CHAPTER 3

French negative concord and discord

An experimental investigation of contextual and prosodic disambiguation

Viviane Déprez and Jeremy Yeaton
Rutgers University

Evidence that DN readings arise in solid NC languages more than previously thought (Déprez et al. 2015) underscore the importance of investigating the factors governing their emergence to deepen our understanding of Negative Concord. This paper examines the roles of context and prosody in disambiguating simple French transitive sentences with two NCIs (*personne*, *rien*) experimentally. French speakers were recorded reading target sentences with NCIs in NC or DN eliciting contexts followed by a verification statement judged as T/F and analyzed as context-matching or not. Context-matching targets were extracted using Praat and analyzed using ProsodyPro (Xu 2013). Sentence contour, average pitch and F0 peak value on NCIs were compared across conditions. Our results provide solid evidence that in French, context influence interpretation and NC and DN interpretations are prosodically distinguished.

Keywords: negative concord, double negation, prosody of French negative concord, context influence

1.   Introduction

French, sequences of potentially negative expressions like *personne* and *rien*, referred to here as Negative Concord Items (NCI) (Watanabe 2004),[1] can have two possible interpretations; a sentence like (1a) can have a Negative Concord (NC) reading as in (1b) or a Double Negation (DN) reading as in (1c), in which two negations cancel each other out to produce a positive reading.

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1. The expressions that participate in negative concord dependencies are also often referred to as n-words. We chose to avoid this term here to avoid any unpleasant connotation.

(1) a. *Personne ne dit rien.*
    b. *Nobody says anything* = Everyone is silent = NC
    c. *Nobody says nothing* = Everybody talks. = DN

On a par with other Romance languages, French is generally regarded as a concord language (Zeijlstra 2004, De Swart 2010). As is known, however, double negation readings of NCI sequences are possible and not uncommon (Déprez 2000, Corblin and Tovena 2003). Still quite unexplored, however, are the different factors that govern the choice between NC and DN interpretations for French speakers. The question of whether NC is a default reading in French as well as the influence of the morpho-syntactic nature of NCI, and their structural position on this choice was examined in previous experimental work (Déprez et al. 2013, Déprez 2014). Processing considerations influencing interpretation are discussed in Corblin (1996). The present study focuses on the role of context, and especially of prosody on the choice of NC/DN interpretation in standard French. Quite a few authors have noted the importance of prosody in influencing the interpretation of French NCI sequences (Corblin and Tovena 2003, Corblin et al. 2004) but up to now, there has been no experimental investigation of how and to what extent NC and DN could be prosodically distinguished. Here we report the result of a production experiment designed to start answering this question.

2. Theoretical background

A popular theoretical stand in generative approaches to Negative Concord has been to consider that there is a macro-parameter that divides NC languages from DN languages (Zanuttini 1991, Haegeman 1995, Zeijlstra 2004, a.o.). In main European languages, the partition would by and large run along the Romance vs Germanic divide, though with noted exceptions. The predictions of such views are that no real NC/DN ambiguities should be observed in languages, and hence, the emergence of NC in DN languages or DN in NC languages is often cast as marked or anomalous and, as such, not considered as part of what the grammars allow. There have been essentially 3 families of theoretical accounts of the phenomenon of Negative Concord, which differ according to the status given to NCIs. In the first type of account, NCI are considered to be non-negative expressions, of either existential or universal nature, and the single negation reading of concord comes from a single sentential negation operator that is overt (Giannakidou 2000) or covert (Zeijlstra 2004). Here, the predictions are that DN readings in sequences of NCI should be no more available than with sequences of negative polarity items like *anything* or *anyone*. In the second type of account, NCI are negative expressions

and concord readings are obtained through a semantic process of Resumptive Quantification, a subtype of polyadic quantification (May 1990, De Swart and Sag 2002, Déprez 2007, 2000). Here, in contrast, sequences of NCI are predicted to be ambiguous and can in principle lead to either NC or DN readings, depending on whether they are interpreted under scopal interaction or resumptive quantification. Left unaccounted on this view, however, is how this choice operates and thus, how languages could differ in their NC/DN distribution. Finally, in a third type of approach, NCI are taken to be ambiguous expressions that are sometimes negative, sometimes not. The ambiguity has been regarded as lexical by some researchers (Herburger 2001) and as structural by others, shaped by the internal syntax of NCIs (Déprez 2000). Déprez (2011) argued that structural considerations affect the interpretability of the negative features of NCIs both within the DP and in the sentence in which they occur. Very briefly, negative features become interpretable at phase edge, but how they get to these edges, and how phases are established in a language can be subject to variation. The prediction of this approach is that NC and DN readings are subject to morpho-syntactic and structural conditions that can vary both language-internally and cross-linguistically, though the principles of negative interpretability remain unchanged.

3.   Experimental background

A previous experimental study on French negative dependencies used a picture to meaning matching choice task without verbal contexts to probe NC and DN interpretations (Déprez et al. 2013, Déprez 2014, Déprez et al. 2015). Contrasting with the expectations fostered by much of the literature on French, the results showed no solid preference for NC. French speakers preferred NC only slightly but not significantly in NCI sequences with pronominal expressions like *personne* and *rien* (noted *Pro* in Figure 1), but significantly preferred DN readings when NCI sequence featured full DP expressions like *aucun enfant* (noted DP in Figure 1) in subject positions, although NC readings were not excluded in these cases either. The graph in Figure 1 sums up the central results of this first experimental investigation.
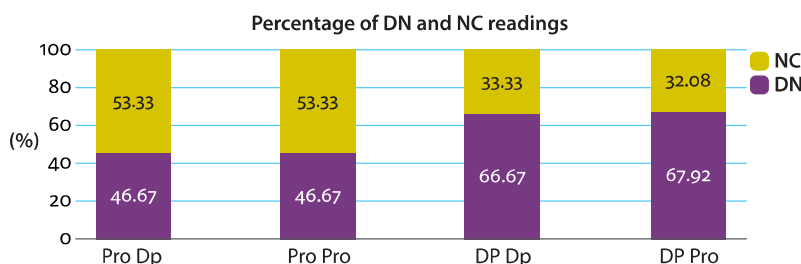
Percentage of DN and NC readings

Figure 1. Morphosyntactic factors influencing NC vs DN readings

We see that the choice of NC or DN is almost equivalent when the subject is a pronominal NCI like *personne*: NC at 53% and DN at 46%. So these structures are clearly ambiguous. But when the NCI is a full DP like *aucun enfant* in subject position, then the DN readings are significantly preferred at 66%, $p < 0.001$. These results confirm that morpho-syntactic and structural factors can strongly influence the NC/DN interpretation choice within a single language. Yet since structures with pronominal NCI were shown to be ambiguous between NC and DN readings, further factors need to be considered for these particular cases, and more specifically, context and prosody. Concerning the influence of context on interpretation, it has been quite generally assumed that in order to be felicitous, a DN sentence requires a special context. Yet the specific nature of this context is not always made clear. Many have noted that the contradiction of a previous negation facilitated these readings. More specifically, as proposed in Puskás (2012), DN sentences are said to felicitous when they negate a discourse old negation with a discourse new negation.[2] This context type, however, is said to facilitate DN readings in all types of languages, independently of whether or not they have been regarded as NC or DN languages. In French, however, contexts of this type are not necessary to elicit a potential DN reading for NCI sequences, even if, of course, they remain possible (Corblin and Tovena 2003, Déprez 2000). So a sentence like (2) can be understood with a DN reading. Assume a context where a restaurant bill is split in a group and everyone must contribute.

(2)   *Tout le monde a bien règlé sa part ? Oui en effet, personne n'a rien payé.*
      'Did everyone pay their part? Yes, indeed. Nobody paid nothing.'

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2. That denial of a previous negation is not always necessary for DN even for supposed DN languages like English is shown by examples like (i), said by a resolute mother determined to protect her child:

(i)   There is nothing I would not do for my child.
      (American Crime, commercial for an ABC TV show).

In this example, DN is used to strengthen an affirmation.

Here, the context facilitates DN because the positive meaning of the double negation sentence (everyone paid something) is the expected outcome. Since we were interested specifically in how this ambiguity is resolved in French, and whether DN readings can be elicited in contexts that do not feature a contradiction, these are the types of context that were used in our design.

The literature reveals some previous experimental research on NC/DN prosody, though at this point, none that we are aware of for French. Prosody has first been investigated for Afrikaans in a production study by Huddlestone (2010), who found NC and DN to be distinguished. A similar study on Dutch by Fonville (2013) did not produce such clear results. It is notable, however, that in the experimental design of both of these production experiments, the interpretation of the actual target sentences was presupposed to match the one the context intended to facilitate. As there was no meaning verification test, however, it is ultimately unclear what interpretation the speakers really had. Some of the observed fluctuation may well result from this design problem, so that in the end, claims of a prosodic differentiation or lack thereof are difficult to evaluate. Other prosodic studies on Catalan (Espinal et al. 2011, Espinal et al. 2016), found a clear NC/DN distinction. This study, however, looked at the meaning of single NCI in answers to negative questions, which proved to be ambiguous in Catalan, but are not felt to be so in French, where they have been observed to systematically lead to a DN interpretation (Corblin and Tovena 2003). In view of our previous experimental results and these preceding prosody studies, the study reported here sought to answer the following research questions: 1. Does context succeed in influencing/determining NC/DN interpretation in French? 2. What is the role of prosody? Does French manifest a particular mapping between prosody and interpretation in NCI sequences? If so which one?

4.   Experimental design

To investigate these questions, we designed a production experiment. Participants were asked to read simple ambiguous transitive sentences in context and were recorded. The test sentences all followed the form [*personne* Verb *rien* PP], and were embedded in short contexts facilitating a NC or DN interpretation, as illustrated in (3) an (4) below. Importantly, our DN facilitating contexts did not contain negative propositions, which have been argued to facilitate DN in all languages, even strict NC ones (Puskás 2012), but rather were simple statements that described situations compatible with a DN reading for our targets. Following the reading, subjects were presented with a verification statement that served to check whether participant interpretation indeed matched the one intended by the context. For

example, respective contexts were as in (3) for the ambiguous target sentence: "*personne ne boit rien dans les soirées*" (Nobody drinks anything/nothing at parties),

(3)   NC Context:
    Dans notre famille, on est tous allergique à l'alcool :
    'In our family, we are all allergic to alcohol.'
    Personne ne boit rien dans les soirées.
    'Nobody drinks anything at parties.'

(4)   DN Context:
    Chez les jeunes, la consommation d'alcool est effrayante :
    'In the youth population, alcohol consumption is frightening.'
    Personne ne boit rien dans les soirées.
    'Nobody drinks nothing at parties.'

For both (3) and (4) above, the verification statement was as in (5) below.

(5)   *Ils ne boivent pas d'alcool.*
    'They don't drink alcohol.'

In the NC context presented in (3), the interpretation intended would yield a response of "True" to the verification statement: since everyone is allergic to alcohol, no person in the family drinks any alcohol, i.e.: no alcohol is consumed, therefore "they don't drink alcohol" would be true. By contrast, the sentence would be false following the DN eliciting context in (4). Since the consumption of alcohol among the youth has reached frightening levels, one understands that at parties, no youth fails to drink, therefore everyone is drinking. Hence the verification statement, "they don't drink alcohol" would be false.

There were 5 categories of stimuli, each with 8 items per category: (1) ambiguous criticals in DN contexts, as in (4) above; (2) ambiguous criticals in NC contexts, as in (3) above; (3) single negation controls with a single NCI in subject position (*Personne ne boit ça*, 'nobody drinks this'); (4) single negation controls with an NCI in object position (*Les gens ne boivent rien*, 'People drink nothing'), and (5) fillers (*Les enfants boivent du jus*, 'Children drink juice'). The verification statements were balanced 4T/4F within each category. With 40 items per participant and 28 participants, 1120 total responses were collected. In order to avoid ordering effects, the items were pseudo-randomized in blocks. Each block featured one item per category, randomized within the block, and the blocks were appended one after the other also in random order such that every participant saw all 40 items. In order to control for prosodic factors, the same number of syllables was used in each of the target sentences. Two syllables for the subject, one syllable for the verb, and one syllable for the object. In order to avoid having the sentence boundary tone fall on the object NCI, each sentence was concluded by a

prepositional phrase of at least two syllables. In addition, the same 8 monosyllabic verbs, of comparable frequency, were used in each category.

5.   Participants and procedure

28 native French speakers (18F, 10M, age 18–45), most students at the University of Lyon were recorded at the L2C2 Bron, France, on an Asus Orion PRO gaming headset with a noise filtering microphone. Participants were asked to read contexts and targets first silently, and then aloud, as if telling a story to a child. The recording was self-paced. After they finished recording, participants answered the verification question T/F. Participants were first presented with two practice items and the total experimental time took at most 20 minutes.

6.   Analysis

Two main analyses were conducted: contextual interpretation and acoustic/prosodic. For the contextual interpretation analysis, T/F responses were coded as +/−context matching, as well as NC/DN. For the acoustic/ prosodic analysis, the critical sentences (*personne ne* [verb] *rien*) [PP]) were excised from context using Audacity 2.0.6 and time aligned, matching phonemes and syllables to waveform in Praat (Boersma and Weenink 2015) using EasyAlign (Goldman 2011). A second Praat script called ProsodyPro (Xu 2013) was used to extract F0 values.

7.   Results: Context influence

In control contexts, interpretations correctly matching the context (NC match = NC interpretation in NC context, DN match = DN interpretation in DN contexts) were provided at 96.21%, from which it can be safely concluded that the task was well understood by the participants. For critical items, overall interpretation matched context at almost 80%, though a bit more in NC context (87%) and a bit less in DN contexts (72%). This clearly shows that context was successful in determining interpretation and is thus a strong factor that influences the NC/DN choice in French.
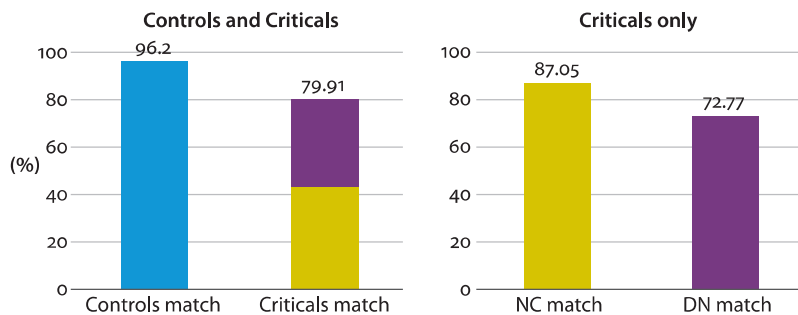
Figure 2. Matching responses in Controls and Critical items

When the contexts results are examined by participant, it can be seen that NCI sequences were not equally ambiguous for all participants; some (7/28) strongly favored NC readings in both NC (Bule black) and DN contexts (= NC mismatch blue grey), and 1/28 strongly favored DN readings in all DN (yellow stripes) and NC contexts (= DN mismatch purple stripes). But for the majority of participants (20/28), sequences of NCIs items are clearly ambiguous: they favor NC interpretations in NC contexts and DN interpretations in DN contexts for the same sentences. Our prosodic analysis was restricted to these 20 participants and their 278 matching items (138 DN, 140 NC). Hence the context verification control in our experiment allowed us to confirm the ambiguity, and it also allowed us to filter out from the prosodic analysis the speakers and productions that did not have the intended meaning: participants and items mismatching the intended meanings were removed from further analysis to ensure that the productions we looked at clearly had the meaning we were interested in.
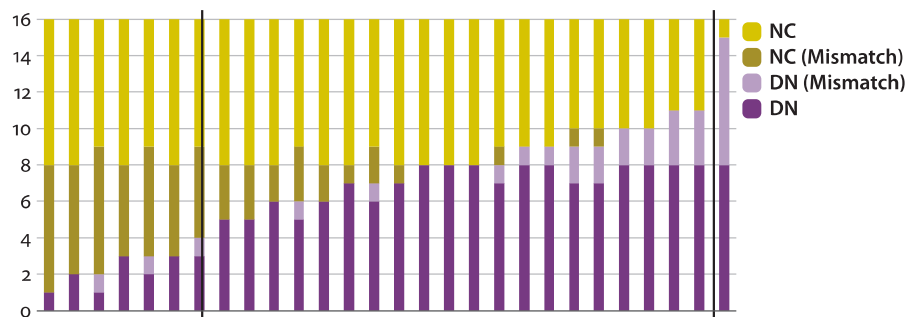

Figure 3. Matching and non-matching responses per participants.

8. Results: Acoustic analysis

From the 278 recordings that were kept for analysis after meaning verification, we excised our disambiguated target sentence using the open source free audio editor software Audacity 2. 1.2:
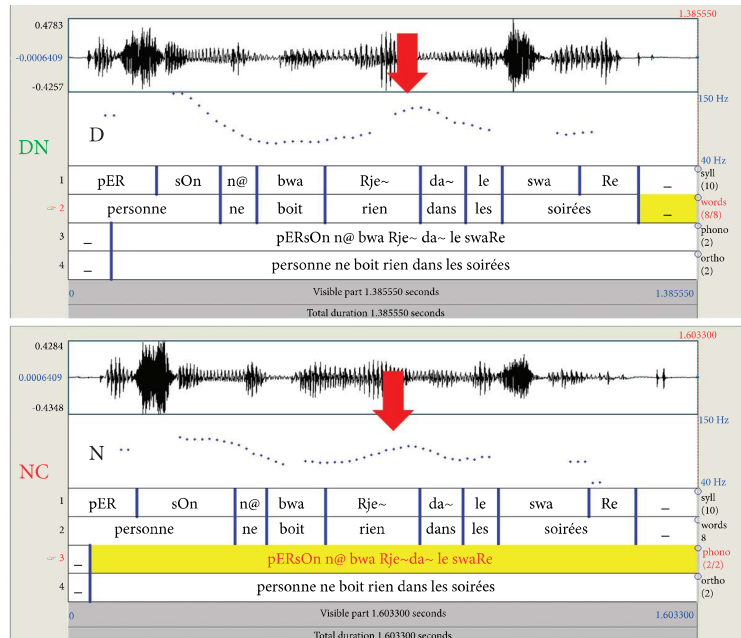

Figure 4. Sample F0 contour

Before we turn to the results of our acoustic analysis, let us first look at a sample F0 contour produced by Praat. Note the difference seen in these contours between the realization of *rien* in the DN reading as opposed to the NC reading. The DN reading here has a higher F0 peak on this item than the NC one. For each syllable in the sentence, ProsodyPro (Xu 2013) was used to Extract (10) time-normalized F0 values. The time-normalized values helped give an idea of how pitch was changing over the course of the syllable as opposed to over the course of time. Thus, instead of each segment having the same period of time (e.g.: 0.1 seconds), each segment represented 0.1 syllables. These ten values were then aligned by syllable across all 8 utterances in a given condition for a given participant. They were then averaged together to create an "average contour" for a participant in a given condition. These participant contours were, in turn, further averaged together to give an idea for the overall behavior in a condition. These were weighted by number

of utterances used, since we only used context-matched recordings, and plotted to see the overall F0 shape of the speakers in a given condition:
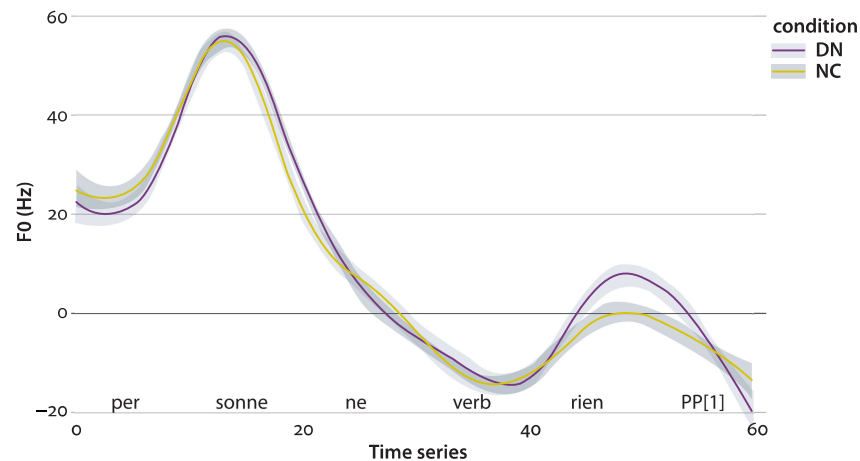

Figure 5. De-meaned averaged contour per condition

Figure 5 shows the average of the de-meaned F0 values for all DN matching and all NC matching items respectively. It can be noted that pitch is higher and rises and falls more sharply on the object *rien* in the DN condition as compared to the NC condition. The difference in the average pitch of *rien* in the DN and NC condition for all subjects combined is significant at the $p < 0.05$ level. The peak F0 values for the NCI *rien* for all of the participants in the two conditions (DN = 16.90Hz vs NC = 6.54Hz) is also significantly different ($p < 0.05$). This is illustrated in Figure 6 both quantitatively on the right and graphically on the left.
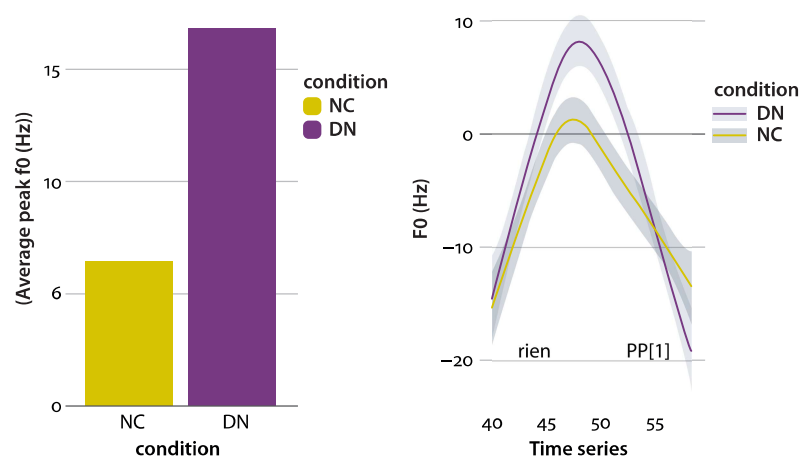

Figure 6. Peak distinction on **rien**

In addition to the peak values, the difference between the peak value on *rien* and the lowest pitch of the following syllable, which represents the pitch drop after *rien* was also significant between conditions, as can be seen below in Figure 7. The bar graph on the right represents the average pitch difference between the highest peak on *rien* and the lowest pitch on the following syllable (=pitch drop) greater for DN than for NC which is graphically represented on the left.
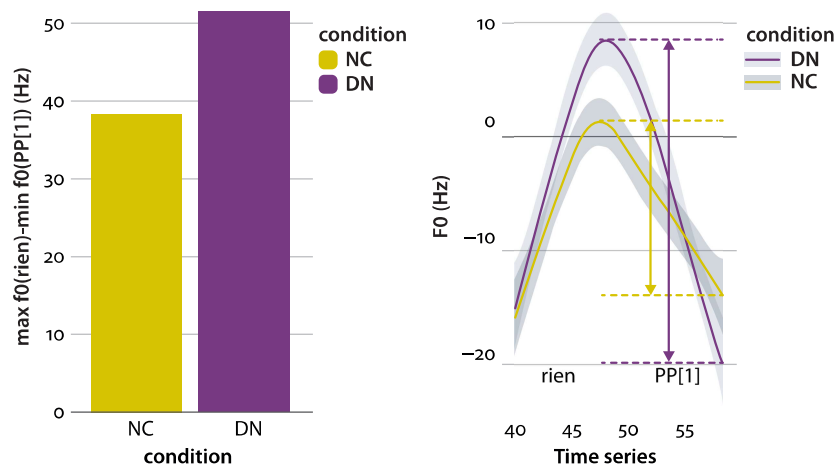

Figure 7. Pitch drop after **rien**

The average F0 contours of all of the participants were then compared and two main patterns were found. The first and less common pattern (4 participants), shown below in Figure 8, is characterized by a higher peak value on the second syllable of the subject NCI *personne* in the DN condition, with little difference on the object NCI. This pattern corresponds to the one suggested in Corblin et al. (2003) as typical for DN readings. For Corblin et al., emphasis on the subject NCI is what is assumed to be distinctive for DN. It is interesting to note that this pattern, although indeed represented in our data, turned out to be used by only a small minority of our participants.
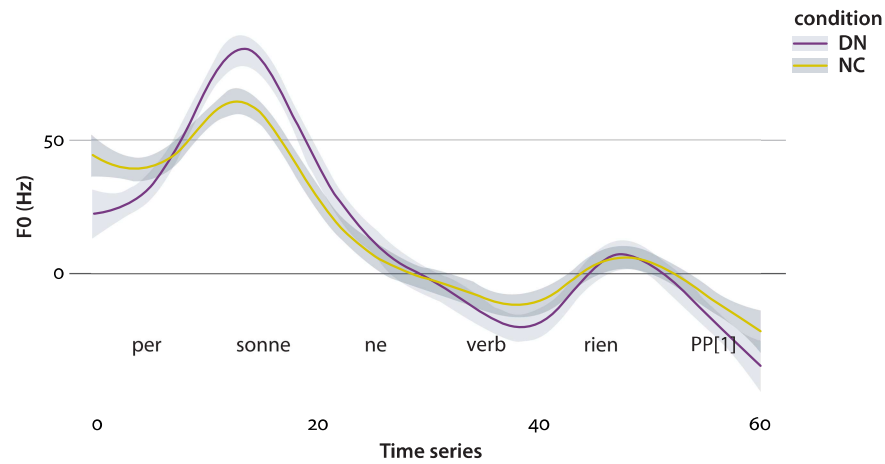
Figure 8. Subject NCI emphasis, DN pattern

The other pattern, which was exhibited by 14 of our participants, featured no discernible difference on the NCI first (*personne*) but a much higher peak value on second NCI (*rien)* in the DN condition.
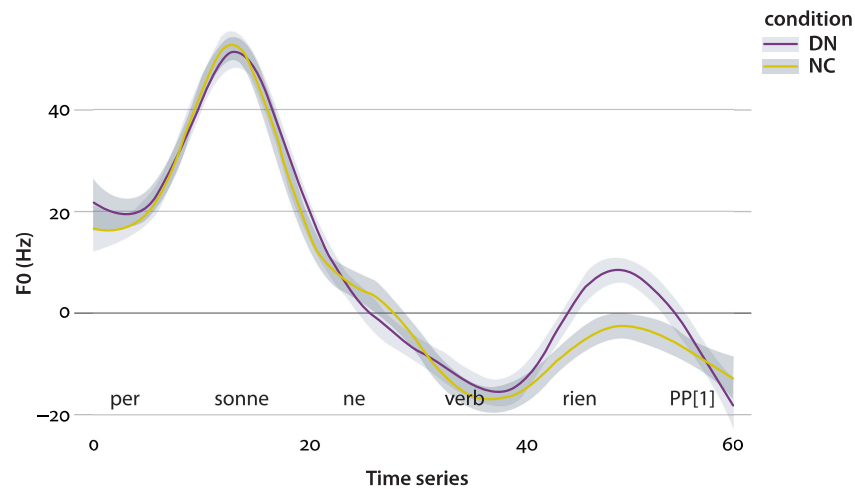

Figure 9. Object NCI emphasis, DN pattern

Two of our participants did not conform to either of these main patterns. Neither did they have a common pattern with one another.

9.   Discussion

The acoustic measures described above clearly indicate that speakers make a distinction in production between the NC and DN readings. However, these measures do not yet constitute a prosodic analysis of this distinction, since a prosodic analysis is based on differences that can be perceived by speakers. We think, however, that the acoustic differences uncovered in this experiment are indeed indicative of a prosodic difference and we suggest that the NC and DN readings are characterized by a phrasing difference as well as by a difference in tone. For NC, we suggest, the prosodic analysis, given in 1 below, where *personne* forms its own accentual phrase, with a low pitch accent on the first syllable, and a high boundary tone marking the subject accentual phrase on the second syllable. The verb and the NCI object *rien* are then phrased together with a low pitch accent on the V and a high boundary tone on *rien* marking the VP accentual right edge phrase boundary. Finally, the prepositional phrase closes the sentence with a phrase final low boundary tone.

(6)   NC: Focus on *personne*; *rien* is phrased as part of VP

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      L*    H-          L*      H-                L%
   (([DPPersonne]AP) ([VPne Verb rien ]AP)..([PP…PP…]AP)IP)
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For the DN reading in contrast, we suggest that *rien* forms its own accentual phrase, separate from that of the verb, which is possibly de-phrased (Féry 2001) or phrased along with the subject (Avanzi et al. 2014). Furthermore, because *rien* is an accentual phrase by itself, it carries a Low+High or rising boundary tone.

(7)   DN: Focus on *personne;* V is 'dephrased' (Féry 2001); Focus on *rien* which
        forms its own phonological phrase.

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      L*    H-          L*      LH-            L%
   (([DPPersonne]AP) ne Verb ([DPrien ]AP) ([..PP..]AP)IP)
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Following Féry (2001), we suggest that this phrasing indicates that in DN, the second NCI is under focus, which is here manifested by an increased F0 peak and followed by a more abrupt fall on the next syllable, which could mark the end of the *rien* phrase.

Support for this analysis is provided by the Prosograms (Mertens, to appear) we obtained for our target sentences, of which a representative sample contrasting realization of the DN reading (above) and the NC reading (under) of a particular speaker is provided in Figure 10.
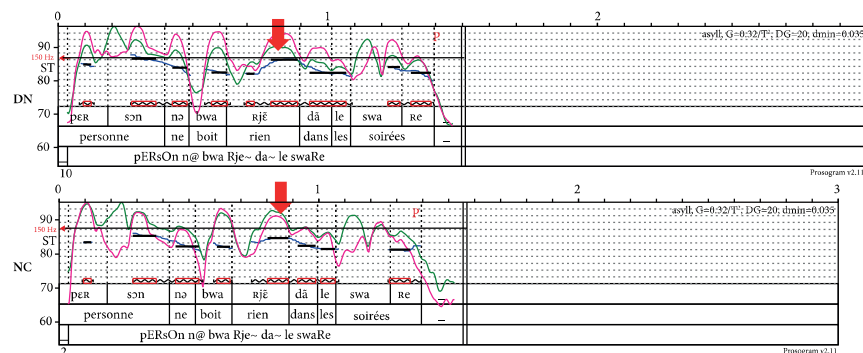
Figure 10. Sample contrastive Prosograms

Prosogram, designed by Piet Mertens, is a software for the semi-automatic transcription of prosody. It takes a time aligned phonetic annotation (here delivered by Praat) and outputs a representation that is an estimation of the pitch contour that can be perceived by an average listener. This representation is a stylization of the F0 curve of vowel nuclei, which aims at the reconstruction of the perceived pitch contour, based on a psycho-acoustic model of tonal perception.

In the sample provided in Figure 8, we see the difference between the stylized perceived contour of the DN and NC production of the target sentence *personne n'aime rien*. Two facts are notable in these representations. First note that the DN clearly has a higher tone on *rien* than the NC one. As you can see the thick bar is set at 150hz in both diagrams. In DN, the tone on *rien* reaches the bar, while in NC, in contrast, it remains clearly below. Furthermore, for DN, the representation shows a Low-High tone on the monosyllabic *rien*, which we take to be representative of *rien* forming a phrase by itself. In contrast, we see a flatter and lower high tone on *rien* in the NC reading. This is a distinction that matches our proposed prosodic analysis and suggests that the difference is indeed perceivable by an average French speaker.

10.   Conclusions

First, our results confirm that both the NC and the DN readings are available for most French speakers, and that this ambiguity is not marginal. These results do not quite fit a NC/DN cross-linguistic parametric divide since, on such a view, French would be unclassifiable. Hence, an empirically correct account of French negative dependencies requires moving away from a macro-parametric divide. We have also seen that context quite generally succeeds in influencing the interpretation, although not equally for all speakers. At this point, an interesting question remains

as to whether this speaker distinction reflects a distinction in their grammars or in their capacities to compute or process ambiguities. Finally, we have shown that, in production, the NC and DN interpretations are acoustically distinguished by a statistically significant higher F0 peak on the second NCI, and a steeper fall after it in the DN reading. We have further proposed that this acoustic difference signals a prosodic difference in phrasing and in tone. We argued that in DN, but not in NC, the second NCI can form its own prosodic phrase independent from the VP and bear a Low-High boundary tone. We would like to further suggest that, possibly, the two prosodic phrasing for NC and DN correspond to two distinct syntactic structures; One for NC, where the NCI remains or reconstructs inside the VP, so that its negative features are not interpretable on Déprez (2011)'s feature interpretability condition, which proposes that negative features are interpretable only when they occur at phase edges (DP,vP,CP); and the other for DN where, under focus, *rien* is interpreted at vP edge, so that its negative feature can be interpreted at the sentential and thus, at the propositional level.

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