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***Wouldn't you agree with a bunch of lemons?***  
***A self-paced reading test on Agreement in quantification expressions.***

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## Introduction

For what concerns quantification expressions (QEs), it is possible to observe cases in which the verb can agree in number either with the quantifier or with the noun it modifies, in the case the noun is plural. The possibility of surfacing of different agreement configurations with respect to the Number is well attested across different languages (Corbett, 2006); however, it is still unclear how formal linguistic theories should deal with it.

Italian QEs like *un sacco/mucchio di + N* 'a lot of +N' (lit: 'a bag/ bunch of') seems to admit the possibility of performing the agreement either with the quantifier or with the noun if the noun is [+concrete] (respectively 1a and 1b). However, if the noun is [-concrete], the agreement with the quantifier gives as an output a sentence whose well-formedness is debatable (2a).

	Concreteness of N:	Verb agrees with:	Examples
1a	[+ concrete]	quantifier	Un sacco di limoni è stato venduto al mercato. 'a lot of lemons was sold at the e'
1b	[+ concrete]	N	Un sacco di limoni sono stati venduti al mercato. 'a lot of lemons were sold to the marketplace'
2a	[- concrete]	quantifier	?Un sacco di concetti è stato chiarito a lezione. 'A lot of concepts was explained at the class'
2b	[-concrete]	N	Un sacco di concetti sono stati chiariti a lezione. 'A lot of concepts were explained at the class'

Traditional grammars refer to the agreement involving N (1b; 2b) as instances of semantic agreement and to the agreement involving the quantifier (1a; 2a) as instances of syntactic agreement; however, in this picture the oddness of (2a) is not accounted for. Similarly, psycholinguistic models (such as Haskell & MacDonald, 2003; Badecker & Kuminiak, 2007) assume that in cases like (1b) and (2b) syntax is overcome by semantics. This possibility seems not to come under the perspective of a syntactic priority in agreement (Pollock, 1989; Kayne, 1989; Chomsky, 2000).

The present survey aims at measuring: (i) the acceptability of the four conditions (listed in the table) and (ii) eventual differences between conditions with respect to processing costs.

## Materials and methods

The experimental trials consists in 80 passive sentences, 20 per each condition (10 with the quantifier *un sacco di* and 10 with *un mucchio di*), as illustrated in the table above. The four conditions result by the manipulation two variables: the *Concreteness* of N, and the probe on which the *Agreement* takes place (N or the quantifier). All QEs and all inflected verbs were balanced with respect to length and frequency by means of it-WaC corpus (Baroni et al., 2009). 140 fillers displaying *un sacco/mucchio di* as well as other quantifiers were added.

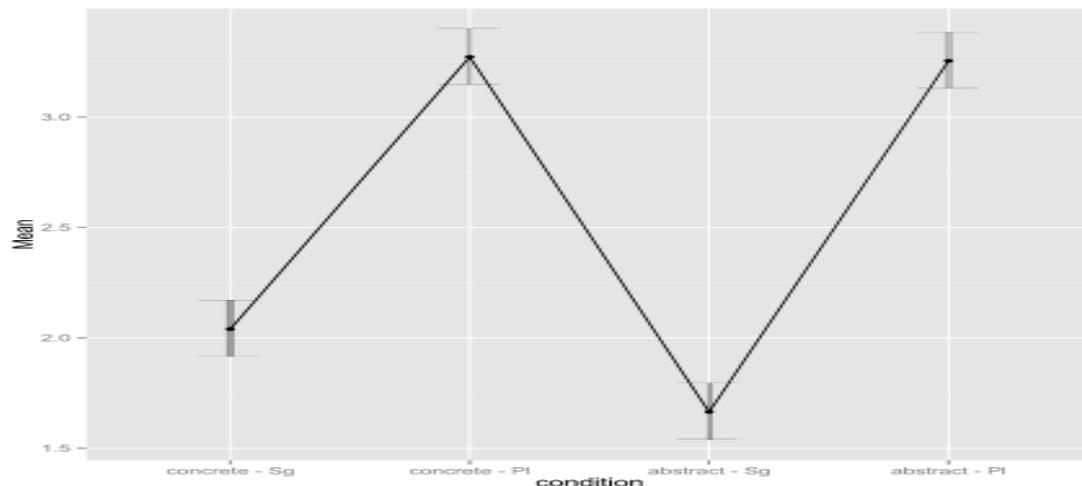
40 native Italian speakers, aged 19 to 25 and with 13 to 16 years of education, participated to the study. The sentences were presented divided in four chunks, as in *un sacco/ di limoni/ è stato venduto/ al mercato*. The first chunk contained the quantifier, the second the N at the plural form, the third the verb, and the fourth an adjunct.

The chunks appeared on the screen one at a time. Once the participants had finished reading a chunk, they had to press a key: the previous chunk disappeared and the following one was displayed. After having read the last chunk, they had to give a grammaticality judgement about the whole sentence on a Likert scale ranging from 1 to 4 (1= absolutely not acceptable; 4= completely acceptable).

## Results

Data analysis focused on three dependent variables: reaction times to the critical chunk, the rating given to the sentences in the grammatical judgment, and the time needed to perform the grammatical judgement. The effect of several predictors on these dependent variables was investigated by means of mixed effect models. These analyses included several variables (e.g., length of chunk, frequency of chunk, overall reading time) as fixed effects, and Subject and Item as random effects. Three separate models were fit, one for each dependent variable. Results showed that: 1) the reading time on the critical chunk is mostly dependent on the chunk length; 2) the time spent to read a sentence was higher for sentences that were judged as not acceptable; 3) the sentence with the agreement with the quantifier were judged as less acceptable, especially if the noun was [- concrete].

Rating score:



## Discussion

The agreement between the verb and the N of a QE is not only considered acceptable, but it is also preferred. In these cases, the expressions like *un sacco/mucchio di* are to be analyzed as functional elements of a DP modifying a NP whose head is the N. Since they are functional elements they cannot be probes for Agreement. They may be probes only in the case that they are interpreted as fully referential nouns (in this case, a real bag or a real bunch). As a consequence, in condition (1a) and (2a) they are not functional elements, i.e. quantifiers, but nouns. In sentences like (2a) the semantic implausibility drives from the fact that the syntactic head agreeing with the verb must be interpreted as a full referential noun (and of course concepts cannot physically fit in a bag).

From this discussion it follows that agreement is always a matter of syntax and that, at least in comprehension, syntax always drives the interpretability of those semantic features (such as Concreteness) of the head involved as a probe in the Agreement. The lack of significant differences between the reading times in correspondence of the third chunk (i.e., no differences between conditions with respect to processing costs) may reflect the fact that there is only one kind of Agreement performed on syntactical basis, rather than the necessity of the integration of some semantic information in some cases and not in others. However, further studies are needed in order to shed light on such phenomena.