations of nominal expressions in pre-verbal and post-verbal  
680 position of a transitive verb: with definite or indefinite articles, demonstratives, bare  
681 plurals, positive indefinite quantifiers, and a few more sentences with universal

682 quantifiers as objects.  
683 (25) a. Els nens miren un programa.  
684 the children watch a programme  
685 ‘The children watch a programme.’

686 b. Aquests convidats beuen suc.  
687 these guests drink juices  
688 ‘These guests drink juice.’

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

692 d. Cada home tira una caixa.  
693 every man pulls a box  
694 ‘Every man pulls a box.’

695

### 696 3.3. Procedure

697 Participants were individually seated in a quiet computer room at the Universitat  
698 Autònoma de Barcelona. The stimuli presentation used the Neurobehavioral Systems’  
699 Presentation 17.0 software. Participants were presented with a set of instructional slides,  
700 the body of the experiment, and a final sociolinguistic questionnaire on their age, sex,  
701 birthplace, current place of living, and amount of Catalan use. Participants were  
702 instructed to read aloud the stimulus sentences as naturally as possible, and then press the  
703 space bar to display the relevant two pictures on the screen. The reading was recorded

704 and the stimulus sentence remained on the screen to prevent confusion.<sup>9</sup> Picture choice  
705 was made by mouse click on the centre of the picture. Mouse trajectory and time to  
706 picture choice were measured, starting from the moment when the pictures appeared to  
707 the choice click. From time to time (approximately every 10 pictures) participants were  
708 asked to explain their choice orally responding to the question: why this choice? The  
709 experimenter listened to these responses. A total of 6,624 responses were obtained, 3,360  
710 for Experiment 1 (32 critical + 32 controls + 32 fillers x 35 participants), and 3,264 for  
711 Experiment 2 (32 critical + 32 controls + 32 fillers x 34 participants). Each of the  
712 experiments lasted approximately between 10 and 15 minutes.

713

#### 714 *3.4. Measures and analyses*

715 The responses were analysed using a Generalized Linear Mixed Model fit by maximum  
716 likelihood (R packages lme4, Bates et al. 2014a, 2014b, and multcomp, Hothorn et al.,  
717 2008) with a logistic regression (logit). Picture choice was recorded with two measures:  
718 mouse tracking (trajectory) from centre point, and mouse clicking (the final choice). The

---

<sup>9</sup> 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.

719 time between picture appearance (after bar-pressing) and picture choice (by mouse  
720 clicking on the picture chosen) was also recorded.

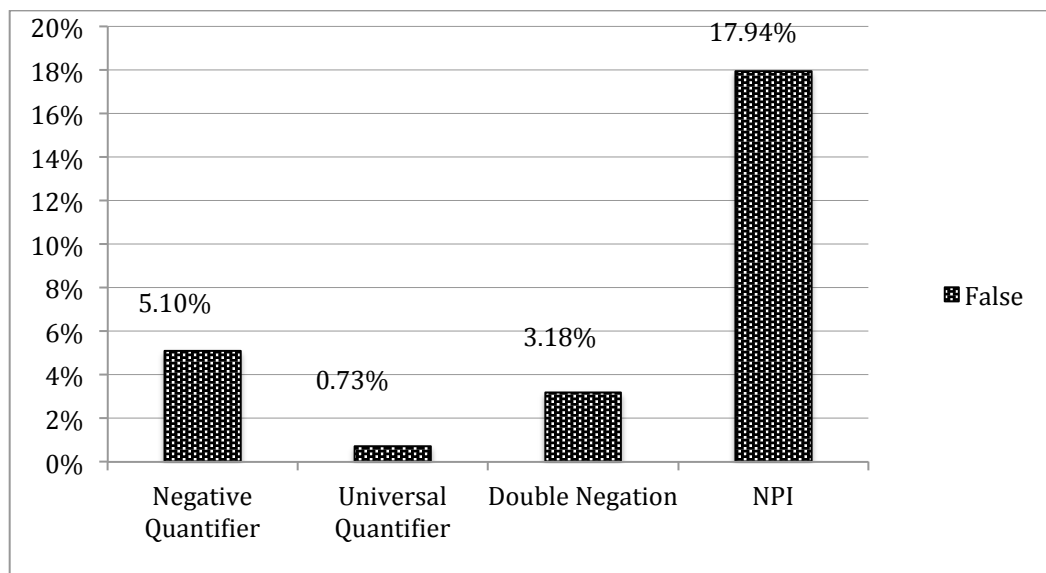
721 In the next section we report our results on picture choice (NC / single negation vs.  
722 DN interpretation for our critical items, and true vs. false for the control conditions and  
723 fillers), as well as on the time that the choice took for distinct readings. A prosodic  
724 analysis of the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

726

#### 727 4. Results

728 In this section, we start by considering responses to our control items represented in

729 Figure 3.



730

731 *Figure 3.* Percentage of error in the expected interpretation of control conditions in

732 Experiment 1 (without *no*) and Experiment 2 (with *no*).

733 Figure 3 shows the percentage of errors participants made under the control

734 conditions described in Section 3.2 above. Considering the overall results of the two

735 experiments together, the total percentage of errors on control items amounted to 6.88%

736 of the responses. For the Negative Quantifiers control the percentage of errors was at  
737 5.10%. For the Universal Quantifier control it was 0.73% and for the Double Negation  
738 control (i.e., those with the complex double proposition structure in (24a)) it was 3.18%.  
739 Notably, this control was entirely failed by one of our participants (100% error), who was  
740 then removed from all further analyses. Finally, for the NPI control, we note that the rate  
741 was distinctly higher with 17.94% of errors.

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

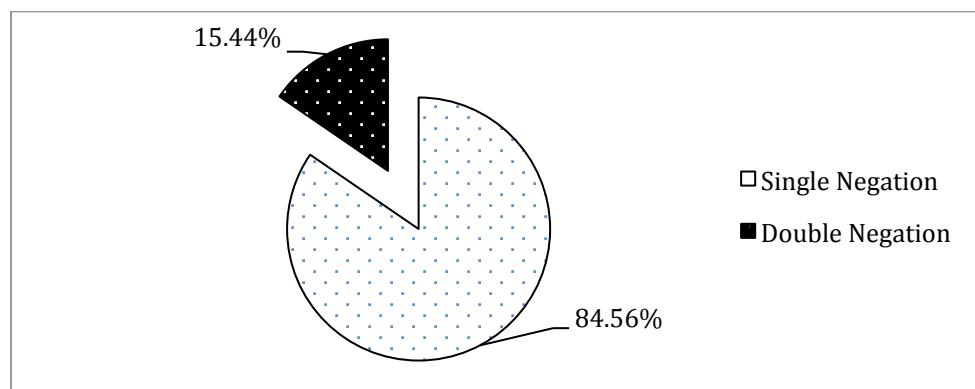
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<sup>10</sup> This was not done for the other control items, as it was not pertinent.

759 the combination of the pre-verbal NCI with the added *no* and creating an ambiguity, such  
760 that the NPI sentence type could no longer be considered a control item. Rather than  
761 errors, indeed, it turned out that our participants' choice of picture reflected a clear DN  
762 reading, where the negation of the pre-verbal NCI was cancelled by sentential *no*,  
763 contrary to the predictions drawn from traditional Catalan descriptions. We return to this  
764 important point in more detail below, where we opted to consider this condition along  
765 with our other critical conditions.

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

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

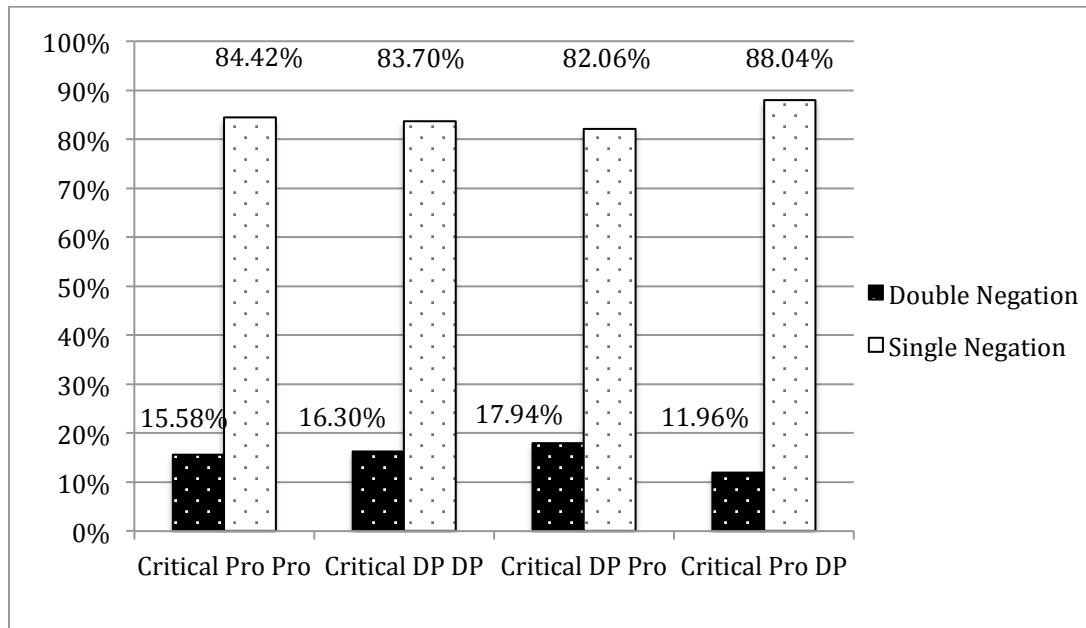


777

778 *Figure 4.* Total percentage of NC / single negation readings vs. DN readings in  
779 Experiment 1 (without *no*) and Experiment 2 (with *no*) confounded.

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

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



798

799 *Figure 5.* Percentage of NC / single negation interpretation and DN interpretation in  
 800 critical conditions with different syntactic complexity in Experiment 1 (without *no*) and  
 801 Experiment 2 (with *no*) confounded.

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

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



812 conditions to the number of errors in the controls and fillers lead no statistically  
813 significant difference with a  $p=1$  value.

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

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

823 In Experiment 1 (without *no*), the random factor ‘Sentence’ had little effect  
824 (Variance = 0.1754), whereas the effect of the factor ‘Subject’ was higher (Variance =  
825 3.9156). Comparing the four critical conditions with the control NPI yielded significant  
826 effects in two conditions: these were critical DP Pro ( $p<0.00206$ ) and critical Pro Pro  
827 ( $p<0.00504$ ).<sup>11</sup> This indicates that these are the conditions that most favoured DN  
828 readings when tested items only contained interacting NCIs but no sentential negative  
829 marker. Concerning these effects, however, it needs to be kept in mind that overall the  
830 level of DN in Experiment 1 (without *no*) is not significantly different from the level of  
831 errors in our control conditions as noted above.

---

<sup>11</sup> 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.

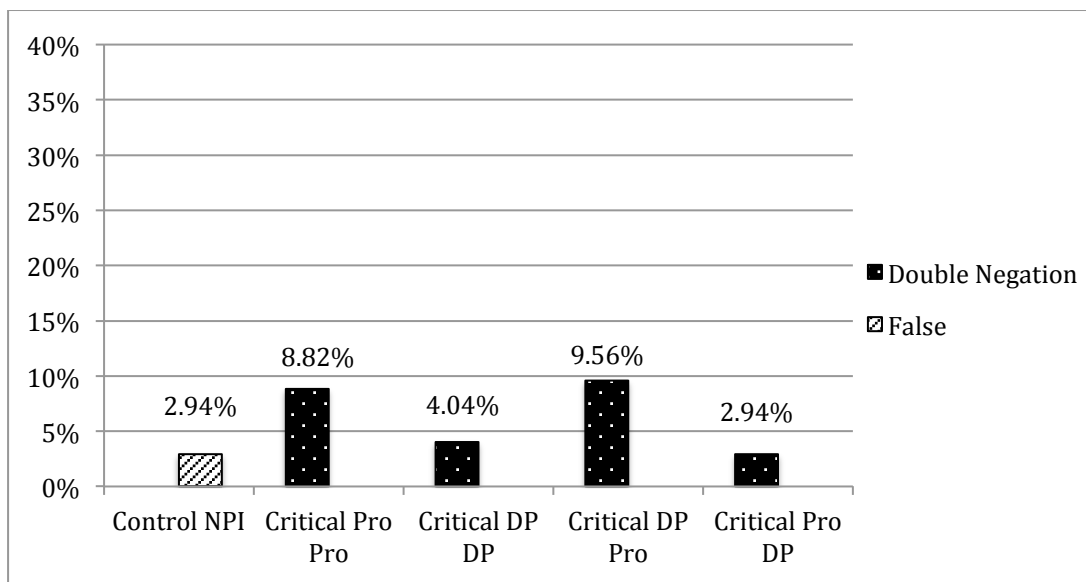
832 Comparing the critical conditions among themselves by means of Tukey Contrasts  
833 Multiple Comparisons of Means (Tukey 1953), we obtained significant effects between  
834 critical DP Pro and critical Pro DP ( $p=0.0174$ ), as well as, between critical Pro Pro and  
835 critical Pro DP ( $p=0.0398$ ). Additionally, the contrast between critical DP DP and critical  
836 DP Pro is significant at  $p<0.1$ . This indicates an overall DN enhancing effect of DP in  
837 pre-verbal position as compared to Pro.

838 For Experiment 2 (with *no*) there was little effect of the random factor ‘Sentence’  
839 (Variance = 0.003822), as in Experiment 1 (without *no*), whereas for the factor ‘Subject’,  
840 the effect was much higher (Variance = 4.528526). This indicates that the variation  
841 among subjects was higher, a point we return to below when discussing subject data.  
842 Statistical significant effects were obtained in three critical conditions when these were  
843 compared with the control NPI: critical Pro DP ( $p<0.001$ ), critical Pro Pro ( $p<0.001$ ), and  
844 critical DP Pro ( $p<0.001$ ). This indicates that these are the conditions that most differed  
845 from the control NPI in terms of how they influenced the rate of DN response. Critical  
846 Pro DP was the condition that resulted in the least amount of DN responses, as compared  
847 to control NPI that manifested the highest rate, followed by the critical Pro Pro condition  
848 and the critical DP Pro condition. After NPI, the condition that most favoured DN was  
849 DP DP, which showed no significant difference with the control NPI.

850 We further conducted a Tukey Contrasts Multiple Comparisons of Means (Tukey  
851 1953) analysis to compare the four critical conditions among themselves with the aim of  
852 finding out which one favoured a DN reading more in Experiment 2 (with *no*). The  
853 output of this test was that the critical conditions that yielded a significant difference  
854 were critical Pro DP as compared to the condition critical DP DP ( $p=0.04616$ ). In this

855 case, the latter condition was the one that showed the most DN readings. This suggests  
 856 that a complex DP in pre-verbal position is a significant factor that favours DN readings.

857 Consider now Figures 6 and 7, which provide the results of DN readings obtained for  
 858 the critical conditions in Experiment 1 (without *no*) and in Experiment 2 (with *no*),  
 859 respectively, as compared with the NPI condition. For Experiment 1 (without *no*), the  
 860 condition that produced the most DN readings is the critical DP Pro, followed by critical  
 861 Pro Pro, critical DP DP and finally critical Pro DP. Recall, however, that the low levels of  
 862 DN in this experiment are not significantly different from error rates in the control  
 863 conditions.<sup>12</sup>

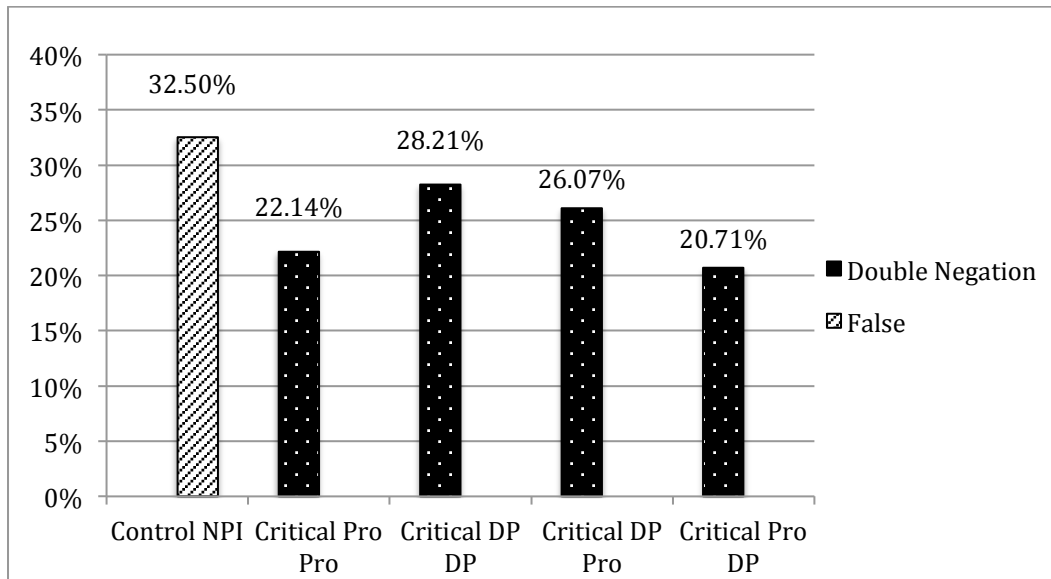


864

865 *Figure 6.* Percentage of DN interpretation in critical conditions in Experiment 1 (without  
 866 *no*) as compared to the NPI control.

<sup>12</sup> 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.

867 In Experiment 2 (with *no*) the highest rate of DN is found in the NPI control. As  
 868 compared to this control, the next highest rate of DN is observed in the critical DP DP  
 869 condition, followed by the critical DP Pro condition, the critical Pro Pro condition and the  
 870 critical Pro DP condition. This leads an apparent effect in favor of increased DN when  
 871 the subject of the transitive sequence is a DP.

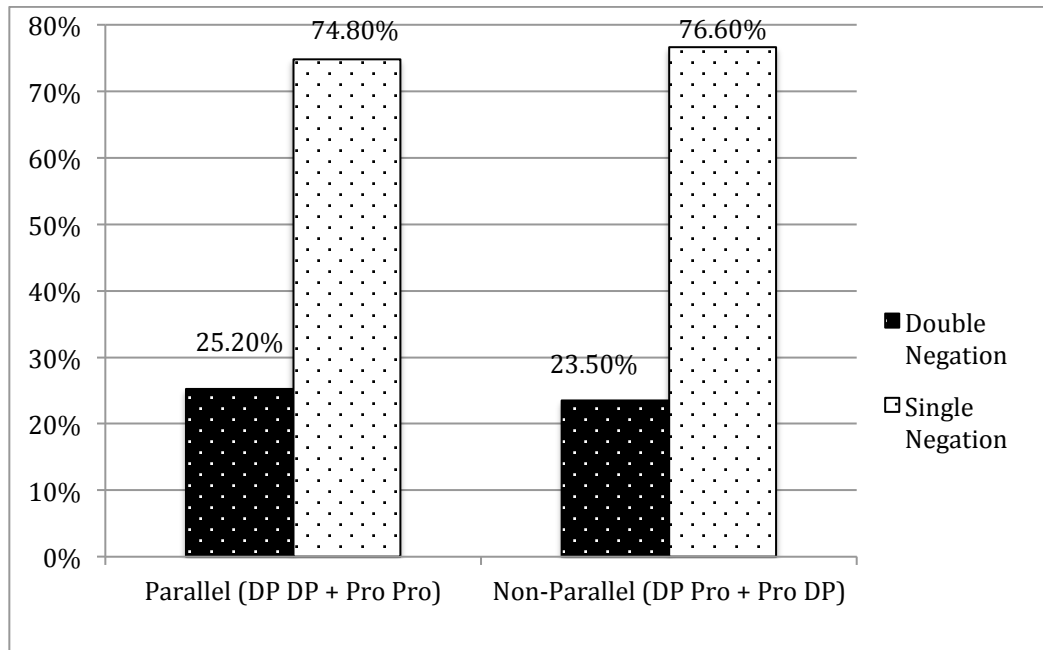


872

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

875 For Experiment 2 (with *no*) a further binomial comparison was conducted to  
 876 compare sequences with parallel morpho-syntactic structures, i.e., conditions that had two  
 877 NCIs of the same morpho-syntactic structures (parallel), to sequences with non-parallel  
 878 NCIs. Figure 8 compares the critical conditions DP DP and Pro Pro (=parallel) together  
 879 to the critical conditions Pro DP and DP Pro (=non-parallel). The effects of parallelism  
 880 were not found to be significant. For clarification, this comparison was conducted  
 881 because it was suggested in May (1990), that parallel sequences of quantifiers may favour  
 882 a resumptive quantification reading. This suggestion was not confirmed in our data,

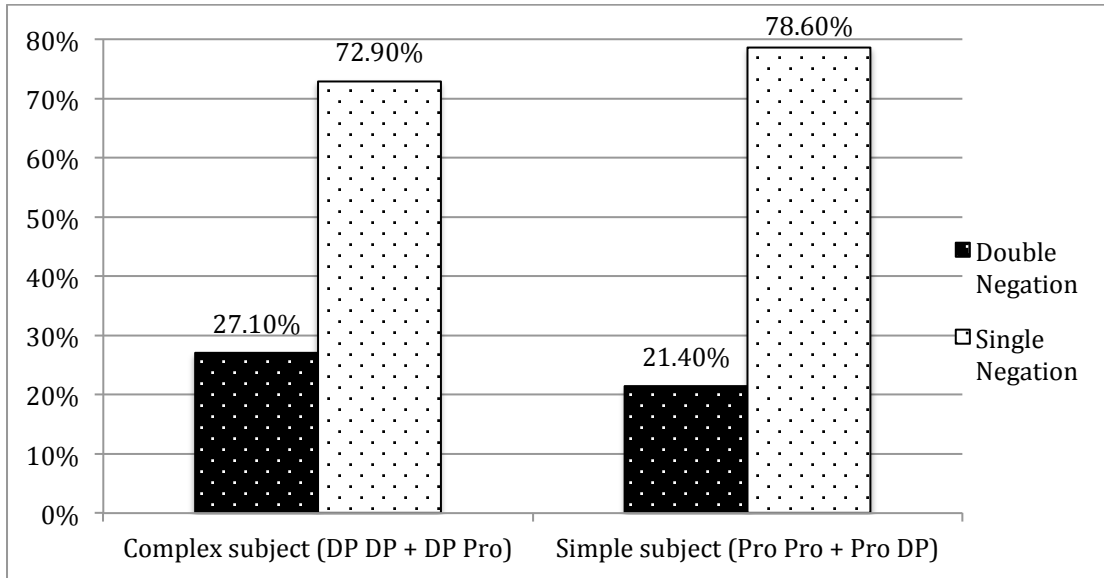
883 presumably because of the otherwise DN enhancing effect of DP in pre-verbal position  
884 (see below), which in all likelihood interfered in the above comparison.



885

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

888 A further analysis was conducted to determine the effect of the complexity of the  
889 negative expression in both pre-verbal (Figure 9) and post-verbal (Figure 10) positions.  
890 Figure 9 reveals that the complexity of negative expressions in pre-verbal position clearly  
891 favors DN readings. A t-test comparison reveals that the difference between conditions in  
892 which a DP is in pre-verbal position (DP DP and DP Pro) significantly increases the rate  
893 of DN in comparison to conditions in which Pro is in pre-verbal position (Pro DP, Pro  
894 Pro) ( $p < 0.001$ ).



895

896

*Figure 9.* Complexity effects of negative expressions in pre-verbal position in

897

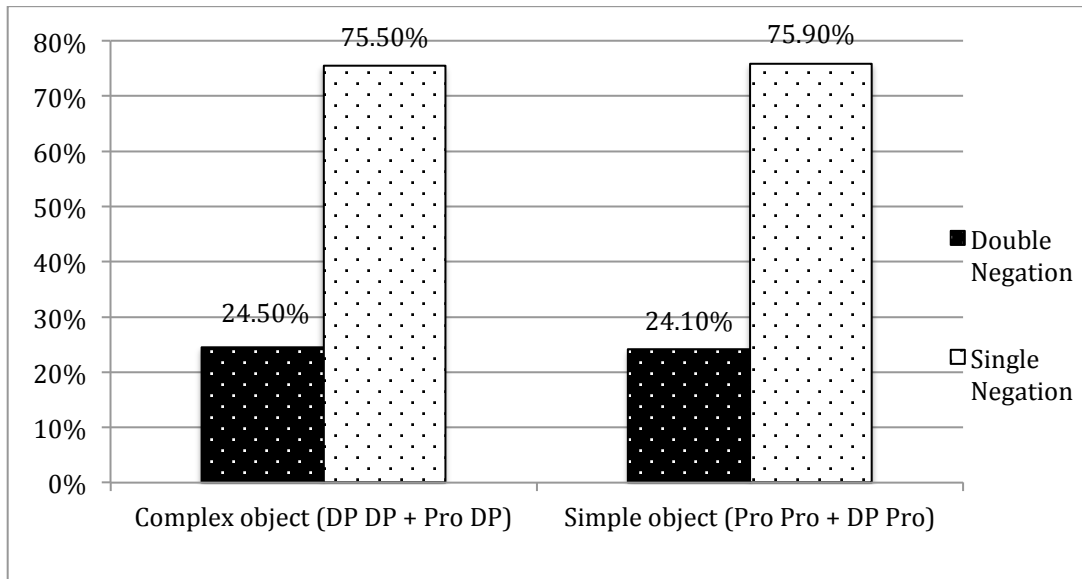
Experiment 2 (with *no*).

898

By contrast, the complexity of negative expressions does not matter in post-verbal

899

position as shown in Figure 10.



900

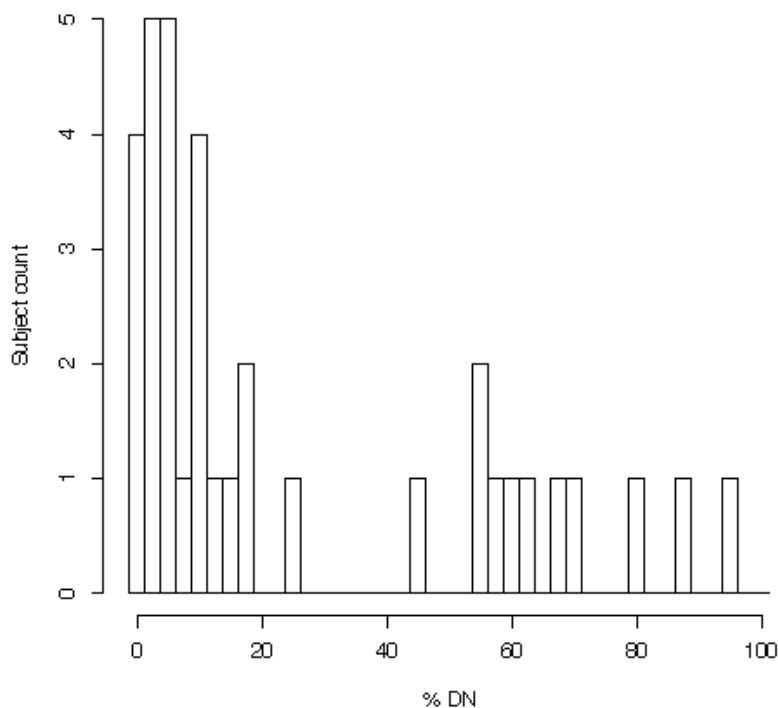
901

*Figure 10.* Complexity effects of negative expressions in post-verbal position in

902

Experiment 2 (with *no*).

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

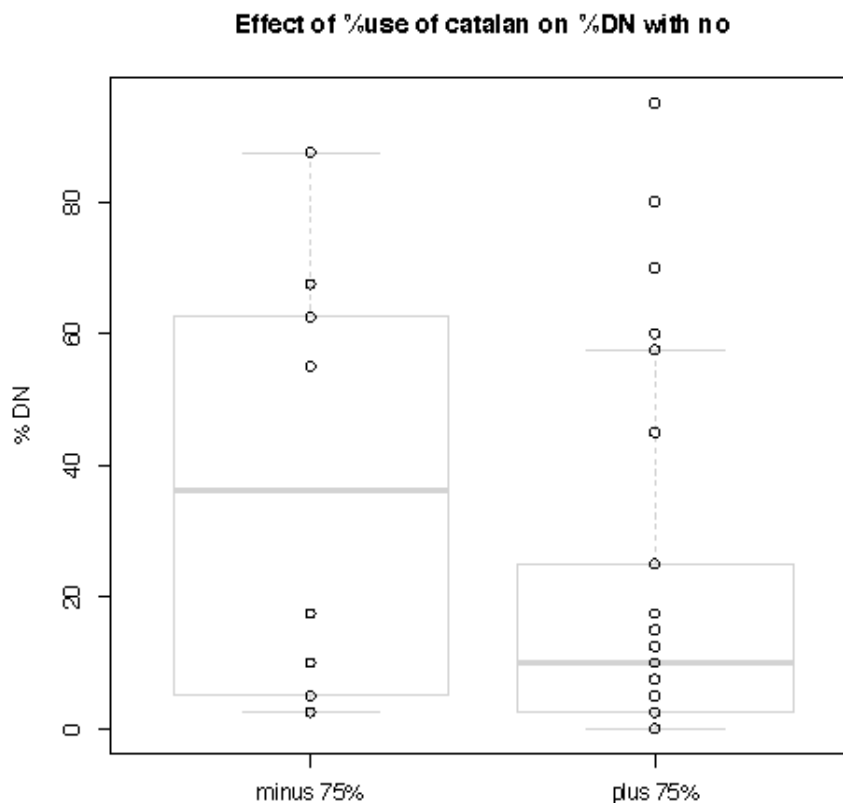


911

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

914 A final remark is of interest concerning our subject data. Recall from the Methods  
915 section that our subjects filled up a small questionnaire at the end of their participation  
916 concerning their place of birth, current living location, age range, sex and percentage of

917 Catalan use in their daily life. In general, the overall population was not sufficiently  
918 balanced for any of these factors to produce a significant effect on the linguistic results.  
919 Nevertheless, one factor that had a suggestive effect nearing significance was the  
920 percentage of Catalan use in daily life. As the figure below reveals, there was overall less  
921 DN interpretation in Experiment 2 (with *no*) for subjects that used Catalan in their daily  
922 life between 75% of the time or more. This suggests that the speakers that used Spanish  
923 more frequently in their daily lives were also the ones who tended to have more DN  
924 interpretations. But to be confirmed, such a tendency would need to be examined in an  
925 experiment with a balanced subject population.



926

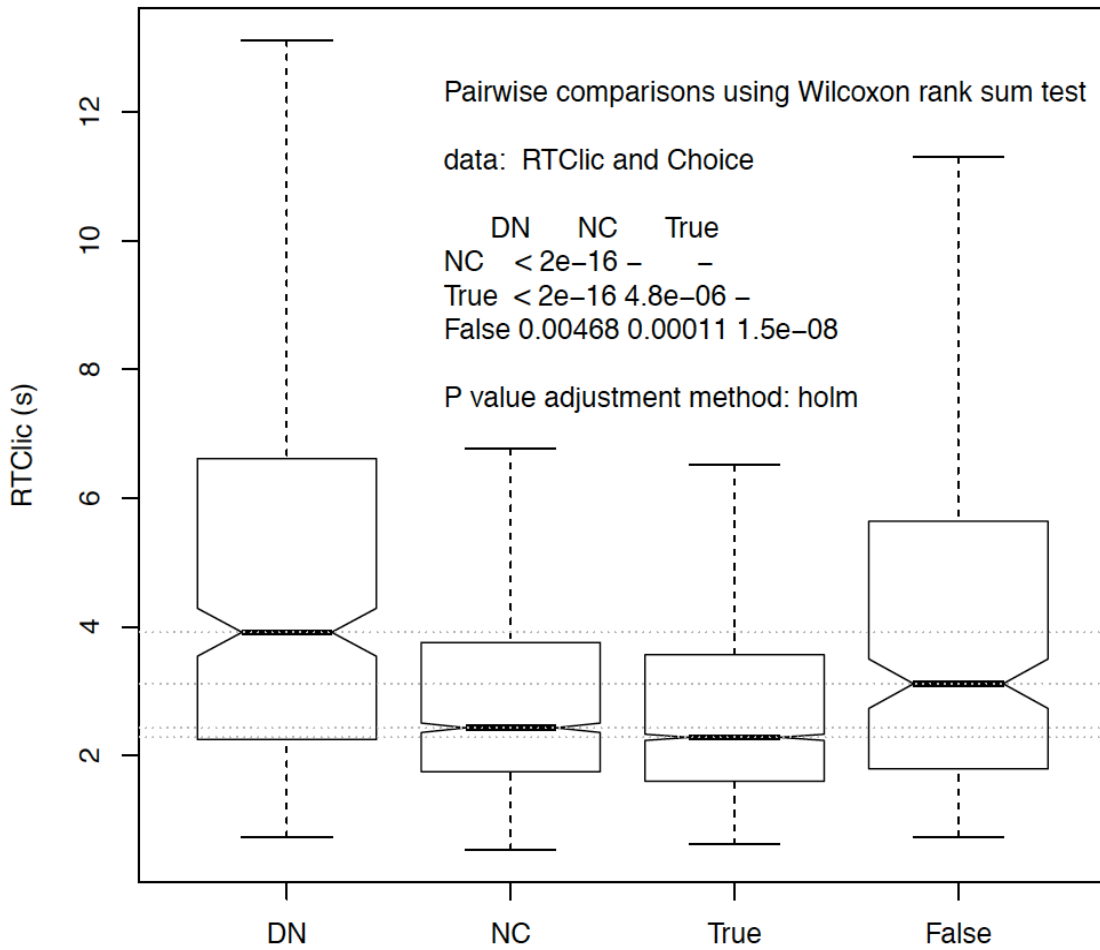
927 *Figure 12.* Effect of percentage of use of Catalan on DN choice in Experiment 2

928

(with *no*)



A final result takes into account our processing factor. Consider Figure 13.



930

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

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

939

## 940 **5. Discussion**

941 In this section, we return to the four initial questions that our experiment was designed to  
942 investigate concerning, first, whether, as standardly assumed by Catalan grammarians,  
943 NC is systematically and consistently the default interpretation for sentences with  
944 multiple NCIs; testing this possibility was important both to probe the nature of Catalan  
945 NCIs with regards to whether or not they could be negative expressions, as de Swart  
946 (2010), among many others, hypothesized, and to establish a baseline for further  
947 manipulations. Our choice of a preference test was guided by an aspiration to find out not  
948 only whether NC is indeed a default reading but also to what extent, if at all, DN readings  
949 could arise as a possible interpretation of Catalan NCI sequences in monoclausal  
950 transitive negative sentences. Second, to deepen this question, we further asked whether  
951 NC could be easier to process than DN readings, as hypothesized by Corblin et al. (2006),  
952 DN being quite generally assumed to be cross-linguistically more marked than NC (de  
953 Swart 2010, Puskás 2012). Third, we explored whether the co-presence of the negative  
954 marker *no* could influence the readings of NCI sequences and boost DN readings, as  
955 predicted by Zeijlstra (2004) if Catalan has a variety with Non-Strict NC, such as Spanish  
956 or Italian, but contrasting with the traditional description of Catalan. Finally, we sought to  
957 examine whether the morpho-syntactic make-up of NCIs (DP vs. Pro) and their syntactic  
958 position could influence the reading of Catalan negative sequences, favoring NC or DN  
959 as was suggested to be the case for other NC languages (Italian, French) (Acquaviva  
960 1995, 1997; Déprez 2000, 2011a, b). This question also aims at probing both the nature of  
961 Catalan NCIs, surveying in particular whether their morpho-syntactic composition can

962 affect the reading they trigger in a negative NCI sequence, and the nature and stability of  
963 the Catalan concord dependency across a variety of negative expressions.

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

972

### 973 *5.1. NC as a default reading in Catalan*

974 Turning to our first question on the default nature of NC readings, it is evident that first  
975 and foremost, our results, with 84.56% NC preferred choice in both experiments  
976 confounded, bring conclusive experimental confirmation that NC is indeed  
977 uncontroversially the prevalent interpretation in Catalan for negative sequences of all the  
978 types considered here, namely monoclausal transitive sentences with NCIs in both pre-  
979 verbal and post-verbal positions with and without *no*. In this respect, our experimental  
980 findings, which fully accord with the abundant traditional and theoretical literature on  
981 Catalan negative dependencies (see references in the Introduction), is evidently, not  
982 novel. It is worth noting, however, that a fully comparable experimental protocol yielded  
983 quite different results for another presumed uncontroversial NC language, namely  
984 French, in which Déprez (2014) found no comparable NC prevalence. Thus, our Catalan

985 results are not as trivial as it may appear, as they establish –for the first time, to our  
986 knowledge– an experimental base line of how prevalent the choice of an NC  
987 interpretation can be in an undisputable NC language, thus providing an informative basis  
988 for further cross-linguistic comparison of NC vs. DN preference.

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

997 Briefly, however, let us here comment on the rather surprising observation that DN  
998 interpretation arose at all in simple Catalan monoclausal transitive sentences with two  
999 NCIs, in the absence of sentential negation or any explicit favoring context (see Figure 6  
1000 for Experiment 1). This possibility evidently raises the question of where the two  
1001 conflicting semantic negations required for a DN reading could come from. Clearly, a  
1002 first semantic negation must be triggered by the presence of an NCI in pre-verbal  
1003 position, which, as is otherwise known, suffices to produce a negative sentence. The  
1004 second semantic negation, however, could just as clearly, only come from the post-verbal  
1005 NCI. As such, this appears to provide a first piece of evidence that Catalan NCIs cannot  
1006 simply always be non-negative indefinites, as they must –at least sometimes– have the  
1007 possibility of being semantically negative on their own or of triggering the presence of an

1008 additional abstract negative operator. In Section 5.3 below, we further discuss how  
1009 exactly such a DN reading can arise in the grammar of Catalan, as several possibilities  
1010 are imaginable, including lexical variants (Herburger 2001), syntactic variants (Déprez  
1011 2000), or a difference in feature composition (Martins 2000; Labelle and Espinal 2014;  
1012 and Espinal and Tubau 2014, to appear). Here we wish only to underscore the mere  
1013 existence of these DN readings in neutral contexts, as this possibility, unexpected in a  
1014 language in which NC is clearly the default interpretation, is predicted to be excluded  
1015 from the start by traditional and descriptive grammars of Catalan and under a strict  
1016 macro-parametric approach to NC. But of course, it must be kept in mind that, if  
1017 surprising, this observation only concerns a rather small proportion of responses in  
1018 Experiment 1 (without *no*), namely only 6.34%, which although slightly larger than the  
1019 overall proportion of errors in our most challenging control, the Negative Quantifier  
1020 control (5.10%), is not statistically significantly different. In this regard, although  
1021 suggestive, this observation surely cannot constitute firm evidence that Catalan NCIs  
1022 must be negative, as these DN readings could, in principle, mostly be due to errors.  
1023 Below, however, additional evidence in support of this possibility is examined.

1024 To sum up, although our experimental results basically uphold the overall traditional  
1025 picture of Catalan as a strongly NC language, they also paint a more nuanced picture that  
1026 is not entirely compatible with the predictions of formal syntactic approaches casting NC  
1027 as the direct consequence of a rigorous macro-parametric choice. In the upcoming  
1028 sections, we focus our discussion on exploring possible explanations for why certain  
1029 factors (i.e., the overt presence of pre-verbal *no*, the structural complexity and the  
1030 distribution of negative expressions) should matter at all in eliciting DN interpretations in

1031 Catalan, given that this language is primarily an uncontroversial NC language. We also  
1032 focus on understanding what this reveals about the nature of Catalan negative  
1033 dependencies. Before we turn to these points, however, we examine the impact of the  
1034 processing results in our experiments, which revealed a significant difference between  
1035 NC and DN.

1036

### 1037 *5.2. Processing NC vs. DN*

1038 As was shown in Figure 13 above, our experimental results demonstrate that Catalan  
1039 speakers clearly required less time to choose a picture corresponding to a NC reading and  
1040 more time to choose a picture corresponding to a DN one, in both Experiment 1 (without  
1041 *no*) and Experiment 2 (with *no*) confounded. Moreover, in Experiment 1 the time to NC  
1042 choice is essentially the same as the True choice for our control items, clearly suggesting  
1043 that monoclausal transitive negative sentences are processed easily under an NC reading.  
1044 Although the measure we recorded (time to picture choice) is not fully comparable to that  
1045 of a more standard reading time, since it involves conscious choice rather than an  
1046 unconscious reading speed, it nonetheless records a measure of reaction. In this regard,  
1047 we conjecture that this measure can be revealing of the comprehension process that is  
1048 taking place in the speaker's mind after reading the relevant sentence. Understood as  
1049 such, the significant difference we found here in Catalan between NC and DN choice  
1050 appears to provide strong support for Corblin's (1996) hypothesis that NC is easier to  
1051 process than DN. This, along with the observation that languages featuring NC are  
1052 usually more frequent in the world's cross-linguistic landscape (cf. Dryer and  
1053 Haspelmath 2013) than those featuring DN, and with Bickerton's (1983) well-known

1054 remark that NC is common to all creole languages, further appears to strengthen the  
1055 already commonly held view that NC could be universally a more natural default reading  
1056 for sequences of negative expressions than DN (de Swart 2010 among others). Should  
1057 NC turn out to be easier to process than DN quite generally, then these cross-linguistic  
1058 generalizations could perhaps even be rethought in processing terms.

1059         However, it must be kept in mind that surprisingly little is in fact known about the  
1060 processing of either NC or DN constructions cross-linguistically. Furthermore, although  
1061 simple negative sentences are quite generally thought to take longer to process than  
1062 positive ones, recent work by Deutsch et al. (2009) shows, in contrast, that negation can  
1063 be processed unintentionally and very quickly. Similarly, an analysis of negative  
1064 dependencies in English using an experimental protocol similar to the one used in our  
1065 study shows that in English, DN readings are in fact processed faster than NC ones and  
1066 about as fast as control items (Déprez 2014). In addition, note that while Corblin's (1996)  
1067 ease of NC processing conjecture was originally offered to explain NC preferences in  
1068 French, it turns out that as Déprez (2014) shows also on the basis of experimental results  
1069 obtained in conditions fully parallel to the ones discussed here, French, in fact, manifests  
1070 no comparable speed advantage for NC over DN choices. That is, in French, contrary to  
1071 Catalan, both DN and NC choices took essentially the same time, with no statistically  
1072 significant difference between the two. Thus, ease of processing for NC seems in fact to  
1073 be language relative, with possible cross-linguistic variation, and not a fully general  
1074 characteristic of DN across languages.

1075         Furthermore, note that if ease of processing were a general NC processing  
1076 characteristic, as conjectured by Corblin, the facts observed here, namely that DN

1077 interpretations seem sensitive to the syntactic complexity of NCIs and to their syntactic  
1078 position (DP vs. Pro in pre-verbal position) would be rather unexpected. The logic of  
1079 Corblin's argument indeed should lead to the reverse expectation, at least considering  
1080 complexity. To see that, consider a sequence of NCIs with a certain complexity.  
1081 Assuming with Corblin (1996) that speakers choose an NC reading to ease its processing,  
1082 it would be expected that if the sequence is made syntactically more complex, the  
1083 pressure to pick a reading easier to process should increase. Our results, however, show  
1084 the opposite tendency. Increased complexity in the NCI sequence, i.e., at least the  
1085 presence of DP NCIs vs. the simpler Pro in pre-verbal position, favors an increase in DN  
1086 readings, not NC. Hence, what both this language-internal observation and the cross-  
1087 linguistic difference between French and Catalan NC processing suggest is that ease of  
1088 processing may not be a factor that generally favors NC readings, but rather it could be  
1089 the processing speed that depends on the choice of NC. If so, our processing results for  
1090 Catalan here can be said to uphold Corblin's (1996) hypothesis, but with a twist, namely  
1091 that ease of processing could be a consequence of a grammatical or semantic pressure for  
1092 NC in Catalan, and not a motivation underlying the NC choice. Note furthermore, that if  
1093 NC readings had different sources cross-linguistically, i.e., if they derived from distinct  
1094 semantic processes such as variable binding (NPI licensing) or resumptive quantification  
1095 in different languages or in different negative sentence types (Déprez 1997 and  
1096 following), then it may well be that ease of processing could characterize some of the  
1097 semantic processes that derive NC, but not others. Thus, for instance, if in French, but not  
1098 in Catalan, NC results from resumptive quantification (Déprez 2000, de Swart and Sag



1099 2002), then cross-linguistic variation and even language-internal variation in the  
1100 processing ease of NC could be expected.

1101

### 1102 *5.3. The role of no: are there two NC varieties for Catalan?*

1103 In this section, we turn to what is perhaps both the most unexpected and the most  
1104 interesting result of our experiments, namely the massive increase in DN readings that  
1105 arose in NCI sequences in the co-presence of the sentential negation marker *no*. Although  
1106 as noted above, DN readings are by and large statistically undistinguishable from errors  
1107 on our controls in Experiment 1 (without *no*), this is not at all the case in Experiment 2  
1108 (with *no*), where overall, a solid 24.29% of DN –highly significantly different from error  
1109 rate on controls– is observed. It is, hence, clear that the increase in DN here is not due to  
1110 error. In this section, we discuss possible explanations for this result, and their relation to  
1111 the existence of two competing varieties for Catalan NC.

1112 Recall from Section 2.2 that in the linguistic literature, the optionality of *no* in  
1113 Catalan has been related to the existence of two NC dialects (van der Wouden and Zwarts  
1114 1993, Zeijlstra 2004). In these approaches, the optionality of *no* is taken to be essentially  
1115 illusory as it results from the interaction of two distinct varieties, unclearly distributed in  
1116 the population. According to Zeijlstra (2004), in the variety identified as Catalan I above,  
1117 the presence of the sentential marker should be as obligatory as in Strict NC languages  
1118 such as Greek, or Romanian, and have no effect on an unambiguous NC interpretation. In  
1119 the variety identified as Catalan II, in contrast, the presence of the sentential marker  
1120 should essentially be disallowed with pre-verbal NCIs, and when enforced, should lead to

1121 an obligatory DN interpretation, as in Non-Strict NC languages such as Spanish or  
1122 Italian.

1123 If we focus on our sentence data, it seems clear that the overall results of our  
1124 Experiment 2 (with *no*) fail to support traditional Catalan descriptions, which basically  
1125 suggest the existence of a single variety where –after pre-verbal NCIs– *no* is optional and  
1126 makes no contribution to the sentential meaning. As our results show, there is little doubt  
1127 that the presence of *no* significantly affected the interpretation of negative sentences, as  
1128 indicated by the sharp increase of DN choice.

1129 However, if instead we focus on our subject data, we observe that the effect of *no* is  
1130 unevenly distributed in our population. Going back to Figure 11, note first that there are  
1131 at least some speakers (actually 4) for whom the co-presence of *no* with pre-verbal NCIs  
1132 makes no difference at all. These subjects simply never chose a DN reading in any of our  
1133 critical condition as well as in the NPI control, which as explained above, was parallel in  
1134 this regard to our critical conditions in Experiment 2. To these subjects, one could add  
1135 some more speakers that produce an amount of DN that essentially hovers around the  
1136 amount of errors in our control items (see the Results section). But the exact number and  
1137 cut is far from clear, as it partly depends on the control items taken as referent, and the  
1138 leniency adopted for inclusion in this group. Nevertheless, what is of interest in Figure 11  
1139 is that overall, we observe an essentially bimodal distribution of our subjects, with a  
1140 larger group of 24 speakers choosing DN between 0-25% of the time, and a smaller group  
1141 of 11 speakers choosing DN almost half of the time or more.

1142 These data may indeed suggest, as hypothesized by Zeijlstra (2004) among others,  
1143 that there are two varieties of Catalan, one with a largely negligible amount of DN

1144 readings and the other for which DN readings are clearly a possible option; for this  
1145 second group of subjects, DN is chosen from 40% of the time up to almost all the time  
1146 (90%), depending on the subjects. As it turns out, however, neither of these two  
1147 populations appears to pattern in complete accordance with Zeijlstra's predictions for  
1148 Catalan. Recall from Experiment 1 (without *no*), that all speakers clearly interpreted NCI  
1149 sequences without *no* massively as NC and that they made this choice as fast as that of  
1150 correct responses to our controls. This strongly confirms the traditional grammar view  
1151 that Catalan sentences with pre-verbal NCIs and without *no* are fully acceptable for all  
1152 speakers. Hence, these data show unequivocally that there is no variety of Catalan  
1153 equivalent to a Strict NC language where the co-presence of sentential negation is  
1154 compulsory with pre-verbal NCIs. Thus, if there are indeed two varieties of Catalan, as  
1155 seems likely in view of the bimodal distribution of subjects observed, the first variety is  
1156 one in which *no* is optional and leaves the preferred NC interpretation essentially  
1157 unaffected, exactly as described by traditional Catalan grammars.

1158 Note that for this variety, Zeijlstra's macro-parametric model is problematic. Recall  
1159 that in his typology, Strict NC languages are characterized by a semantically non-  
1160 negative ([uNeg]) sentential marker, and semantically non-negative ([uNeg]) NCIs. Yet,  
1161 for Zeijlstra's model to correctly predict the obligatory co-occurrence between NCIs and  
1162 the sentential negation marker in Strict NC languages, the latter must be the only element  
1163 able to trigger/license the presence of an abstract [iNeg] operator, so that pre-verbal NCIs  
1164 correctly fail to be able to license post-verbal ones. But this makes incorrect predictions  
1165 for his Catalan Variety I. To account for the Catalan Variety I, in which *no* is optional  
1166 and leaves the NC interpretation unaltered, there are essentially two possibilities. First,

1167 Catalan Variety I could have pre-verbal NCIs that are semantically negative (or  
1168 equivalently, trigger an abstract negative operator) and a sentential negation marker that  
1169 is semantically non-negative, i.e., an expletive negation. Recall from the Introduction that  
1170 Espinal (2007) and Espinal and Tubau (to appear) argue that such a marker is  
1171 independently needed in Catalan to account for the phenomenon of expletive negation  
1172 and is essentially a strong NPI-like element. Second, pre-verbal NCIs in the Catalan  
1173 Variety I could be ambiguous between semantically negative expressions able to occur  
1174 alone in pre-verbal positions, and polar NCIs, requiring the co-presence of negation even  
1175 when in pre-verbal subject position (i.e., a special kind of NPI expressions equivalent to,  
1176 for instance, the Hindi NPI expressions in Lahiri's 1998 work). On this alternative view,  
1177 positing an expletive negation is not needed, but it must be assumed that the Catalan  
1178 polar NCIs can be licensed in pre-verbal positions by a negation that may fail to strictly  
1179 c-command them, at least in their Spell-Out position. Several proposals along these lines  
1180 have been developed, offering distinct accounts on what licenses these NPI-like  
1181 expressions pre-verbally (Martins 2000; Déprez 2000, to appear; among others).<sup>13</sup> We  
1182 return to such a proposal in section 5.3 where we discuss the nature of Catalan NCIs.

1183 The second variety that Figure 11 revealed is one in which the presence of *no*  
1184 significantly increases DN readings, but, in which, crucially, DN readings are not

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<sup>13</sup> 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).

1185 obligatory, since NC remains overall the favored interpretation for negative sequences,  
1186 even in Experiment 2 (with *no*). Here Zeijlstra's (2004) macro-parametric model also  
1187 encounters difficulties. In this model, the presence of pre-verbal *no*, assumed to be  
1188 always semantically negative in Non-Strict NC languages such as Spanish and Italian, is  
1189 predicted to always yield DN. Given that Zeijlstra's Catalan II is described as Non-Strict,  
1190 the existence of a group of speakers for whom DN is the only choice for pre-verbal NCIs  
1191 followed by *no* is expected, but this is not what we found. For this second variety, we  
1192 thus have to conclude that either a non-negative *no* is also part of this variety, but need  
1193 not be used whenever it is licensed, or, alternatively, that pre-verbal polar NCI licensing  
1194 by a non-c-commanding negation has become more costly.

1195       Assuming that Catalan has two lexically distinct (but homophonous) sentential  
1196 negative markers *no*<sub>1</sub> and *no*<sub>2</sub> as proposed in (20) (Espinal and Tubau to appear), and two  
1197 lexical variants of NCIs: *NCI*<sub>1</sub>, which is a polar variant that can trigger an abstract  
1198 negative operator, and *NCI*<sub>2</sub>, a negative existential quantifier, as proposed in (21) (Espinal  
1199 and Tubau 2014), the distinction between the two varieties we observed can be accounted  
1200 for as follows. In Variety A, whenever *no* is present, speakers automatically use the  
1201 expletive form whenever it is locally c-commanded by a non-veridical licensing element.  
1202 This correctly predicts that only the expletive form can be used with pre-verbal NCIs, but  
1203 not with post-verbal ones, since in this case, the expletive *no* would itself not be  
1204 appropriately licensed. This variety appears to be characterized by a constraint that  
1205 requires that only the highest potentially negative element in a chain be associated with  
1206 an actual semantic negation, either overtly or covertly (characterized [iNeg]), and  
1207 precludes all the following potentially negative elements in a chain to be semantically

1208 negative ones. This is a form of Neg-first constraint, though distinct from the one  
1209 proposed by de Swart (2010)<sup>14</sup>, since it concerns negative interpretation, rather than  
1210 morpho-syntactic marking. For some of these speakers, we suggest that the residual small  
1211 amount of DN found could presumably arise from errors or from the interaction of two  
1212 (possibly negative) NCIs, as seen in Experiment 1 (without *no*) (see Figure 6), but not  
1213 from the presence of *no*.

1214 In Variety B, in contrast, the use of the expletive form of the negator is not enforced  
1215 under c-command by an [iNeg] element. Speakers instead may use freely either the  
1216 semantically negative sentential marker or the expletive one, with a lot of intra-speaker  
1217 variability, and with the latter option being regressive and becoming less and less  
1218 common.<sup>15</sup> This accounts for the fact that the massive DN-triggering-*no*-effect observed  
1219 is largely driven by this smaller group. However, here as well, Zeijlstra’s Catalan II is not  
1220 strictly realized, although it seems apparent that some speakers are transitioning to it.  
1221 Note that these observations provide support for the view defended in Section 2.2 that  
1222 contemporary Catalan has two different lexical entries for *no*, one *no*<sub>1</sub> which is  
1223 semantically negative, and one *no*<sub>2</sub> which is semantically non-negative, i.e., expletive.  
1224 Recall that in this regard, Catalan appears similar to Afrikaans, for which Biberauer  
1225 (2013) similarly recently concluded that a strong macro-parametric model such as the one  
1226 proposed by Zeijlstra (2004, and subsequent work) made incorrect predictions.

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<sup>14</sup> Recall that this Optimality Theory constraint specifies that “Negation precedes the finite verb” (de Swart 2010: 96).

<sup>15</sup> It is interesting to note that in this respect, Catalan is also rather similar to Québec 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.

1227 It is therefore interesting to note in regards to the variety here distinguished, that our  
 1228 results suggest that there seems to be a tendency for the speakers of Variety A to be in the  
 1229 class of speakers that use Catalan more than 75% of the time in their daily lives, as the  
 1230 following table reveals.

Percentage of subjects	minus 75% Catalan	plus 75% Catalan
%DN > 25%	14.28%	17.14%
%DN ≤ 25%	14.28%	54.28%

1231 *Table 4. Correlation between percentage of DN readings and percentage of use of*  
 1232 *Catalan in daily life.*

1233 Observe that 54.28% of our subjects use Catalan more than 75% of the time in their  
 1234 daily lives and have less than 25% of DN. These are the subjects closest to what  
 1235 traditional grammars describe. But the cut is not as sharp as one could wish, since in this  
 1236 category of 75%-of-Catalan users, there are still 17.14% who chose DN between 40% to  
 1237 90% of the time. To confirm the tendency here observed, a follow-up study that would  
 1238 properly balance the sampled population for age, use of Catalan in daily life, region and  
 1239 socio-economic factors would be needed. If confirmed, this would demonstrate that the  
 1240 Catalan speakers that deviate from the model described by traditional grammars are  
 1241 speakers that may be more under the influence of their second native language, namely  
 1242 Spanish, a textbook characteristic Non-Strict NC language.<sup>16</sup>

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<sup>16</sup> 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

1243 In sum, the complex profile of the NC and DN distribution that our results revealed  
1244 is one that only partially fits the predictions of either the traditional view of Catalan or of  
1245 Zeijlstra's proposed model. With respect to the use of *no*, we conclude that *no* is optional  
1246 in all varieties of Catalan and there is no variety in which it is either systematically  
1247 required, or systematically rejected. Yet, with respect to the existence of two NC  
1248 varieties, our data indeed suggest that they are attested, and we suggest that whereas for  
1249 one population an expletive *no* most often (optionally) co-occurs with pre-verbal NCIs, in  
1250 another population this is a regressive option and both the negative and the expletive  
1251 variants are variably allowed. Hence, the presence of *no* is increasingly associated with  
1252 DN readings, as it is interpreted as semantically negative to a varying extent.

1253

#### 1254 *5.4. The nature of Catalan NCIs*

1255 While it is clear that the most important factor triggering potential DN readings in  
1256 Catalan is the co-presence of *no* with NCIs, Experiment 2 (with *no*) also provided strong  
1257 evidence that the differing morpho-syntactic nature of NCIs matters in influencing the  
1258 interpretation of negative sentences and fostering DN readings. In particular, our results  
1259 showed that complex NCIs, i.e., DPs with full NP complements, or partitive DPs, in  
1260 contrast to simple Pronominal NCIs, have the effect of significantly raising the number of  
1261 DN choices that speakers made, particularly when they occur in pre-verbal positions.  
1262 Concerning the types of negative sequences we tested, we observed specifically that in

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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.



1263 Experiment 2 (with *no*), our Control NPI sequences most increased the choice for DN,  
1264 followed by DP DP sequences, DP Pro sequences, Pro Pro and finally Pro DP sequences  
1265 (cf. Figure 7).<sup>17</sup> In this section, we examine how these results bear on what has always  
1266 been a core question about NC, namely the nature of the dependent negative items that  
1267 participate in it.

1268 Before we turn to a more detailed account of the specific influence of NCI types on  
1269 DN vs. NC choice, it is worth stressing here that the mere existence of such effects is  
1270 unpredicted under a macro-parametric approach to NC. Clearly, a macro-parameter that  
1271 regulates whether or not a language has a formal negative feature [+/- u/iNeg] has  
1272 nothing to say about why certain types of NCIs can induce more DN / NC readings than  
1273 others within the same language. A proper account of how the nature of NCIs can  
1274 differently affect NC / DN choice requires attention to the internal micro-parametric  
1275 make-up of the NCIs themselves and not just to the general nature of the dependency, as  
1276 strongly advocated in Déprez's works (1997-2011). These type of data, then, demonstrate  
1277 that languages are not homogeneously of NC or DN types, as expected under a macro-  
1278 parametric approach, but feature, rather, NC inducing vs. DN inducing negative  
1279 structures and expressions that can be similar or not across languages and that can differ  
1280 or not language-internally. Thus the variation in interpretation, uncovered here, that is  
1281 induced by diverse NCI types within a single language provides an important

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<sup>17</sup> 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.

1282 experimental confirmation for a micro-parametric inside out approach to variation in NC,  
1283 historical, cross-linguistic or language-internal (Déprez 2000, 2011b, 2014; Déprez and  
1284 Martineau 2004; Labelle and Espinal 2014).

1285       Returning to the question of NCI types, recall that, by and large, four families of  
1286 approaches to the nature of NCIs have been commonly distinguished in the literature. The  
1287 first one considers NCIs as non-negative indefinite expressions that depend on negation  
1288 (or non-veridical operators) to be licensed (Ladusaw 1992, 1994; Zeijlstra 2004; Penka  
1289 2011; among others); in the second one NCIs are always negative quantifiers (Zanuttini  
1290 1991, Haegeman and Zanuttini 1991, de Swart and Sag 2002, among others) and NC  
1291 obtains through resumptive quantification; in the third one, NCIs are wide scope  
1292 universals that outscope their licensing negation (Giannakidou 2000); and in the fourth  
1293 one, NCIs are ambiguous between the first and second type (Herburger 2001). On the  
1294 first and third views, NCIs are essentially dependent polar expressions that require  
1295 specific contexts to be licensed. For Catalan, recall from our Introduction that in Espinal  
1296 and Tubau's (2014, to appear) model, the polar variety of NCIs is characterized with a  
1297 semantic strong [+σ] feature, following Chierchia's (2006) characterization of NPIs, and  
1298 with a morpho-syntactic [uNeg] feature. However, Catalan NCIs cannot just be of this  
1299 type, lest the DN readings that we see arising in both Experiment 1 (without *no*) and  
1300 Experiment 2 (with *no*) would remain unaccounted for.<sup>18</sup> NPIs indeed, even of the  
1301 strongest type, never lead to DN readings, even in denial contexts (otherwise known to

---

<sup>18</sup> 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.

1302 favor the felicity of such readings). To allow for DN readings to arise at all outside of any  
1303 particular facilitating contexts (cf. Experiment 1), it must be assumed that Catalan NCIs  
1304 can also either systematically trigger the appearance of their own abstract negative  
1305 operator, or have the ability to be semantically negative by themselves. In other words,  
1306 our results support the view that Catalan NCIs must be ambiguous, allowing both for a  
1307 non-negative polar-like variant in sentences with an NC interpretation and for a  
1308 semantically negative one to allow DN readings (cf. (21) in the Introduction section).

1309       The idea that NCIs are ambiguous is of course not new, as it has been repeatedly  
1310 proposed in different versions at different times. Among the first to argue for such an  
1311 ambiguity was Longobardi (1987), but perhaps the best known defense of this type of  
1312 analysis is that of Herburger (2001), who argued that Spanish NCIs are lexically  
1313 ambiguous between a negative and a non-negative type, and that of Martins (2000), who  
1314 argued for a typology of polarity items in Romance based on the well-established  
1315 weak/strong distinction. Déprez (1997a, b, 1999, 2000) and Déprez and Martineau (2004)  
1316 offer yet another ambiguity proposal, arguing that NCIs can be morpho-syntactically  
1317 ambiguous, with each interpretation corresponding to a different internal morpho-  
1318 syntactic structure. In these studies, it is proposed that NCIs with negative force occupy a  
1319 high position in their nominal structure, while those that are non-negative indefinites  
1320 occupy a low DP internal position. Recently, Déprez (2011b) argued that semantically  
1321 negative NCIs occupy a (contrastive) topic/focus position within their internal DP  
1322 structure (see for instance Ticio 2005 among others for such a position in the DP) that can  
1323 either be derived via a DP-internal displacement (Kayne 2005) or be grammaticalized as  
1324 a result of historical evolution. Schematically, the morpho-syntactic distinction can be

1325 represented as follows:

1326 (26) negative NCI :  $[_{\text{Top/Foc}} \text{NCI } [_{\text{DP}} \dots [_{\text{NumP}} [_{\text{NP}} \quad ]]]]$

1327 non-negative NCI :  $[_{\text{Top/Foc}} [_{\text{DP}} \dots [_{\text{NumP}} [_{\text{NP}} \text{NCI} ]]]]$

1328 Assuming DP to be a phase (Chomsky 2000), Déprez (2011b) proposes that the  
1329 negative feature of NCIs can become accessible at the sentence level (i.e., at a higher  
1330 phase level of computation) and hence semantically interpretable only if NCIs occupy the  
1331 edge of their constituent, i.e., here the highest structural position in the DP in these cases.  
1332 Otherwise, when buried deep inside the DP constituent, the negative feature remains  
1333 uninterpretable at the sentence level, so that NCIs are interpreted as non-negative.<sup>19</sup>

1334 Yet another proposal for NCI ambiguity is offered in Labelle and Espinal (2014) and  
1335 Espinal and Tubau (2014, to appear). These authors argue that NCIs can have a different  
1336 feature make-up, and that it is their distinct feature composition that is responsible for  
1337 their differing interpretation. One lexical variant is a polarity item (defined as  $[+\sigma]$   
1338 following Chierchia (2006)), which may acquire a syntactic formal feature  $[u\text{Neg}]$  in  
1339 syntax that requires an Agree dependency to be established with an  $[i\text{Neg}]$  constituent;  
1340 the other is a lexical variant that is a negative existential quantifier ( $\neg\exists$ ) endowed with an  
1341 uninterpretable Focus feature,  $[u\text{Foc}]$ . Such a proposal is in line with Déprez's (2011b)  
1342 proposal that negative NCIs that are semantically negative occupy a Focus position  
1343 within their DP structure.

1344 Arguing for a choice among these alternative proposals for the ambiguity of Catalan  
1345 NCIs lies beyond the scope of this particular paper. Of relevance to our purpose here is  
1346 the idea that, in Catalan, the NCIs, as well as perhaps the sentential negative marker *no*,

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<sup>19</sup> For an earlier formulation of this Feature Accessible Condition and its applicability to domains other than negation, see Déprez (1998, 2007).

1347 can have distinct variants that compete within the same language. Let us now turn to  
1348 consider what possibilities these assumptions offer in regards to our experimental  
1349 findings.

1350 In comparison with Zeijlstra's (2004) macro-parametric view, the micro-parametric  
1351 approach here advocated, which takes into account the possible ambiguous make-up of  
1352 the Catalan negative marker, and of the Catalan NCIs, clearly offers more flexibility. It  
1353 predicts that Catalan should allow for at least the following possibilities. The combination  
1354 of a semantically negative sentential marker with NCIs that are semantically non-negative  
1355 evidently leads an NC reading, which is comparable to the reading obtained in polarity  
1356 dependencies. As we have seen, this is clearly a possibility in Catalan, and, perhaps, the  
1357 most common one featuring a dependency between a sentential negation and a post-  
1358 verbal NCI. To obtain this combination, we suggest that the semantically negative  
1359 version of the sentential negative marker is its default interpretation, shared by all  
1360 speakers of Catalan, in all variants. For NCIs, in contrast, we take the non-negative  
1361 variant to be the default one. Concerning the two Catalan variants discussed above, we  
1362 suggest that speakers of Variety A use the expletive *no*<sub>2</sub> when the optional negation is c-  
1363 commanded by a negative NCI. Moreover, they only allow pre-verbal NCIs to trigger an  
1364 abstract negative operator.<sup>20</sup> This allows for the optionality of *no* without affecting the  
1365 preferred NC reading of the sequences. Post-verbal NCIs, in turn, are licensed either like  
1366 pre-verbal ones (by an abstract negative operator triggered by a pre-verbal NCI), or by  
1367 negation.

1368 Let us now turn to consider the variety in which DN readings are clearly a  
1369 possibility. Here we suggest that DN readings emerge from the combination of a negative

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<sup>20</sup> We discuss below where this restriction may come from.

1370 NCI in pre-verbal position and the semantically negative sentential negation marker,  
 1371 accounting for the massive effect of *no* that our data have uncovered. Additionally, we  
 1372 conjecture that for the same type of speakers, the possibility of DN readings in NCI  
 1373 combinations without *no* is also allowed to emerge from the possibility of having  
 1374 negative existential quantifier NCIs both in pre-verbal and in post-verbal positions.  
 1375 Evidently, this second possibility also arises in the presence of *no*, and also leads to a DN  
 1376 reading. For all varieties, additionally, the presence of either a negative NCI in pre-verbal  
 1377 position or a negative sentential negation marker and non-negative NCIs in post-verbal  
 1378 position leads to the preferred NC reading that is observed overall.

1379 Table 3, repeated here as Table 5 for convenience, summarizes the options our  
 1380 proposal has made available. A question that remains to be answered at this point is:  
 1381 when are these variants allowed or fostered?

Catalan	NCIs in negative contexts	Negative marker(s)
Variety A	1. [+σ] 2. ¬∃, [uFoc] (emergent)	1. [iNeg] 2. [+σ]
Variety B	1. [+σ] 2. ¬∃, [uFoc]	1. [iNeg] 2. [+σ] (regressive)

1382 *Table 5. Lexical variation in NCIs and the negative marker in Catalan*

1383 Concerning the non-negative negation marker, it has been hypothesized in Espinal  
 1384 (2007) and Espinal and Tubau (2014, to appear) that speakers that have this variant of *no*  
 1385 also use it in so-called expletive negation constructions. This makes the clear prediction  
 1386 that speakers who chose a NC reading in sentences that combine two NCIs with the  
 1387 sentential negative marker *no* (Variety A) are also the ones who will otherwise manifest a  
 1388 relatively frequent use of expletive negation in the relevant constructions. Vice versa,  
 1389 speakers who chose a DN reading for these negative sequences (Variety B) will also lack  
 1390 or tend to reject expletive negative constructions. We aim to conduct further experimental

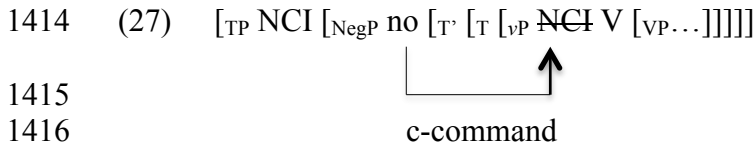
1391 work to verify this prediction.

1392 Note, however, that the two Catalan varieties uncovered in our results can also  
1393 receive an alternative account that would locate their difference solely in the variable  
1394 nature of their NCIs, thus possibly doing away with the contribution of an expletive  
1395 negation.<sup>21</sup> Relying on suggestions made in Déprez (to appear), such an account would go  
1396 as follows. Recall that, descriptively, Catalan Variety A is a variety in which the  
1397 sentential negation *no* optionally co-occurs with pre-verbal NCIs without affecting the  
1398 NC interpretation. This can obtain, as discussed above, if the negative force is located in  
1399 or triggered by the pre-verbal NCI and absent from the sentential negation, which is then  
1400 an expletive negative dependent item. Alternatively, however, it can also logically obtain  
1401 if the negative force is located in the sentential negation marker only, being then absent  
1402 from the pre-verbal subject NCI. This option, however, is rarely explored in the literature,  
1403 in view of the well-known fact that English-type NPIs require c-command by negation in  
1404 their Spell-Out position. In turn, this type of c-command requirement, whose effect is to  
1405 exclude English NPIs from pre-verbal subject positions, is commonly thought to  
1406 generalize to all NPI expressions. Suppose, however, that there existed a type of negative  
1407 dependent expressions for which this requirement could be relaxed. That is, suppose that  
1408 for these Catalan preverbal items, c-command by negation of one of their copies –not  
1409 necessarily the final Spell-Out one– could be sufficient for licensing. Given the so-called  
1410 *vP-Internal Subject Hypothesis* (Koopman and Sportiche 1991), whereby pre-verbal  
1411 subjects are derived by movement from a *vP*-internal position, such relaxed negative

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<sup>21</sup> 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).

1412 dependent expressions could occur in pre-verbal subject positions as long as overt  
 1413 negation c-commanded their vP-internal copy. (27) illustrates this proposal:



1417 With option (27) in hand, Catalan Variety A would then be accounted for as follows.  
 1418 First, assuming ambiguous NCIs that either lack or have negative force, pre-verbal NCIs  
 1419 lacking negative force would require the co-presence of sentential negation to be  
 1420 licensed, but with this licensing allowed in their base position (i.e., Spec, vP for subjects  
 1421 or VP for objects) under a single negation reading. By contrast, the NCI with negative  
 1422 force would occur pre-verbally, without *no*, and, in turn, license dependent post-verbal  
 1423 NCIs. In Variety A, the presence of *no* would trigger the choice of the negative dependent  
 1424 expression lacking negative force both in subject and object position.

1425 Variety B would then differ from Variety A as follows: in Variety B, pre-verbal  
 1426 NCIs that lack negative force would come to disallow licensing by negation in their base  
 1427 position, turning into English-like NPIs that require c-command by negation in their overt  
 1428 derived position. That is, option (27) becomes regressive. As a consequence, gradually,  
 1429 only NCIs with negative force are allowed in pre-verbal position, with the co-occurrence  
 1430 with *no* then leading to increasing DN readings. In post-verbal position, however, NCIs  
 1431 that lack negative force are still properly licensed by a c-commanding negation,  
 1432 accounting for the growing subject-object asymmetry. On this view, as well, since the  
 1433 distinction in Variety B leads to a closer resemblance to the asymmetric Spanish / Italian  
 1434 NC type, the tendency to regard speakers of Variety B as more sensitive to the influence  
 1435 of Spanish remains.



1436 Let us finally concern ourselves with the availability of DN readings with the  
 1437 negative variant of NCIs. Here several possibilities can be entertained, which ultimately  
 1438 depend on what the exact source of NCI ambiguity turns out to be. One interesting point  
 1439 deserves further attention. Recall that our data showed that the complexity of DP  
 1440 structure matters in fostering DN readings. As it turns out, most of the complex DP in our  
 1441 experimental material and particularly those in pre-verbal positions were partitive DPs  
 1442 (like for instance *cap dels alumnes* ‘none of the students’). In recent work on Catalan  
 1443 partitive DPs, Martí i Girbau (1999) argued that these complex DPs involve DP-internal  
 1444 movement (predicate inversion) to a high position in the DP structure, as shown in (28):

1445 (28)a. molts dels llibres

1446 many of.the<sub>PL</sub> books

1447 ‘many of the books’

1448 b. [<sub>DP</sub> molts<sub>i</sub> [<sub>D/PP</sub> [<sub>D/P°</sub> de [<sub>DP</sub> els [<sub>FP</sub>[<sub>NP</sub> llibres [<sub>F°</sub>[<sub>XP</sub> t<sub>i</sub> ]]]]]]]]]

1449 When associated with Déprez’s structural proposal on NCI ambiguity, which relates  
 1450 the strength of the negative force of NCIs to a high position in DP structure, Martí i  
 1451 Girbau’s (1999) structure for partitives suggests an interesting explanation for the  
 1452 increase in DN readings observed in our experimental results with full DPs that are  
 1453 mostly partitive NCIs.<sup>22</sup> The significant increase in DN reading observed with partitives  
 1454 provides strong support for the proposal that the internal structure of NCIs matters for  
 1455 their interpretation and more specifically, that their negative force correlates with the high

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<sup>22</sup> 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<sub>i</sub> [<sub>FP</sub> t<sub>i</sub> F° [<sub>PP</sub> t<sub>i</sub> de P° 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.

1456 position of NCIs within their structure (Déprez 1997a, b, 1999, 2000, 2011b; Déprez and  
1457 Martineau 2004).

1458 Note, furthermore, that, as is rather well known, subject DPs are far more often  
1459 topics than object DPs (Prince 1992). If sentential DP topics are also DPs in which a DP  
1460 internal (contrastive) topic/focus movement is fostered, this again hints at a plausible  
1461 avenue to explain why DN readings should be particularly favored by complex DPs in  
1462 pre-verbal subject positions. That is, the idea here is that the DN reading is fostered under  
1463 a kind of structural parallelism between a DP occurring in a higher sentential edge  
1464 position (topic/focus in Rizzi's 1997 sentential structure) and NCIs occurring in their  
1465 higher edge DP-internal position, the edge position in both serving to enhance the  
1466 visibility / interpretability of the negative feature in the sentential domain. Here too,  
1467 further experimental verification that targets partitive NCIs and topic structure/focus  
1468 structure within the DP and in the larger sentential domain is called for to solidify these  
1469 novel conjectures.

1470 But independently of these particular conjectures, it is clear that what our current  
1471 experiment results have shown is that the internal structure of NCIs matters for the  
1472 overall interpretation of negative sentences. Note that this is exactly what a micro-  
1473 parametric approach such as the one advocated in independent work (Déprez and  
1474 Martineau 2004; Déprez 2011b; Espinal and Tubau to appear, 2014) predicts. We  
1475 therefore conclude that the complex empirical landscape of the distribution of DN and  
1476 NC interpretation that our experiment has uncovered provides solid support for a micro-  
1477 parametric approach to NC. Such an approach takes into account possible lexical variants  
1478 in the interpretation of the sentential negation marker but especially in the structure and

1479 interpretation of NCIs, which can vary and compete within a single language.

1480

## 1481 **6. Conclusion**

1482 To conclude, this paper has presented experimental work that explored the interpretation  
1483 of NCI sequences in Catalan with and without the co-occurrence of the negative marker  
1484 *no*. Our results have shown that the empirical landscape of these constructions is far more  
1485 complex than standardly assumed in the literature. Clearly, and unsurprisingly, our results  
1486 have first and foremost confirmed experimentally that NC readings are overall the  
1487 favoured reading of NCIs sequences in Catalan, both with and without the co-presence of  
1488 the negative marker *no*, hence establishing an experimental base line useful for further  
1489 cross-linguistic experimental investigation of NC constructions. But beyond this  
1490 empirical confirmation, our results have also shown that in contrast to the traditional  
1491 description of Catalan, the co-presence of the negative marker *no* with pre-verbal NCIs  
1492 clearly affects the interpretation of NCI sequences as it can sometimes elicit DN readings  
1493 in simple sentences outside of any particular favouring contexts. Interestingly, however,  
1494 such DN readings are not elicited for all our subjects. As hypothesized by Zeijlstra  
1495 (2004), the existence of two variants of Catalan that co-exist in the native speaker  
1496 population seems to be supported by the near bimodal distribution of DN readings we  
1497 observed in our sample population. The two variants, however, did not entirely pattern as  
1498 predicted under Zeijlstra's model, as Catalan clearly does not feature a variant with Strict  
1499 NC, but only a variant in which the co-presence of the negative marker is indeed optional,  
1500 as described by traditional Catalan grammars. For the second variant, DN readings, which  
1501 are generally not obligatory, are mostly elicited by the co-presence of *no* but were also

1502 shown to increase with the particular structure of NCIs, and more specifically for  
1503 complex DP NCIs such as partitive NCIs in pre-verbal position. To account for these  
1504 facts, we argued for a micro-parametric approach to Catalan NC that features both a  
1505 possibly ambiguous negative marker –semantically negative or expletive, the latter option  
1506 being readily available for the speakers of Variety A, and regressive for the speakers of  
1507 Variety B–, and ambiguous NCIs, non-negative and negative, variably available for all  
1508 Catalan speakers. Alternatively, the option of licensing polar NCIs under c-command by  
1509 negation of their base-merged copy, while solid in Variety A, would become regressive in  
1510 Variety B, leading to a gradual ban for polar NCIs to occur in pre-verbal position. The  
1511 paper further offers conjectures as to why certain types of NCI structures (complex or  
1512 partitive DPs) can foster an increase in DN interpretation and why the pre-verbal position  
1513 also matters. Overall, one of the central points of our experimental work is the  
1514 demonstration of how crucial taking into account the elicitation of possible DN readings  
1515 can be, for a better understanding of the nature of negative constructions in Catalan, and  
1516 cross-linguistically. In this regard, we hope that our work will encourage the  
1517 experimental exploration of the interesting variable emergence of DN readings in the  
1518 cross-linguistic landscape of NC constructions.

1519

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