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# Acquiring the Ordering of Italian Near-Synonymous Quantifiers

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## 1. Introduction

We investigated whether Italian children and adults differ in how they order the six Italian quantifiers *alcuni*, *pochi*, *qualche* ('a few') and *molti*, *parecchi*, *tanti* ('many') on a scale according to their magnitude. In the present study, we asked the following questions: can Italian native speakers order the six quantifiers on a scale? Can Italian five-year-olds do the same? Are there differences between the adult and child ordering? In order to answer these questions, we gave both adults and children a magnitude-comparison task where, between two identical boxes, they had to choose the box containing the larger amount; the content of the boxes was described using quantifiers.

This paper presents new data of sixteen Italian adults who took exactly the same test as the children in Montalto et al. (2010), and compares the results. In section 2, we describe the six Italian quantifiers, we introduce two different notions of scale and we formulate our predictions. In section 3, we describe the experimental setup. In section 4, we report the results, which we discuss in section 5.

## 2. Background

### 2.1. Italian Quantifiers

Italian has several quantifiers that refer to an indefinite quantity. Based on descriptions in a well-known contemporary descriptive grammar (Dardano and Trifone, 1997) and several dictionaries (Devoto and Oli, 1985; Felici and Riganti, 1987; Palazzi and Folena, 1992), we distinguish two groups of quantifiers: a low-magnitude group (those that translate as "a few") and a high-magnitude group (those that translate as "many"). The low-magnitude group

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consists of: *poco*, *alcuno* and *qualche* ('a few'); the high magnitude-group consists of: *molto*, *parecchio*, and *tanto* ('many'). The quantifiers across magnitude groups are sometimes cross-referenced as antonyms and the ones within the same magnitude group as synonyms.

The grammar defines *poco* as referring to a "small quantity" and describes it as antonym of *molto*, which refers to "a large quantity". *Parecchio* is said to point to "a consistent quantity", smaller than *molto*, yet often used as a synonym for *molto*. *Tanto* is said to be equivalent to *molto*, but also to express the idea of "a large quantity" with more strength. Zamparelli (2008) defines *qualche* as pointing to a larger, yet still limited, quantity than *poco*. The plural forms of *alcuno* (i.e. *alcuni* and *alcune*) are referenced as synonyms of *qualche*.

### 2.2. Quantifiers and Scales

A quantifier is "a word (usually a determiner or pronoun) or phrase expressive of quantity" ("quantifier", Oxford English Dictionary). If quantifiers express quantities, then it should be possible to represent these quantities as degrees on a scale. Several psychologists hypothesized that quantifiers correspond to specific degrees in terms of amounts or numbers (see Moxey and Sanford, 1993:19-24 for a review). If this is correct, it should be possible to order quantifiers on a *linear scale*. A linear scale is a one-dimensional scale typically used for physical measurements (Dehaene, 1997; Wiese, 2003). On a linear scale, degrees are represented as points on a line and these points can either precede or follow each other. Therefore, no overlap among degrees is allowed. Moreover, it is possible to determine the position of a degree on a linear scale by using an arithmetic predictor function (e.g. assuming the predictor function to be $n$+1, if we know that $n_0 = 0$ we will also know that: $n_1 = n_0+1$, $n_2 = n_1+1$, etc.).

Kennedy (2001) proposed a different kind of scale, which he calls *interval scale*, to describe the semantic properties of words which establish antonymic relations and comparative constructions. On an interval scale, degrees are not formalized as points but rather as intervals. The lengths of these intervals correspond to the semantic values of each word, and overlap between two or more intervals is allowed (e.g. *a few* and *not many* might overlap). With an interval scale, there is no predictor function. Therefore, it is not possible to exactly predict the position of a given interval degree.

The use of either type of scale with indefinite quantifiers is in principle possible. For instance, we can establish a linear scale among English indefinite quantifiers and say that *a few* is less than *several,* which is less than *many* (e.g. *a few* < *several* < *many*). Alternatively, we can exploit the antonymic relation that *a few* and *many* have with each other and choose to represent them on an interval scale instead (e.g. we will know that *a few* is less than *many*, but we will not know, for instance, whether *a few* is less than *not many* as the two degrees will overlap).

In this study we try to establish whether the six Italian quantifiers introduced in §2.1 are only apparently synonyms, and therefore can be ordered on a linear scale, or whether the three low and the three high-magnitude Italian quantifiers are (partially) synonyms and have to be ordered on an interval scale instead.

Using the information available in dictionaries and grammars of Italian, we posit the ordering in (1) as our hypothesized scale.

(1) *pochi* < *qualche* < *alcuni* << *parecchi* < *molti* < *tanti*

An interesting characteristic of Italian is that synonymy seems to apply to the functional category of indefinite quantifiers. Agreeing with Bolinger (1977), Eve Clark (1987:4) argues that "any word which a language permits to survive must make its semantic contribution". Thus we hypothesize that the Italian quantifiers all have a slightly different meaning. We therefore expect that native speakers, adults and children alike, are able to distinguish the three low-magnitude quantifiers (*alcuni*, *pochi*, *qualche*) from the three high-magnitude quantifiers (*molti*, *parecchi*, *tanti*). More importantly we predict that both age groups are able to intuitively order the quantifiers within each magnitude group on a scale and that this scale will resemble the linear scale in (1).

## 3. Experiment

The magnitudes of six Italian quantifiers were compared in a minimal verbal and visual context to find out whether a difference among the quantifiers can be established. We tested a group of adults, and compared their data with the data previously collected from a group of five-year-old children to see whether children differ from the adults in establishing a magnitude ordering among Italian indefinite quantifiers.

### 3.1. Participants

Sixteen adults participated in the experiment, four women and twelve men (mean age 36). Six participants came from northern Italy, nine from the center and one from southern Italy. The participants had no linguistic impairments and they all grew up in Italian monolingual families. The children were seven boys and nine girls, whose age ranged between 4;7 and 6;0 (mean age 5;3). All children were recruited in a kindergarten in Milan and they all come from Italian monolingual families.

### 3.2. Method and Materials

The participants sat in front of a laptop and first watched a cartoon. A pre-recorded voice introduced a story about a mouse who needed for a birthday party all boxes containing the larger quantity of different kinds of foods and

objects from the stock house of a supermarket. The experimenter explained that the mouse was not sure which boxes contained the larger quantity; therefore, the mouse needed the participant's help to choose the one with the largest amount of things.

The experiment consisted of a series of slides displayed on a laptop screen. Each slide showed two same-size, closed boxes (Figure 1). For each slide, the pre-recorded voice told the participants what was in each box (2).

(2) Nella scatola a pallini ci sono [quantifier 1] mele. Nella scatola a strisce ci sono [quantifier 2] mele.
'In the box with dots there are [quantifier 1] apples. In the box with stripes there are [quantifier 2] apples.'

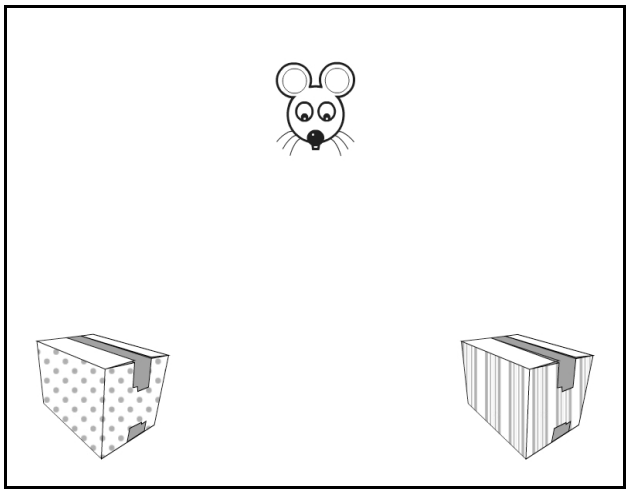

**Figure 1: an example of the experimental items used in the task.**

While the item was on display, the experimenter asked the participant the question in (3). If the participant answered "Yes", then the experimenter simply advanced to the next experimental item. If instead the participant answered "No", then the experimenter asked a second question, given in (4).

(3) Le due scatole contengono le stesse quantità?
'Do the two boxes contain the same (two) quantities?'

(4) Quale scatola ne contiene di più?
'Which box contains more?'

The experimenter explained the participants that in response to (4) they could either choose one of the two boxes ("dotted" or "striped") or, when they were unsure about their response, let the mouse choose the box.

Before the experiment started, there was a practice session with five trials. In the first trial, the participants were asked to first point to the striped box and then to the dotted one, as we wanted to make sure (at least for the children) that they recognized the two patterns. The four remaining practice items had the function of introducing the participants to the simple rules of the "game" and to check whether the participants understood the concept of "larger quantity". For these practice items, we used number comparisons. The first two items of the practice session showed pictures in which the boxes were open and their contents visible (e.g., comparing *two apples* vs. *ten apples*, the picture showed two apples in one box and ten in the other). The last two practice items showed closed boxes instead, just like the test items (e.g. "Nella scatola a pallini ci sono tre fragole. Nella scatola a striscie ci sono dieci fragole", 'In the dotted box there are three strawberries. In the striped box there are ten strawberries').

The experimental materials included 18 test items, 8 control items and 4 "attention catchers". The test items were constructed using six different pairs of quantifier contrasts: *pochi* vs. *qualche*, *pochi* vs. *alcuni*, *qualche* vs. *alcuni* for the low-magnitude quantifiers, and *molti* vs. *parecchi*, *tanti* vs. *molti*, *tanti* vs. *parecchi* for the high-magnitude quantifiers. There were 3 test items for each low-magnitude pair and 3 for each high-magnitude-pair. High- and low-magnitude test items featured in both grammatical genders (masculine and feminine). All nouns were plural.

Quantifier pairs belonging to opposite magnitude clusters functioned as control items: in these items we expected participants to always choose the box denoted by the high-magnitude quantifier. We used six of these control items: *tanti* vs. *qualche*, *tanti* vs. *pochi*, *qualche* vs. *parecchi*, *pochi* vs. *molti*, *parecchi* vs. *alcuni*, *alcuni* vs. *molti*. In addition, we used two control items that were drawn from pairs of numbers: 4 vs. 10, 10 vs. 3. The four "attention catchers" involved questions unrelated to the interpretation of quantifiers and appeared at regular intervals during the experiment. Their function was to check whether the children were still paying attention.

## 4. Results

The control items results of both age groups were at ceiling: all adults' answers and nearly all children's answers (99.7%) judged two quantifiers from different magnitude groups as representing two different quantities. The answers on the test items however show two different patterns between groups. For the first question, children answered 99% of the time that the two quantifiers do not represent exactly the same amount, in contrast to the adults, who gave this answer only 64.2% of the time (Figure 2).

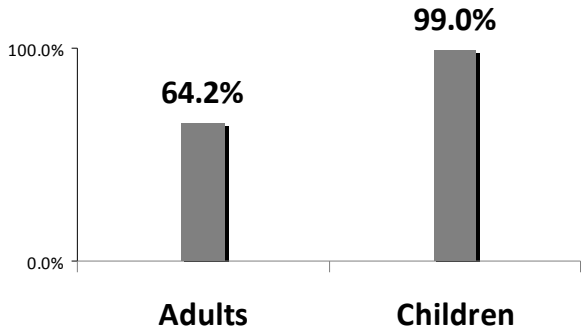


**Figure 2 – Percentage of "No" answers to the first question: "Do the two boxes contain the same amount?"**

For the second question, asking which box contains most, we had fewer data points than for the first question because this question was only asked in those cases in which the participants said "No" to the first question. Here, we see that the children always pointed in their answers at one of the two near-synonymous quantifiers as representing the larger amount (96.5%). The adults' answers varied between letting the mouse choose the box containing the larger amount (56.2%), and choosing one of the two quantifiers (43.8%) (Figure 3).

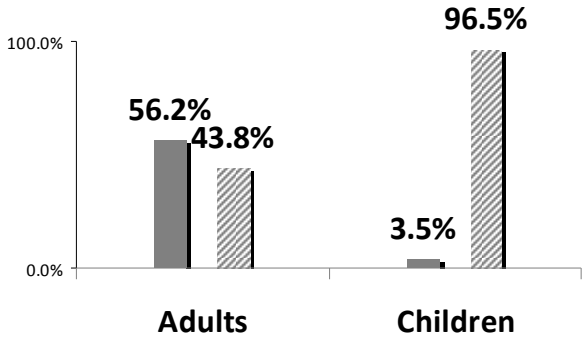


**Figure 3 – Answers to the second question: "Which box contains the larger amount?". The gray bars represent the answer that the participant let the mouse choose, while the answers that pointed at one of the two quantifiers are represented by the striped bars.**

A logistic regression analysis run on the data of both adults and children shows that age group is a very strong predictor for the kind of answers given to the test items. If the participant is a child, the odds that the participant will not

accept two near-synonymous quantifiers as referring to the same amount will be very high ($p < .001$). For the second question, the odds that a child will always know which quantifier represents the larger amount will also be very high ($p < .001$).

We compare the answers of children and adults in Table 1, where the answers are divided by type of quantifier pair and age group. For each group we have the same number of trials per pair (3 trials per pair per participant multiplied by 16 participants per age group, in total 48 trials per pair per age group). Note, however, that the total for each pair does not always add up to 48 because participants only answered this question when they said that the two quantifiers are not the same in their response to the first question. Therefore, when adding up to 48, the missing values for each group are either those trials in which the two quantifiers were said to refer to the same amount or those trials in which the participant let the mouse choose.

**Table 1 - Choice of one of the two near-synonymous quantifiers as representing the larger amount. For each quantifier pair we report the count of answers per quantifier and the chi-square *p*-value confirming whether or not the difference between two quantifiers is significant.**

| ***Quantifier Pairs*** | | | ***Children*** | | | ***Adults*** | | |
|---|---|---|---|---|---|---|---|---|
| ***Q1*** | ***vs.*** | ***Q2*** | ***Q1*** | ***Q2*** | ***Sig.*** | ***Q1*** | ***Q2*** | ***Sig.*** |
| alcuni | | pochi | 37 | 10 | $p < .01$ | 19 | 0 | $p < .001$ |
| alcuni | | qualche | 34 | 8 | $p < .01$ | 4 | 2 | n.s. |
| pochi | | qualche | 19 | 27 | n.s. | 1 | 18 | $p < .01$ |
| molti | | parecchi | 36 | 11 | $p < .01$ | 11 | 6 | n.s. |
| molti | | tanti | 21 | 27 | n.s. | 5 | 2 | n.s. |
| parecchi | | tanti | 15 | 33 | $p = .09$ | 4 | 9 | n.s. |

We then looked at the individual differences in the answer patterns, to see how consistent a certain participant was for the three trials of each pair If a participants gave for a specific pair an answer that was consistent in 3/3 of the trials (e.g. if she chose *molti* as pointing to a larger quantity than *parecchi* in all of the relevant trials), then a consistency score of 1. If she was not consistent in 3/3 of the trials, her piece of data for that specific test item was given a consistency score of 0. After computing the consistency scores for all pairs for all participants, we grouped the participants according to their total consistency score, from a minimum of 0 ("No consistent answers") to a maximum of 6 ("6 Pairs with a consistent answer"). Ten out of sixteen adults never consistently choose one out of two near-synonymous quantifiers as representing the larger amount, whereas all children were consistent in at least one pair. In fact, half of the children (eight out of sixteen) show a consistency score of 4 or even 5 (Figure 4).

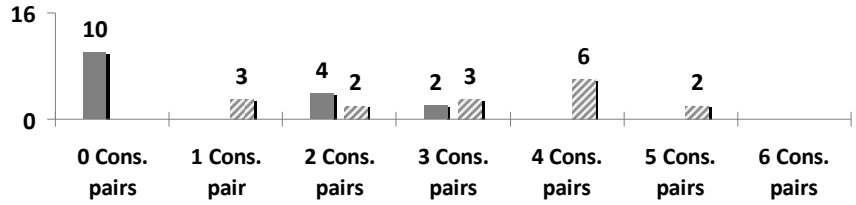


**Figure 4 – Number of participants per total consistency score. The gray bars in the chart represent the adults and the striped bars the children. The value of each bar represents a given number of participants (16 per age group in total, on the Y axis).**

## 5. Discussion

In the present study, we asked the following questions: can Italian native speakers order the six quantifiers under investigation? Can Italian five-year-olds order the same six quantifiers? Are there differences between the adult and child ordering? After dividing six Italian indefinite quantifiers in two different magnitude groups (i.e. high and low magnitude), we tested sixteen adults and sixteen children in a task where pairs of quantifiers from different groups (i.e. control items), and pairs of quantifiers from the same group (i.e. test items), were compared.

The data from the control items confirmed that quantifiers from opposite magnitude groups are interpreted as antonyms; between two quantifiers of different magnitude, the high-magnitude quantifier was always chosen as representing the larger quantity by adults and children alike. The data from the test items showed a difference between children's and adults' answers: children hardly ever accepted two quantifier from the same magnitude group as synonyms; instead they always pointed at one of two quantifiers as representing the larger quantity. Moreover, we measured the individual consistency of the participants for the three pairs comparing each combination of quantifiers and saw that half of the children were very consistent in their answers (for 4 or 5 pairs of quantifiers). In contrast there were hardly any consistency patterns in the adults. These differences we found between Italian children and adults raise several questions regarding the acquisition of quantifiers in Italian, for example: from what information in the adult input do children draw their partial scalar order? And also, at what point in their linguistic development do children stop showing a partial ordering and acquire the adult system?

Our data show that both adults and children express the same magnitude choices in relation to the antonymous quantifiers in the control items. However, only the children express firm magnitude judgments for the comparisons that used two near-synonymous quantifiers, leading them to the establishment of a partial ordering. Neither group could order all six quantifiers along the posited

linear scale in (1). The adult scale has only three intervals (5), whereas the kids' scale (6) has four:

(5) *pochi* < *alcuni-qualche* << *molti-parecchi-tanti*

(6) *pochi-qualche* < *alcuni* << *parecchi* < *molti-tanti*

We conclude from this data that, for both age groups, the six quantifiers are not ordered with respect to a linear scale, but that they could be ordered with respect to an interval scale instead. On an interval scale, the quantifiers establish antonymic relations across magnitude groups, while those quantifiers belonging to the same magnitude group and whose intervals completely or partly overlap, can be considered near-synonyms. Our conclusion is motivated by the degree overlaps of *qualche-alcuni* and *parecchi-molti-tanti* for the adults, and *pochi-qualche* and *molti-tanti* for the children; degree overlap is completely incompatible with a linear scale whereas it would be possible on an interval scale. Moreover, the interval nature of the scale is further supported by the fact that quantifiers from different magnitude groups were always clearly distinguished across the board as antonyms.

We explain the different degrees of scalar ordering across the two age groups by positing that children dislike synonyms. This follows from the Principle of Contrast which effectively blocks synonyms (Clark, 1987). According to this principle, differences in form always contrast in meaning. Since children expect a specific label to correspond to a specific meaning (Clark, 1987:13-14), the Principle of Contrast leads children to refuse synonymous quantifiers. The evidence that children apply the Principle of Contrast is in the participants' individual consistency patterns: the majority of the adults never gave consistent answers, whereas we think the Principle of Contrast is what led to a high consistency score in half of the children we tested (a score of 4/6 for six children and a score of 5/6 for two children).

The results of our study raise new questions, for instance: How do children arrive at the partial scalar ordering they individually show? And how does synonymy emerge in adults? The children's ordering might be derived from the input they receive from the adults. Alternatively, the explanation of how the children's ordering is derived might lie in the children's cognitive system, and might, for example, be sought in the interaction between language and the acquisition of counting.

In order to study these developmental questions one needs to enlarge the age range of the child participants. In a younger population we might observe when and how the partial scalar ordering they show at age five arises, and whether the individual consistency in answering is age-related or not. In a slightly older population we may instead observe when and how the transition to the target adult-like behavior takes place.

Based on our data we cannot make claims on how synonymy emerges in adults. We found that 64% of the adults' answers estimated pairs of same-

magnitude quantifiers as not representing the same amount, and that 56% of the answers to the second question expressed uncertainty about which quantifier represents the larger quantity. Our data is ambiguous as to whether adults have completely lost their sensitivity for quantifier ordering. Perhaps the sensitivity we observe in the children is suppressed in the adults by some other mechanism, or maybe the adults have learned that quantifiers may be interpreted slightly differently across contexts and in this way develop a more flexible interpretation of quantifiers.

## 6. Conclusion

In this study, we tested Italian children and adults investigating their scalar ordering of six Italian quantifiers (*alcuni*, *molti*, *parecchi*, *pochi*, *qualche* and *tanti*). Our main goal was to see whether Italian native speakers and Italian five-year-olds could order six indefinite quantifiers according to their magnitude on the basis of a series of two-point scale comparisons. Moreover, we wondered whether differences between the adult and child ordering would arise.

We found both age groups to be unable to order all six quantifiers. The children distinguished four scalar degrees (*pochi-qualche* < *alcuni* << *parecchi* < *molti-tanti*) whereas adults only distinguished three (*pochi* < *alcuni-qualche* << *molti-parecchi-tanti*). For both groups, we concluded that the quantifiers could be ordered on an interval scale.

Moreover, across groups, we observed two clear differences. First, throughout the experiment only the adults pointed at two quantifiers as representing exactly the same amount, or expressed uncertainty about which of two quantifiers represented the larger amount. Second, when choosing the larger of two quantifiers, the adults were hardly ever consistent in their choices. For the children, on the other hand, we observed very high consistency scores in half of the participants, and lower, yet observable, individual consistency patterns in the other half of the participants.

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