Composita solvantur:
Compounds as lexical units or morphological objects?

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Which criteria can be invoked to identify compounds? This paper suggests a quadripartite approach which carefully distinguishes between compounds and phrases, by treating the properties of being a lexical unit and being the output of a morphological operation as independent. Elaborating on Bauer's (2001) idea of formal isolation as a basic criterion for compoundhood, we emphasize the relevance of morphological activation. This is intended as the set of explicit properties which characterize compounds in morphological terms and are independent of their lexical status. Our quadripartite approach is able to show an intriguing convergence as for the morphological status of certain constructs, which cannot always be considered lexicalized, in three typologically and genetically different languages like Italian, Chinese and Modern Hebrew[*].

1. Introduction

Compounds are often taken to be the minimal piece of morphology occurring even in the most consistent isolating languages. For instance, Joseph & Janda (1988:204) observe that "we know of no language that lacks both affixation and compounding; Chinese, for example, certainly has compound morphology". This claim runs the risk of being too optimistic. In fact, very much depends on how we intend compound morphology. A rather strict definition of compounding has been recently suggested by Bauer (2001:695):

(1) "Compound is a lexical unit made up of two or more elements, each of which can function as a lexeme independent of the other(s) in other contexts, *and which shows some phonological and/or grammatical isolation from normal syntactic usage* (italics ours)".

If we adopt this view, then we might be surprised by observing that even in languages in which compounds are generally taken to occur, the picture is much more complex than expected. In this paper, we will try to show that a clear-cut definition of compounding may help us in discovering what is the morphological essence of compounding by contrasting it with other forces at play, namely lexicalization on the one hand, and syntactic constituency on the other.

The paper is structured as follows: §2 tries to set up the main issue of the paper, namely the need of clearly distinguishing the morphological procedures from the lexicalization processes. In §3 some general criteria are discussed, which prove useful for attempting such a distinction; subsequently, further specific criteria are elaborated when discussing Italian in §4, Chinese in §5, and Modern Hebrew in §6. The final §7 draws the conclusions.

2. Discriminating compounds between lexicon and syntax

Let us start by taking Bauer's definition reported above seriously. If only those cases displaying a certain degree of formal isolation can be considered instances of compounding, then a number of consequences have to be taken into account. First, we cannot rely on semantics. Nothing in the referential properties of a certain unit tells us whether the denotatum is referred to by means of a compound, or a phrase, or even a simplex. However, referential unity and stability are often claimed to be the presupposition for any morphologically complex word to be formed, despite the difficulty in evaluating these notions precisely (cf. for instance Arnaud 2004:334-335), particularly when dealing with new formations.

To emphasize the difficulty of using referential unity and stability (i.e. nameworthiness) as criterial for isolating compounds, let us discuss two opposite cases, namely a stable conceptual unit which cannot be considered a compound, and its opposite, a water-tight compound which cannot be considered a naming unit. As is well known, German displays a highly productive system of compounds (cf. Schlücker & Hüning 2009). Thus, it can be taken as a good case for assessing the question of naming. Let us look at the following examples:

(2)   a. *reitende Artillerie* 'horse artillery'

        b. *Eigentum der reitenden Artillerie* 'estate of the horse artillery'

        c. *Eigentum der *Reitendartillerie*

        d. *reitende Artilleriekaserne* 'horse artillery barracks'

        e. *die reitenden Artilleriekasernen* 'horse artillery barracks (pl.)'

The noun phrase in (2a) cannot be taken as a compound, because it clearly displays morphosyntactic properties like agreement, as shown by (2b) and (2c). However, its naming force is so strong

that it gives rise to a classical example of bracketing paradox in (2d): the name is embedded as a whole into a compound headed by *Kaserne* 'barracks', but given its syntactic nature, the adjective is syntactically regrouped as a modifier of the new head: [[<*reitende*] *Artillerie>kaserne*]$_{NP}$. In fact, (2e) shows that the adjective agrees with the compound head *Kaserne* rather than with the modifier *Artillerie*. It is the naming force of the lexical unit which allows one to recover the correct meaning, discarding what would result from the strictly compositional interpretation of *reitende Artilleriekaserne*.[1]

The opposite case is given by true compounds which cannot be considered naming units in any meaningful sense:

(3)   a. *entscheidungsbestimmend* 'decision-determining'

b. *Entscheidungsort* 'decision place'

Being headed by a participle, the construction in (3a) might be considered a case of syntactic incorporation of the kind advocated by Baker (1988, for German cf. Siebert 1999). However, notice the presence in (3a) of the linking element *-s-*, which is obligatory in compounds when the modifier ends with certain suffixes, among others the abstract suffix *-ung*, and equally occurs where no verb is involved, as shown by (3b). Given the parallel behavior of (3a-b), we are forced to assume a unitary explanation for both cases.

Against a purely syntactic explanation, three objections can be put forward. First, both examples in (3) are prosodic words, displaying one primary stress falling on the modifier. Second, the linking element cannot be explained away as an inflectional marker, because it does not match the inflectional behavior of the modifier (it is a case of *unparadigmische Fuge* 'non-paradigmic insertion', cf. Fuhrhop 1996). Third, the head noun of (3b) is not normally associated with any argument structure, thus we cannot restrict the domain of incorporation to deverbal or more in general argumental heads. If we were to consider also this case as an instance of incorporation, we would be forced to assign all German compounds to syntax, which would solve the question of discriminating between phrases and compounds quite radically indeed, by eliminating the latter category completely.

Compared with semantic and referential features, formal properties seem to be better suited for discriminating between compounds and phrases, although some caveats are in order. A quite problematical criterion, for instance, is separability, according to which complex words (and among them compounds) are taken to be atoms, not being generally separable by means of other lexical material. It is

clear that there are lots of complex lexical units which are not sepa-
rable, while at the same time many linguists (even if not all, cf. for
instance Dardano 1978:178-181) would prefer to take them apart
from compounds. This is the case of It. *ferro da stiro* 'flatiron, lit.
iron-for-ironing', which cannot be interrupted by any modifier: **ferro
giallo da stiro* 'yellow flatiron'. But even "looser" kinds of collocational
phrases, without any grade of idiomaticity somehow present in *ferro
da stiro,* are not interruptable. In Italian, the uncountable instances
of sequences noun + restrictive adjective can be mentioned, like
ingegnere elettronico 'electronic engineer' or *vino bianco* 'white wine',
and similarly NPs where a modifying PP has classifying meaning,
as *direttore d'orchestra* 'conductor, lit. director of orchestra', *campo
di gioco* 'playground, lit. field of play', etc. Should they be considered
all compounds? As a matter of fact, non-separability seems to depend
more on the referential stability (or 'nameworthiness') of the given
complex lexical unit than on the procedure by which it is formed. So,
we are driven back to the considerations made above.

The failure of the preceding criterion means, in our opininon,
that to save the notion of compoundhood from the traps of overgen-
eration we have to distinguish carefully between what we want to
attribute to the lexicon (i.e. to consider lexicalized), and what we
would like to see as the result of a morphological operation; and
accordingly call compounds only the latter instances. Being aware
that this is far from easy, in what follows we suggest a quadripartite
typology, which allows us to treat the properties of being a lexical/
stored unit or the output of a morphological operation as independent
grades of freedom.

(4)   a. [+ morphological], [+ lexical]

         b. [+ morphological], [- lexical]

         c. [- morphological], [+ lexical]

         d. [- morphological], [- lexical]

Notice that we do not intend to consider as lexicalized only items
which display any sort of (formal or semantic) idiosyncrasy. Rather,
we are inclined to consider that being lexicalized or stored depends
very much on behavioral properties like token frequency and/or nam-
ing force. This is in agreement with psycholinguistic research which
assumes dual-route models of lexical processing to be superior to one-
route models (cf. among others Baayen, Dijkstra & Schreuder 1997).
However, while lexicalization doesn't necessarily imply idiosyncrasy

(*contra* Di Sciullo & Williams' 1987 listemic approach), the reverse is true in our opinion: idiosyncratic properties require lexicalization.

We are confident to show that the typology in (4) may be of great help in keeping morphology and the lexicon apart. We will first show that this typology is able to capture in an adequate way the facts in a single language, namely Italian, and that it allows us to project the language specific findings onto a more general picture by taking into consideration intriguing phenomena from other typologically and genetically different languages like Chinese or Hebrew.

Before going into the details of language-specific accounts, let us comment shortly on the quadripartite typology laid down above.

Among the four alternatives listed in (4), (4a) represents quite obviously the prototypical instance of a compound: the feature [+ lexical] points to a unit with a stable referent, a unitary meaning and (possibly) a non-negligible frequency of occurrence,[2] and the feature [+ morphological] implies that this unit is formed via some morphological procedure or "template" which differs from the syntactic patterns of the language. Basically these are the items under Bauer's definition in (1).

Conversely, (4d) identifies the prototypical phrase, i.e. a purely syntactically-built unit where the sequence of the two items is freely interruptable, the semantic and referential connections between head and modifier are loose and the meaning is entirely compositional, so that we do not expect that the unit as a whole requires to be stored independently in the mental lexicon.

Usually, the borderline area between compounding and syntax tends to be identified with items of type (4c): these are formally phrase-like units which display a (more or less) relevant amount of idiosyncrasy from the semantic and/or referential point of view. A case like It. *luna di miele* 'honeymoon' is a good illustration, since (i) it denotes a unitary concept, (ii) its meaning is largely idiomatic and could be scarcely inferred from the standard meanings of its components,[3] (iii) it cannot be interrupted by any linguistic material. It can be hardly disputed that an item like *luna di miele* requires a place by itself in the mental lexicon.

However, while the corresponding English equivalent *honeymoon* can also be considered a compound on formal grounds, the Italian sequence cannot: structurally, it does not differ anyhow from (4d)-like phrases like *statua di marmo* 'marble statue'. A purely semantically oriented definition of compounds on the basis of their naming capacity would force us to include into compounds items like *luna di miele* as well as German *reitende Artillerie* discussed above. Such move would

fatally lead us to an overgeneration of compounds, as seen above with items like *ingegnere elettronico* or *direttore d'orchestra*: we would thus be faced with the mirror-image of the overgenerating syntax assumed by the incorporation approach discussed for the examples in (3).

By the same token, the criterion (ii) of idiomaticity taken alone would also be equally unsatisfactory, this time being manifestly too strong. In fact, there are lots of items like *can opener* or It. *apriscatole* 'id.' which presumably no one would like to rule out from compounds, but are not idiomatic at all.[4]

In this paper, we will try to take the opposite approach: namely, to exclude all items of the type (4c) from compounds and see to what extent this works empirically. Taking the [+ morphological] feature as criterial has a big advantage in terms of theoretical economy, as it keeps the whole complex of derivation, conversion and compounding phenomena within the unitary domain of morphology. To be sure, it compels us to exclude from compoundhood *all* phrase-like sequences, including the strongly lexicalized (and even idiomatic) ones like *luna di miele*. But this does not mean that the linguistically relevant opposition between the items of the types (4c) and (4d) – in fact the opposite poles of a lexicalization continuum – is lost: the two grades of freedom provided by the classification in (4) allow us to deal with the gradual process of phrase lexicalization without interfering with the notion of compounding.

While simplifying the latter, this choice does not conversely increase the complexity of the lexicon, since it seems at any rate unavoidable that the lexicon should host some units, or listemes as advocated by Di Sciullo & Williams (1987), which are not morphological words (cf. Jackendoff 1997:110-111 for a discussion).

A first interesting check for the two-feature approach in (4) is provided by the last theoretically conceivable option, namely the items of the type (4b). If compoundhood and lexicalization are independent notions, they should combine in all possible ways: namely, beside finding lexical units that are not compounds, but syntactic units, we should also find compounds (morphological units) which are not lexical units.

This possibility is surely less straightforward than its converse: Bauer's definition, for instance, assumes that compounds are lexical units / listemes (thus including only items of type (4a) in our scheme, as said above). And indeed it is commonplace to treat compounding as one of the two main branches of "word formation", where this expression is in fact understood to mean "lexeme"-formation (as stressed among others by Aronoff 1994:13-16).

However, if compounding is considered – as we try to do here – plainly as a class of morphological procedures, on a par with, say, affixation, we should expect to find non-lexeme-forming compounding, parallel to what we find in derivation: several derivational procedures may in fact have outputs whose lexeme status is at least doubtful. Think for instance of the evaluative derivatives in languages where they are often used with mere pragmatic function,[5] as in Italian baby-talk *È abbastanza calda l'acqu-etta per il bagn-etto?* 'Is the water-DIM for the bath-DIM warm enough?': here, the suffixed nouns denote exactly the same entity of their bases. Further cases occur when very productive deanthroponimic suffixes are used more or less like a genitive case, without any classifying or stereotypical connotation. This is the case of Italian *-iano* '-ian' in frequent newspaper expressions like *gli obbiettivi più probabili della rappresaglia gheddafiana* 'the most probable objectives of Qadafi's retaliation' (from *La Repubblica*).[6]

The existence and theoretical interest of productive compounding morphology which does not form lexemes has been recently pointed out by Hohenhaus (2005:365-367), who explicitly discusses the issue of non-lexicalizability. Indeed, non-lexical compounds seem to be far from rare when a language has a very productive compounding procedure. Take, for instance, English determinative (or endocentric subordinate, according to Bisetto & Scalise 2005 classification) N-N compounds. It would be audacious to state that all the outputs of this procedure are stored in the lexicon. Especially the instances of N-N compounds involving proper nouns, like the often cited *China report* (cf. Arnaud 2004:330) or even Downing's (1977) *apple-juice seat*, in which the interpretation is strictly context-dependent because it refers to a seat in front of which a glass of apple-juice is placed, do not seem to qualify as such at all. However, they are formed by the same non-syntactic procedure found in [+ lexical] items like *snail mail* or *guest book*. Similarly, the German example mentioned in (3a) above clearly speaks in favor of a compound-like treatment, although the lexical status of *entscheidungsbestimmend* is highly questionable.

The same can be said for VN-compounding in Romance languages, or at least in Italian. Ricca (2005, forthcoming) has shown that many VN-formations occurring in newspaper corpora in modifier function could hardly be labeled as restrictive or qualifying adjectives; rather, they express a looser kind of modification, with transient/eventive character, bordering on the function of a (reduced) relative clause. Some instances are:

(5) *astensione salva-Prodi*   'Prodi-saving abstention'

    quel terzo posto acchiappa-Uefa   'that Uefa-catching third place'

    colpo di testa fissa-risultato   'result-securing header'

However poor candidates to lexical storage these formations are, it would be odd to exclude them from the compounds and reserve the term for such well established nominal or adjectival items as *portalettere* 'postman' or *mozzafiato* 'breathtaking', because they are all formed by the very same, characteristically non-syntactic procedure. We will come back to this point later in §4.

3. In search of criteria for compoundhood

The existence of clearly morphological compounding rules which have [- lexical] items as outputs is a first good argument, on our view, for keeping the definition of compounding fully separate from semantic considerations. But at this point we need to give some substance to the [+ morphological] definitory feature. What makes a given formation procedure non-syntactic? We think that apart from some very general facts of limited impact, this question can be answered only on a language-specific basis. This is obviously not very welcome from a typological point of view, since it makes cross-linguistic comparisons much more difficult. But the same difficulty holds for every search of universals in the domain of morphology, since, trivially, morphology (and consequently the morphology-syntax contrast) concerns formal features which cannot be identified once for all on a semantic/functional basis. Only after morphological compounds are identified and consistently contrasted with the outputs of syntactic rules for each language under consideration, cross-linguistic generalizations can be attempted (and – optimistically – attained).

In the next section we will try to draw such a dividing line between compounds and syntactic items for Italian. We are confident that, despite some problematic cases, this is a feasible operation, although it will imply some re-labeling of quite familiar items (especially in the domain of N-Adj formations).

Before tackling this issue in detail, in this section we will point to three formal criteria which can help us to rule out preliminarily some candidates for compoundhood, and – differently from those discussed in §4 – can be said to enjoy cross-linguistic generality. These are already present in most definitions of compounds (for a brief dis-

cussion, see among others Arnaud 2004:329-332). They can be summarized as follows.

(i) First, the compound must consist of one continuous phonological string, which cannot be interrupted by any intervening (non-inflectional) linguistic material. This non-separability constraint cannot be a sufficient condition, because many lexicalized phrases are uninterruptable as well, as discussed in §2 above. However, the criterion of adjacency should be maintained as a necessary condition for compoundhood, even though two caveats must be added here. The first caveat concerns the acceptability of formations like Italian *centro internazionale congressi* 'international congress center' (ex. (12b) below) besides *centro congressi* 'congress center'. This can be explained by considering *centro internazionale congressi* itself a compound in which the head consists of a noun phrase: [NAdj]$_{NP}$ [N] (see also example (10d) below). Thus, no foreign linguistic material intervenes to interrupt the compound.[7]

As for the second caveat, we would like to emphasize that structural adjacency refers to the fact that the lexical items involved in a compound have to be close to each other at least at one configurational level. This allows us to comprehend into our definition of compounds some much discussed instances like Germanic separable verbs of the type exemplified below by German *radfahren* 'to cycle, lit. wheel+fare' (cf. Wurzel 1998):

(6)   a.   *Vor zwei Jahren fuhr Karl noch gerne rad.*
             'Two years ago, Karl still enjoyed cycling'.

       b.   **Vor zwei Jahren radfuhr Karl noch gerne.*

       c.   **Vor zwei Jahren fuhr Karl rad noch gerne.*

       d.   *Vor zwei Jahren ist Karl noch gerne radgefahren.*
             'Two years ago, Karl has still enjoyed cycling'.

       e.   **Vor zwei Jahren ist Karl rad noch gerne gefahren.*

       f.   *Vor zwei Jahren hat Karl Bücher noch gerne gelesen.*
             'Two years ago, Karl has still enjoyed reading books'.

       g.   *Vor zwei Jahren hat Karl noch gerne Bücher gelesen.*
             'Two years ago, Karl has still enjoyed reading books'.

Inspite of its idiomaticity, the verb *radfahren* appears scattered into two different syntactic positions (cf. (6a) vs. (6d)). However, this

does not mean that *radfahren* is not a morphologically complex unit; rather, for some verbs a peculiar syntactic behavior is observed. Similar to what happens with prefixed verbs like *ausbrechen* 'to explode', *einsteigen* 'to mount', etc., in certain sentence types the finite part of the verbal complex occupies the second (or possibly the first) position, while the rest of the verb closes the sentence (see (6d-f)). When the latter takes place, then the two parts of the morphologically complex unit must be adjacent, as shown by the inacceptability of (6e) in contrast with the free ordering of the direct object *Bücher* in (6f-g). Thus, structural adjacency is observed in well-defined contexts, and – more importantly – the scattered distribution can be explained away by making reference to a purely syntactic domain.[8] In this light, the structural adjacency of the two members of the compound turns out to be of a morphological origin, whereas the distribution is syntactically motivated.

(ii) Second, the compound must be made up of at least two lexical morphemes.[9] This quite standard constraint is nonetheless effective in ruling out items like:

- prefixed words, which are considered as compounds in some linguistic traditions (especially in France, cf. Bauer 2005:106);
- Aux + V sequences in cases where they are so tightly connected to escape criterion (i) above;[10]
- the formations of the type Prep-N, like Italian *senzatetto* 'homeless', *sottocoperta* 'below deck', *insomma* 'in short', even when they have reached full lexical status.[11]

(iii) Third, the compound must not be structured by means of any functional word which codifies inner grammatical relationships between its components.[12] This is an important criterion for those languages where functional words (prepositions, articles, conjunctions) provide the bulk of grammatical information within the syntactic units, i.e. the phrases. Thus in such languages, like Italian, sequences like N-Prep-N, or V-Det-N are the normal output of a syntactic, and not a morphological rule. Of course they can undergo lexicalization (the cases like *luna di miele* seen above), which in extreme cases can lead to full opacity and synchronic unanalyzability (as for the often cited case of Italian *pomodoro* 'tomato', originally *pomo d'oro* 'lit. fruit of gold'). However, at no point of the lexicalization process from *pomo d'oro* to *pomodoro* it seems legitimate to speak of a compound in our morphological sense, because these items are in no way the output of a morphological rule. When the earlier phrase has unquestionably

become a single word (possibly, but not necessarily, even an unanalyzable word like *pomodoro*), the term "univerbation", and not compound, should be used.

4. The feature [+ morphological] throughout a given language: the example of Italian

Let's now begin to examine systematically the different kinds of items traditionally called "compounds" in Italian and see how they behave under our more restrictive, morphologically based criterion.

We have already stated that univerbations should be distinguished and excluded from compounds. They are a very different kind of lexicon enrichment process, since their formation is typically idiosyncratic and unpredictable, and above all they originate gradually in discourse context, requiring a collocational contiguity of their components in real use, parallel to the grammaticalization processes which give rise to new affixes: native speakers cannot form univerbations *ex novo* by rule, just exploiting their morphological competence.

Therefore, the relevant items to analyze among those usually called "compounds" in Italian are the productive formations only. These can obviously be formed by rule, but to include them among compounds in our sense we should further prove that they cannot be formed simply by syntactic rules.

A first type, already mentioned above, is given by VN formations like *apriscatole* 'can opener' and the like. They are clearly compounds under our definition as well: they are not built by the same syntactic rule which builds VPs, because in VPs the V governs a full noun phrase including the determiner's slot (namely, a DP), while the determiner is ruled out in VN formations. Furthermore, it is well known that VN formations in Italian and other Romance languages undergo special restrictions on both V and N (V must be agentive, N is nearly always a direct object, see e.g. Bisetto 1999:511), which are not matched at all by a strictly syntax-driven rule of VP formation. Therefore, they cannot be considered as 'frozen VPs' or univerbations.[13] This holds even in an extreme instance like (7), taken from the newspaper *La Repubblica*, where the V governs a huge NP:

(7)   *L'attentatore ha collocato l'ordigno nel piccolo vano… dove si trova il* [*porta*[*rotolo delle strisce di carta che si usano per coprire la tavoletta del wc*]].
    'The bomber has placed the bomb in the little space where the **[**roll of paper strips that are used to cover the wc board**]** - holder is located'.

Example (7), – together with many others involving NPs of lesser
length as arguments of V, which are not so hard to find in real texts[14]
– shows how interwoven the morphologically activated VN-pattern
and the embedded NP can be, and strongly supports our approach
which distinguishes between morphological activation and lexicali-
zation. In fact, while the morphological pattern is clearly activated
in the compound *portarotolo* in (7), the whole construction cannot be
said to be lexical in any meaningful sense. Interestingly, quite paral-
lel instances can be added for some derivational prefixes of Italian,
like *anti-*, which can apply to non-lexicalized NPs as in

(8)   *marcia* [*anti* [*moschea di Lodi*]]
         'anti mosque of Lodi march'

and other examples provided in Montermini (2008a:116). Parallel
to (7), the construction in (8) must be the output of a morphological
procedure, because, as shown in (9a), it is impossible to insert a deter-
miner, which is required in the semantically parallel construction (9b)
with the preposition *contro* 'against':

(9)   a. *marcia anti* (**la*) *moschea di Lodi*
            'anti (*the) mosque of Lodi march'

         b. *marcia contro *(la) moschea di Lodi*
            march against *(the) mosque of Lodi

On the other hand, neither the input nor the output of the *anti-*
prefixation in (8) may be considered lexicalized: we are dealing with a
clear instance of a [+ morphological], [- lexical] item in the domain of
derivation.

N-N compounds are a more complex issue. We may start by divid-
ing the field, according to the classification scheme suggested by Bisetto
& Scalise (2005), into three subtypes: the subordinate compounds
(*capomafia* 'mafia boss'), the attributive (*scolaro modello* 'exemplary
schoolboy'), and the coordinat(iv)e (*cantante-attore* 'singer-actor', *bar-
pasticceria* 'bar-confectioner's'). The latter seem to have all intersective
semantics in Italian. Examples of additive semantics are Modern Greek
anðrójino 'couple, lit. man+woman' or French *point-virgule* 'semicolon,
lit. period-comma' (cf. Arnaud 2004:336).[15] Although we are naturally
well aware of the possibility of "grey" items whose assignment to a
given subtype may be problematic,[16] we find this tripartition well suit-
ed to verify our way of reasoning, since for each kind of N-N formations
a natural comparison with syntactic structures comes to mind.

Subordinate N-N sequences are to be compared with more complex NPs where a similar subordination relation holds between a NP and its head: in these cases, the subordinate NP is usually overtly marked by means of a preposition (as in *la bella macchina rossa **di** mio cugino Mario* 'the beautiful red car of my cousin Mario'). On the contrary, such marker is absent in subordinate N-N sequences like *centro congressi* 'congress center' or *vagone merci* 'freight wagon'. Contrasting *capomafia*, *vagone merci* with their syntactic equivalents *capo della mafia*, *vagone per le merci* allows then to conclude that the former are not built by means of a syntactic rule, and therefore are proper instances of a morphological template, i.e. compounds in our sense.

The same argument applies to what Bisetto & Scalise (1999) term compound-like phrases, which we think should be included into subordinate compounds as well: namely, formations like *cambio gomme* 'tyre change', where the subordinate N is an argument – nearly always the object – of the action noun functioning as head. In fact, the latter are kept distinct from compounds because they are claimed to pass the test of head deletion under coordination and the test of insertion, which is taken to be "traditionally the main test of cohesiveness", as shown by the examples in (10a) and (10c) with respect to those in (10b) and (10d), all from Bisetto & Scalise (1999:37, 42):

(10)   a.   *hanno licenziato il capostazione e il _reparto*.
             'the station master and department _ have been fired'

       b.   *?il trasporto passeggeri e il _ merci sono fallimentari*.
             'passenger and freight transportation are not convenient'.

       c.   *capostazione* 'station master' / **capo giovane stazione*

       d.   *produzione scarpe* / *produzione accurata scarpe*
             'shoe production' / 'accurate shoe production'

Notice that Bisetto & Scalise (1999) make the point that it is the inherited argument structure of the deverbal heads which keeps compound-like phrases distinct from the rest of compounds, where no such argumental relation occurs. Accordingly, the argumental relation is made responsible for their allegedly phrase-like behavior witnessed by the two tests.

However, besides what has been said above against using cohesiveness as a decisive test for compoundhood, the two tests cannot be said to provide unambiguous results. In fact, even for compounds

like *treno merci* 'freight train' and *centro congressi* 'congress center', in which the head cannot be said to display argumental structure, it is not difficult to google out cases which pass both tests and look quite fine to us. In the following battery of examples (Google query 30.10.2008), we repeatedly observe head deletion both for *treno merci* and *trasporto merci* in strict coordination (cf. (11a-b)) and in larger gapping contexts (cf. (11c); more generally on gapping, see Gaeta & Luraghi 2001):

(11) a. *Il macchinista… prega che tra il suo treno e il _ merci vi sia una distanza sufficiente a evitare l'impatto.*
'the driver prays that between his train and the freight train there will be enough distance to avoid the clash'.

   b. *Trenitalia ha però a sua volta al suo interno tre divisioni… : la lunga percorrenza… , il trasporto regionale e il _ merci.*
'Trenitalia consists of three internal divisions: long distance trains, regional trains and freight trains'.

   c. *se passa il _ merci vuol dire che il treno passeggeri è di nuovo in ritardo.*
'if the freight train is allowed to pass, the passenger train must again be delayed'.

Similar results are obtained for the insertion test, in that an adjective can be inserted into the compounds *treno merci* and *centro congressi*:

(12) a. *È bastata la partenza di un treno speciale "merci" per far saltare tutto.*
'The departure of a special freight train was sufficient to stop everyhting'.

   b. *Potrete raggiungere il centro esposizioni ed il Centro Internazionale Congressi in soli 5 minuti a piedi.*
'You can walk the exhibition center and the international congress center in only 5 minutes'.

Finally, all these compounds allow for head deletion, which is often taken to be a further test for assessing the syntactic islandhood of compounds with respect to phrases (cf. the discussion in §5 below for the similar Chinese *de*-less construction):

(13)   a. *Se fosse passato un treno$_i$ passeggeri al posto di quello$_i$ merci,…*
 'If a passenger train would have passed instead of a freight train,… '

   b. *A soli pochi passi troverete il Centro$_i$ Culturale, quello$_i$ Congressi, il centro commerciale Forum, oltre alle università.*
'Nearby you will find the cultural center, the congress center, the Forum trade center, besides the universities'.

These examples weaken the predictive force of these tests, at least with respect to their supposed ability to distinguish between syntax and morphology. As a matter of fact, once that we neatly distinguish between compounds and phrases on the basis of their purely structural properties, it is not surprising to observe that compounds do not fit into the ideal picture of syntactic islands that has traditionally been assumed (in this regard cf. also Dressler 1987, Montermini 2006). Clearly, syntactic islandhood must be thought of as gradient and crucially connected with the degree of lexicalization of a certain construct, rather than with its morphological status. Notice that syntactic islandhood is also at odds with constructions like the VN-compounds and *anti*-N prefixations seen in (7) and (8) above.[17] Thus, it doesn't seem advisable to distinguish compounds from compound-like phrases as advocated by Bisetto & Scalise (1999), because no different structural properties can be observed: they are both morphological objects, and as such enjoy the same status.[18]

The case of the other two kinds of N-N sequences is less straightforward. Let's start with the attributive compounds. On what basis could we argue, without circularity, that a juxtaposition of two nouns is morphological and not syntactic in character when the second expresses an attribute of the head, as in *scolaro modello* 'exemplary schoolboy', *presidente fantoccio* 'puppet president'? In some cases we could think of a paraphrase involving a relative clause (*scolaro che è un modello* 'schoolboy who's a model') and/or an equality marker (*presidente (che è) come un fantoccio* 'president (who's) like a puppet'). But another, probably more general, syntactic parallel which comes to mind is the appositive relation between two complex NPs, as in *la casa di Mario, l'unica villa col giardino del paese* 'Mario's house, the only villa with garden in the village'. This appositive relation is not usually overtly marked apart from an intonational break, although more complex markings are possible, of course. So the simple juxtaposition strategy seen in *scolaro modello*, *presidente fantoccio* cannot be taken as foreign to Italian syntax in this case.

However, a formal difference with the syntactic appositional construction can be detected, taking into consideration the agreement pattern. If the attributive N-N sequences were built according to a syntactic template, they should require number agreement between the two nouns, as occurs with the appositional construction above. But their plural is marked on the head only: *scolari modello*, *presidenti fantoccio*. This seems to identify a formal template which is specific to that construction, and not taken over from more general syntactic rules. Consequently, we can conclude that there are good grounds to treat N-N attributive compounds as pertaining to morphology.

As for coordinative compounds, Italian syntax normally marks coordination between two nouns overtly, by means of a coordinative conjunction, chiefly *e* 'and'; so we could argue that *cantante e attore* is the only possible syntactic output, and *cantante-attore* is the output of a different rule that could be assigned to morphology. However, asyndetic coordination is clearly also a possibility in Italian syntax; therefore, quite like the preceding case, the simple juxtaposition strategy in *cantante-attore* does not demonstrably fall outside syntax.

Following this line of reasoning, coordinative N-N sequences become very problematic as possible instances of morphological compounds. See also Fradin (2003:203-206), who on similar grounds considers the French coordinative type *auteur compositeur* 'writer-composer' as generated by syntax, unlike the attributive type *cité dortoir* 'dormitory town'. In this case we cannot apply the considerations on agreement which hold for the attributive N-N's, because coordinative N-N's tend to take the plural marker on both nouns quite productively: *cantanti – attori*, thus patterning like it would be required by phrasal syntax: *cantanti e attori* or *cantanti, attori*.[19]

Notice that the double plural marking is not a necessary consequence of the coordinative semantics. For instance, in German and English nominal coordinative compounds are marked for plural only in the (rightmost) head: *the writer-directors*.[20]

Further doubt on treating coordinative N-N sequences as compounds comes from the fact that even in Italian, the parallel (and also very productive) coordinative Adj-Adj sequences behave differently, as they prevalently mark number (and gender) only once at the end of the word:

(14) a. *caramelle agrodolci*
          'sour:M:SG-sweet:PL bonbons:F:PL'

      b. *magliette bianconere*
          'white:M:SG-black:F:PL shirts:F:PL'

    c. *unione economico-monetaria*   '
       economic:M:SG-monetary:F:SG union:F:SG'

As Grossmann & Rainer (2009) show, patterns of gender/number marking are much varied in corpus data in this domain, but it is undeniable that at least a relevant subset of Adj-Adj formations have to be treated as morphological objects on the basis of their peculiar agreement pattern. Indeed, many of them show a further mark of morphological compoundhood at the junction between the two adjectives: either the final vowel truncation after /l, n, r/ (as in *stampa clerical-conservatrice* 'clerical-conservative press', *gestione clientelar-paternalistica* 'clientelistic-paternalistic management', *epoca craxian-forlaniana* 'Craxi-Forlani period') or the rarer insertion of the linking element *-o-* in cases where it cannot be ascribed to the first adjectival stem, as in *coproduzione belgo-americana* 'Belgian-American coproduction'. Both phenomena are impossible in the parallel syntactic sequences (cf. *stampa sia *clerical che conservatrice*, *coproduzione sia *belgo che americana*, etc.), while they occur elsewhere in Italian morphology: *clericalmente* vs. **clericalemente* 'clerically', *musicoterapia* 'music-*o*-therapy', etc.

As for V-V coordinative verbs, they are extremely rare in Italian. An old instance, now partly opaque, is *saltabeccare* 'hop, lit. hop-peck'. New formations include the common *copincollare* 'copy and paste' and the much rarer, but attested *compravendere* 'buy and sell' and *saliscendere* 'go up and down'. If a very marginal productive pattern can be identified by these instances, it is clearly controlled by morphology, as the first verb occurs as a bare stem.

The last case to be examined is perhaps also the most problematic, namely the nominal N-Adj and Adj-N formations belonging to the endocentric attributive type in Bisetto & Scalise's (2005) classification. Examples are *cassaforte* 'strongbox, lit. case-strong', *camposanto* 'graveyard, lit. field-holy', and *altoforno* 'blast furnace, lit. high-oven', *bassorilievo* 'bas-relief' respectively. The productivity of both classes is highly doubtful, but their labeling as compounds usually is not (cf. Scalise 1992:177). However, if we apply the morphological criterion to these formations, it is far from straightforward that they should be considered the output of a morphological rule. Unlike German (in which the compounds like *Rotwein* 'red wine' or *Großstadt* 'big town' formally contrast with the phrases *Roter Wein*, *Große Stadt* 'id.'), and perhaps English (where the formal distinction may only be founded upon the much discussed phonological contrasts like *blackbird* vs. *black bird*, but see Giegerich 2004 for a critical survey), the form and

meaning of these nominal N-Adj and Adj-N sequences can be fully accounted for by syntax plus lexicalization. The same remarks on the corresponding French N-Adj sequences can be found in Fradin (2003:199-202).

The application of the agreement criterion gives very tricky results here. It is true that many of these 'compounds' may inflect on the last term only, sometimes preferably (*altopiani* vs. *altipiani* 'uplands') or even exclusively (*mezzogiorni* 'noon:PL, lit. middle:SG-day: PL', *camposanti* 'lit. field:SG-holy:PL'). A look on Google data shows still more variability than the one already allowed by normative lexicography.[21] When we discussed the case of Adj-Adj coordinative compounds we took this behavior as sufficient to identify a morphological template. However, in that case the omission of the plural marking in the first component was the prevalent choice also among new formations or textual hapaxes. In this case, on the contrary, the absence of the internal inflectional marker seems to correlate somehow with frequency of use and/or semantic opacization of the compound (cfr. the everyday word *mezzogiorni* and the opaque *camposanti*). Therefore, it could be considered an instance of externalization of inflection (cf. Haspelmath 1993), which can be found also in other kinds of opaque univerbations (e.g. *pomodori* 'tomatoes'), rather than the establishment of a new peculiar and productive morphological template contrasting with the syntactic agreement rule. Notice also that this loss of internal plural occurs irrespective if the item affected is the head (*camposanti*) or the modifier (*mezzogiorni*). The matter is difficult to settle also because, differently from the Adj-Adj case, the productivity of both kinds of formations is very low at most; on the other hand, this very fact speaks in favor of treating the whole set of such formations as univerbations starting from N-Adj and Adj-N phrases, rather than morphological compounds. Such view has the further advantage of treating these alleged Adj-N or N-Adj compounds in Italian (as well as in other Romance languages) on a par with the similar German constructions like *reitende Artillerie* mentioned above. In this light, it doesn't come out as a surprise to note that in German Adj-N compounds are far less productive when denominal adjectives are involved:

(15)   *Salzwasser* / **Salzigwasser* 'salt water'
         Zeitvertrag / **Zeitlichvertrag* 'temporary contract'

In fact, it has been repeatedly observed that the high generative potential of N-N compounds to a certain extent preempts the produc-

tion of Adj-N compounds when the adjective is denominal or more generally suffixed (cf. Eisenberg 1998:219).[22]

A totally different kind of Adj-N sequence is given by specialized color terms like *verde bottiglia* 'bottle green', *giallo limone* 'lemon yellow'. These also belong to the endocentric attributive type in Bisetto & Scalise (2005)'s classification, but are left-headed adjectives, not right-headed nouns like *bassorilievo*. Contrary to the former, they are clearly productive, although in a very restricted semantic domain, and they are not problematic concerning their classification as compounds, because they display a quite idiosyncratic agreement pattern: there is no agreement at all, as the adjectival head always keeps its default masculine singular ending, neither may the noun modifier vary in number: *bandiere giallo limone* 'lit. flag:F:PL yellow:M:SG lemon:M:SG' vs. *bandiere gialle come il limone* 'lit. flag:F:PL yellow:F:PL like the lemon'.[23]

Finally, also the fourth conceivable possibility occurs in Italian, namely N-Adj right-headed adjectives. Although this pattern presumably rests on foreign (chiefly English) models, it is now widely attested in scientific and newspaper prose, apparently also without strict parallels in English or other languages. Among the numerous examples in *La Repubblica* (as pointed out to us by Maria Grossmann), we can mention: *persona ticket-esente* 'lit. person charge-free', *ventunenne zaino-munito* 'lit. 21-years-old rucksack-provided', *prodotti aspirino-simili* 'lit. products aspirin-*o*-similar', etc. These are clearly subordinative compounds (the head is often a participle, or an adjective with an internal argument) and they are not problematic from the point of view of our compoundhood criteria, since they fully depart from the semantically equivalent syntactic NPs, which would be left-headed and contain a preposition, as *esente da ticket* 'free of charge', *munito di zaino* 'provided with rucksack', *simile all'aspirina* 'similar to aspirin'. Notice incidentally the presence of the linking element *-o-* in the last example.

5. *The feature* [+ morphological] *in an isolating language: the case of Chinese*

A long-lasting issue within Chinese linguistics concerns the status of the so-called Adj-N compounds. A construction corresponding to English *blackboard* in (16a) is flanked in (16b) by the type containing the subordinating particle *de*, which corresponds to the English phrase *black dog*:

(16) a. *hei ban* 'blackboard'
          black board

      b. *hei de gou* 'black dog'
          black SUB dog

Basically, two positions are defended: (i) a morphological treatment of the constructions like (16a), which are claimed to be compounds (either 'true' compounds or syntactic compounds) and distinguished from the phrases in (16b), or (ii) a syntactic view of these constructions on a par with the *de*-constructions.

In the light of our careful distinction of the four types in (4) above, let us see whether our approach is able to shed some light on this intricate issue. We do not intend to give a full treatment of Chinese, nor we dispose of new data on the subject. Rather, we will review some properties of these constructions as summarized in the most recent literature (cf. Duanmu 1998, 2002, Starosta, Kuiper, Ng & Wu 1998, Packard 2000, Paul 2005, Ceccagno & Scalise 2006), and see how they can be accounted for in our quadri-partite model.

Nobody questions the syntactic status of the construction in (16b). In fact, conjunction reduction is possible (17a-b), the adjective allows for adverbial modification (17c), and the construction is utterly productive, in that any sort of adjective can be used as modifier (cf. Duanmu 1998):[24]

(17) a. *jiu de shu gen xin de shu*
          old SUB book and new SUB book
          'an old book and a new book'

      b. *jiu de gen xin de shu*
          old SUB and new SUB book
          'an old and a new book'

      c. *hen / geng / zui / zheme / bu xin de shu*
          very more most so   not new SUB book
          'a very new / newer / the newest / such a new / not new book'

On the other hand, the *de*-less construction in (16a) displays a clearly contrasting behavior:

(18) a. *jiu shu gen xin shu*
          old book and new book
          'an old book and a new book'

b.   **jiu gen xin shu*
old   and new book

c.   **hen / geng / zui / zheme / bu xin shu*
very   more most so   not new book

In particular, the limited productivity of the pattern must be emphasized, which points to severe restrictions of lexical nature, as is typical in many languages for morphological operations. In fact, disyllabic adjectives are often blocked, and even with some monosyllabic adjectives the *de*-construction is required in some cases:

(19) a.   **kunnan ti* 'hard question'
*kuanda jian 'large room'

b.   **gao shu* 'tall tree'   /   *gao de shu*
gao ren 'tall person'   /   *gao de ren*

This evidence seems to speak in favor of a morphological treatment of the *de*-less construction in contrast with the former type, because it basically shows that the *de*-less construction cannot be freely manipulated at a syntactic level. Crucially, the embedded adjective is not accessible to phrase-level modifiers like adverbs in (18c), very much like the similar German Adj-N compounds:[25]

(20) a.   *Rotwein* 'red wine', *Dunkelkammer* 'darkroom'

b.   **tief Rotwein* 'dark red wine', **sehr Dunkelkammer* 'very darkroom'

However, Paul (2005) has raised a number of objections relating to the fact that the *de*-less construction does not match precisely the picture of syntactic island that is usually assumed to distinguish words from phrases. In fact, a contrast is observed if the test of head deletion is applied in that only a subset of the *de*-less constructions gives ungrammatical results, namely those displaying semantic idiomaticity like (21b):

(21) a.   *Amei bu xihuan huang meigui, hong-de hai keyi*
Amei not like   yellow rose   red-SUB   still acceptable
'Amei doesn't like yellow roses, red ones are still ok'

b.   **Amei bu xiang chi hong-hua, huang-de hai keyi*
 Amei not want   eat red-flower   yellow-SUB still acceptable
'Amei doesn't want to take safflower, yellow ones are still ok'

Furthermore, the ordering of adjectives diverges, in that only the subset of *de*-less constructions displaying semantic idiomaticity, as in (22b), forces a linearization which is different from what normally happens in syntax where the color adjective has to be closer to the head noun than the size adjective:

(22) a. *da bai   panzi*   **bai da panzi*
         big   white plate   white big plate
         'a big white plate'

      b. *bai da guar*   **da bai   guar*
         white   big gown   big   white gown
         'a white unlined long gown'

Is this enough for lumping the two constructions in (16) together under the label of syntax, as suggested by Paul (2005)? Notice that she is anyway forced to assign the status of compounds at least to some *de*-less constructions, namely those in (21b) and (22b). One might be tempted to use semantic idiomaticity as a discriminating criterion, in that compounds could be taken to display a non-compositional meaning in contrast with phrases. In accordance with our approach, however, this cannot even be sufficient. As we have seen above in §2, neither can semantic idiomaticity be used alone for discriminating between compounds and phrases, nor can it be taken to characterize compounds as lexical objects with respect to phrases.[26]

Paul (2005) also considers semantic idiomaticity to be unreliable, and seeks the difference between compounds and phrases in the "(in-)accessibility of phrase-structure rules" like those seen above in (21) and (22).

However, we have seen that also head deletion and insertion are unreliable tests for assessing compoundhood as such. In fact, Italian data showed that both head deletion and insertion are possible for compounds (see respectively (13) and (12) above), and that in general syntactic islandhood must be considered a gradient notion, which holds (at different degrees of robustness) for any unit whose lexicalization is plausible. Thus, non-lexicalized morphological products need not be islands, whereas non-morphological lexicalized units display island effects.

This idea of the gradience of syntactic islandhood can be exploited to explain the contrast observed above in (21) and (22). For instance, in Italian head deletion may be blocked for strongly lexicalized compounds like *capostazione* – see (10a) above and the related discussion – while on the other hand the order of adjectives in N-Adj$_1$-Adj$_2$ sequences is rigid whenever the internal adjective has classify-

ing value, as in (23b), not only when idiomatic constructions, as *camposanto* in (23c), are involved:

(23) a. *tavolo grande rosso* 'big red table' / *tavolo rosso grande*

b. *clarinetto basso costoso* 'expensive bass clarinet' / **clarinetto costoso basso*

c. *camposanto grande* 'big cemetery' / **campo grande santo*

On the other hand, this view does not exclude the possibility of identifying clear-cut specific properties, which help us assigning certain constructs to a given component. For instance, adverbial modification in (18c) seems to be a crucial test for assigning Chinese Adj-N constructs to either morphology or syntax, because it tells us whether the modifier is syntactically active or not. It is important to stress that what is at stake here is not the fact that syntax should not interact with morphology: we already pointed out above that NPs can be freely integrated into N- or V-headed Italian compounds. By syntactic (in-)activation we mean to express that an NP or a V is not part of a syntactic configuration. In this light, we observed above that only NPs and not DPs can enter into a V-N Italian compound, while only DPs are licensed by a syntactic configuration (cf. *decreto salva *(il) Consiglio d'amministrazione* '*(the) Board of Directors saving decree', see fn. 9). In this sense, the NP *Consiglio d'amministrazione* is syntactically inactive. Similarly, the verb heading such compounds is syntactically inactive as well, in so far as for instance it cannot be modified by adverbs (cf. *decreto salva *(improvvisamente) Consiglio d'amministrazione* 'Board of Directors *(suddenly) saving decree'). In this view, Chinese *de*-less constructions have to be assigned to morphology, even though in many instances they are not lexicalized, very much like the Romance VN-compounds.

6. Modern Hebrew construct state between syntax and morphology

The last case we would briefly like to discuss has also been hotly debated in the last decades, namely the construct state in Modern Hebrew. This case is even more complex than the Chinese one, so that we will limit ourselves to list and discuss its general properties as they have been pointed out in the recent literature (cf. Borer 1988, 2009, Spencer 1991:447-453, Koptjevskaja-Tamm 1996), with the aim of assessing its position with respect to the issues of our concern.

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Basically, we find two clearly different constructions in Modern Hebrew, the so-called construct state and the genitive construction:

(24) a. *beyt   dan*
         house:CS Dan
         'Dan's house'

      b. *ha-bayit   šel dan*
         the-house:ABS of Dan
         'Dan's house'

Notice that the head of the constructions is on the left, and takes a particular form in the construct state which is different from the form of the absolute state. The construct state construction is not only used to express possession as in (24a), but any kind of genitival relation, the last option being limited to colloquial registers (cf. Koptjevskaja-Tamm 1996:268):

(25) a. *orex   (ha-)ma'amar*
         editor:CS (the-)article
         '(the) editor of (the) article'

      b. *melaxex (ha-)'esev*
         chewer:CS (the-)grass
         '(the) (one who) chews grass'

      c. *dxiyat   dan et ha-hacaa*
         rejection:CS Dan:ACC the-offer
         'Dan's rejection of the offer'

Quite similar to the construct state construction, units of two concatenated nouns occur, whose meaning is "neither compositional nor predictable from the individual N-components" (cf. Borer 2009:491); for the latter one usually speaks of compounds:

(26) a. *beyt   (ha-)sefer*
         house:CS (the-)book
         '(the) school'

      b. *orex   (ha-)din*
         editor:CS (the-)law
         '(the) lawyer'

Apart from the semantic idiomaticity, the construct state constructions and the compounds share a number of properties. Both of them are prosodic words, displaying one primary stress falling on the modifier:

(27) a. *beyt   morá*   (construct state)
          house:cs teacher
          'house of a teacher'

      b. *beyt   midráš*   (compound)
          house:cs sermon
          'religious school'

Furthermore, the bound forms of the feminine singular nouns ending in *-á* like *šmira* 'guarding' and of the masculine plural nouns ending in *-ím* like *bayt* 'house' / *batím* 'pl.' differ from their free forms both for the compounds and for the construct state construction:

(28) a. *šmirat   sáf*   *šmirat   yeladím*
          guarding:cs threshold   guarding:cs children
          'gate keeping'   'guarding children'

      b. *batey   midráš*   *batey   morót*
          houses:cs sermon   houses:cs teachers
          'religious school'   'teachers houses'

Finally, the head of both the construct state construction and the compound cannot be directly modified either by an adjective (cf. (29c) and (29e)) or by a determiner (cf. (29g) and (29i)):

(29) a. *ha-bayit ha-xadaš*
          the-house the-new
          'the new house'

      b. *beyt   mora xadaš*
          house:cs teacher new
          'a new teacher's house'

      c. **beyt   xadaš mora*
          house:cs new   teacher

      d. *beyt   xolim xadaš*
          house:cs patients new
          'a new hospital'

e. **beyt   xadaš xolim*
   house:cs new   patients

f. *beyt   ha-mora   ha-xadaš*
   house:cs the-teacher the-new
   'the new teacher's house'

g. **ha-beyt   (ha-)mora   (ha-xadaš)*
   the-house:cs (the-)teacher (the-new)

h. *beyt   ha-xolim   ha-xadaš*
   house:cs the-patients the-new
   'the new hospital'

i. **ha-beyt (ha-)xolim   (ha-xadaš)*
   house:cs   (the-)patients (the-new)

Notice that the adjective must be placed at the right side of the construction, while the determiner has to be attached to the non-head of the construction. However, a difference is observed between the construct state construction and the compound. In fact, in the latter case the determiner can only be referred to the head, while in the construct state construction "the definiteness marked on that non-head is associated not only with the entire expression… , but also with the non-head itself" (cf. Borer 2009:496). More in general, the compound does not allow the non-head to be freely accessed. The latter is non-referential, as shown by the fact that any pronominal reference to the non-head is not allowed, unless its non-compositional reading is lost:

(30) a. *'iš   ha-sefer$_i$ ve-beyt-o$_i$*
         man:cs the-book$_i$ and-house:cs-his$_i$
         *'the scholar and the school'

      b. [*'iš   ha-sefer*]$_i$ *ve-beyt-o$_i$*
         [man:cs the-book]$_i$ and-house:cs-his$_i$
         'the scholar and his house'

In this case, the occurrence of the pronoun forces a compositional reading of the construction, namely 'the scholar's house', excluding the non-compositional interpretation of the compound *beyt sefer* 'school'. In the same vein, head deletion and non-head coordination are normally excluded with compounds, unless their non-compositional reading is lost:

(31) a. **hu bana lanu shney batey   xolim   ve-exad le-yetomim*
he built us   two   houses:CS patients and-one for-orphans
intended: 'he built for us two hospitals and one orphanage'

b. *hu bana li shney batey   'ec   ve-exad mi-plastik*
he built me two   houses:CS wood and-one of-plastic
'he built for me two wooden houses and one of plastic'

c. *beyt   talmidim   ve-talmidot*
house:CS student:M:PL and-student:F:PL
'a student house for boys and girls'

d. **beyt   xolim   ve-xolot*
house:CS patient:M:PL and-patient:F:PL

Finally, the non-head of compounds cannot be freely modified, unless their non-compositional reading is lost:

(32) a. *beyt   ha-talmidim ha-xadašim*
house:CS the-student:M:PL the-new:M:PL
'the new students' house'

b. *beyt   ha-xolim   ha-xadašim*
house:CS patient:M:PL the-new:F:PL
*'the new hospital' / *'the hospital for new patients' / 'the new patients' house'

There is a third set of construct state constructions, which partially differ from both cases shortly exemplified above, namely what Borer (2009) calls modificational constructs, or M-constructs. The latter share with compounds the non-referentiality of the non-head, but not their idiomaticity. In fact, the non-head of M-constructs cannot be modified by a definite adjective (see (33a)), and in general a modifying indefinite adjective must have classifying value (see (33b)); they cannot be pluralized, unless the plural is interpreted as property and not referentially (see (33c-d)), and don't allow pronominal reference (see (33e)):

(33) a. *beyt   ha-zxuxit* (**ha-xadaša*)
house:CS the-glass   (the-new)
'the (*new) glass house'

b. *beyt   zxuxit venezianit* / (**xadaša*)
house:CS glass   Venetian   (*new)
'a Venetian (*new) glass house'

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    c. **beyt   ha-zxuxiot*
      house:CS the-glass:PL
      *'the (multiple) glasses house'

    d. *mic   ha-tapuzim*
      juice:CS the-orange:PL
      'the orange juice'

    e. **xalon   ha-zxuxit$_i$ ve-dalt-a$_i$*
      window:CS the-glass$_i$ and-door-her$_i$
      *'the glass window and its door'

Moreover, both compounds and M-constructs share an important development in spoken Modern Hebrew: the definite article is shifting from being placed on the non-head to being placed on the head. In this case, the whole construction is definite, in other words we do not observe the contrast described in (29f) and (29h) above:

(34) a. *ha-beyt   xolim   ha-'ironi*
       the-house:CS patients the-municipal
       'the municipal hospital'

      b. *ha-magevet mitbax ha-meluxlexet ha-zot*
       the-towel:CS kitchen the-dirty   the-this
       'this dirty kitchen towel'

Borer attempts to derive all the types described above via syntactic procedures, and specifically for compounds incorporation is invoked, so that "at least for Hebrew compounds, then, there is no need for any recourse to a non-syntactic component of word formation or an independent grammatical lexicon, nor is it necessary to define a specialized syntactic component dedicated to the formation of 'words'" (Borer 2009:511).

Without going into the details of Borer's analysis, we may remark the following: first, as we have repeatedly observed, semantic idiomaticity cannot be considered a reliable criterion for keeping compounds and phrases apart; second, invoking incorporation as a unitary – and syntactic – explanation for compounds incurs in the same objections pointed out above for the German examples in (3). On the other hand, no explanation is provided for the fact that all these types share a common morphological behavior, in that a specific allomorph is selected which differs from the way nouns appear in a normal syntactic context (see (28) above).

Moreover, to account for the prosodic properties of all these types, which share a unique primary stress on the non-head (see (27) above), Borer (2009:507) is forced to consider the latter as due to "liaison", namely as "the assignment of pure prosodic structure to syntactic constituents, often resulting in the emergence of bound forms conditioned exclusively by phonological string adjacency". In more explicit terms, she considers any sort of allomorphy or morphology-related property (including stress) as "a-morphemic", involving "the phonological spell-out of non-hierarchical formal syntactic features on L[exical]-heads (e.g. *dance*.PST. ⇒ /*dænst*/; *sing*.PST ⇒ /*sang*/ [sic])/". While we take this view of morphology as untenable, we further believe that prosodic properties can be decisive in discriminating compounds as morphological objects from phrases, as in German. In this view, the fact that all these types share a common prosodic pattern constitutes a strong piece of evidence for adopting a morphological view of the construct state construction in Modern Hebrew.

What we surely observe in Hebrew construct states is a lexicalization cline, in which morphological constructions which have the formal word properties seen in (27) and (28) above, namely primary stress on the non-head and a specific allomorphy (for the standard variety we can also consider the impossibility of a definite article on the head to be criterial) tend to be lexicalized increasing their syntactic isolation, i.e. their islandhood. But they can all be kept together on the morphology's side: notice that the criterial properties exactly match the properties generally assumed for identifying German compounds (see §2 above). In this way, they are clearly opposed to the syntactic strategy exemplified in (24b). Compounds like *beyt xolim* 'hospital' can be considered both [+ morphological] and [+ lexical], while the opposite pole of exclusively [+ morphological] constructions is provided by constructions like *beyt mora* 'teacher's house', and an intermediate status along this continuum of lexicalization has to be assigned to what Borer terms M-constructs like *mic tapuzim* 'orange juice'.

7. Conclusion

To sum up, we hope to have been able to show how useful the quadripartite approach sketched in (4) above can be in distinguishing between compounds and phrases, by treating the properties of being a lexical unit / listeme and being the output of a morphological operation as independent. In particular, it allowed us to carefully look for

solid evidence in support of the morphological activation of a certain construct in a given language. Thus, morphological activation can be taken as the positive counterpart of Bauer's formal isolation mentioned in (1). The lesson to be taught is that morphological activation cannot simply be invoked when syntax fails to compute the meaning of semantically opaque constructs. Or even worse: compounds cannot simply be treated as lexicalized phrases. Rather, morphological patterns possess their own properties and generative capacity, which can be explicitly shown to diverge from syntactic patterns. In this sense, morphology, including compounding, stands by itself, to the extent that its output may even be non-lexical.

We also hope to have been able to draw cross-linguistic parallels, in that three very different languages like Italian, Chinese and Modern Hebrew arguably display an intriguing convergence as for the morphological status of certain constructs which cannot be considered lexicalized. This is encouraging and stimulates for a wider investigation of compounds throughout the languages of the world along the guidelines sketched out in this paper.

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Notes

[1] In the framework of Construction Morphology, bracketing paradoxes are accounted for by making reference to the mechanism of conflation (cf. Booij 2005, Gaeta 2006), which crucially relies on the property of a certain construct of being stabilized in the lexicon.
[2] As said above and repeatedly pointed out in the literature, all the notions given above, though intuitively linked with the notion of lexical unit, are quite problematic to evaluate and even to define precisely and surely have to be meant at most as endpoints within a continuum of lexicality.

[3]   Probably, *luna di miele* is not (yet) fully opaque, but – exactly like its English counterpart *honeymoon* – it illustrates well the three main ways of departing from the basic meaning of its components: metonymical interpretation of 'month' for *luna*, metaphorical interpretation of *di miele* as 'sweet > agreeable', plus a culturally conditioned meaning specialization of 'sweet month' into 'after-wedding holiday period' (the latter inference being possibly the less predictable / most synchronically opaque of the three).

[4]   Similar skepticism about the applicability of purely semantic-oriented criteria is expressed for instance by Wälchli (2005:97-98), whose notion of compound is also markedly different from ours, however.

[5]   On pragmatic uses of diminutives, see Dressler & Merlini Barbaresi (1994).

[6]   This does not amount to collapse the notions of lexeme and listeme / lexical unit: the latter includes the former but not viceversa. Clearly, *gheddafiano*, as well as *acchiappa-UEFA* quoted immediately below, are still potential lexemes, whereas *direttore d'orchestra* or *luna di miele* can only be listemes, because they are not generated via a mechanism of word (or lexeme!) formation. The latter can only become lexemes via a process of univerbation (see below), which is quantitatively rather marginal.

[7]   Notice that such compounds violate the No Phrase Constraint, which has also been suggested as criterial in discriminating between compounds and phrases. However, that such a principle is inadequate is self-referentially shown by its name, which already contains a violation of the alleged principle (cf. Spencer 1991:321).

[8]   Eisenberg (1998:245) speaks in this case of *syntaktische Trennung* 'syntactic separation', to be distinguished from the *morphologische Trennung* 'morphological separation' which refers to the fact that the prefixal morpheme *ge-* of the past participle in both verbal compounds and prefixations is inserted within the morphologically complex unit, as shown by *radgefahren* and *abgefahren* 'left'. Notice that this morphological separation is not a counterexample to criterion (i), since it involves inflectional material.

[9] We include among lexical morphemes the bound neoclassical formatives like *idro-* 'water' in *idromassaggio* 'water massage' or *-logia* 'study' in *dialettologia* 'dialectology', and consequently we take these kind of items basically as compounds (although some doubtful instances bordering on derivation clearly exist), following e.g. the approach in Iacobini (2004:84-85).

[10]   Notice that to rule out cases like Aux + main verb combinations, the two general criteria above suffice: we do not need the requirement that the whole compound be a new lexeme, contrary to what is stated by Bauer (2001:695).

[11] The set of the Italian Prep-N formations is by no means unitary. While some sequences may be explained away as belonging to the category of univerbations discussed immediately below (e.g. It. *adagio* 'slowly', originally a prepositional phrase *ad agio* 'with ease'), there are cases like *sottobraccio* 'under the arm' or *dopoguerra* 'post-War period' which are likelier to reflect a morphological pattern (notice the absence of the determiner), and require criterion (ii) to be excluded from compounds. Moreover, the same criterion (ii) might be problematic, as most prepositions which occur in Prep-N sequences can also be used as adverbs: e.g., *contro* 'against', *dopo* 'after', *oltre* 'beyond', *sotto* 'under', etc. Therefore, they are at the fuzzy border between functional and lexical items.

[12]   Clearly, functional words may occur when they are external to the whole compound (as a clitic hosted by a compound verb, e.g. Italian *prendere il nostro articolo,* [[*copincollar*]*lo*] *e fare delle leggerissime modifiche* 'take our paper, cut-and-paste it and modify it very slightly', Google query 29.12.2008) or when they belong to an NP embedded within the compound (e.g. Italian *decreto* [[*salva* [*Consiglio di amministrazione*]] 'Board of Directors-saving decree').

[13]   Very few formations are attested, in Italian and other Romance languages, with the structure V-Det-N, like It. *battiloro* 'gold-beater, lit. beat-the-gold' or Fr. *trompe-l'oeil* 'id.'. Under our assumptions, these cannot be seen on a par with the productive VN formation, and are really instances of idiosyncratic univerbation (a similar view for instance in Gather 2001:22-24, and Corbin 1992).

[14]   Some instances from another newspaper, *La Stampa*, are: [*copri* [*borsa dell'acqua calda*]] 'hot water bag cover', *canaletta* [*raccogli* [*acque meteoriche*]] 'rainwater-collecting pipe', *cofanetto* [*porta* [*fili e spilli*]] 'lit. [[threads and pins] containing] little box' (cf. Ricca 2005:479).

[15]   It is by no means obvious that the additive and intersective compounds belong together: for instance, Bauer (2001:699) restricts his definition of coordinative compounds (*dvandva*) to the additives only, and puts the intersectives together with the attributive compounds (*karmadhāraya*). Similarly, Wälchli (2004:7) explicitly rules out the 'singer-actor' type – together with several others – from his notion of co-compound. On the contrary, Olsen (2001) keeps additive and intersective compounds together.

[16]   For instance, should a compound like *swordfish* be labeled as subordinative, 'fish with a sword', or attributive, 'fish like a sword'? (example taken from Montermini 2008b:169). Border-line cases between the attributive and the intersective coordinative type are probably even more systematic (to the extent that Montermini 2008b:165-166, for instance, is highly skeptical about the very feasibility of the distinction). The difference basically lies in the fact that head and modifier give a very unbalanced semantic contribution in the attributive type (a *snail mail* is a mail, but not a snail), while they concur equally in the ideal coordinative type (a *singer-actor* is both an actor and a singer). But here we are clearly dealing with a matter of degree. Could not *ape man* (labeled as attributive in Bisetto & Scalise 2005:328) be considered rather a coordinative compound, if one just takes a slightly less anthropocentric perspective? A continuum attributive – intersective – additive is also reflected in Bauer's (2001) choice mentioned in the preceding footnote. For further reflections on this subject, see Arcodia, Grandi & Montermini (2009).

[17]   A couple of real examples of anaphoric chains referring to the internal N are: *collanina acchiappatalenti$_i$ tra i quali$_i$ ha figurato anche…* 'talent$_i$-scouting little novel series among whom$_i$ also figured… ' (from Ricca 2005:479), *La liberazione di Rugova è una mina anti-USA$_i$, che$_i$ hanno sostenuto l'UCK per scardinare un equilibrio instabile* 'The liberation of Rugova is an anti-USA$_i$ threat, who$_i$ have supported the UCK to upset an unstable equilibrium' (*Umanità Nova* 16.5.1999, Google query 10.1.2009).

[18]   In a recent paper, Baroni, Guevara & Zamparelli (2009) point out that the N-N compounds where N is a deverbal noun are particularly frequent in the 'headline-style'; and in particular those where a modifier is inserted between the two N's (*raccolta differenziata rifiuti* 'lit. collection:F:SG selective:F:SG waste: M:PL', *approvazione nuovi parametri* 'lit. approval:F:SG new:M:PL parameter:M:PL') seem to be nearly exclusive to this style, characterized *inter alia* by the absence of determiners everywhere. Therefore, they suggest to consider the latter instances as syntactic objects, which, however, should be licensed only by the quite peculiar 'headlinese' syntax. Interestingly for our approach, however, Baroni, Guevara & Zamparelli (forthcoming) do not deny the status of morphological objects to the more usual N-N type (like *raccolta rifiuti* 'waste collection') which occurs also outside of the special 'telegraphic', determiner-less contexts.

[19]   Double plural marking, however, seems to be dispreferred in the case of a gender clash between the two nouns: *donne-prete* 'woman priests, lit. woman:F: PL-priest:M:SG' better than *donne-preti* 'lit. woman:F:PL-priest:M:PL'. See Thornton (2004:528) and Montermini (2008b:179) for some empirical evidence, which, howe-

ver, is substantially weakened by the fact that he does not make the distinction between attributive and coordinative compounds, and most of his examples clearly belong to the former type.

[20]   On the basis of this and other arguments Olsen (2001:290) also states that "the evidence reviewed so far seems to suggest copulatives in… Romance are formally more like simple asyndetic syntactic coordinations of nouns than genuine morphological compounds".

[21]   For instance, a dictionary like Devoto & Oli (1987) allows for both *altopiani* and *altipiani*, but prescribes *altiforni* and conversely *bassorilievi*; all six conceivable alternatives, however, are widely attested in Google, even if with different frequencies. Native speakers' judgements are also very oscillating.

[22]   However, the preemption is not absolute: see Schlücker & Hüning (2009) for a critical discussion.

[23]   Maria Grossman (p.c.) remarks that there are marginal instances of Adj-N color compounds where the head shows gender-number agreement, as *occhi verdi smeraldo* 'lit. eye:PL green:M:PL emerald:SG', *capelli rossi fuoco* 'lit. hair:PL red:M:PL fire:SG' (from *La Repubblica*). However, this pattern is still morphological, because there is no syntactic model in Italian licensing the sequence *rossi fuoco*.

[24]   Sproat & Shih (1988) assume that this construction can be analyzed as a sort of relative clause with the meaning 'a dog which is black'. Against such an analysis, Paul (2005) objects that there is a class of non-predicative adjectives which can equally occur in *de*-constructions. Whatever the correct interpretation of the *de*-constructions might be, the question is irrelevant for the present purposes.

[25]   Notice further that the parallel between German and Chinese also holds for the restriction on embedding an adjective into the compound:

(i)   *rote Dunkelkammer* 'red darkroom' / **dunkel*[*rote Kammer*]
(ii)   **da* [*tie de shi-zi*] 'big iron lion'   / *da de* [*tie de shi-zi*] 'big iron lion'
        big iron SUB lion   big SUB iron SUB lion
(iii)   *bai de hei-ban* 'white blackboard'
        white SUB black-board

As argued by Duanmu (1998), a *de*-construction cannot be embedded into a *de*-less construction, while the opposite is possible, as shown by (iii).

[26]   Furthermore, Duanmu (1998) questions the force of this criterion in Chinese by pointing out that there are cases of bound morphemes which only occur in combination with other morphemes; for the latter, a syntactic analysis is clearly impossible a priori:
        a.   Free-Free: *ji dan* 'chicken egg'
        b.   Bound-Free: *ya dan* 'duck egg'
If semantic composition were used to discriminate between compounds and phrases, we would be forced to consider *ji dan* as a phrase whereas *ya dan* would be taken as a word, which, according to him, is a rather odd conclusion.

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