The Processing of Expletive Negation: A Developmental Study

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1 Introduction

In Italian, the negative operator "non" is normally used to negate the propositional content of a sentence and reverse its polarity, such as in the Italian sentence below:

(1) Gianni *non* viene alla   festa
     Gianni *neg* comes to-the party
     'Gianni doesn't come to the party'

There are, however, cases in which this operator seems to be expletive: despite its presence, the sentence retains the same meaning as its affirmative counterpart.

(2) Rimarrò qui   finché Gianni *non*   viene
     stay.1st sing.fut here   until   Gianni *neg*
     alla   festa
     comes to-the party
     'I will stay here until Gianni comes to the party'

There is general agreement that the acquisition of standard negation (SN) follows a developmental trajectory of forms and functions. Following Pea's (1980) classification, children learn to express nonexistence first, then rejection and only later denial (Thornton, 2020). This seems to be confirmed in Child Italian as well, where denial begins to appear in the production of children as young as 20 months old, although mainly conveyed by the negator *no*. At 3 years old, denial is consistently expressed by *non*+VP (Tagliani et al., 2022). The processing of negation, on the other hand, is known to be challenging even for adults (Kaup, Dudschig, 2020), leading to processing difficulties and inflated reading times (Lüdtke, Kaup, 2006). As for expletive negation (EN), some authors (Delfitto, 2020; Greco, 2020) have argued that its presence, despite not negating the propositional content of the sentence, still contributes an additional level of meaning. However, its processing has been rarely addressed in literature (Greco et al., 2020), and to our knowledge only one study (carried out by the Authors) has focused on reading. In both cases, EN increased the processing difficulties of the sentence, but differently than SN. In a childood population, research on the processing of denial negation is comparatively scarce, with a few notable exceptions showing the same delays in children aged 4-5 years (Doyle et al., 2019), and for negation in imperatives in 11-years-olds (Dudschig et al., 2021). Adding to that, no study to our knowledge has specifically addressed neither the acquisition nor the processing of EN in children. The present study aims to assess the processing costs associated with the integration of negation in a reading paradigm by addressing the following research questions:

1. Do children aged 11 years old correctly interpret the difference between SN and EN?

2. Does the the effect of the processing effort of SN entail inflated reading times in children as well?

3. Are there any differences between the processing of SN and EN in a childood population?

2 Method

The study will consist of a self-paced reading paradigm, aiming to assess the processing cost associated with the comprehension of EN during childhood, in comparison with SN.

The present work follows up on two previous experiments run with adults. Results from an acceptability rating paradigm (80 participants) suggested that EN sentences are perceived as more natural and understandable than their affirmative counterparts. Despite this, a self-paced-reading paradigm (80 participants) revealed that reading times increase significantly in the presence of EN. This outcome suggests that while sounding perfectly natural to native speakers, EN still entails higher processing costs than an affirmative sentence. The results also

Condition	Sentence
EN	*Chiara | è rimasta | in casa | finché | Marco non | ha chiamato | la pizzeria | per la cena* Chiara | remained | in the house | until | Marco didn't | call | the pizzeria | for dinner
A_EN	*Chiara | è rimasta | in casa | finché | Marcello | ha chiamato | la pizzeria | per la cena* Chiara | remained | in the house | until | Marcello | called | the pizzeria | for dinner
SN	*Chiara | è rimasta | in casa | perché | Marco non | ha chiamato | la pizzeria | per la cena* Chiara | remained | in the house | because | Marco didn't | call | the pizzeria | for dinner
A_SN	*Chiara | è rimasta | in casa | perché | Marcello | ha chiamato | la pizzeria | per la cena* Chiara | remained | in the house | because | Marcello | called | the pizzeria | for dinner

Table 1: Example of experimental items sorted for condition and divided by chunks

showed that such cost was reduced compared to that associated with SN in adults.

2.1 Participants

We plan to collect data from 60 Italian-speaking children attending the first year of middle school (age range: 10-12). A pilot version of this experiment has been run with 18 children aged 11-12 years old (7 male, 11 female).

2.2 Materials and design

In the self-paced reading paradigm, participants are asked to read sentences that will appear on the computer screen progressively in a masked chunk-by-chunk design. They have to press the spacebar to proceed, and Reaction Times (RTs) are recorded for each chunk. After each sentence, a yes-no comprehension question will also be asked, to ensure correct interpretation.

The experiment comprises 28 critical trials and 42 filler trials. Experimental trials are presented in 4 different conditions: Expletive Negation (EN), Standard Negation (SN) and two Affirmative conditions presenting the same structure as EN (A_EN) and SN (A_SN), but with no negative operator present. An example of the critical trials can be found in Table 1.

3 Results

3.1 Preliminary results

A visual representation of the results obtained from the pilot can be seen in Figure 1. At a glance, the results suggest that, similarly to adults, children are sensitive to the presence of the negative operator in both types of negation. Data analysis will be performed once the data has been collected.
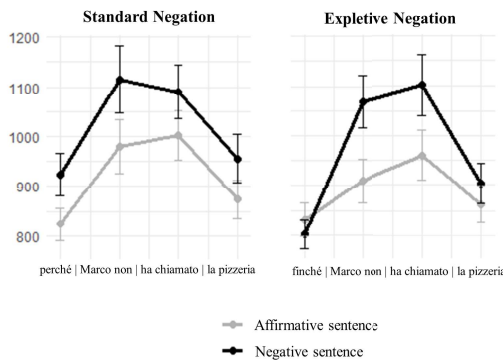

Figure 1: Mean RTs with standard error for the chunk containing the negative operator and surrounding ones.

3.2 Data analysis plan

A two-stage data-cleaning procedure will be performed on RTs. In the first stage, RTs under 100 milliseconds and over 4000 milliseconds will be excluded.Then, RTs exceeding the mean by 2.5 standard deviations within each chunk and condition will also be excluded. Following this, a logarithmic transformation will be applied to the remaining RTs to normalize the data distribution.

Statistical analysis of the RTs will focus on the critical chunk (containing the negative operator) and the following three chunks up to the sentence's end. Linear mixed models will be applied separately to EN and SN for each chunk. For each chunk and in each condition, a linear mixed model (LMM) will be fitted for data analysis, with log-transformed RTs as a dependent variable and the presence or absence of the negative operator as a fixed factor. The random effects structure for each model will be determined in a data-driven manner, beginning with the maximal random effects model.

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