

Metonymy in numerals

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By adopting a synchronic/diachronic perspective, the study addresses the role of metonymy in the representation of numerical quantity. This can be observed in: (a) the motivation relating individual numeral forms, as well as the internal organization of the whole numeral sequence, to non-numeric entities involved in actual quantifying procedures; (b) the phenomenon by which certain salient numerosities function as *reference points* (Langacker, 1993) for other numerical representations within the functional/conceptual domain (Barcelona, 2011) of numerical quantity. First, a metonymic interpretation of a small group of numerals from different linguistic areas is proposed. Subsequently, the study focuses on a class of collective numerals in contemporary standard Italian that are derived from cardinals by means of affixation with *-ino*. The analysis of these word formations is aimed at demonstrating that metonymic mapping is a prerequisite for derivation, and that the mapping is based on privileged conceptual/pragmatic functions within the domain of NUMEROSITY.

Keywords: metonymy, numerals, collective numerals, word formation, derivation, Italian, pragmatic function, functional/conceptual domain, semantics

1. Introduction

Semantic motivation in the form of number words has often been pointed out in the literature. Saussure (1916) and Heine (2004), from obviously distant vantage points, both select numerals as paramount examples of the peculiar type of linguistic motivation each of them is arguing for. More generally, the motivated nature of cardinals, or, at least, of certain cardinals, is a phenomenon very few scholars in linguistics and related disciplines would deny. However, I am not aware of proposals explicitly trying to relate such undisputed presence of motivation to metonymy. Even Heine (2004, pp. 107–110), in his analysis of numerals aimed at demonstrating the existence of what he terms “genetic motivation”, while dwelling, for example, upon the fact that in a number of languages the word for ‘five’ derives from the noun

'hand', does not take up the issue of the metonymic nature of this type of diachronic transfer, that is, of the "motivational role" of metonymy (Barcelona, 2009) in the creation of the secondary form-meaning association.

In this paper it will be maintained that metonymy, as a cognitive and linguistic process, is involved in the formation of number words,¹ in at least two respects:

- A. metonymy relates numeric representations to non-numeric representations (Section 2).
- B. metonymy relates numeric representations to other (salient) numeric representations (Section 3).

In both cases, it will be argued, the metonymic link is based on pragmatic associations of entities within the context of actual quantifying and counting procedures, and such associations are included in the structure of the "functional/conceptual domain" (Barcelona, 2011, pp. 14, 52) of NUMEROSITY.

The linguistic data referred to in Section 2 are instances of attested and reconstructed numerals, belonging to different and distant languages, part of which allow to highlight a crosslinguistically recurrent metonymic pattern relating body parts to numerosities (2.1). Section 3, instead, exemplifies metonymic associations *between* numerical entities, and the related phenomenon of metonymic word-formation through derivation (Janda, 2011), by analyzing a sub-class of collective numerals in contemporary standard Italian, which are derived from specific cardinals by means of suffixation with *-ino*. The data in Section 3 are primarily drawn from the *La Repubblica Corpus* of written contemporary Italian (newspaper texts); two dictionaries of the language were also thoroughly searched (De Mauro, 1999–2003; Devoto & Oli, 1967), and a third one (Battaglia, 1966–2004) was occasionally consulted.

2. Non-numeric/numeric metonymic associations

The typical manifestation of this kind of association is constituted by the polysemy of a linguistic expression, a single lexical item or a more complex construction, primarily referring to a non-numeric entity, that is metonymically capable of referring to a numerical entity. Eventually, a complete semantic shift may take place and the non-numeric meaning comes to be cancelled.

In fact, for most of the instances mentioned in this section, the metonymic connection is only recoverable *via* etymology. The historical linguistic literature

1. In what follows the terms "numeral" and "number word" will be used, unless otherwise specified, with reference to the "cardinal" function of this part of speech.

on numerals has, actually, produced a host of data (see, for instance: Gvozdanović, 1992, 1999a; Blažek, 1999) which might straightforwardly be interpreted as metonymic, even from the view point of a “classical”² conception of metonymy as a referential mechanism based on factual contiguity and resulting in the lexical representation of the target via the source. The two following subsections deal with metonymies associating numeric representation with, respectively, body parts (2.1), and further entities involved in counting practices (2.2).

2.1 Body parts as sources

A crosslinguistically recurrent and well known phenomenon, already hinted at above (Section 1), is the diachronic/synchronic correlation of number words and the body parts that are involved in counting, typically the ‘hand’ and the ‘fingers’. For example, etymologies for Indo-European ‘five’, *penk^we* have been proposed linking this numeral to denotations of the ‘fist’ or the ‘finger/s’, or to a notion of ‘totality’ (of the fingers of a hand) (Winter, 1992, p. 17; Edelman, 1999, p. 229; for a survey and discussion see Luján Martínez, 1999, pp. 207–208). A more recent proposal regarding IE ‘five’ (Silvestri, 2010, p. 756) argues that *penk^we* would have literally meant ‘and the tail’ (*pen-* ‘tail’, plus *-k^we* ‘and’), with the thumb construed as a final segment (a ‘tail’) concluding the count on the fingers of one hand. In this case, the numeral would be interpretable as a complex metonymic representation (‘and the thumb’) enclosing a metaphorical one (‘tail’).

Comparable etymologies involving the hand have been put forward for numerals in a variety of language families, among which Austronesian (Dahl, 1981, p. 49), Austro-Asiatic (Rischel, 1997, pp. 289–290), and Dravidian: for instance, according to Andronov (1978, p. 244), proto-Dravidian **cay* ‘five’ is etymologically connected to **kay* / **key* ‘hand’.

This type of diachronic transfer is, evidently, closely connected to the synchronic polysemy of words denoting body parts and numbers. For example, Rischel (1997, p. 275) describes the counting sequence of the Munda language Turi as follows: “In that language the word *ti* ‘hand’ crucially enters the counting system, ‘5’ being expressed as [...] *myad’ ti*, literally ‘one hand’ [...] ‘6’ is *myad’ ti myad’* [...]. This goes up till ‘10’, which is *baran ti*, literally ‘two hands’”. According to Rischel, base five systems like that of Turi are rather the exception in Austro-Asiatic; nonetheless, in many other languages of the family the noun meaning ‘hand’ is the source of number words, mostly denoting ‘5’, but also, less frequently, ‘8’. As it

2. Nerlich (2006) describes the classical conception of metonymy and its evolution starting from the *Retorica ad Herennium*.

happens, for Austro-Asiatic (Rischel, 1997, pp. 289–297), and Indo-European as well (Loewe, 1936; Gvozdanović, 1999b, p. 10; Luján Martínez, 1999, pp. 209–206, Silvestri, 2002, pp. 20–21; 2010, p. 756), linguistic traces of base 4–8, alongside base 5–10, counting have been identified. The explanation provided by scholars in both fields is that finger counting can involve either all the fingers of one hand (5), or only 4 of them (in most cases, to the exclusion of the thumb). This kind of considerations point to a crucial aspect of metonymic processes in number word formation (and elsewhere in language): metonymic associations primarily arise “in context” (Koch, 1999), which in the case of numerals consists of the complex activities aimed at the numeric quantification of objects and involving both linguistic and non-linguistic actions that may be performed with the aid of material counters like, for instance, the fingers of the hands.

Accounts of synchronic polysemy of words denoting body parts and numerical quantities can be found, among others, in the collective volume on *Native American mathematics* edited by Closs (1986), and, for languages of Africa, in Zaslavsky’s (1979) volume. For example, according to Zaslavsky (1979, p. 242), in Taita (Bantu) numeral ‘7’, *mufungade*, literally means ‘bind three fingers’, from a corresponding counting gesture.

2.2 Other non-numeric sources

Besides body parts, other components of counting procedures may serve as sources of metonymic “mapping”.³ For instance, in extinct Ventureño (Chumash, California), native numeral ‘16’ was *chijipsh*, a complex formation which Beeler (1986, p. 118) paraphrases as literally meaning ‘it (the count) is complete’. Ventureño native numeral system had 4 as its base, so that counting up to 16 (4 x 4) would bring the first seriation to a point of COMPLETION. The metonymy underlying Ventureño ‘16’ may be described as establishing a link, within the actual counting procedure, between one SUB-EVENT, ‘having reached a point of completion’, and another SUB-EVENT ‘having counted 16 units’, or between an ACTION (‘completing a count’) and its RESULT (‘reaching 16’) Alternatively, the metonymic relation could be viewed as connecting, within the Ventureño counting frame, a category, COMPLETE COUNTS, and a salient member, COUNTING UP TO 16, with a process of meaning narrowing. However, the metonymic status of CATEGORY-MEMBER shifts remains a debated issue: it has been advocated by Kövecses and Radden’s (1998) and Barcelona (2011),

3. The notion of “metonymic mapping” is here applied after its formulation by Barcelona (2011, p. 14).

among others, while recent contrary views are expressed by Koskela (2011) and Panther and Thornburg (forthcoming).

Partially comparable to the case of *Ventureño* '16' is the well known example of English *score*, denoting both 'twenty' and 'a cut, a notch',⁴ in connection with the practice of cutting a notch on a piece of wood or other material while reckoning in groups of '20' (a salient quantity alongside '10' and '12' in European languages, see below, Section 3). In English the vigesimal numeral *score* '20' is not integral part of continuous counting sequence, while in Irish linguistic varieties *scór* '20' competes with *fiche* '20' in the formation of higher complex numerals (Greene, 1992, pp. 523, 535).

Both in the case of metonymies based on body parts involved in counting and of those arising from other connections with non-numeric entities, there appears to be a crosslinguistically recurrent "pragmatic function"⁵ connecting a numeral quantity and a different entity, material or not, contextually contiguous to it in the actual quantifying procedure (typically, the counting procedure) through which the target numerical quantity is attained. The function might relate an INSTRUMENT of counting ('the hand') and the RESULT of counting ('5'); an ACTION ('completing a count') and its RESULT ('reaching 16'); the RESULT of material operation involved in counting ('a score, a notch') and the RESULT of counting ('a group of 20'). In each case, the pragmatically based connection leads to the extension of the range of contextual senses of an expression to include a numerical meaning, yielding "lexical metonymy" (Janda, 2011, p. 360). The semantic shift is, initially, effected "on-line", and may become conventionalized, resulting in polysemy (like, for instance, that of English *score*, with 'twenty' and 'a cut, a notch' among its different meanings). Hence, the metonymic conceptual relation that motivates the emergence of the secondary (numeric) construction, also plays an "inferential" role in guiding the categorization of the polysemous form in context (Barcelona, 2009, pp. 372–373) as a numeric form-meaning construction.

Eventually, the semantic shift may result in the substitution of the primary meaning by the secondary one, as it appears to have been the case in the formation of Indo-European '5', thus obliterating the metonymic relation.

4. Cf. *Oxford English dictionary* (Simpson & Weiner, 1989, vol. XIV, p. 678). According to Price (1992, p. 489, note 27) the numerical value '20, group of 20' would be a loanword from a Northern Germanic language (cf. Nordic *skor* '20'). However, the presence in the English tradition of the related late Old English *scoru*, likewise including in its semantic range the denotation of a notch made on a tally, must have, at least, paved the way for the affirmation of the Nordic vigesimal model.

5. "Pragmatic function" as re-defined by Barcelona (2011, p. 14), on the basis of Fauconnier (1997).

3. Numeric-numeric metonymic associations: *-ino* collective numerals in Italian

This second type of metonymic motivation relates number representations to other number representations, a relation which may be overtly marked in a language, for instance, via affixal derivation, as in the data discussed below.

I here analyse this phenomenon by focusing on the semantics of a subclass of numerals in standard Italian, which in reference grammars are generally included in the category of “collective numerals”.⁶ These are derived from simple cardinals by affixal derivation with, up to ‘90’, *-ina*, the feminine form of suffix *-ino*, and, from ‘100’ on, *-aio/-aia*. Owing to space limitations, I will not deal with *-aio/-aia* formations, and restrict my analysis to *-ino* derivatives.

The majority of these convey two fundamental meanings (I and II), which are exemplified by the two senses of *decina* (from *dieci* ‘10’) in, respectively, (1) and (2) :

I. ‘a group/set of *n*’

- (1) *I visitatori venivano fatti accedere all’esposizione una decina alla volta.*
 ‘The visitors were allowed into the exhibition in groups of ten.’

II. ‘a group/set of approximately *n*’

- (2) *Avevamo una decina di amici ieri a cena.*
 ‘We had about ten friends for dinner, yesterday.’

The morphosyntax of these numerals is quasi-nominal, which sets them apart from simple cardinals.⁷ Like English forms *dozen* and *score*, to which they are roughly comparable, they are “extra-sequential”, that is, not part of the continuous counting sequence.

The *La Repubblica* on-line corpus of contemporary written Italian was searched for *-ino* numeral derivatives: the following forms, possessing the twofold “precise/approximate” meaning, occur more than once:

- a. those based on number words denoting the decimal base *dieci* ‘10’ and its first series of multiples, that is the decades up to ‘90’, *decina/dicina* (10), *ventina* (20), *trentina* (30), *quarantina* (40), *cinquantina* (50), *sessantina* (60), *settantina* (60), *ottantina* (80), *novantina* (90);

6. For instance, in Dardano and Trifone (1997, pp. 226–228).

7. On the cross-linguistic word class status of cardinals, see Pannain and Riccio (2014).

- b. *dozzina/dodicina*, from *dodici* ‘12’;⁸
- c. *quindicina*, from *quindici* ‘15’;⁹
- d. *venticinquina*, from *venticinque* ‘25’ (7 tokens only).

Other *-ino* numeral derivatives, when extant, are extremely rare¹⁰ and/or semantically distinct from the forms listed above, besides being usually restricted to technical/specialized discourse.¹¹

The inquiry into the *La Repubblica corpus* suggests that the vast majority of occurrences of these collective numerals convey approximate meanings, like in Example (2) above. The much less frequent exact meaning (type A) is significantly represented in the corpus only for *dozzina/dodicina* from ‘12’, but, even in this case, the majority of occurrences convey approximate meaning.

Aside of *venticinquina* (7 tokens), for the other forms listed above (*decina/diecina*, *ventina*, ... *novantina*, *dozzina*, and *quindicina*) the search yielded occurrence rates ranging in between the thousands and the hundreds.¹²

The only other collective *-ino* form that has a relevant occurrence rate in the *Corpus* is *cinquina* (from *cinque* ‘5’), a near-technical term with 449 occurrences, none conveying approximate numerical denotation: the term refers to either ‘a string of five numbers extracted in a (betting) game’, or ‘a group of five competitors/ the first five placement positions, in sports, games and other types of competitions’, or, rarely, it occurs with the generic meaning of ‘group of five’.

The fact that *-ino* derivation, also resulting in approximate numerical denotation, typically applies to *certain* cardinals, and not others, is significant, as will

8. Of the two variants, *dozzina*, the most frequent one, is, according to Price (1992, p. 482), a northern borrowing, of which he does not, unfortunately, specify the exact provenience.

9. *quindicina*, in appropriate contexts can also refer to ‘a period of 15 days’, or, in a more technical sense, to ‘a period of work of the duration of fifteen days’ and to ‘the pay for a period of work of 15 days’. Similar uses are attested for *quattordicina* (De Mauro, 1999–2003, Devoto & Oli, 1967).

10. One token was found for *tredicina*, from ‘13’ (*una tredicina di miliardi* ‘about thirteen milliards’), and another for *quattordicina* from ‘14’ (*una quattordicina di feriti*, ‘about fourteen injured’).

11. The two dictionaries (Devoto & Oli, 1967; De Mauro, 1999–2003) consulted in this study, include, for example: *duina* (from *due* ‘2’) ‘two musical notes to be played in a given time interval together with other three notes’; *quattordicina* (from *quattordici* ‘14’) ‘a fourteen days worth of payable work’, now obsolete. However, no occurrences of these two form-meaning associations were found in the *La Repubblica corpus*.

12. The highest occurrence rates were found for *decina/diecina* (38171) and *ventina* (8500). The only two forms with occurrence rates below one thousand are *ottantina* (888) and *novantina* (300).

be argued more in detail below (Section 3.1): these cardinals appear to represent *salient* values in the domain of NUMEROSITY. In fact, the decades from 10 to 90 constitute “turning points” in the numeral system, as each of them is the “base”¹³ for the formation of the nine subsequent intermediate numerals. Among the decades, aside of ‘10’, the particular salience of which is guaranteed by its constituting the fundamental base of the numeral system, ‘20’ also displays additional independent relevance in Italian and other European cultures. This is demonstrated by the widespread presence of vigesimality, observable, besides French, also, for instance, in certain Celtic languages, in Danish (Greene, 1992; Ross & Berns, 1992), and in several Italian regional varieties (Pannain, 2007).

Numerosity ‘12’, that underlies Italian *dodicina/dozzina*, has recognizedly played a crucial role in quantification practices in Italy, like elsewhere in Europe and beyond.¹⁴ As already noted above, *La Repubblica corpus* testifies a relatively high recurrence of the ‘precise’ numerical denotation for *dozzina*. This is due to the fact that certain categories of objects, like eggs, cutlery, china, etc., are customarily collected in sets of 12 (or fractions and multiples of 12). This custom, in turn, adds to the evidence for a *canonical* status of the dozen as a *quantity of reference* in Italian cultures (as elsewhere). In passing, it is worth noting that the Italian adjective *dozzinale*, meaning ‘ordinary, of little or no value, second-rate’, is derived from the collective numeral *dozzina* plus the adjectival suffix *-ale*, through a conceptual process of metonymic extension (and further metaphoric transfer), from the very notion of ‘objects of everyday use’ being ‘typically arranged in sets of 12 equal things’, none of which is meant to stand out as an individual.¹⁵

Number ‘15’, likewise, stands out as a salient numerosity in Italian culture. This is shown, among other things, by the fact that a time interval of two weeks is customarily referred to as *quindici giorni*, ‘fifteen days’ (rather than as *quattordici giorni* ‘fourteen days’), like in (3):

- (3) *oggi a quindici*¹⁶
‘in two weeks’

Different factors may have contributed to the salience of ‘15’. First, it corresponds to the mid-point in the numerical span between the fundamental base 10 and 20

13. Also definable as a “serialized augend” (Greenberg, 1978, p. 266).

14. The relevance of 12 in Indo-European traditions has repeatedly been pointed out in the literature. See, for instance, Justus (1999).

15. A very close semantics is, for instance, that of Danish compounds based on *duzin* ‘dozen’ (Strudsholm, 2011, p. 148).

16. Battaglia (1966–2004, vol. V, p. 329).

(a particularly salient decade in its own right, as pointed out above). The role of 15 as an intermediate quantity is exemplified in (4) and (5):

- (4) *la lista dei dieci, quindici o venti cognomi più diffusi*
 ‘the list of the ten, fifteen, or twenty most common family names’
- (5) *dieci, quindici, venti anni addietro era impensabile*
 ‘ten, fifteen, twenty years ago it would have been unconceivable’¹⁷

A similar consideration might be brought to bear to explain the presence of 7 tokens for *venticinquina* (from ‘25’) in the *Corpus*, all conveying approximate denotation: number 25 constitutes the mid-point between 20 and the subsequent decade 30.

The salience of ‘15’ may, at the same time, represent a remnant of a pre-decimal base-five, alongside a base-four (see above, Section 2.1), counting in Indo-European (Justus, 1999), of which there is clear evidence in Celtic languages (Greene, 1992, p. 545); this might also be the case for *cinquina* (from ‘5’). Finally, but not conclusively, the relevance of 15 may also be related to the sexagesimal representation of time ($15 = \frac{1}{4}$ of 60).

In sum, all these cognitively and culturally salient quantities (‘10’, ‘20’ and the other decades, ‘12’, ‘15’, and, marginally, 25) are good candidates for *reference point* (Langacker, 1993) role in the domain of NUMEROSITY.

3.1 The semantic contribution of derivational suffix *-ino*

Suffix *-ino*, which forms a considerable amount of other derivatives in a variety of semantic domains, is, both synchronically and diachronically, eminently polysemous.¹⁸ Starting from an adjectival function in Latin, still preserved in a few Italian de-nominal adjectives, it developed (Rohlf, 1969, pp. 412–414) a wide range of values, among which that of ‘something resembling’ the entity denoted by the lexical base, and of ‘something less good or less complete’ or ‘smaller than’ the denotation of the base (in addition to the function of forming agent nouns, anthronyms based on toponyms, and patronymics); the alterative/diminutive value of ‘smallness’ or ‘attenuation’, with its affective nuances, is the most productive one in contemporary standard Italian. The complex network of such semantic extensions has been subjected to several analyses in the literature (among others, Rohlf, 1969,

17. Examples extracted from texts available on the web. The relevant pages are: http://italia.indettaglio.it/ita/cognomi/top_ten_cognomi_per_regione.html for (4), and www.triestesalutementale.it/basaglia/citazioni_12.htm for (5).

18. On the semantic underspecification of derivative suffixes involved in metonymic word formation see Janda (2011, pp. 361, 375–378).

pp. 412–414; Merlini Barbaresi, 2004), and the action of metonymy in the relevant semantic shifts has been pointed out by Taylor (1995, pp. 144–148).¹⁹

For the sake of the present analysis I will not, primarily, focus on the role of metonymy in the polysemy of the suffix, as I rather intend to concentrate on the semantics of the numeral bases of derivation. In fact, I maintain that the cardinal bases themselves must have been metonymically understood in the first place, in order to give rise to the widely used *-ino* derivatives displaying the twofold collective and approximate meaning.

Of course, the semantics of the suffix does contribute to the resulting linguistic/conceptual representation, specifically in its capacity of:

- a. forming nouns that relate one entity to another entity to which it is closely connected; for instance, a person named after his job (e.g., *postino* ‘postman’ from noun *posta* ‘mail’), or after his town of origin (e.g. *viareggino*, from toponym *Viareggio*);
- b. forming nouns that relate one entity to another entity to which it comes close by approximation and resemblance, and/or via attenuation of certain properties of the entity denoted by the base (e.g., *tesina*, ‘final dissertation paper submitted by students at the end of the first three-year cycle of university education’, based on noun *tesi* ‘final dissertation paper submitted by students at the end of a four-year university program, or of an MA/PhD degree program’: a *tesina* is meant not only to be shorter, but also less demanding and of less scientific value than the *tesi*).

In its application to cardinal bases, *-ino* forms numeral nouns that denote a collection, that is characterized by being made of *n* entities of the same kind (‘a group of *n*’), and, in the case of *certain* cardinal bases, by also denoting an entity that encompasses a number of entities that “approximates” *n*, (‘a group of approximately *n*’).

As already specified, in my line of reasoning, the metonymic processes of extension that yield the target representations, grammatically marked by *-ino* derivation, must first take place in the domain of numerosity:

- I. from a vehicle numeral quantity to a target collection of entities whose number coincides with the vehicle quantity;
- II. from a vehicle numeral quantity to a target collection of entities whose number falls in the vicinity of the vehicle quantity.

Process (I) accounts for the collective *precise* meaning, while process (II) accounts for the *approximate* one.

19. Taylor’s analysis is, however, at variance with the diachronic and synchronic data reported by Rohlf’s and Merlini Barbaresi.

In my view, the conceptual transfers sketched above are licensed by the very structure of the conceptual domain of NUMEROSITY in which they take place. This domain does not, obviously, consist of a mere aggregate of numerical concepts. Furthermore, the continuous sequential order of counting does not represent the only conceptual knowledge that structures the domain. A full characterization of this domain also needs to account for the fact that *certain* numerosities are assigned a special status, which they have acquired by virtue of their role in the actual quantifying practices that necessarily underlie the development of the conceptual/linguistic representations of numbers. In fact, the emergence of a numeral system (i.e., of a continuous sequence of linguistic labels denoting numbers), implies, in a given linguistic/cultural tradition, the gradual entrenchment of specific counting procedures. These may, for instance, have included the custom of counting up to 10 (possibly, with the aid of the natural counters represented by the fingers of the hands), then, having put a first group of 10 counted objects aside, the count would be resumed for the remaining objects, eventually ending up with another group of 10 counted objects, and so on; or, alternatively, the count could start and proceed till a group of 20 counted objects has been grouped, before starting over again.

As repeatedly underlined by scholars in linguistics that have devoted their attention to numerals (Winter, 1992, pp. 24–26; Gnerre, 1995, p. 147), the purely decimal, fully standardized system that has prevailed in so many areas of the world – and that, in the case of Indo-European, has even been projected backwards as the only “true” proto-system (Szemerényi, 1960) – has, more often than not, even in modern times, coexisted with a *variety* of counting practices that have involved other bases (20, 4–8, 12, 15, 25, etc.) and/or “arithmetic” procedures (subtraction, beside addition, etc.), like in the case of the notion of ‘75 years’ lexicalized as *centō menā quīnici* (‘100 minus 15’), or, alternatively as *tre vvote venticincu* (‘3 times 25’) in a linguistic variety of Central Italy (Rohlf, 1969, p. 314).

The different coexisting bases, by being customarily applied in quantifying practices, must have acquired the role of *canonical* numerosities in which things are grouped for the sake of quantification, and such canonical role has become entrenched in the conceptual knowledge that constitutes the domain of NUMEROSITY and is shared by the members of a certain linguistic-cultural community.

Back to Italian *-ino* numerals, underlying their linguistic structure there must be a conceptual domain in which 10, 12, 15, 20, 30, etc., constitute *numerosities of reference* for the quantifications of objects in the world, and for the conceptual/linguistic representation of other less salient numbers. This, in my opinion, is the conceptual base that licences the collective precise/approximate meaning of *-ino*

forms, which, as shown above (Section 3) are productively formed and frequently used only based on certain cardinals, 10, 12, 15, 20, 25, 30, etc.²⁰

As regards the approximate meaning, an additional characteristic of the conceptual domain of NUMEROSITY must be brought to bear: the conceptual representation of each of these salient numerals also comprises the information that its value is immediately “contiguous” to other numerical values in the counting sequence, the sequential ordering of which must be schematically represented in domain.

The first phase of an ongoing experiment – designed to test native speakers’ perception of the approximate quantification span of *-ino* numeral forms – involved a group of university students who were asked to choose, as an adequate representation of the meaning for numeral *ventina*, among different ranges of numerical values: 63.61% of the subjects chose a range that includes numerosities that are one or two units apart in both directions from the exact numerical value of 20.²¹

The reference role of salient numerosities is grammatically marked in Italian by means of *-ino* affixation, but, as a matter of fact, the *bare cardinals* themselves, may, in the appropriate linguistic and communicative context, serve as *reference points* for approximate denotations of certain portions of the numerical domain, as in Examples (4)–(5) above (Section 3), or in (6):

- (6) *risse anche di venti, trenta persone per parte*
 ‘scuffles involving up to twenty, thirty people on each side’²²

Approximate denotation, both with and without *-ino* marking, can take place because these numerals represent canonical quantities, *culturally and pragmatically sanctioned* as typical amounts into which things are grouped for the sake of quantification, and, because of this salient status, they can act as *metonymic vehicles* for the representation of other less relevant numerosities, which are contiguous to them in conceptual structure underlying the counting sequence.

20. As specified in Section 3, *cinquina* (< 5) only conveys the precise collective meaning.

21. The experiment was performed in May 2015 and involved 77 first year college students at the University of Naples “L’Orientale”, Italy. The students were asked to rate five alternative possible quantification spans, by assigning them scores ranging from 4 (best correspondence) to 0 (no correspondence). The test was part of an individual research of mine on the semantics of numerals, within a broader collective research on numerals, *Atlante dei numerali e delle istanze di numerazione* (AUNIN), which started in 2000 at the University “L’Orientale”, with founding (PRIN 2000) from the Ministry of University and Research. The theoretical background, methodology and preliminary results of the AUNIN project were published as Pannain (2000).

22. The example is part of a piece of news published on the web: http://milano.corriere.it/notizie/cronaca/15_aprile_17/pestaggi-vendette-all-asilo-spari-rom-la-prostituzione-4e390952-e4d9-11e4-845e-5bcd794907be.shtml.

3.2 Salient numerosities as reference points

The cultural, and intercultural, salience of specific numerosities appears to have a psychological counterpart. Rosch (1975, p. 532) noted that certain, especially “round”, numerical representations may function as cognitive reference points for the representation of other numeral concepts. Her early observations stimulated a trend of studies in cognitive psychology and in neuropsychology that confirmed the existence of reference points effects in numerical cognition and in its linguistic representation, including the precise/approximate semantics of specific cardinals.²³ Dehaene and Mehler (1992, p. 19) observe that “Some numerals, called reference numerals, are used not only to refer to precise numerosities, but also to approximate wide ranges of numerosities”. Similarly, Sigurd (1988, p. 1) notes that “Numbers are used for exact and approximative estimations. The numbers used in approximative expressions are typically so-called round numbers, such as 10, 20, 25, 30, 40, 50, 100, 1,000, and such numbers are also very frequent in texts. [...] some numbers are rounder than others”. Moreover, Dehaene and Mehler (1992, p. 18) remark that “Reference numerals may span a whole region of the numerical space” and they name “numerical span” the range of numerosities that a given numeral may approximate.

In fact, the mental representation of numbers appears to include a visuospatial configuration called the “mental number line” (Dehaene, 1992, pp. 20–24; Dehane & Mehler, 1992, pp. 18–20). According to Link, Huber, Nuerk, and Moeller (2013, p. 1), who trace the emergence of this notion back to research by Moyer and Landauer (1967) and Restle (1970), the metaphor of a mental number line describing the (spatial) representation of number magnitude is widely recognized and is included in the most influential theories of numerical cognition: behavioral as well as neuropsychological data provide evidence for an automatic activation of number magnitude on an analogous left-to-right oriented number line (in Western cultures). This visuospatial representation reflects, beside the salience of lower numbers, also the prominence of certain “reference” numerosities (Dehaene & Mehler, 1992).

In synthesis, the abovementioned scientific literature corroborates the idea, central in my analysis, that numerals constitute an inherently structured conceptual/lexical category, and that domain-specific conceptual structure exists that may licence the kind of metonymic connections that are addressed in this section. More specifically, image schematic structure in the domain of numerosity, beside including the sequential ordering of the values, must also account for the fact that

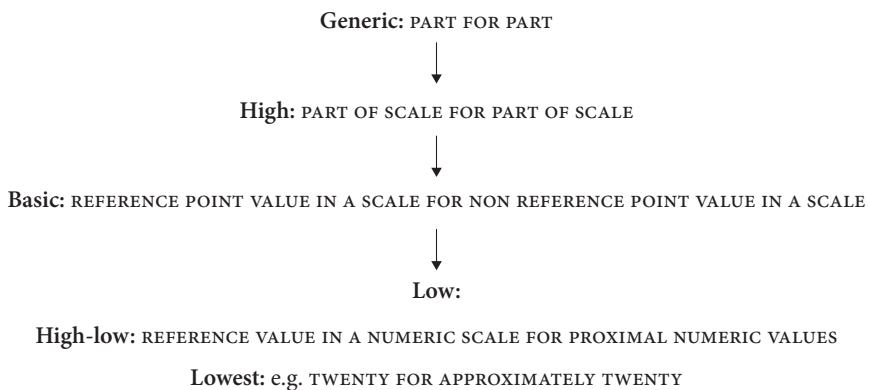
23. An early overview is in Pannain (1995, pp. 228–234), and a more recent one in Tribushinina (2008, pp. 27, 42).

certain numerosities are at the base of the construction (conceptual and linguistic) of other numerosities and may act as “cognitive reference points” for the mental and linguistic representation of other, non-reference point, numerosities.

Accordingly, if a *SCALE* image schema is part of the conceptual structure of the domain of numerosity, as is the case of quantitative domains in general, this schema must encode, beside the linear increase of values in between a lower and a higher pole, also a series of subintervals of values, the lower and higher boundaries of which coincide with reference quantities.

Table 1 presents a possible formulation of the metonymic mapping from precise to approximate numeral meaning discussed in this section, by applying Barcelona’s (forthcoming) model of a hierarchy of metonymic mappings, from a *generic* level down to the specific, *lowest*, level, that in this case is exemplified by ‘20’ → ‘approximately 20’.

Table 1. A hierarchy of levels of metonymic mappings for precise/approximate numerical conceptual relations



4. Conclusions

The conception of metonymy that is to be advocated in order to contend that the linguistic data analysed in the last three sections of this paper (3–3.2) *are* metonymic is the one lately emerged in the theoretical framework of Cognitive Linguistics (Panther & Thornburg, 2007), and, in particular, in the works of Langacker (1993, 1999, 2009), who views metonymy as, essentially, a *reference point* phenomenon (Langacker, 1993, p. 29–35), and describes its action as follows: “[...] the entity that is normally designated by a metonymic expression serves as reference point affording mental access to the desired target (i.e., the entity actually being referred to)” (Langacker, 1993, p. 30).

Barcelona (2011, p. 29) provides a further characterization of the phenomenon by stating that:

[...] metonymy should be regarded as a process of activation of concepts that are closely connected in experience, and which tend, therefore, to be mentally activated, one after the other in quick succession. [...] the “conceptual contiguity” giving rise to metonymy must have the additional property of being a privileged pragmatic connection between source and target.

He also gives the following synthetic definition (Barcelona, 2011, p. 52): “Metonymy is an asymmetric mapping of a conceptual domain, the source, onto another domain, the target. Source and target are in the same functional domain and are linked by a pragmatic function, so that the target is mentally activated”.

In fact, even the data proposed in Sections 2.1 and 2.2 of this study are best accounted for by a conception of metonymy that does not view it as a mere substitution of labels for things that are factually close. The data in those sections, as well, consist of cases of conceptual entities connected within a functional/conceptual domain (again, that of NUMEROSITY and of the related quantification/counting practices). So that a conceptually more stable entity, e.g. the ‘hand’, is experientially connected to a less stable entity ‘5’, that it is capable of activating by being customarily involved in its attainment (in the first stages of the formation of numerical representations and of the corresponding linguistic labels in a given tradition). The one between ‘hand’ and ‘5’, as well as that between ‘20’ and *score*, and that between an event of ‘completion’ and a notion of ‘16’, all are privileged connections linked by a “pragmatic function” within a specific “functional domain” (Barcelona, 2011, pp. 29, 52).

Moreover, the topology of the numerical domain includes, in my analysis, a SCALE image schema in which the continuous increase in number is not purely linear, being additionally structured around specific values that act as landmarks for the conceptual organization of numeric concepts into serial subsets. This conceptual structure is reflected in the linguistic representation of numeric values, in which the label for certain values serve as the base for the representation of a series of further numerical values. This underlying conceptual structure is, in turn, the result of the entrenchment of culturally determined quantifying practices, in which linguistic, gestural and other symbolic operations concur in the attainment of progressively higher numerical representations.

In summary, in the conceptual/functional domain of NUMERICAL QUANTIFICATION, there appears to be a pragmatic function, linking number concepts and the concepts of material objects or procedural elements involved in quantifying practices, as well as a pragmatic function linking a specific salient numerical representation to: (a) the representation of a collective entity made of a corresponding

number of individual entities; (b) a range of other immediately contiguous numerical representations in the counting sequence.

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Corpora

La Repubblica corpus, <http://dev.sslmit.unibo.it/corpora/corpus.php?path=&name=Repubblica>

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