

# Recursiveness and Italian compounds

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*This paper deals with the notion of recursiveness in compounding. It is shown that the notion found in the relevant literature is too broad and encompasses also the expansion process that could be better called iteration. The process of recursion can, in fact, be distinguished from the process of iteration if one accepts that recursiveness is characterised by two peculiar properties: identity of category with, and embedding of, the base compound. This strict definition of recursiveness is then utilised to discuss recursive Italian compounds.*

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## 1. Introduction

A linguistic entity is recursive when it has a complex structure that can be decomposed into two or more entities of the same type. A verb phrase like *expect to try to reduce taxes* (cf. Radford et al. 1999: 295), for example, is recursive and is decomposable into simpler constituents of the same type:

(1) [ expect [to [try [to [ reduce taxes ]]]]]

The verb *try* is merged with the initial infinitive phrase *to reduce taxes*, which is formed by merging the infinitive particle *to* with the initial verb phrase *reduce taxes*, then another *V* (*expect*) is merged and the recursive VP in (1) is obtained.

Recursion does not occur in verb phrases only. Roeper (2007:108), for example, gives a list of (linguistic) entities admitting recursiveness – a process he calls “reproduction of themselves” – as in (2) where recursion is exemplified in phrases and clauses:

(2) Phrase level:  
Possessive: John’s friend’s car’s motor  
Prepositional phrase: in the kitchen, in the cabinet, in the corner  
Conjunction: and I came and I saw and I conquered  
John and Bill and Susan  
Clause level:  
Infinitive: John wants to start to go to sing  
Finite: Mary thinks I think you think she did it

Recursion, Roeper (2007:106-7) points out, must not be confused with *repetition* and *concord*; *repetition* is in fact to be viewed as a process of iteration of “the same word again and again, usually to intensify meaning” like in *very, very, very big* while “*concord* is the term for marking the same meaning in several places across a sentence” that “builds up upon structures [...] but, unlike recursion, [it] does not change meaning.”

Addition of a new constituent yielding recursive structures is of two kinds, according to the ‘place’ where the new element is attached, more specifically: it is represented by ‘tail’ recursion and ‘nested’ recursion (cf. Parker 2006). Tail recursion occurs when a new entity is

added at the edge of the given entity, whereas nested recursion occurs when there is insertion of an entity inside of a given one. Examples of syntactic recursion in English are those in (3), representing, according to Parker, a possessive construction (3a), a (recursive) relative clause construction (3b) and a case of NPs centre embedding (3c). Examples in (3a, b) are cases of tail recursion while (3c) is an example of ‘nesting’ of new constituents:

- (3)
- a. John’s brother’s teacher’s book is on the table.
  - b. The man that wrote the book that Pat read in the cafe that Mary owns.
  - c. The mouse the cat the dog chased bit ran.

Parker also underlines that recursion is to be distinguished from another process, namely *iteration*. She maintains that *iteration* is the simple, unembedded repetition of an action or object while *recursion* is the embedding at the edge or in the centre of an action or object of an instance of the same type.

The difference between the two processes is illustrated by Parker by means of the explanation in (4):

- (4)
- When baking a cake, we might encounter a recipe instruction such as “stir the mix until it becomes smooth”. Following the instruction involves repeating some action over and over again until we reach the terminating condition. Importantly, each stirring action does not rely on the previous or the next. This is *iteration*. Once the cake has been baked, serving an equal-sized piece to each of sixteen guests involves repeating a cutting action over and over. We first cut the whole cake in half, then cut each half in half, then cut each quarter in half, and then cut each eighth in half. Here the process differs from the iterative example in that there is a dependency between actions; the output of each cutting action becomes the input to the next. Further, we cannot omit any intermediate action and end up with the same result; it is not possible to go from halves to eighths leaving out the step that gives us quarters. This is *recursion*.

Iteration is thus slightly differently conceived of by the two scholars: it is interpreted as repetition of the very same element – giving rise to meaning intensification – by Roeper, while it is repetition of the same action/object – giving rise to enlargement of the base entity not simply coincident with meaning intensification – according to Parker. However, recursion is considered by both of them as a process of enlargement / expansion of a linguistic entity carried out by means of the addition of a new constituent that must be identical in category to the one of the given entity.

However, the two proposed notions differ, to my mind, in an important respect: while Roeper assigns to recursion the property of change in meaning, Parker underlines that recursion is based on action/object embedding. Roeper’s notion of recursion, therefore, is less restricted than Parker’s, just because of the absence of the notion of embedding.

In this paper, Parker’s stricter notion of recursion will be taken into consideration and applied to Italian compounding processes.

The aim of this paper is in fact to finding out whether recursiveness affects compound formation in Italian and to trying to make a distinction between processes usually labelled as ‘recursive’.

The paper is organised as follows. In section 2 recursion in word formation, specifically in compounding, is briefly presented; in section 3 the two types of compound enlargement will be discussed and section 4 Italian data are analysed. In section 5, eventually, conclusions will be drawn.

## 2. Recursiveness in word formation

### 2.1 Recursiveness and prefixation

Among the linguistic levels “where recursion takes place” (cf. (2) above), there is also the level of words, as Roeper (2007) points out:

- |     |                 |                               |
|-----|-----------------|-------------------------------|
| (5) | Word level:     |                               |
|     | a. Prefixation: | re-re-read, anti-anti-missile |
|     | b. Adjective:   | big, black, strange bear      |
|     | c. Compound:    | student film group festival   |

In the field of word formation, recursiveness has been mainly discussed with regard to compounding, while quite little or no attention has been gone to recursiveness in derived words. Recursiveness in derivational processes, actually, is only occasionally mentioned with regard to prefixed words. It is prefixation, in fact, that allows the attachment of more than one element (though usually no more than two or three of them) to a base lexeme, giving rise to constructs that manifest no word class change and new meaning, as the prefixation examples in (5) above show. In the first of the two examples in (5) – viz. *re-re-write* – the base verb does not change its word class when it is merged with the prefix *re-* and there is no change either when the same prefix is re-adjoined. The base word is affected by a change in meaning, since the derived verb means ‘write again and again’. Roeper’s conditions on recursiveness are thus fulfilled.<sup>1</sup>

Prefixation processes of this kind are generally analysed as cases of recursiveness (cf. for example, Scalise 1994, Scalise & Bisetto 2008 for Italian). It seems to me, however, that multiple application of a prefix (the same one, as in the (5a) example, or different ones, as in the Italian word *ex-vice-ministro* ‘ex-vice-minister’) does not instantiate the phenomenon.

Prefixes are generally non-categorised elements, so prefixation cannot be viewed as adjunction of a constituent that is categorially identical to the base lexeme. The prefixed word preserves the word class of the base lexeme thanks to the lack of category influence of prefixes. Multiple addition of prefixes to a lexeme could, at the most, be viewed as an example of a process of iteration of a (base) lexeme, notwithstanding the fact that it implies embedding. The last added prefix (*ex-*) in *ex-vice-ministro*, in fact, has semantic scope over the already prefixed word *vice-ministro*, in that the last complex lexeme is ‘an atom’ for the new prefixation process, either morphologically and semantically.

Prefixes like the Italian *vice-*, *pro-*, *post-*, etc. are problematic, however. As in the case of *anti-* (cf. fn. 1) they introduce a new referent: a *vice-ministro* is someone who acts as a minister but who is a different person from the minister he substitutes. A *pro-rettore* ‘pro-rector’ is someone substituting a rector but different from a rector, and so on. The words such elements form are not exactly like prefixed lexemes of the *re-re-write* type where the same

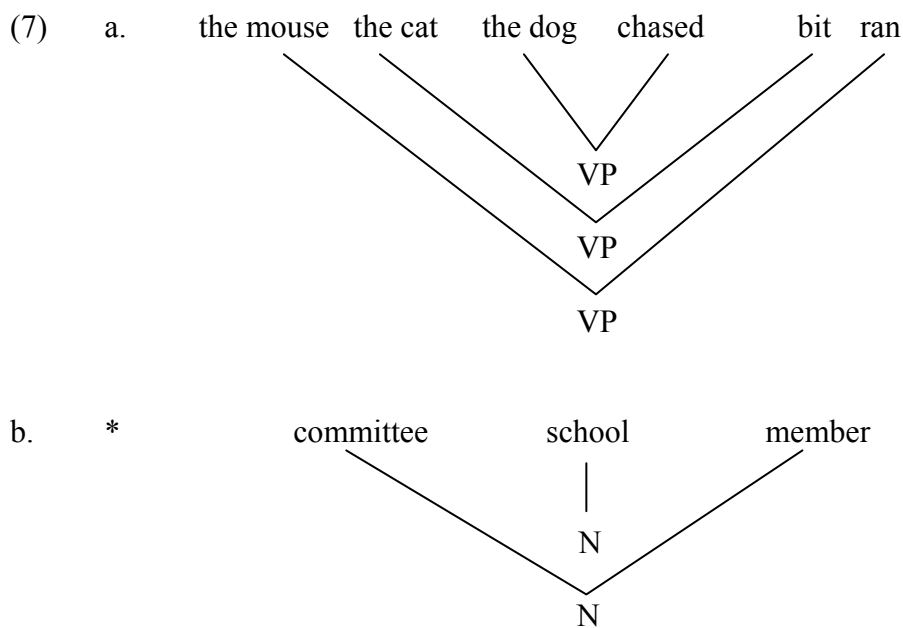
action (*write*) is implied; to my mind, they form instead, complexes resembling exocentric compounds.

## 2.2 Recursiveness and compounding

More attention has gone to compounding, a word formation process where recursiveness is more widely attested, at least in non-Romance languages, as examples like those in (6) illustrate:

- (6) a. [[[university [teaching award]] committee] member] (Plag 2003:133)  
 b. [[[[student [film society]] committee] scandal] inquiry] (Spencer 1991:48)

Recursiveness in compounds is of the tail-type, as the examples show. It is peculiar to either derived and compounded words to be ‘atoms’ (cf. Di Sciullo & Williams 1987); consequently insertion of material inside them is banned, and nested addition is impossible. If insertion of a VP inside another VP (cf. 3c) is allowed (as 7a illustrates), insertion of a noun (a N° constituent) inside a [NN]<sub>N</sub> compound is impossible (cf. 7b):



Compounds, thus, can only be expanded through the addition of a new constituent on the left or on the right side of the base form.

Compound recursiveness is widely allowed in Germanic languages, here exemplified in (8a) with one of the most famous German examples (cf. Neef 2009: 386), and in (8b) with a Dutch compound (cf. Don 2009: 371):

- (8) a. Donau - dampf-schiff-fahrt -s- gesell -schaft -s- capitän -s- mütze  
 Danube steam ship journey LE journeyman SUFFIX LE captain LE cap  
*Cap of the captain of the Danube steam ship company*

- b. weer -s- voorspelling -s- deskundigen – congress  
*weather LE forecast LE experts conference*

In the above formations, addition of new elements to the base constituent affects both edges in the German example while it affects only the right one in the Dutch compound.

Recursiveness, however, is explicitly stated to take place on both edges of Dutch compounds by Booij (2009) who maintains that "only N+N compounding (and under certain conditions [...] V+N compounding as well) is recursive, both in the head position and the non-head position [...]". Recursive Dutch compounds are exemplified in (9) (Booij's 2009:205 – ex. 5):

- (9) a. [[[[[ziekte]<sub>N</sub>[verzuim]<sub>N</sub>]<sub>N</sub>[bestrijdings]<sub>N</sub>]<sub>N</sub>[programma]<sub>N</sub>]<sub>N</sub>  
illness absence fight programme  
‘programme for reducing absence due to illness’
- b. [[zomer]<sub>N</sub>[[broed]<sub>V</sub>[gebied]<sub>N</sub>]<sub>N</sub>]<sub>N</sub>  
summer breed area  
‘breeding area for the summer’
- c. [[[grond]<sub>N</sub>[water]<sub>N</sub>]<sub>N</sub>[[over]<sub>P</sub>[last]<sub>N</sub>]<sub>N</sub>]<sub>N</sub>  
ground water over burden  
‘groundwater problems’

They represent, respectively, cases of constituent addition on the right (9a), constituent addition on the left (9b) and (9c) what Booij calls recursiveness on both constituents.

As it can be seen, Dutch compounds exemplify tail-recursion in that extension of the base compound can be made on both sides; (9a) is a case of a compound where constituent addition is made in the head position: the compound is consequently left branching; (9b) exemplifies addition of a constituent in the non-head position and the compound is consequently branching to the right. (9b) is, in my opinion, a compound (*grondvater*) expanded in head position by means of another compound (*over last*).

An identical phenomenon is represented by the English examples in (6 a-b) above, where the recursive constituents (= branching constituents) are either added to the head position (at the first step in the operation of enlargement of the base compound) and to the non-head position (in the subsequent operations of N addition), as (10 a-b) illustrate:

- (10) a. teaching award  
university teaching award  
university teaching award committee  
university teaching award committee member
- b. film society  
student film society  
student film society committee  
student film society committee scandal  
student film society committee scandal inquiry

Recursiveness in compound formation can be found in other languages too. Mukai (2008: 191-2), for example, gives some instances of Japanese and Mainland Scandinavian formations where new constituents are added on both edges of the initial form giving rise to recursive compounds:

- (11) a. right branching compounds (where addition of a new constituent occurs on the left, the non-head side):
- |      |   |     |   |
|------|---|-----|---|
| i.   | [barn[bogklub]]<br>[Swedish]<br>'child book club'   | ii. | [restaurant[kaffekop]]<br><br>'restaurant coffee cup'     |
| iii. | [restaurant [koohii kappu]]<br>[Japanese]<br>'restaurant coffee cup'<br>'coffee cup for restaurant' | iv. | [jisatsu [internet saito]]<br><br>'suicide internet site' |
- b. left branching compounds (where addition of a new constituent occurs on the right, the head side):
- |      |  |     |   |
|------|--|-----|---|
| i.   | fot-boll-s-domare<br>[Swedish]<br>foot-ball-LINK-referee<br>'football referee'             | ii. | bo-stad-s-kvarter<br><br>live-place-LINK-area<br>'residential area' |
| iii. | undergrund+s+vand<br>[Danish]<br>under-ground-LINK-water<br>'underground water'            |     |   |
| iv.  | fod+bald+s+plan<br>[Norwegian]<br>foot-ball-LINK-pitch<br>'football pitch'                 |     |   |
| v.   | [[gekijoo ticket]uriba]<br>[Japanese]<br>theatre ticket shop<br>'shop for theatre tickets' |     |   |

Mukai maintains that in Japanese and the Mainland Scandinavian languages Swedish, Danish and Norwegian – all of which have right headed compounds –, recursiveness on the left (= left addition of a new constituent) is more restricted<sup>2</sup> than recursiveness on the right (= right addition of a new constituent). Expansion in the head position of NN compounds is thus easier to be made than expansion in non-head position. Mukai suggests (sharing her opinion with Josefsson 1997 who discusses Scandinavian compounds) that this discrepancy in the

‘left-right’ direction of compound expansion is probably due to constraints in processing: right-branching compounds (where addition is on the left) “may cause processing problems: in left-branching compounds, the speaker forms a constituent out of adjacent roots earlier than in right-branching compounds, where a constituent cannot be formed until the last root is pronounced” (cf. Mukai 2008: 193). It is also maintained that recursiveness in compounds is enabled by the presence of a linking element between the constituents and that “[t]his is true only in left-branching, not right-branching, compounds.” In other words, Mukai asserts that the presence of a linking element (that she calls ‘linking morpheme’) allows for the addition of new constituents on the right side, the head side.<sup>4</sup>

However, while this is true in some languages, such as Dutch and German, as observed before, as well as in Turkish,<sup>5</sup> for example, the claim does not seem to be true in a general way. In the West Slavic language Czech, for example, NN compounds are characterised by the presence of a linking element *-o-* in between the two constituents (e.g. *lesopark* ‘wood-park’, *štěrkopísek* ‘gravel-sand’), but recursiveness is banned, probably due to the non-productivity of the compounding pattern (cf. Štichauer 2009) as Mukai herself notes. In Modern Greek, however, where the NN pattern is productive and the two constituents host a linking vowel between them, addition of new constituents is not allowed on the head side but only on the non-head one (cf. Ralli, 2009: 457 and ex. (15) below). As for Turkish, in NN structures, constituent addition to the left, the non-head side, is, in principle, unrestricted, while addition to the head side, the right one, “full recursivity is constrained by the ban against multiple adjacent occurrences of [the linking element] *-si*” (cf. Göksel (2009: 231 who refers this assertion to Kornfilt 1984). This is, however, probably due to the fact that the linking element in this type of Turkish compounds is final (cf. [*roman+kahraman*]-*i*] ‘novel+hero-LE’ = ‘character (of a novel)’).

We can, thus, conclude that linking elements actually play a role as far as recursiveness in compounds is concerned, but this role is different in the different languages.

In the following sections I will try to make a distinction between left and right adjunction (at least in right headed NN compounds) suggesting that expansion of a compound on the non-head side does not represent recursion but a different phenomenon, the phenomenon Parker (2006) defines as *iteration* (cf. § 1) which implies that only compound expansion on the head side can be regarded as a real case of recursiveness.

### 3. Types of expansions

To understand the difference between the process of enlargement of compounds on the head side and the process where compound extension occurs on the non-head edge, I will take into account Parker’s (2006) illustration of the difference between repetition of an action implying the preceding one and repetition of an action not implying the preceding one illustrated in (4) above.

Consider the English compounds in (12) which represent, respectively, cases of left addition of a constituent to a base compound (12a, a’) and (11b) a case of both left and right addition:

- (12) a. [student [film society]]      a’. [American [student [film society]]]  
 b. [[[[student [film society]] committee] scandal] inquiry]

In the (12a) example, the base constituent *film society* is enlarged on the non-head side by means of the merger of a new constituent, *student*, and in the (12a') the complex compound *student film society* is (again) enlarged through the addition, on the left, of the adjective *American*.

The adjunction of these constituents is aimed at restricting the denotation of the head constituent, i.e. *film society*, adding specification/modification: the meaning of the complex formation (12a') does not rely heavily on the meaning of the preceding one (12a) as it happens in the complex expression (12a) with regard to the base compound constituent. That is to say, from a semantic point of view, a *film society* does not need to be a *student society* to be a *society*; and there is no need for it to be a *student film society* to be also an *American* one: modification of the noun *society* either on the first and the second layer does not strictly imply the meaning of the preceding form. What the constructions speak about is a *society* of some kind and the reverse order of the two modifiers does not yield to particular differences, except a reverse specification involving the noun *society*. In (12a) a *film student society* is a 'society whose members are students and whose interest is about film', meaning not at all different from 'society interested in films whose members are students'. The same holds for the example in (12a'), containing the adjective *American* that modifies the base noun *society*: be it a *student film society* or simply a *film society*, what counts is that it is an *American society*.

Expansion on the non-head side can be viewed, consequently, as a phenomenon of iteration, a case of (multiple) modification not implying embedding: hence the process does not instantiate recursiveness.

Conversely, expansion on the head-side causes embedding of the base compound or of the preceding construction (an already embedded compound). It represents a true case of recursion since each process of constituent addition implies the preceding object/action the base constituent refers to. The merger of a new head, in fact, introduces a new referent bound to the preceding one. If one of the nouns on the right edge of a(n English) compound like (12b) is deleted (cf. 13a.i-iii) or their order is inverted (cf. 13b.i-iii), different results/objects obtain:

- (13) a. i. student film society committee scandal inquiry =  
*inquiry into the scandal involving the committee of a society...*  
 ii. student film society committee scandal =  
*scandal involving the committee of a society...*  
 iii. student film society committee = *committee of a society...*
- b. i. student film society committee inquiry scandal =  
*scandal on the inquiry regarding the committee of a society...*  
 ii. student film society scandal inquiry committee =  
*committee for the inquiry on the scandal involving a society...*  
 iii. student film society inquiry committee scandal =  
*scandal involving the committee of the inquiry on a society...*

To further clarify the point, the two English compounds in (14) (taken from Roeper, Snyder & Hiramatsu 2002), both analysed as instances of recursiveness, will be discussed:

- (14) a. student –film committee [committee of students on films]  
 b. student film- committee [committee for films for students]



The first example exhibits constituent addition to the left (hence, what I would like to call modifying insertion) while the second exhibits constituent addition to the right (hence recursion). Such three member constructions refer to the same entity - a *committee* - but the base structures refer to different entities. The first compound base (*film committee*) refers to a committee while the second (*student film*) to films. In (14b), the meaning of the base compound is embedded on the whole compound, as the semantic paraphrases underline; the compound refers, in fact, to a committee intended to take care of films dedicated to students. The compound in (14a), instead, refers to a committee whose members are students and it is a committee interested in films. While in the latter case (14a) both *film* and *student* are tied to *committee*, it is not so in the former construction (14b) where *student* is tied to *film* but not to *committee*.

In other words, in *student film committee*, *student* acts as a modifier of the base compound (*film committee*) notwithstanding its nominal nature (in Italian it should be expressed through the relational adjective *studentesco*) and the compound always refers to a committee (viz. *committee* is always the head of the construction). In (14b), *film* is the head of the nominal compound (*student film*) but loses this property when the new noun *committee* is adjoined. *Student*, consequently, has different semantic scope in the two structures: in *student-film committee* it has scope over *committee* and expresses a (new) property of the head; in *student film-committee* it has scope over *film* and has little or nothing to do with *committee*.

These differences strengthen the idea that (14a), differently from (14b), is not a recursive compound but is instead an instance of *iteration*.

Instances of iteration are, I would suggest, Modern Greek compounds also, here illustrated by the example in (15), that is analysed as a recursive compound by Ralli (2009: 457):

(15) *meɣal-o-kapn-emboros* 'big tobacco merchant'

In this example, the nominal compound *kapnemboros* is left-expanded through the addition of the adjective *meɣal(oq)*. The complex is a compound, as the presence of the linking element *-o-* proves. However, if recursiveness is addition of a constituent sharing the category of the base compound (i.e. nominal category), the MGreek formation cannot be considered an instance of this phenomenon.

The MGreek example should instead be viewed as a case of compound expansion through modification, a process that does not involve embedding of the base compound noun *kapnemboros* and that, therefore, could be better called **iteration**. In this compound, as in the English one in (14a), the new constituent does not become the head of the construction and the compound retains its referent (*emboros* 'merchant'). Moreover, the adjective modifies the noun *emboros*, the head of the compound, and, in the formation as a whole, *kapn(os)* has a 'minor' role in that it is itself a modifier.

English compounds too can be expanded through the addition of an adjective in non-head position, giving rise to new constructions, as (16) shows (but see also (12a') above):

(16) [American [history teacher]] [English [railway police]]

These constructions also do not, in my opinion, instantiate recursiveness, at least to the extent that recursiveness is taken in its strict definition, viz. as addition of a constituent sharing word

class with, and involving embedding of, the base form. They are, instead, instances of iteration of a compounded word.

A challenging question now remains, namely whether the result of this iteration process is or is not a compound. Actually, they are generally regarded as compounds. However, differently from MGreek (and other languages as well), English, e.g., does not have ‘compound markers’ (cf. Ralli 2008) signalling the word nature of constructions of this kind, i.e. constructions involving (ethnic) adjectives that, as is known, have a peculiar behaviour.

Ethnic adjectives, actually, belong to the class of so called relational adjectives whose specificity is to create AN / NA structures very similar to compounds<sup>6</sup> if not, in fact, actual compounds<sup>7</sup>. One of the main properties of relational adjectives, in fact, is that of occurring in a close, fixed position with respect to the noun from which they are generally inseparable<sup>8</sup> (It. *sforzo muscolare* ‘muscle effort’ / \**muscolare sforzo* / \**sforzo grande muscolare* ‘muscle great effort’; En. *industrial output* / \**output industrial* / \**industrial heavy output*; Fr. *élection présidentielle* ‘presidential election’ / \**présidentielle élection* / \**élection nouvelle présidentielle* ‘presidential new election’). The question, thus, is about the compound or phrasal nature of formations like those in (16).

The fact that these, actually, act like compounds is proved by their behaviour with respect to recursiveness. Nominal constructions such as those in (16) above accept addition of a noun in the head position:

(17) [[American [history teacher]] meeting] [[English [railway police]] intervention]

Were they not compounds, they could not be further expanded as words:

- (18) a. [history teacher]  
 b. [American [history teacher]]  
 c. [[American [history teacher]] meeting]  
 d. [very intelligent [American [history teacher]]]  
 e. \*[[very intelligent [American [history teacher]]] meeting]

In English, relational/ethnic adjectives, yet, are the only kind of adjectives allowed to iterate compounds and to become constituents of new compounds. Modification of a compound with a qualifying adjective (as in 18d) results in a construction that cannot be compounded any further, neither through addition of a noun on the recursive side, i.e. the head side (cf. 18e), but nor by means of addition, to the non-head side, of an ethnic adjective:

(19) [very intelligent [history teacher]] → \*[American [very intelligent [history teacher]]]

The conclusion that can be drawn from the above discussion is thus the following: Constituent addition on the non-head side of a compound is different from addition on the head side. The former process allows addition of nouns with modifier function<sup>9</sup> (cf. 10a, b) and of relational adjectives, whereas the latter exclusively admits nouns.

Addition on the non-head side results in a modification of the head constituent while addition on the head side results in a new compound embedding the previous one. Non-head addition is thus **iteration**; head addition is, instead, **recursiveness**.

### 3.1 Observations

Before examining recursiveness in Italian, I would like to point out a couple of problems tied to this phenomenon.

The first problem, underlined by Mukai (2008) (cf. 11 above and fn. 2) has to do with the fact that formations instantiating what I have called **compound iteration** are poor in number, at least in some languages. Is there any reason why there are languages that cannot or can only poorly be expanded on the non-head position, differently from English, Swedish or Japanese, for example?

The second problem touches upon MGreek and Turkish compounds<sup>10</sup>. Why can these two languages, in which NN compounds are characterised by the presence of linking elements, form **iterated compounds** by adding qualifying adjectives? Why is recursiveness, as defined in this paper, viz. as addition of a new head, impossible in Modern Greek but possible in Turkish?

These questions surely deserve an answer, however I leave such problems for future research.

## 4. Italian compounds

In Italian, recursiveness, taken as addition of constituents on the head-edge, has often been considered rather limited, but not completely absent. Though discussion on recursiveness has so far quite exclusively looked at NN compounds, I would first like to take into account a very curious example of recursiveness involving a different type of formations, the so called VN formations.

### 4.1 VN Compounds

VN compounds are the most typical headless compounds of Italian (and Romance languages in general). Such compounds can be, as the examples show, both nouns (20a) (cf. Bisetto 1999) and adjectives (20b) (cf. Ricca 2005):

- (20) a.      porta-bagagli      porter/luggage trolley  
              spremi-agrumi      citrus-fruit squeezer  
              cava-tappi          corkscrew
- b.    salva-spazio          space-saving          confezione salvaspazio          \_\_\_\_\_ pack  
              salva-Berlusconi      lit. save-Berlusconi      decreto salva-Berlusconi      \_\_\_\_\_ decree  
              spacca-gambe          lit. break-legs          salita spaccagambe          \_\_\_\_\_ slope

VNs can refer to objects (= instruments: *spremiagrumi*, *cavatappi*) or to objects and/or human beings (=instruments/agents: *portabagagli*) or only to agents (*portalelettere* 'mailman').

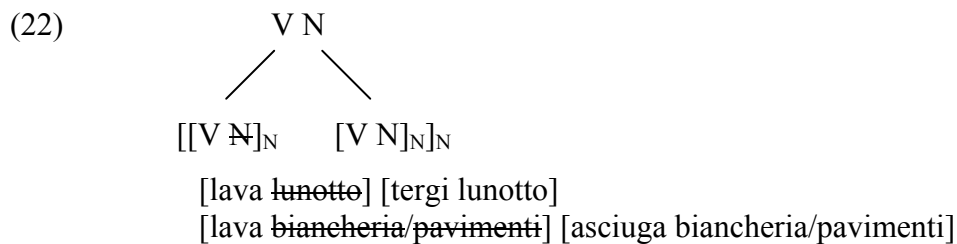
As it is well known, the exocentricity of these formations depends on the fact that neither of the two constituents is the *determinatum*. The second constituent is a noun but is not the head of the complex because it neither shares its features with the whole compound nor refers to the same entity. For example, differently from *portabagagli*, which is a singular noun and can refer to an animate or an inanimate entity, *bagagli* – the N in the compound – is

a plural noun and does not refer to a *porter*; the same is true for *spremiagrumi: agrumi*, the noun internal to the VN, is a plural noun while the compound construction is singular and refers to a *squeezer* not to citrus fruits as *agrumi* does. The first constituent, in turn, is a verb form<sup>11</sup> and, as such, cannot either serve as head of the compound either.

Some of VN compounds (cf. Dressler 1987) can, surprisingly enough, be expanded through the adjunction of a verb constituent on the left side, the side where endocentric compounds generally host the head constituent:

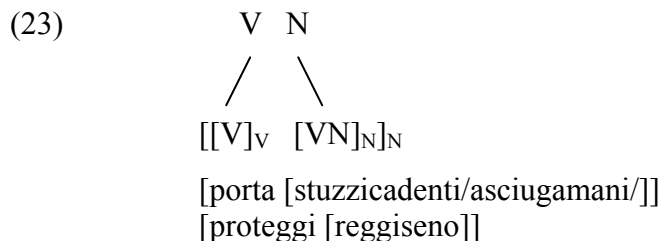
- (21) a.    porta-stuzzicadenti      lit. carry-pick-teeth = toothpick-holder  
            porta-asciugamani      lit. carry-dry-hands = towel-holder  
            proteggi-reggiseno      lit. protect-bra      = bra-protector<sup>12</sup>
- b.    lava-tergi lunotto          lit. wash- wipe rear window = rear window wiper-washer  
            lava-asciuga biancheria/ lit. wash-dry clothes = washer-dryer  
               pavimenti      lit. wash-dry floors = floor washer

The two groups of forms in (21), though sharing the structure, belong to two different subtypes, at least according to the traditional classes into which compounds are divided.<sup>13</sup> Adjunction of a verb constituent, in fact, gives rise to subordinate compounds in (21a) while it forms coordinate compounds in (21b). The two verb forms in the (21b) example, in fact, have to be interpreted as expressing a coordination relation between two compounds sharing an identical second constituent; they can, therefore, be analysed as in (22):



i.e. as involving identical nouns, the first of which is deleted.

In the previous examples (21a), however, the base compounds (*stuzzicadenti*, *asciugamani*, *reggiseno*) work as the internal direct object of the added verb, just like the nouns (*denti*, *mani* and *seno*) in the base VNs do. Their structure is (23):



Expansion of VN compounds is not a common process, probably due to semantic and 'syntactic' reasons. From the semantic point of view, Italian VN compounds denote agents and/or instruments; consequently, their recursive expansion must maintain this semantic

relation. The syntactic reason depends instead on the fact that the N, in VNs, is the direct object of V: this restriction too must, of course, be maintained when a new V constituent is added. In other terms, the (base) VN must comply with this restriction and serve as the direct object of the new verb.

Compounds like those in (24) are possible recursive formations, though they are not attested (as the ° symbol is intended to signal):

- |      |                                   |  |
|------|-----------------------------------|--|
| (24) | °appoggia-asciugamani             | lit. prop-towel  |
|      | °copri-guardacanapo               | lit. cover- save rope = ropesaver-cover                        |
|      | °controlla-guardamerci (agentive) | lit. supervise-goods attendant = goods attendant<br>supervisor |
|      | °porta-copripiumone               | lit. hold-duvet cover = duvet cover-holder                     |
|      | °ripara-frangizolle               | lit. fix-harrow = harrow-fixer                                 |

For example, a *guardacanapo* is a metal ring in naval equipment, safeguarding a rope from friction. If an object protecting a *guardacanapo* were invented, it could be easily called a *copri-guardacanapo*. The same could be said about *controlla-guardamerci*. A *guardamerci* is, in railway stations, the person in charge of the procedures of loading and unloading goods. A person in charge of making periodical controls on the *guardamerci* could be easily called *controlla-guardamerci*.

A puzzling but interesting fact about VN compounds is that they can be recursively expanded notwithstanding their exocentricity. Addition of a new element concerns the constituent occupying the position hosting the head in endocentric compounds, a clear indication that the constituent on the left is interpreted by speakers as the head. That is to say, speakers recognise V as the constituent to which a nominaliser is associated. Such a nominaliser is a zero element introducing the formal features that characterise the compounds.

The Ø constituent has been claimed to be necessary to account for the formation of VN compounds; as a consequence, VN compounds have been analysed as ternary parasynthetic constructions (cf. Bisetto forthcoming, Bisetto & Melloni 2008) whose structure is that in (25):

- |      |          |       |                               |
|------|----------|-------|-------------------------------|
| (25) | [[V      | N]    | Ø <sub>N</sub> ] <sub>N</sub> |
|      | reggi    | seno  |                               |
|      | stuzzica | denti |                               |

The recursive formations in (21a) above have, consequently, the structure in (26):

- |      |           |            |        |                               |                 |
|------|-----------|------------|--------|-------------------------------|-----------------|
| (26) | [V        | [[V        | N]     | Ø <sub>N</sub> ] <sub>N</sub> | Ø] <sub>N</sub> |
|      | [proteggi | [[ reggi   | seno]  | Ø <sub>N</sub> ] <sub>N</sub> | Ø] <sub>N</sub> |
|      | [porta    | [[stuzzica | denti] | Ø <sub>N</sub> ] <sub>N</sub> | Ø] <sub>N</sub> |

In both (25) and (26), the covert nominaliser is strictly linked to the (relevant) V: it ‘saturates’ the external argument of the verb and semantically corresponds to the derivational suffix *-tore*.<sup>14</sup>

The two kinds of forms exemplified in (21a-b), that could be both called recursive in that represent cases of addition on the head side, instantiate different expansion processes. In

the coordinate forms in (21b), in fact, the new V constituent does not embed the base compound, while it does so in the subordinate forms in (21a, 23). In the forms where a subordinate relation holds, addition of a new constituent gives rise to a recursive compound. When the relationship between the base compound and the added V is of coordination, the same does not happen.

#### 4.1.2 *Coordinate compounds*

The idea that forms like (21b) do not instantiate recursiveness raises a problem. Coordinate compounds are usually considered typical cases of recursion occurring also in Italian where recursiveness, as it is known, is not as widespread as in, for example, Germanic languages. Actually, coordination demands addition of a constituent similar (not only categorially, but also in many other respects)<sup>15</sup> to the base one, so coordinate compounds of the form in (27a), can be expanded as in (27b):

- |      |    |  |                       |
|------|----|--|-----------------------|
| (27) | a. | attore-scrittore                             | writer-actor          |
|      | b. | attore-scrittore-regista                     | director-_____        |
|      |    | attore-scrittore-regista-cantante            | singer-_____          |
|      |    | attore-scrittore-regista-cantante-calciatore | football player-_____ |

Coordinate compounds are known for their multi-headedness, at least from a semantic point of view. An *actor* who is simultaneously a *writer* and a *director*, a *singer*, etc., is also a *writer-actor-director* etc. and a *director-writer-actor*, etc. Each ‘property’ associated with that person can thus stand as the head of the compound. Syntactically, however, coordinate compounds are single-headed, a property that in English manifests itself in the formation of the plural (only one constituent - that on the right, the head – is marked for this information) while in Italian, where both constituents host the plural marker (*attori-registi*, *cantanti-calciatori*) headedness is manifested in the syntax by the features of gender agreement with the determiner (*la pizzeria-ristorante* ‘the<sub>Fem</sub> pizzeria<sub>Fem</sub>-restaurant’ but *il ristorante-pizzeria* ‘the<sub>Masc</sub> restaurant<sub>Masc</sub>-pizzeria’).

Expansion of coordinate compounds, thus, is simple addition of ‘properties’ to a nuclear constituent, the head (or the base compound’s head); neither of the added nouns causes embedding of the preceding one(s). This is why the order of further added constituents can be changed, process that is, however, as we saw in (13b) above, impossible when compounds are of the subordinate type.

VN compounds in (21b), then, being of the coordinate type, do not instantiate recursiveness but have to be classed as iterative compounds.

#### 4.2 *NN root compounds*

As for nominal endocentric compounds, complexes like the following are allowed, where there is recursiveness on the left edge, the canonical head position in Italian compounds:

- (28) [ ufficio [responsabile [reparto [giocattoli e attrezzature sportive]]]]  
 office manager section toys and sports facilities  
 'toys and sports facilities section manager office'

However, expressions of this kind cannot be used in common speech but belong to what could be called the ‘label/subtitle speech’; that is to say, such an expression could be found on a door of a manager's office, for example or as a sign indicating direction, followed by an arrow.

Shorter compounds, instead, even though still having a slight 'headline flavour', can be used in sentences and can be quite easily found on the internet:

- (29) a. Il comune ha introdotto un programma riciclo materiali molto innovativo  
*‘the municipality has introduced a very innovative **stuff recycling programme**’*
- b. L'ufficio oggetti smarriti è stato trasferito al secondo piano  
*‘the **lost property office** has been moved to the second floor’*
- c. I moduli di richiesta acquisizione libri sono sul bancone distribuzione libri  
*‘the forms for **book acquisition request** are on the **book distribution counter**’*
- d. Gestione completa del magazzino (carico, scarico, ordini etc.) per librerie con gestione acquisizione libri e notifiche clienti (e-mail, sms, etc.) e aggiornamento libri on-line mediante servizi configurabili. (<http://www.logicode.it/>)  
*‘complete warehouse running (load, unloading, orders etc.) for book-shops with **running of book acquisition** and customer notice (e-mail, sms etc.) and on-line book updating through representable services’*

Examples like those in (29), which are actually not only formed by root nouns but contain deverbal nominals, show that recursive formations are possible also in Italian, though recursiveness is not so widespread as it is in Germanic languages or as in Turkish, for example.

Such restrictiveness is due to the restrictiveness concerning NN root compound formation itself, again when compared to Germanic languages.

Though NN compounds are claimed to be “uno dei maggiori centri di produttività e regolarità del lessico” [one of the main centres of productivity and regularity in the lexicon] by Baroni, Guevara, Pirrelli (2006) who give the examples in (30):

- |      |                |                     |
|------|----------------|---------------------|
| (30) | stanza server  | ‘server room’       |
|      | altezza righe  | ‘line height’       |
|      | vacanza studio | ‘learning vacation’ |
|      | foto tessera   | ‘card photo’        |
|      | asilo nido     | ‘nursery-school’    |

their not completely free formation, and consequently their limited recursiveness, is due, I would like to suggest, to a peculiar reason.

As it is known, Italian NN root compounds show a fixed interpretation; they can rarely be given a multiple interpretation. *A treno passeggeri*, for example, is a *train for passenger transport*

- (31) treno passeggeri lit. ‘train passengers’ ‘train for passenger transport’  
\*‘train having passengers painted on its sides’

it cannot be given any other interpretation, such as, for example, ‘train having passengers painted on its sides’ or something like that.

This ‘one way’ interpretation, which is also characteristic of other Romance languages, has often be interpreted as being indicative of ‘lexicalisation’. Bauer (1978), for example, has suggested that French (root) compounds, when existing, have to be considered as lexicalised just because they do not have a variable meaning.<sup>16</sup>

Though Scalise (1983) has maintained that in Italian NN root compounds there exists a R relation between the two Nouns, of the kind proposed by Allen (1978), this is not generally true. Forms like:

- (32) capostazione ‘station master’  
fondo assistenza ‘aid fund’  
trasmissione radio ‘radio program’  
formazione base ‘basic training’

have a unique meaning. This fact, however, is not enough for claiming their lexicalisation.

The ‘invariable/fixed’ meaning of Italian NN root compounds, actually, is not an ‘accident’ of the language but depends on a particular type of semantic restriction.

The semantic relationships holding between the two nouns of Italian NN root compounds, in fact, can only express two of the four relations Pustejovsky (1995) has called *qualia roles*. Moschin (2009), has shown that, while the constituents of [N Prep N] formations can be linked by all the four *qualia roles* (Constitutive, Formal, Telic and Agentive – cf. 33), NN compounds constituent can only be linked by the formal (34a) or the telic (34b) roles:

- |      |    |                     |                     |                    |
|------|----|---------------------|---------------------|--------------------|
| (33) | a. | constitutive quale: | barca a vela        | ‘sailing boat’     |
|      |    |                     | agente di polizia   | ‘policeman’        |
|      | b. | telic quale         | abito da sera       | ‘evening dress’    |
|      |    |                     | campo da gioco      | ‘playing field’    |
|      | c. | formal quale        | scala a chiocciola  | ‘spiral staircase’ |
|      |    |                     | cappello a cilindro | ‘top hat’          |
|      | d. | agentive quale      | acqua di rubinetto  | ‘tap water’        |
|      |    |                     | olio di oliva       | ‘olive oil’        |
| (34) | a. | formal quale        | abito farfalla      | ‘butterfly dress’  |
|      |    |                     | pesce palla         | ‘globefish’        |
|      | b. | telic quale         | pausa pranzo        | ‘lunch break’      |
|      |    |                     | posto auto          | ‘parking space’    |

This is, therefore, the reason why NN Italian compounds have a unique meaning. Consequently, this can also be viewed as the reason governing the constraint on recursiveness. Insertion of a new noun can only be linked to the base compound by one of the two *qualia roles* admitted, as (35) illustrates:



(35)	responsabile - reparto giocattoli	'toy section - manager'
	arredamento - stanze server	'server room - furniture'
	rimessa - vagoni letto	'sleeping car – depot'

## 5. Summary and conclusions

The notion of recursiveness in compounds has not received a unified analysis in the literature. Examination of data in various languages has revealed that the notion has been applied to the wide phenomenon of expansion of NN root compounds, while no attention has been paid to the place where expansion occurs. Namely, whether expansion occurs on the head side or on the non-head side. Little attention has been paid also to the category of the expanding constituent, i.e. if it is a noun or an adjective, at least when expansion occurs on the non-head side. In this paper, in order to give an account of the differences manifested by the constructions obtained by means of expansion on the head side as opposed to the non-head one, a strict definition of recursiveness, proposed by Parker (2006), has been adopted.

Expansion on the non-head side, moreover, has been claimed to be more restricted than expansion on the head side, a fact that has been associated with the presence of linking elements occurring in between the two nominal constituents. However, data from other languages have shown that this is not always the case: Turkish, for example, a head-final language where NN compounds have linking elements and where expansion can occur on both sides, manifests a preference for left-expansion. Modern Greek, which shares with Turkish both final headedness and the presence of linking elements, does not expand on the right edge. This discrepancy can, in my opinion, be interpreted as a signal of the fact that linking elements do have a role but that other information is relevant in order to find out the reasons determining the left/right direction of compound expansion.

In the second part of the paper recursiveness in Italian compounds has been analysed on the basis of the strict notion of recursion, adopted from Parker, based on two properties: a) categorial identity between the base compound and the added constituent and b) embedding of the base form by the new constituent.

It has been also pointed out that the low degree of recursiveness manifested by Italian NN root compounds is due to the semantic restrictions linking the compound constituents. Expressed in the terms of Pustejovsky's *qualia roles* the semantic relation between the two nouns can only be *formal* or *telic*, and as a result a recursive compound can only realise one of these roles.

Germanic languages, however, do not know this restriction: all *qualia roles* can connect two nouns in a compound and, consequently, each *quale* can be utilised for the linking of a new noun – recursively adjoined in the head position - to the base compound.

The restriction on Italian NN compounds is also responsible for their unique interpretation, again contrary to the many interpretations concerning these types of Germanic compounds.

## Notes

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<sup>1</sup> The same, however, cannot be maintained for *anti-anti-missile*; *anti-* does not behave as a usual prefix. If *re-write* refers to the (repetition) of the action of writing, in *anti-missile* the phenomenon is not the same. An *anti-missile* can be something different from a *missile* used against *missiles*, it can be any kind of weapon. The prefixal element *anti-* introduces a new referent: ‘something that serves against missiles’ and consequently it seems more like a preposition (cf. Bisetto forthcoming). Repetition of the prefixal element does not change things: an *anti-anti-missile* is a weapon that can be used against the weapon used as an anti-missile; repetition of the prefixal element does not only introduce new meaning but also new referents. Such an example could be better viewed as a case of recursiveness in exocentric compounding than recursiveness in prefixation. For a different view on *anti-*, cf. Montermini (2005).

<sup>2</sup> To demonstrate the phenomenon, Mukai (2008:192) gives a number of examples not reproduced here.

<sup>3</sup> The author makes reference to Hawkins (1990) for this explanation.

<sup>4</sup> Mukai (2008: 194) presents a table with data from various languages to strengthen her claim.

<sup>5</sup> A recent account of Turkish compounds is Göksel (2009) where, though briefly, recursiveness is clearly discussed.

<sup>6</sup> The reader is referred to the lively discussion on relational adjectives. Among the many, cf. Nowakowska (1995, 2002), Mc Nally & Boleda (2004), Mezhevich (2004), Wandruszka (2004), Giegerich (2005), Fradin (2007a, 2007b), Fábregas (2007), Bisetto (2010).

<sup>7</sup> Cf. Ten Hacken (1994) on nominal constructions containing a relational adjective as compounds.

<sup>8</sup> They are ‘atoms’, in the sense of Di Sciullo & Williams (1987).

<sup>9</sup> The modifier function of nominal constituents in these compounds can easily be grasped in Italian where the two non-head nouns in a construction like *student film society* must be translated with two relational adjectives; the corresponding Italian construction is: *società cinematografica studentesca*.

<sup>10</sup> On Turkish compounds, cf. Göksel (2009).

<sup>11</sup> On the nature of the verb form of VN compounds many proposals have been advanced since the second half of XIX century: cf., a.o., Diez (1858-70), Meyer-Lübke (1890), Darmesteter (1894), Pagliaro (1930), Prati (1931). Cf. Bisetto (1999) for a review of the literature on this topic.

<sup>12</sup> Example found in Google.

<sup>13</sup> On compound classes see, among others, Bloomfield (1933), Marchand (1969) and the recent Bisetto & Scalise (2005), Scalise & Bisetto (2009).

<sup>14</sup> A few Italian VN compounds have two other meanings: a locative one (i.e. *puntaspilli* ‘pincushion’) and an eventive one (i.e. *ammainabandiera* ‘(the) lowering of the flag’). In this case the nominalising zero constituent does not correspond to *-tore* but to the different suffixes carrying the respective meanings. This does not change the situation, however, given that an expression like <sup>o</sup>*porta-puntaspilli* lit. ‘carry- pincushion’ seems to be entirely acceptable.

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<sup>15</sup> Cf. Bisetto, Scalise & Guevara (2005) for a discussion on this topic.

<sup>16</sup> On this kind of NN compounds in French cf. Arnaud (2003).

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