Compounds: the View from Hebrew

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1. Introduction

That Hebrew does have compounds is very clear, given the possible concatenation of two nouns, as in (1a-d), with a meaning that is neither compositional nor predictable from the individual N components:

1. a. orex   (ha-)din
        editor   (the-)law
        '(the) lawyer'
    b. melaxex (ha-)pinka
        chewer   (the)-bowl
        '(the) psychophant'
    c. beyt   (ha-)sefer
        house   (the-)book
        '(the) school'

What is trickier, however, is setting a precise boundary between the clear compounds in (1), and noun concatenations such as those (2), which are syntactically productive and which have a meaning entirely predictable from their parts:

2. a. orex   (ha-)ma'amar
        editor (the-)article
        '(the) editor of (the) article'
    b. melaxex (ha-)'esev
        chewer   (the-)grass
        '(the) (one who) chews grass'
    c. beyt   (ha-)sar
        house (the-)minister
        '(the) house of (the) minister'

The structures in (2), Construct Nominals, have been discussed extensively in the generative literature in the past decades, and there is a clear consensus that regardless of their specific analysis, they are clearly creatures of the syntax. In turn, the nominals in (1) and in (2) share some major structural properties, making it implausible that their respective derivations follow entirely distinct routes. Distinctions between the two groups exist, however, suggesting that their paths do diverge, at some point. At the end of the day, then, any investigation of the shared and disjoint properties of compounds (as we shall refer to the combinations in (1)) and constructs (the combinations in (2)) per force bears on how word formation operations should be modeled, relative to, or within, the syntax.

Section 2 of this note is devoted to reviewing, largely following Borer (1989), the grounds for assuming that the paradigm in (1) – but not in (2) – is associated with compounding. In section 3 I show that there are at least two distinct types of N+N constructs; one, labeled here an *R-construct,* whose non-head is referential, and another, an *M*-construct, whose non-head is a modifier. I will further show that *M*-constructs, but not *R-construct*s, share important properties with compounds. Finally, section 4 is a sketchy outline of an analysis of constructs and compounds in Hebrew.

2. Constructs and Compounds

2.1.   Similarities

2.1.1.   Phonological. Phonologically, N+N combinations, both constructs and compounds, are prosodic words. Combinations such as those in (1)-(2) have only one primary stress falling on the non-head. A variety of phonological operations sensitive to stress placement take place in both constructs and in compounds in an identical fashion, e.g. non-final (short) vowels of the head are subject to deletion on a par with such pre-penultimate vowel deletion in the stress-suffixed forms (e.g. pluralization) (cf. (3)). Further, feminine singular forms ending in *-á* when free, and masculine plural forms ending in *-ím*, when free, exhibit a distinct bound form for the head both in compounds and in constructs (compounds italicized) (cf. (4)):

3.   a. báyit,   ha-báyit
         'house.sg'   'the-house'
     b. *beyt   midráš,*   beyt   morá,
         house sermon,   house   teacher
         'religious school',   'house of a teacher'

4.   a. šmira   batím
         guarding.f   houses
     b. *šmirat   sáf;*   šmirat   yeladím
         guarding threshold;   guarding children
         'gate keeping'   'guarding children'
     c. *batey   midráš;*   batey   morót;
         houses sermon;   houses teachers
         'religious schools'   'teachers houses'

2.1.2.   *Syntactic.*

A.   The head of the construct cannot be directly modified. While in free nominals a modifying adjective occurs between the head and any additional non-head constituent, in the construct, the modifying adjective must follow the non-head, indeed, it must follow all construct non-heads, if there is more than one. An identical restriction holds for compounds*:*

5.   ha-bayit   ha-xadaš   (free nominal)
     the-house   the-new
     'the new house'

6.   a. beyt mora   xadaš   (construct)
         house teacher new
         'a new teacher's house'
     b. *beyt xadaš   mora
         house new   teacher

7.   a. *beyt xolim*   xadaš   (compound)
         house patients   new
         'a new hospital'
     b. *beyt   xadaš   xolim
         house   new   patients

B.   The definite article, *ha-*, cannot be realized on the head of either constructs or compounds. In turn, when it is realized on the (last) non-head, the entire expression, with the bare left-most N as it's head, is interpreted as definite, triggering, subsequently, definite agreement on a modifying adjective

(cf. (8) for constructs and (10) for compounds; definite agreement involves the reiteration of the definite article *ha-* on the adjective):[1]

8. ha-bayit   ha-xadaš   (free nominal)
    the-house.m   the-new.m

9. a. *ha-beyt   (ha-)mora   (ha-xadaš)   (construct)
       the-house.m   (the-)teacher.f   (the-new.m)
    b. beyt   ha-mora   ha-xadaš
       house.m   the-teacher.f   the-new.m
       'the new teacher's house'

10. a. *ha-beyt   (ha-)xolim   (ha-xadaš)
       the-house.sg   (the-)patients.pl   (the-new.sg)
    b. *beyt   ha-xolim   ha-xadaš*
       house.sg   (the-)patients.pl   the-new.sg
       'the new hospital'

We return below to some additional syntactic similarities between compounds and *some* constructs, but not others.

2.2 *Differences*

2.2.1 *Constituent Structure.*

A.   While constructs allow the modification of the non-head, such modification is impossible for compounds without the lose of the non-compositional reading:

11. a. beyt   ha-talmidim   ha-xadašim
       house.sg   the-students.pl   the-new.pl
    b. *beyt   ha-xolim*   ha-xadašim
       house.sg   the-patients.pl   the-new.pl
       'the new patients' house; *the new hospital; the hospital for the new patients'

B.   While the non-head in constructs may be coordinated (cf. (12)), such a coordination is excluded with a non-compositional (compound) reading (cf. (13)):

12. a. beyt   talmidim   ve-talmidot
       house   students.m.pl   and-students.f.pl
    b. gan   perot   ve-yerakot
       garden   fruits   and vegetables
       'a garden of fruit and vegetables'

13. a. **beyt xolim*   ve-xolot
       house patients.m.pl   and-patient.f.pl
    b. gan   yeladim ve-xayot   cf: *gan   yeladim   gan   xayot*
       garden children and-animals   garden children   garden animals
       '*a kindergarden and a zoo'   'kindergarten'   'zoo'
       'a kindergarden and animals'
       'a garden for children and animals'

C.   While a pronoun may refer to the head of a construct (excluding the non-head), (cf. (14a-b)), such reference is impossible with a non-compositional (compound) reading (cf. (15)):

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[1] For some potentially complicating factors, see Engelhardt (2000) as well as Danon (2000, 2007).

14. a. hu bana li   shney batey 'ec   ve-*exad* mi-plastik
       he built me two   houses wood and-one of-plastic
       'he built for me two wooden houses and one of plastic'
    b. 'amdu šam šney batey   morot   mi-xul   ve-*'exad* šel mora   mi-be'er ševa
       stood there two houses teachers from-abroad and one of teacher from Be'er Sheba
       'there were two houses there of teachers from abroad, and one of a teacher from Be'er Sheba'

15. *hu bana lanu shney *batey xolim*   ve-exad le-yetomim
    he   built us   two   houses-patients and-one for-orphans
    'he built for us two hospitals and two orphanages'
    cf. *beyt xolim; beyt   yetomim*
        house sick   house   orphans
        'hospital'   'orphanage'

D.   Finally, while at least prescriptively the head of the construct may not be coordinated directly, the entire construct may be coordinated with the identical non-head realized as a pronoun on the second conjunct, as illustrated in (16):

16. a. beyt   ha-mora$_2$ ve-xacer-a$_2$
       house   the-teacher$_2$ and-yard-her$_2$
       'the teacher's house and her yard'
    b. beyt   mora$_2$ ve-xacer-a$_2$
       house   teacher$_2$ and-yard-her$_2$
       'a teacher's house and her yard'

   Such coordination is not possible for compounds, nor is any pronominal reference to the non-head allowed without a loss of non-compositional meaning:

17. a. mitat (ha-)xolim$_2$ ve-beyt-am$_2$ cf.   *beyt (ha-)xolim*
       bed   (the-)patients$_2$ and house-theirs$_2$ house (the-)patients
       '*(the) patients bed and their hospital'   '(the) hospital'
    b. *beyt (ha-)xolim$_2$ ve-mitat-am$_2$*
       house (the-)patients$_2$ and bed-theirs$_2$
       '(the) patients$_2$ home and their$_2$ bed'
       'the/a hospital and their bed' (with reference of 'their' vague)

18. *'iš   (ha-)sefer$_4$ ve-beyt-o$_4$*   cf.   *iš   (ha-)sefer*   *beyt   (ha-)sefer*
    man book$_4$ and-house-his$_4$ man (the-)book   house (the-)book
    *the/a scholar and the school'   '(the) scholar'   '(the) school'
    'the/a scholar and his house'

2.2.2. *Definiteness Spreading:* While the definite determiner in both constructs and compounds may only be realized on the last non-head member, in the construct, the definiteness marked on that non-head is associated not only with the entire expression, as already noted, but also with the non-head itself. If the construct has more than two members, such definiteness comes to be associated with every single noun in it, as can be illustrated through the obligatoriness of agreement on adjectives modifying such non-heads:[2]

19. a. delet   beyt   ha-mora   ha-vatiqa   ha-xadaš
       door.f house.m the-teacher.f the-senior.f the-new.m

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[2] The order of adjectives in constructs mirrors that of the nouns. As such cases of center embedding tend to deteriorate rather rapidly, all exemplifications in (19) involve only two adjective combinations. As we shall see shortly, definiteness spreading is relevant to *R-construct*s, but not to *M*-constructs.

b. delet   beyt   ha-mora   ha-vatiqa   ha-xadaša
   door.f   house.m   the-teacher.f   the-senior.f   the-new.f
c. delet   beyt   ha-mora   ha-xadaš   ha-levana
   door.f   house.m   the-teacher.f   the-new.m   ha-white.f

Not so in compounds, where the non-head, although directly marked by a definite article, is not interpreted as definite. In fact, it is not even referential. The 'orphans' under discussion in (20a) not only need not be specific, they need not exist altogether, nor does the 'king' (20b) need to be a specific one or exist. The expression is best translated as 'prince', rather than a 'king's son':

20. a. *beyt   ha-yetomim*
        house   the-orphans
        'orphanage'
     b. *ben ha-melex*
        son   the-king
        'prince'

2.2.3 *Semantic Headedness.* Adapting somewhat the 'Is A' condition of Allen (1978), we note that a construct <u>*IS A*</u> modified version of its head. Not so compounds, where such semantic connection does not typically obtain:

21. a. beyt   mora   *IS A* bayit
        house   teacher   *IS A* house
     b. šomer   mexoniyot *IS A* šomer
        guard   cars   *IS A* guard

22. a. *beyt   sefer* *IS NOT* (necessarily) *A* *bayit*   cf. *beyt sefer*
        house book   *IS NOT* (necessarily) *A*   house   house book
                                                                         'school'
     b. yošev   roš   *IS NOT A* yošev   cf. yošev roš
        sitter   head   *IS NOT A* sitter   sitter head
                                                                   'chairman'

Summarizing thus far, we note that the lack of compositional reading for some N+N combinations correlates directly with syntactic opacity. In turn, cases of compositional readings correlate with syntactic transparency. The label 'compounds' thus appears well deserved for the former.

This said, a closer scrutiny reveals that at least some compositional N+N combinations are not as syntactically distinct from compounds as may be presumed on the basis of the comparison just outlined. We now turn to the discussion of these combinations.

3. Modification Constructs

3.1.   M-constructs vs. R-constructs – the syntax

Construct formation is an extremely heterogeneous phenomenon which is not restricted to N+N combinations. In turn, even within the class of N+N combinations (by far the largest construct group) we find diverse properties associated with distinct sub-types. A full review of all construct types is outside the scope of this note, but with the properties of compounds in mind, I will focus here on the properties of modificational constructs (henceforth *M*-constructs; broadly speaking, a type of Modificational Genitive as discussed in Munn 1995 and others), and whose syntactic properties are closer to those of compounds. *M*-constructs are illustrated in (23), to be contrasted with the constructs in (24):

23. beyt (ha-)'ec;   kos (ha-)mic;   signon (ha-)ktiva;   magevet (ha-)mitbax;
    house (the-)wood;   glass (the-)juice; style   (the-)writing; towel   (the-)kitchen
    '(the)wooden house; (the) juice glass; (the) writing style;   (the) kitchen towel

24. beyt (ha-)mora;   gag (ha-)bayit;   na'aley (ha-)yalda; mexonit (ha-)nasi
    house (the-)teacher; roof (the-)house; shoes   (the-)girl;   car   (the-)president

The intuitive meaning difference between the two groups of constructs is clear, but considerably more crucial is the fact that they are syntactically distinct. Most saliently, the non-head of *M*-constructs is not referential and is interpreted as a modifying property, while the non-head of the constructs in (24) (henceforth *R*-constructs) must be referential.[3] In (25), we list syntactic differences, in turn illustrated by the contrasts between (26a-e) and (27a-e):[4]

25. *The non-head in M-constructs -*
    a. cannot be modified by a definite adjective ((26a) vs. (27a))
    b. when indefinite, can only be modified by a property modifier ((26b) vs. (27b))
    c. cannot be pluralized, unless the plural itself is interpreted as a property ((26c) vs. (27c))
    d. cannot be quantified ((26d) vs. (27d))
    e. does not allow pronominal reference ((26e) vs. (27e)).
    f. does not allow determiners or adjectives that entail reference ((26) vs. (27f))

26. a. beyt   ha-mora   ha-vatiqa
       house   the-teacher the-senior
       'the house of the senior teacher'
    b. beyt   mora   vatiqa
       house   teacher   senior
       'a house of a senior teacher'
    c. beyt   (ha-)morot
       house   (the-)teachers
       '(the) teachers' house'
    d. beyt   šaloš/harbe   morot;   /   beyt   kol   mora
       house   three/many   teachers   house   every teacher
       'a house of three/many teachers'   'every teacher's house'
    e. beyt   (ha-)mora₃   ve-rahite-ha₃
       house   (the) teacher and furnitures-her
       'the/a teacher's house and her furniture'
    f. beyt {'eyze}   mora   {kolšehi/mesuyemet}
       house {some}   teacher {some/specific}
       'a house of some/specific teacher'

27. a. beyt   ha-zxuxit   {*ha-xadaša; ??ha-venezianit}
       house   the-glass   {*the-new;   ??the-Venetian}
       'the [{*new; ??Venetian glass}] house'

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[3] The term *R*-construct is used here for all constructs with a referential non-head (broadly, the Individual Genitives of Munn, 1995 and subsequent literature). Constructs in Event Derived Nominals are formed of the head N and one of the arguments. Since arguments are per force referential, all such constructs are *R*-constructs. For some previous discussion of this distinction within Hebrew constructs see Hazout (1991); Dobrovie-Sorin (2003).

[4] Dobrovie-Sorin (2003) likewise draws a syntactic distinction between (our) *R-construct*s and *M*-constructs, and suggests that compounds are related to the latter. Dobrovie-Sorin's (2003) syntactic analysis of these structures, however, cannot be adopted. See Borer (2008) for a fuller review.

    b. beyt   zxuxit {*xadaša; venezianit}
       house   glass   {*new;   Venetian}
       '*a [new glass] house
       'a [Venetian glass] house'

    c. *beyt   (ha-)zxuxiot;   kir (ha-)levenim   mic (ha-)tapuzim
       house   (the-)glasses   wall (the-)bricks   juice (the-)oranges
       '*(the-) (multiple) glasses' house'   '(the) brick wall'   '(the) orange juice'

    d. *kir   me'a/harbe   levenim;   *beyt kol 'ec
       wall   hundred/many bricks   house every wood
       '*a wall of hundred/many bricks'   '*a house from every (type of) wood'

    e. *xalon   (ha-)zxuxit$_1$ ve-dalt-a$_1$
       window (the-)glass   and door-her
       '*the/a glass window and its door'

    f. *xalon   {'eyze} zxuxit {kolšehi/msuyemet}
       window {some}glass   {some/specific}
       'a window of some/specific glass'

3.2. M-constructs, Compounds and Pre-N+N Determiners

As the reader no doubt noted already, the behavior of *M*-constructs is suspiciously similar to that of compounds. The similarity is further supported by a development in spoken Modern Hebrew which affects *M*-constructs and compounds, but not *R-constructs*. Specifically, the placement of the definite article in constructs is shifting in spoken Modern Hebrew from a realization on the non-head to a realization on the head itself. In such cases, the entire construct is definite., The non-head, however, cannot be independently marked with a definite article, and is not interpreted as definite, as illustrated by (28)-(29):[5]

28. *Compounds:*
    a. ha-*yom huledet* šeli
       the-day birth   mine
       'my birthday'

    b. ha-*beyt sefer* ha-ze
       the-house book the-this
       'this school'

    c. ha-*beyt   xolim*   ha-'ironi
       the-house   patients   the-municipal
       'the municipal hospital'

    d. ha-*'orex din*   ha-ca'ir
       the editor law   the-young

29. *M-constructs:*
    a. ha-*kos   mic*   ha-zot
       the-glass juice   the-this
       'this glass of juice'

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

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[5] The reanalyzed definite marker appears to require some anchoring in the form of an additional demonstrative, adjective or PP.

    c. ha-*mic   tapuzim* šeli
       the-juice oranges mine
       'my orange juice'

    d. ha-*signon dibur* šelo
       the-style   talking his
       'his talking style'

30. a. **ha-yom ha-huledet; *ha-beyt   ha-sefer;   *ha-orex ha-din*
       the-day   the-birth   *the-house the-book   *the-editor the-law
       (the birthday)   (the school)   (the lawyer)

    b. *ha-kos ha-mic; *ha-magevet ha-mitbax; *ha-signon   ha-dibur
       the-glass the-juice the-towel   the-kitchen the-style   the-talking

When applied to constructs with a (contextually plausible) referential non-head, such placement of the definite article has the effect of converting them, however implausibly, to *M*-constructs (cf. (*31*)): the non-head acquires a property interpretation, disallowing definite and non-property modification of the non-head; it cannot be pluralized or quantified, and pronominal reference to it becomes impossible (cf. 32)):

31. a. ha-tmunot   muzeon ha-ele
       the-pictures museum the-these
       (*'these pictures of the museum'
       (ok: 'these museum-type pictures')

    b. ha-beyt   mora   ha-xadaš
       the-house   teacher   the-new
       (*the new house of the teacher)
       (ok: the new 'teacher-type house')

    c. ha-na'aley yalda   ha-xumot
       the-shoes   girl   the-brown.pl
       (*the brown shoes of the girl)
       (ok: the brown 'girl-type shoes')

32. a. *ha-simlat rof'a   (ha-)vatiqa
       the-dress   physician (the-)senior
       'the dress of the/a senior physician'

    b. *ha-simlat rof'ot
       the-dress   physicians
       'the physicians' dress'

    c. *ha-simlat kol   rof'a
       the-dress   every physician
       'the dress of every physician'

    d. *ha-simlat rof'a$_3$ ve-rahite-ha$_3$
        the-dress   physician and furnitures-her
       'the physician's dress and her furniture'

    e. *ha-simlat   {'eyze} rof'a   {kolšehi/mesuyemet}
       the-dress   {some} physician{some/specific}
       'the dress of some/specific physician'

Siloni (2001) notes that when semantically definite detereminers such as *oto*, 'the same' and the (post-nominal) demonstrative *ze* are used with N+N compounds, the entire expression is definite, but not so the non-head. This, Siloni reasons, suggests that while definiteness does spread from the non-head to the head, indefiniteness does not, and is rather associated independently with each N member of the construct. However, the properties of *oto* and *ze*, as it turns out, are exactly identical to those

just outlined for the reanalyzed definite article *ha-* when it occurs on the head – they are only compatible with *M*-constructs and are strictly barred in the context of referential non-heads:

33. a. 'oto   *'orex din* ca'ir   / *'orex   din* ca'ir   ze
     same editor law young   editor   law young this
     'the same lawyer'   'that young lawyer'

    b. ota   kos   mic   / kos   mic   zot
     same glass juice   glass juice this
     'the same glass of juice'   'this glass of juice'

34. a. oto   beyt   mora (*vatiqa)   / beyt   mora   (*vatiqa)   ze
     same house teacher (*senior)   house   teacher (*senior) this
     'the same [(*senior) teacher's house]'   this [(*senior) teacher's house]'

    b. *ota simlat rof'ot   / *simlat rof'ot   'ele
     same dress physicians   dress physicians these
     'the same [dress of physicians]'   this [dress of physicians]

    c. *ota simlat kol   rof'a   / *simlat kol   rof'a   zot
     same dress   every physician   dress   every physician   this
     'the same [dress of every physician]'   'this [dress of every physician]'

    d. *ota simlat rof'a$_3$ ve-rahite-ha$_3$ / simlat physician$_3$ zot ve-rahite-ha$_3$
     same dress physician and furnitures-her   dress physician this and-furniture-her
     'the same [dress of a physician] and her furniture' 'this [dress of a physician] and her furniture'

    e. *ota simlat {'ezye} rof'a {kolšehi/mesuyemet} / simlat {'eyze} rof'a {kolšehi/mesuyemet} zot
     same dress {some} physician {some/certain}   dress {some) physician {some/specific} this
     'the same [some/specific physician's house] '   'this [some/specific 's house]

    The absence of indefiniteness spreading exactly in these contexts follows now directly from the very same factor which excludes definite modification for such a non-head – as the non-head is not referential in *M*-constructs and compounds, it is neither sensibly definite nor sensibly indefinite. Not so the non-head in *R-construct*s, which is referential, and where both definite and indefinite spreading hold as traditionally described.[6]

3.3   *M-constructs vs. Compounds*

    Are *M*-constructs compounds, then? Even more significantly, are all DET+N+N combinations, including the those in (31) and (33b) compounds? In terms of their interpretation, they most certainly come closest to the properties of typical English primary N+N compounds. The answer to this must be 'no'. Some crucial distinctions do remain between *M*-constructs and compounds, both with and without a preceding determiner, mandating a separate treatment. Specifically, although the modification of the non-head in *M*-constructs is limited, as compared with *R-construct*s, it is possible. Not only by adjectives (providing they refer to properties) but also by a PP and through the non-head itself heading a construct. Such modification is never possible in compounds without the loss of non-compositional meaning (cf. (35)-(36)). It further remains possible to coordinate the non-head in *M*-constructs (with and without a preceding DET), whereas such coordination remaining incompatible with non-compositional reading (cf. (37)-(38)) and finally, reference to the head of *M*-constructs with a pronoun, never possible in compounds, is possible in *M*-constructs (cf. (39)-(40)):[7]

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[6] For a fuller analysis of the exclusion of referential DP non-heads in the context of pre-N+N determiners, see Borer (2008).

[7] [N + [N+N]] compounds (non-compositional) do occur, just in case the embedded [N+N] itself is a compound:

35. a. mitkan 'energiya tiv'it;   ha-mitkan 'energiya   tiv'it ha-ze
          facility energy   the-natural; the-facility   energy   natural the-this
          'a/this natural energy facility'
     b. na'aley yaldat rexov;   ha-na'aley yaldat   rexov ha-'ele
          shoes girl street;   the-shoes   girl   street the-these
          '(these) street girl shoes'
     c. mic   [tapuzim mi sfarad];   ha-mic   [tapuzim mi-sfarad]   ha-ze
          juice [oranges from spain];   the-juice [oranges from-spain]   the-this
          '(this) juice from Spanish oranges'

36. a. *beyt xolim   xroniyim;   *ha-beyt   xolim   xroniyim   ha-ze
          house-patients chronic.pl   the-house   patients   chronic.pl   the-this
          'a/this hospital for chronic patients'
     b. *beyt   xoley   Alzheimer;   *ha-beyt   xoley   Alzheimer ha-ze
          house   patients Alzheimer;   *the-house   patients   Alzheimer the-this
          'the/this hospital for Alzheimer patients'
     c. *beyt xolim   me-'ayarot pituax;   *ha-beyt xolim me-'ayarot pituax   ha-ze
          house patients   from towns development; the-house patient from towns development the-this
          'a/this hospital for patients from under-developed towns'

37. a. beyt 'ec   ve-levenim   ha-beyt   'ec   ve-levenim   ha-ze
          house wood and bricks   the-house   wood and-bricks   the-this
          'this/a house of wood and bricks'
     b. 'aron   magavot ve-sdinim   ha-'aron   magavot ve-sdinim ha-xadaš
          cabinet towels   and-sheets   the-cabinet   towels   and sheets the-new
          'the/a (new) cabinet for towels and sheets

38. a. *beyt   xolim   ve-yetomim   *ha-beyt   xolim   ve-yetomim ha-ze
          house   patients   and orphans   the house   patients and orphans the this
          *a/this hospital and orphanage'
     b. *gan   yeladim   ve-xayot   *ha-gan   yeladim   ve-xayot   ha-ze
          garden children and animals   the-garden children   and-animals the-this
          'a/this kindergarden and zoo'

39. a. a. hu bana lanu   šney batey 'ec   ve-'exad mi-levenim
                 he built for us   two   houses wood   and one   from-bricks
          b. ha-magavot mitbax   šekanita   yoter šimušiyot me-ha-'ele   le-ambatia
                 the-towels   kitchen   that-you-bought more useful   than-the-those for-bathroom

40. a. *hu bana lanu šney batey xolim   ve-'exad   le-yetomim
          he built   for us two   houses patients   and-one   for orphans
              *he built for us two hospitals and one orphanage'
     b. *ha-batey   xolim yoter muclacim   me-ha-ele   le-yetomim
          the-houses   sick   more successful   than-the-those for orphans
              *the hospitals are better than the orphanages'

Finally, we observed that the non-head in *R*-constructs and in *M*-constructs may itself be a
construct, but not so for compounds. Significantly, however, the compound *as a whole* can, at least at
times, function as a head of a construct, never a possibility for either *M*-constructs or *R-construct*s:

i.   oxel   lexem   xesed
      eater   bread   compassion
      eater   ['charity   ']
      'charity receiver' (derogatory, implies laziness)

41. [*beyt-sefer*] sade;   [*beyt-xolim*]   sade;   [*begged-yam*] meši;   [*'orex din*]   xuc;
     house book field   house patients field   suit   sea   silk   editor law   out
     'field school'   'field hospital'   'silk bathing suit'   'external lawyer'

     [*yošev roš*]   mo'aca   [*beyt-mišpat*] 'al
     sitter head   council   house-court up
     'council chairman'   'higher court'

The table in (42) summarizes the diagnostics of compounds, *R-construct*s and *M*-constructs, before we turn to some speculations on the theoretical ramifications of this three-way distinction:

42.

		Compounds	*M*-**constructs**	*R*-**construct**s
a.	Semantic compositionality	No	Yes	Yes
b.	Coordination	No	Yes	Yes
c.	Pronominal reference to the head	No	Yes	Yes
d.	[N+N]+N structures	Yes	No	No
e.	Non-head modification	No	Property modification only	Yes
f.	Free pluralization of non-head	No	Property reading only	Yes
g.	Pronominal reference to the non-head	No	No	Yes
h.	Cardinals or quantifiers w/the non-head	No	No	Yes
i.	(In)definiteness spreading	No	No	Yes
j.	Reanalyzed DEF placement	Yes	Yes	No
k.	Determiners and reference denoting adjectives w/non-head	No	No	Yes

4. Structural considerations

4.1. R-constructs and M-constructs

Effectively, the table in (42) suggests that there are three types of nominal constructs in Hebrew. Only one of them allows for a referential non-head (*R*-constructs), and only one of them (could be) semantically and syntactically opaque. Considerations of scope exclude a detailed analysis of these distinct types. A sketchy outline of such an analysis, however, is attempted in the next few paragraphs (and see Borer, 2008, for a fuller treatment).

Seeking to account for the referentiality, or lack thereof, of the non-head, suppose we assume (following Munn 1995) that the non-head in *R*-constructs (Individual Genitives) is a full DP, while the non-head in *M*-constructs (Modificational Genitives) and compounds is not a full DP. In fact, even the projection of a #P (Quantity Phrase) non-head in *M*-construct and compounds appears unwarranted given (42h). Rather, the non-head appears to be either a ClP (Classifier Phrase) or an NP, a predicate.[8] Assume now that non-heads in N+N constructs always merge in the specifier of some

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[8] As is argued extensively in Borer (2005a), 'plural' marking is a Classifier, not a Number (#) specification.

nominal functional projection associated with the head N. If the non-head is a full DP, it will be interpreted referentially, as a possessor, as an argument, or as bearing a part-whole relations with the head. If, on the other hand the non-head is a predicate, it will be interpreted as a modifier.[9] Finally, regardless of the merger site of the non-head, the order *Head – Non-head* is generated, I assume, through the movement of N to a functional head above the relevant specifier, in line with Ritter's original (1988) analysis and much subsequent work. Schematic structures for *R*-constructs and *M*-constructs are given in (43)-(44):

43. *R-construct*:
    [$_{FP}$ N   [… [$_{specifier}$ [$_{DP}$ *Non-Head*]   N̶ … [$_{NP}$ N̶]]]]

44. *M-construct*:
    [$_{FP}$ N   [… [$_{specifier}$ [$_{CLP/NP}$ *Non-Head*]   N̶ … [$_{NP}$ N̶]]]]

In Borer (1996, 1999) I propose that the phonological word properties of constructs are derived through the syntactic incorporation of the non-head into the head (see also Shlonsky, 1990). As Siloni, (1997) points out, however, such an incorporation account must allow for violations of the Coordinate Structure Constraint (e.g., in (12), (39)) (and see also Benmamoun (2000) for Arabic). Rather crucially, the coordination of non-heads *is* possible for *M*-constructs, making it untenable that the *M*-construct, but not the *R-construct*, is derived through incorporation.

In Borer (2005a,b, forthcoming), I argue that morpho-phonological merger rules affecting constituent structure do not exist. Constituent-structure forming operations as well as recursion are, rather, within the province of the syntax alone. Word formation, in turn, consists of two components – one, morpheme based, is syntactic and recursive (see section 4.2. below). The other, a-morphemic, involves the phonological spellout of non-hierarchical formal syntactic features on L-heads (e.g., *dance.pst.* → /dænst/; *sing.pst* → /sang/) very much in line with the approach to (much of) inflectional morphology put forth by the Word and Paradigm approach (see in particular Beard 1995, Anderson, 1992). It therefore follows that if the construct is not formed by syntactic incorporation, it fails to involve an incorporation altogether. We must therefore conclude that the word properties of constructs derive from liaison, the assignment of pure prosodic structure to syntactic constituents, often resulting in the emergence of bound forms conditioned exclusively by phonological string adjacency (with clitics being the prime comparison class).[10]

If on the right track, we do not expect constructs to be syntactically uniform, a conclusion that is independently extremely plausible. The essence of the construct diagnostics, it would appear, involves a bare head form of *any* category, an obligatorily *nominal* non-head, and the prosodic-word properties of the output. Beyond that, we do not expect, nor do we find, syntactic similarities between constructs formed from N-N combinations, A-N combinations, Participle-N combinations, Cardinal-N combinations, Q-N combinations, and P-N combinations, exemplified by (45a-f):[11]

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[9] A maximal #P will presumably be interpreted as a measure phrase. We set this case aside.

That modifiers, including adjectives and PPs, may merge as specifiers is explicitly suggested in Cinque (2000) and pursued for Hebrew by Shlonsky (2000) and by Sichel (2000). I depart from the Cinque model in assuming that modifiers can be licensed by *any* functional specifier.

[10] I thus reject explicitly the phonological merger approach put forth by Benmamoun (2000) and adopted in Siloni (2001).

[11] The existence of P+N constructs is an inevitable conclusion from the properties of prepositions which are attested as a bound plural form in conjunction with pronominal complementation (cf. (45f)). See also the archaic form in (i):

i.   al-ey   kinor
     on-[pl.m.BOUND FORM] violin
     'on violin' (e.g., in the context of playing 'on' it)

45. a. yefe   (ha-)'eynayim   A+N
         beautiful   (the-) eyes
         'beautiful of eyes'
     b. kotev   (ha-)ma'amar   Ptc+N
         writer   (the-)article
         'the writer of the article'
     c. šlošet   ha-dubim   Cardinal+N
         three   the-bears
         'the three bears'
     d. rav   nocot;   mrube   yeladim;   mu'at   emca'im   Q+N
         multiple   features;   multiple children;   few   means
         'of many features';   '(one with) many children'; '(one of) few means'
     e. rov   ha-no'ar;   kol   ha-kita;   Q+N
         most   the-youth;   all   the-class
         'most of the youth'; 'all the class'
     f. al   ha-šulxanot;   'aleyhem   P+N
         on   the-tables;   on-pl-pron
         'on the tables';   'on them'

4.2.   Deriving Compounds

I concluded in section 4.1 that the prosodic word properties of both *M*-constructs and *P*-constructs do not involve any change in constituent structure, and are rather a phonological liaison. Given this conclusion, one plausible assumption as concerning Hebrew compounds would be that they are not a morphological formation altogether, but rather a species of idioms with a syntax and morphology identical to that of constructs. This conclusion, however, is unsatisfactory. First, unlike idioms, and with the exception of plural inflection, compounds never involve any functional material otherwise attested in constructs – no (non-affixal) articles, no adjectives, no pronouns etc., all potentially possible in idiomatic expressions. Second, languages do not typically exhibit an 'idiom strategy', with idioms systematically formed from one syntactic structure, and yet constructs are, by far, the language's predictable source for compound formation. Finally, that compounds, but not any other constructs, can themselves head a construct argues in favor of them having a distinct structure.

Note now that intriguingly, no syntactic problem faces an incorporation account for compounds. The Coordinate Structure Constraint invoked to exclude incorporation in at least some cases of *M*-constructs and *R*-constructs is tangential, for the simple reason that non-head coordination never occurs with compounding. Suppose, then, that syntactic incorporation may take place where licit (i.e. when the CSC is not violated), and that compounds are formed through such an incorporation.

What are the unique properties of compounds such that they can be attributed to incorporation? By assumption, these could not be the phonological word-like properties of compounds, as these are shared with constructs, which do not involve incorporation.

Suppose we assume that incorporation is an operation which merges predicates (<et>), and that both N and N+CL are of type <et>, but # and D are of type <e>. Suppose we assume further that incorporation may not proceed past functional heads (contra Baker, 1988). It now follows that if #P or DP project, incorporation cannot take place, thereby excluding incorporation in (non-coordinated) *R*-constructs, and excluding the formation of compounds with referential non-heads. We now also derive the obligatoriness of non-referential non-head in compounds, accounting for their affinity with *M*-constructs.

Why, the reader may now wonder, is incorporation necessary for the formation of compounds? Such a question, however, appears to be ill-phrased. Incorporation is not necessary for compounds. Rather, compounds, by definition, are constructs that have undergone incorporation. Elaborating,

suppose we re-examine the entire logic of the distinction between compounds and constructs. Assuming no pre-theoretical category of 'compounds', what we have done, in actuality, is diagnose three types of nominal constructs, distinguished from each other along syntactic and semantic lines. Having called one of these groups 'compounds' already implies some conclusions on our part as concerning the properties of that group. Those conclusions are not based on the phonological properties of that group, as these are identical to those of other construct types. They are not based on the syntactic properties of that group either, as those syntactic properties in and of themselves do not classify that group as what is traditionally referred to as 'compounds'. Fundamentally, then, we labeled that group 'compounds' because of its semantic non-compositionality, a key factor in the diagnostic of compounds, proceeding then to ask whether non-compositional constructs have syntactic properties which distinguish them from those of compositional constructs. Having answered this question in the affirmative, we then proceeded to propose that they involve a unique syntactic derivation – incorporation – which is impossible for *R*-constructs and at the very least unnecessary for *M*-constructs, thereby attempting to relate the possibility of incorporation with the emergence of a non-compositional meaning.[12]

Reformulate the original question, then – what is it about incorporation which allows a non-compositional meaning?

By way of offering an answer, suppose we define (morpheme-based) morphology as the syntactic merger of L-head predicates in general, either with each other (i.e., *incorporation*, giving rise to, e.g., English compounding) or with functional morphemes, including L-affixes, where by L-affixes we refer to affixes that are themselves categorically marked (i.e. $[_N$ *–ation*$]$, $[_A$ *–al*$]$). According to this view morphology is not a separate component, but a generalization over a class of particular syntactic operations and their outputs.

We may now define the constituents of the morphological stratum (but not those of higher phrasal strata) as the input to encyclopedic searches. In other words, encyclopedic interpretation, as linked to phonological spellout, confines its searches to L domains (with the intended meaning), with interpretation for bigger syntactic domains requiring compositionality.[13] The boxed combinations in (46a', b') are now possible targets for an encyclopedic search. Their pre-incorporation components, as in (46a, b) can only be searched separately, and put together compositionally. It thus follows that 'compounds' must undergo incorporation, insofar as by definition, their 'holistic' meaning can only be assigned on the basis of the post-merger structure.

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[12] Incorporation in non-coordinated *M*-constructs (with compositional meaning) may arguably be ruled out by considerations of economy.

[13] For the relations between PF and encyclopedic searches, see Marantz (1996). This description, we note, covers not only the output of word formation (internal merger), but external merger as well, to wit, 'lexical insertion', insofar as it concerns the properties of any merged L-heads.

A few comments are warranted (and see Borer, 2008 for a fuller execution). First, note that phrasal idioms are now excluded, as whole units, from the domain of encyclopedic searches. Rather, we must assume that an encyclopedic entry such as *kick* makes reference to the relevant reading of *kick* in the context of *bucket* (and, presumably, the entry for *bucket* references *kick* in a similar fashion.) See Harley and Noyer (1999) for an explicit suggestion along these lines.

Second, the system explicitly allows for separate searches for the L subparts of mergers within the morphological stratum. Thus N+N may remain compositional, as may the L in any L+aff combination, thereby allowing compositional morphological operations.

Finally, this execution entails that copies are not assigned meaning by the encyclopedia, a direct result of the fact that the encyclopedia operates on (syntactically annotated) PF representations.

46. a. [$_{FNP1}$ N$_1$] [[$_{CLP}$ N$_2$+CL] [$_{NP2}$ N̶$_2$]… a'. [$_{FNP1}$ N$_1$+[N$_2$+CL]] [[$_{CLP}$ [N̶$_2$+C̶L̶] [$_{NP2}$ N̶$_2$]…
    b. [$_{FNP1}$ N$_1$] [[$_{NP2}$ N$_2$]]. b'. [$_{FNP1}$ N$_1$+N$_2$]   [[$_{NP2}$ N̶$_2$]…
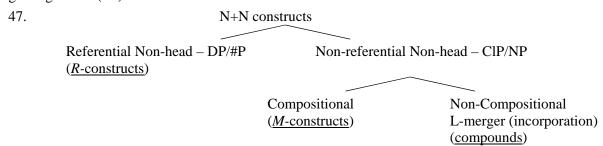   (FNP= some functional projection in the N extended projection)

We can now explain in full the distinctions between compounds and *M*-constructs in table (42). The impossibility of coordinated non-heads in compounds follows from the fact that compounds are formed by syntactic incorporation. The impossibility of pronominal reference to the head follows from the fact that the compound is assigned an encyclopedic interpretation as a whole. As the head is not assigned any reference or meaning independently of the compound, pronominal reference to it in exclusion of the non-head is impossible. The exclusion of modification for the non-head is likewise excluded, as the non-head does not effectively exist as an independent meaning to be modified.

And finally, that compounds, but not *M*-constructs, can themselves head a construct follows from the existence of an N constituent [$_N$ N+N] formed by the incorporation. No such constituent exists in either *M*-constructs or *R*-constructs.

We have now derived in full the properties of compounds without recourse to non-syntactic operations, or to syntactic structures that are not otherwise available.[14]

5. *Conclusion*

Beyond establishing the existence of compounds in Hebrew, I investigated the systematic relations which hold between their properties and those of construct nominals. The typology that emerges is given in (47):

47.   N+N constructs

    Referential Non-head – DP/#P   Non-referential Non-head – ClP/NP
    (*R*-constructs)

                                        Compositional   Non-Compositional
                                        (*M*-constructs)   L-merger (incorporation)
                                                                    (compounds)

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[14] For completeness sake, we note that synthetic compounds, just like other compounds, have non-referential non-heads, and altogether share the properties of compounds discussed thus far. It follows that synthetic compounds cannot be derived from Complex Event Nominals, in the sense of Grimshaw (1990). This is further supported by the fact that Event Nominals (in their construct form) allow for event modification (ia), strictly barred in synthetic compounds (ib), as illustrated in (ic). Therefore at least Hebrew synthetic compounds do not differ from 'primary' compounds, and their non-head is a modifier and not an argument. The appearance of complementation relation between the head and the non-head thus must be otherwise accounted for. See Borer (forthcoming) for some relevant discussion.

    i. a. šmirat   ran 'et   ha-bayit   be-mešex 30 ša'ot/be-hac'laxa
          guarding Ran DOM the-house   for 30 hours/successfully   DOM=DIRECT OBJECT MARKER
          'Ran's guarding of the house for 30 hours/successfully'
       b. *šmirat   saf   šomer saf
          guarding   threshold   guard threshold
          'gate keeping'   'gate keeper'
       c. *šmirat   ha-saf   be-haclaxa/be-mešex šanim rabot
          guarding   the-threshold successfully/for many years
          literal (absurd) reading only

Crucially, while the properties of compounds are syntactically entirely regular, their formation through the merger of two L-stems results in allowing the encyclopedia to search for their PF representation, thus potentially associating them with non-compositional meanings. 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'. What is needed is a clearer delineation of the domain which falls under the jurisdiction of encyclopedic searches, independently needed within any model involving late insertion.

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