The “Generalized” X-bar Conventions and Word-Formation Typology

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ABSTRACT

It is proposed in Tang (1990, 1993, 1994a, 1994b) that two additional rules (i.e. (vi) X → 'X, 'X, and (v) X → 'X, 'X, where 'X stands for a stem or morpheme, free or bound) be added to the original X-bar conventions (i.e. (i) XP → XP, X', (ii) X' → XP, X', (iii) X → XP, X) to account for the formation or licensing of Chinese compounds. In these additional rules, the endocentric and binary-branching constraints remain intact, with a recursiveness mechanism incorporated in the rule (v) for morphological constructions just as the same mechanism is incorporated in the rule (ii) for phrasal constructions. What distinguishes the additional rules from the original rules is while the latter consist of Xs, X’s and XPs, the former consist only of ‘Xs, which accounts for, among other things, the impossibility of extraction of constituent stems from words, the non-referentiality of noun stems and their failure to serve as antecedents of pronouns or anaphors, and the prohibition against insertion of elements from outside words.

In this paper, our discussion of the relevancy of the generalized X-bar conventions to word-formation includes not only compound words, which consist of stems or roots, but also complex words, which consist of stems and affixes. Furthermore, the proposed conventions will be tested against the word-formation in three typologically distinct as well as genetically unrelated languages (namely, Chinese, English and Japanese) to see whether the same licensing conditions hold for languages other than Chinese.

Our paper consists of five sections. After a brief introduction in section 1, section 2 presents the generalized X-bar conventions and discusses how they apply to generate or license Chinese compound words and complex words, while section 3 defines the notion of head for both compound and complex words and investigates how the categorial features of the head stems percolate to the entire words and, in case of categorial conversions, how one category may convert into another. Then section 4 examines the hierarchical structure and linear order of constituent stems, which constitute various types of Chinese compounds and contrasts various types of compounds between Chinese, English and Japanese. Finally, in section 5, a typological study of word-formation is suggested in terms of the recent developments of the principles-and-parameters theory.
Key Words: Chinese, English and Japanese word-syntax, the "Generalized" X-bar Convention, word-formation typology

1. Introduction

It is proposed in Tang (1991a,1993,1994a,1994b) that, in addition to the original X-bar conventions (la),(lb) and (lc), two more rules (ld) and (le), where 'X stands for a stem or morpheme, free or bound, be added to account for the formation or licensing of Chinese compounds.

(1) a. XP → XP, X' (Specifier Rule)
    b. X' → XP, X' (Adjunct Rule; recursive)
    c. X' → XP, X (Complement Rule)
    d. X → 'X, 'X' (Compound Rule)
    e. 'X → 'X, 'X' (Stem Rule; recursive)

In these additional rules, the constraints on endocentricity and binary branching remain intact, with a recursiveness mechanism incorporated in the rule (le) for morphological constructions just as the same mechanism is incorporated in the rule (lb) for phrasal constructions. What distinguishes the additional rules from the original rules is that, while the latter consist of Xs, X's and XPs, the former consist only of 'Xs, which accounts for, among other things, (i) the impossibility of extraction of constituent stems from compounds (since only Xs and XPs, but not 'Xs, may be moved), (ii) the nonreferentiality of noun stems occurring in compounds and their failure to serve as antecedents of pronouns and anaphors (since reference is a unique property of NPs and only NPs, but not 'Ns, may serve as antecedents or pronouns or anaphors occurring outside compounds), (iii) the non-occurrence of pronouns, prepositions and conjunctions as constituent stems of compounds other than those forming compound pronouns, prepositions or conjunctions (since pronouns are by definition NPs, prepositions must take NPs as objects, and conjunctions must take various XPs as conjuncts or complements), and (iv) the prohibition against inserting elements from outside compounds as well as substituting constituent stems occurring in compounds with question words asking about XPs.¹

¹ Note that these observations are in agreement with Huang's (1984:60) "Lexical Integrity Hypothesis, which states that no phrase-level (i.e. XP) rule may affect a proper subpart of a word (i.e. 'X).
In this paper, our discussion of the relevancy or the generalized X-bar conventions to word-formation includes not only compound words, which consist of stems or roots, but also complex words, which consist of stems and affixes. Furthermore, the proposed conventions will be tested against word-formations in three typologically distinct as well as genetically unrelated languages, namely, Chinese, English and Japanese, to see whether the same licensing conditions hold for languages other than Chinese.

Our paper consists of five sections. After a brief introduction in section 1, section 2 presents the generalized X-bar conventions and discusses how they apply to generate or licence Chinese compound words and complex words, while section 3 defines the notion of “head” for compound and complex words and investigates how the categorial features of the head stem percolate to the entire word and, in case of categorial conversions, how one category may convert into another. Section 4 then examines the hierarchical structure and linear order of constituent stems, which constitute various types of Chinese compounds, and contrasts various types of compounds between Chinese, English and Japanese. Finally, in section 5, a typological study of word-formation is suggested in terms of the recent developments of the principles-and-parameters theory.

2. The Generalized X-bar Conventions as licensing Conditions on Chinese Compound and Complex Words

Tang (1990, 1993, 1994a, 1994b) has discussed in considerable detail how the above-proposed generalized X-bar conventions apply to license Chinese compound verbs, nouns and adjectives, as illustrated in the examples (2) through (4), where “’X|’Y”, “’X\’Y”, “’X/’Y”, “’X∥’Y”, “’X & ’Y” and a “’X=’Y” stand respectively, for “predicate-object,” “predicate complement,” “modifier-head,” “subject-predicate,” “coordinative” and “reduplicative” compounds, and “’X>’Y” indicates conversion or the category X to the category Y.

(2) a. predicate-object compound verbs

(i) \[ 'Vt \mid 'N \]
     \[ 翹 [play] \]
     \[ 課 [truant] \]

(ii) \[ 'Vt \mid 'N \]
     \[ 造 [spread] \]
     \[ 謠 [rumor] \]

(iii) \[ 'Vt \mid 'N \]
     \[ 注 [pay] \]
     \[ 意 [attention (to)] \]

“plat truant” “spread a rumor” “pay attention (to)"
b. predicate-complement compound verbs

(i) \( V_i \)  
(ii) \( V_t \)  
(iii) \( V_e \)

走 動 看 見 
run move look see 
"move around" "notice" "(cause to become) wet (by urinating)"

(c. modifier-head compound verbs

(i) \( V_i \)  
(ii) \( V_t \)  
(iii) \( V_t \)

痛 哭 傳 送 眼 見 
painful(ly) cry pass send eye see 
"cry painfully" "transmit" "witness"

d. coordinative compound verbs

(i) \( V_i \)  
(ii) \( V_t \)  
(iii) \( V_e \)

跳 蹦 接 受 動 搖 
jump hop accept receive move shake 
"jump" "accept" "(cause to) waver"

e. subject-predicate compound verbs

(i) \( N > V_i \)  
(ii) \( N > V_i \)  
(iii) \( A > V_i \)

地震 便 秘 眼 紅 
earthquake stool hide eye red 
"earthquake" "constipation > constipate" "envious > envy"

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2. The subcategorial symbol "Ve" stands for the "ergative verb," which has both causative-transitive and inchoative-intransitive uses.
(3) a. predicate-object compound nouns

(i) \[ V_i \rangle N \]

\[ \text{'Vt} | \text{'N} \]

"keep" "house"

"housekeep > housekeeper"

(ii) \[ V_i \rangle N \]

\[ \text{'Vt} | \text{'N} \]

"hurt" "wind"

"(catch) cold" "algebra"

(iii) \[ (V_i \rangle)N \]

\[ \text{'Ve} | \text{'N} \]

"substitute" "number"

b. predicate-complement compound nouns

(i) \[ V_t \rangle N \]

\[ \text{'Vt} \backslash \text{'A} \]

"say" "clear"

"explain > explanation" "improve > improvement"

(ii) \[ V_t \rangle N \]

\[ \text{'Vt} \backslash \text{'A} \]

"alter" "good"

(c. modifier-head compound nouns

(i) \[ N \]

\[ \text{'A} \backslash \text{'N} \]

"wild" "cat"

"wild cat"

(ii) \[ N \]

\[ \text{'N} \backslash \text{'N} \]

"fire" "vehicle"

"train"

(iii) \[ N \]

\[ \text{'V_i} \backslash \text{'N} \]

"fly" "machine"

"airplane"

d. coordiinative compound nouns

(i) \[ N \]

\[ \text{'N} \& \text{'N} \]

"root" "base"

"foundation"

(ii) \[ N \]

\[ (V_i \rangle)'N \& (V_i \rangle)'N \]

"habit" "custom"

"habitat" "customary"

(iii) \[ A \rangle N \]

\[ \text{'A} \& \text{'A} \]

"arrogant"
e. subject-predicate compound nouns

(i) \[ N \quad N \quad N \]
    \[ 'N \parallel 'V_i \quad 'N \parallel 'V_i \quad 'N \parallel 'V \]
    春 分 雪 崩 兵 變
    spring divide snow collapse soldier rebel
    “vernal equinox” “avalanche” “mutiny”

(ii) \[ N \quad N \quad N \]
    星 星 誰 誰 人 人
    star star someone someone person person
    “star(s)” “so-and-so(s)” “everyone”

f. reduplicative compound nouns

(i) \[ N \quad N \quad N \]
    星 星 誰 誰 人 人
    star star someone someone person person
    “star(s)” “so-and-so(s)” “everyone”

(ii) \[ N \quad N \quad N \]
    春 分 雪 崩 兵 變
    spring divide snow collapse soldier rebel
    “vernal equinox” “avalanche” “mutiny”

(iii) \[ N \quad N \quad N \]
    春 分 雪 崩 兵 變
    spring divide snow collapse soldier rebel
    “vernal equinox” “avalanche” “mutiny”

(4) a. predicate-object compound adjectives

(i) \[ V_i > A \quad V_i > A \quad V_i > A \]
    賣 力 守 法 失 望
    sell force observe law lose hope
    “hard-working” “law-abiding” “disappointed”

(ii) \[ V_i > A \quad V_i > A \quad V_i > A \]
    賣 力 守 法 失 望
    sell force observe law lose hope
    “hard-working” “law-abiding” “disappointed”

(iii) \[ V_i > A \quad V_i > A \quad V_i > A \]
    賣 力 守 法 失 望
    sell force observe law lose hope
    “hard-working” “law-abiding” “disappointed”

b. predicate-complement compound adjectives

(i) \[ V_t > A \quad V_t > A \quad A \]
    充 實 分 明 靠{得/不}住
    enrich quality divide clear depend able
    “enrich in quality” “clear-cut” “(un)dependable”

(ii) \[ V_t > A \quad V_t > A \quad A \]
    充 實 分 明 靠{得/不}住
    enrich quality divide clear depend able
    “enrich in quality” “clear-cut” “(un)dependable”

(iii) \[ V_t > A \quad V_t > A \quad A \]
    充 實 分 明 靠{得/不}住
    enrich quality divide clear depend able
    “enrich in quality” “clear-cut” “(un)dependable”

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3. In addition to the interrogative use (equivalent to the English “who”), 誰 has an indefinite use (equivalent to the English “someone”).

4. The symbol “Pm” stands for “phase marker.” Note also that “靠{得/不}住” must take the potential infix 得 or its negative counterpart 不.
c. modifier-head compound adjectives

(i) \[ A \]
(ii) \[ A \]
(iii) \[ A \]

'\( A \) / 'A
早 熟 雪 白 浪 熱
early mature snow white boil hot
"precocious" "snow-white" "boiling-hot"

d. coordinative compound adjectives

(i) \[ A \]
(ii) \[ N > A \]
(iii) \( (Vt > )A \)

'\( A \) & 'A
重要 便利
heavy important convenience profit keep protect
"important" "convenience > convenient" "conservative"

e. subject-predicate compound adjectives

(i) \[ A \]
(ii) \[ A \]
(iii) \[ A \]

'\( N \) || 'A
心 軟 年 輕 口 緊
heart soft year light mouth tight
"soft-hearted" "young" "tight-mouthed"

In all the compound words represented in the word-structure (henceforth “w-structure”) trees above, w-structures are essentially similar to sentence-structures (henceforth “s-structures”). For example, in both w-structures and s-structures, predicate verbs or adjectives occur in the head position, the objects or complements in the complement position, the modifiers in the adjunct position, and the subjects in the specifier position.\(^5\) Compare the s-structure projection (3) and the w-structure projection (4), which are closely analogous to each other.

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5. According to the VP-internal Hypothesis, the deep-structure subject occurs in the specifier position of VPs or VP-shells
The close parallelism in X-bar constructions between w-structures and s-structures can be more clearly seen by comparing the X-bar structure between the following pairs of compound nouns (a) and their corresponding VPs and NPs (b), the only difference being while w-structures have two levels of projection (i.e. from 'X to 'X, or from 'X to X), s-structures have three (i.e. from X to X', from X' to X', or from X' to XP).

(7) a. 
```
  N
   'N  'Vi
脳 brain
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b. 
```
  VP
     NP  V'
         'N  (大)脳(裡)
脳 brain
   'Vt  V
充 blood
fill
```

"cerebral hemorrhage" "The brain (proper) is filled with blood."

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6. For ease of exposition and comparison, only the deep-structure VPs of the corresponding sentences are given in (5b) through (8b).
(8a.  
\[
\begin{array}{c}
\text{N} \\
\text{胃} \\
\text{stomach} \\
\text{A'd} / \text{'Vi} \\
\text{下} \quad \text{down} \\
\text{垂} \quad \text{hang} \\
\end{array}
\]
"gastroptosis"

b.  
\[
\begin{array}{c}
\text{VP} \\
\text{胃} \\
\text{stomach} \\
\text{PP} \quad \text{V'} \\
\text{往} \quad \text{down} \\
\text{垂(落)} \quad \text{hang} \\
\end{array}
\]
"The stomach hangs down."

(9a.  
\[
\begin{array}{c}
\text{N} \\
\text{'Vi} \\
\text{人} \\
\text{person} \\
\text{讀 書} \\
\text{readbook} \\
\end{array}
\]
"book-man"

b.  
\[
\begin{array}{c}
\text{NP} \\
\text{CP} \\
\text{IP} \quad \text{C} \quad \text{人,} \\
\text{的} \quad \text{person} \\
\text{VP} \quad \text{(who)} \\
\text{e_i} \\
\text{Vt} \quad \text{NP} \\
\text{讀 書} \\
\text{read book} \\
\end{array}
\]
"person who reads books"

(10a.  
\[
\begin{array}{c}
\text{N} \\
\text{'Vi} \\
\text{機} \\
\text{'Vt} \\
\text{洗} \\
\text{wash} \\
\text{Vt} \quad \text{造} \\
\text{Vt} \quad \text{manufacture} \\
\text{N'廠} \\
\text{factory} \\
\end{array}
\]
"washing-machine manufacturing factory"
"Factory that manufactures machines that wash clothes"

A similar parallelism is manifested between the following pairs of compound adjectives (a) and their corresponding APs (b), the only difference being while the former have two-level projections, the latter have three-level projections:
Note that in both w-structural and s-structural trees given above, all the nodes are binary in branching, as required or licensed by the Generalized X-bar Convention (1). There seem to be, however, certain counterexamples to the binary branching constraints on Chinese compounds. Firstly, coordinative compounds may contain more than two conjunct stems, in which case n-ary rather than binary branching seems to be required. It is proposed in Tang (1991,1994a) that coordinate constructions in both s-syntax and w-syntax may be incorporated in our Generalized X-bar Convention as illustrated below, where “JP” stands for “conjoined” or “coordinate” phrases:
(13a. \[ \text{JP} \rightarrow \text{VP} \]

\[
\begin{array}{c}
\text{VP} \\
\text{Adp} \quad \text{V'} \\
\text{side} \quad \text{V} \\
\text{sing} \quad \text{song} \\
\hline
\text{J'} \\
\text{Je} \\
\text{VP} \\
\text{Adp} \quad \text{V'} \\
\text{side} \quad \text{V} \\
\text{jump} \quad \text{dance} \\
\end{array}
\]

“sang (on one side) and danced (on the other)”

b. \[
\begin{array}{c}
\text{N} \\
'\text{N} \\
'\text{N} \\
\text{柴} \\
\text{firewood} \\
\text{米} \\
\text{rice} \\
\text{油} \\
\text{oil} \\
\text{鹽} \\
\text{salt} \\
\text{醋} \\
\text{vinegar} \\
\text{茶} \\
\text{tea} \\
\end{array}
\]

“firewood, rice, oil, salt, vinegar, (and) tea (i.e. necessities of daily life)”

Note also that the recursive mechanism incorporated in (le) will license not only (13b) but also (14), which accounts for the potential of compound words to be infinitely long.

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7. The maximal category “JP” is to be rewritten as its conjunct category (in this case, “VP”). All the conjunct phrases belong in the same syntactic category, at least in unmarked cases.
(14) ...
N...

N N

A N 飛彈
反 missile
anti N N

A N 飛彈
反 missile
anti N N

A N 飛彈
反 missile
anti N N

A N 飛彈
反 missile
anti missile

"...anti-anti-anti-anti-missile-missile-missile-missile-missile ...

Secondly, predicate-complement compound verbs containing the potential infix 得 or its negative counterpart 不 may appear to be ternary rather than binary in branching, as illustrated below:\(^8\)

(15)a. Vt

'Vt 'Ad 'Pm

看 得 見
look obtain see
"can see"

b. Vt

'Vt 'Ad 'Pm

看 不 見
look not see
"cannot see"

A comparison of the scope of negation between (16a) and (16b) with regard to the negator 不 and 没(有), however, seems to indicate that the correct analysis of 看不見 is (17b), in which the negator 不 c-commands 見 but not 看, rather than

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8. This is what Lu et al. (1975:78) call a "discontinuous" word (離合詞). We will tentatively analyze the infixal 得 and 不 as adverb stems ('Ad).
(15b), in which 不 c-commands both 看 and 見。Compare:

(16) a. 他没看见。"He didn't see it."
    b. 他看了又看，还是看不见。"He looked and looked, and still couldn't see it."

Similarly, predicate-object compound verbs containing aspect markers such as 了，過 and 着 can be analyzed as binary (18a) rather than ternary (18b):

(18) a.  "bent the body to make a bow"

Note further that only sisterstems dominated by a node can be considered as forming a constituent or compound. Thus, while the adjacent stems 充 and 血 in (18a), which are dominated by an 'Vi node, form a compound 充血("congestion (of the brain, etc.)"), 腦 and 充，though adjacent to each other, are not sister stems dominated by a node and thus cannot be a constituent or compound. Similarly, while 下 and 垂 in (19b) are sisterstems forming a compound 下垂("drooping,

9. The symbol "Am" stands for the "aspect marker," and the perfective aspect marker 了 is tentatively glossed as equivalent to the English past-tense morpheme "-ed".
nutation”). 胃 and 下 are not a constituent and thus do not form a compound. Thus, we have 充血 and 下垂，but not 腦充 and 胃下，as compound words in Chinese.

Finally, the so-called “dual status” problem of certain predicate-object constructions which have both literal and idiomatic readings and thus can be analyzed as compound verbs as well as VPs are treated in our analysis as two distinct expressions sharing the identical phonetic shape but differing in semantic import and syntactic structure. 吃醋，for example, can be analyzed either as an VP, with a literal reading of “eat vinegar,” as in (20a), or as a compound verb with an idiomatic reading of “get jealous,” as in (20b). Compare:

With the structural analysis (20a), the verb 吃 “eat” and the noun 醋 “vinegar” are listed separately as two lexical items. With the structural analysis (20b), however, 吃醋 “get jealous” is treated as a compound verb and listed as such in the

10. For a more detailed discussion of this problem and previous solutions, which are radically different from ours, see Her (1995).
lexicon. Note that the 酢 in (20a), but not the 醢 in (20b), is dominated by an NP node. Thus, only the NP 醢 in (20a), but not the noun stem 醢 in (20b), can be topicalized (as in (21a)), become the subject by passivization (as in (21b)), occur preverbally with the preposition 把 (as in (21c)), or be replaced by the question word 什麼 (as in (21d)).

(21) a. 醢，他吃了。
   b. 醢被他吃了。
   c. 他把醋吃了。
   d. 他吃了什麼。

Likewise, structural differences as well as similarities between the VP 生了很大的氣 “fly into a rage” and the compound adjective 生氣 “angry” are clearly shown below in terms of our generalized X-bar conventions:

(22) a. VP
    /     \
   NP V' --
      she  VP
        生了很大的氣
        bear great anger
        “She got very angry.”

   b. AP
    /     \
   NP A' --
      she  Ad  A
        很
        very Vt 'N
        bear anger
        “She was very angry.”

3. The Definition of “Head” and Percolation of Head Features

Another constraint on the X-bar conventions is that of endocentricity. In the case of phrasal constructions (i.e. rules (1a) through (1c)), the head X, its intermediate projection X' and the maximal projection XP must belong in the same syntactic category. A question arises, however, as to whether the same constraint is applicable to word structures (i.e. (1d) and (1e)), and if so, how to define the head of the word, and if not, how to account for the existence of exocentric constructions in compound words.

11. With the exception, perhaps, of coordinate constructions, which we have tried to incorporate into the X-bar structure with a category-changing rewrite rule “JP → XP.”
In the case of modifier-head compounds, the heads of compounds are the right-most constituent stems, since in Chinese these types of compounds are head-final and endocentric in construction; that is, modifiers always precede their heads and furthermore entire compounds are identical in syntactic category with their heads. Coordinative and reduplicative compounds can also be considered as double-headed (or multiple-headed, in the case of coordinative compounds containing more than two conjunct stems) and endocentric in construction, since reduplicative compounds contain two identical constituent stems while coordinative compounds consist of conjunct stems which are identical in syntactic category and subcategory. With these endocentric compounds, the categorical features of heads will simply percolate up to the entire compounds.

Subject-predicate compounds, on the other hand, are “headless“ and exocentric in construction, since neither the subject noun stem nor the predicate verb or adjective stem may be considered as heads of sentences and, moreover, the category “sentence” or “clause” is not available in w-syntax. When the predicate stem is a verb, however, subject-predicate compounds denote an event and can be analyzed as nouns. Furthermore, a large majority of subject-predicate compounds containing predicate verb stems can also be analyzed as modifier-head compounds consisting of noun modifiers and nominalized verb heads (e.g.胃(的)下垂·肺(的)結核·心肌(的)梗塞. By contrast, when the predicate stem is an adjective, subject-predicate compounds denote a state and can be analyzed as adjectives. In fact, subject-predicate compounds containing predicate-adjective stems are all adjectives. Thus, we have proposed that when the predicate stem is a verb (whether nominalized or not within the compound), the entire subject-predicate compound be analyzed as a noun and that when the predicate stem is an adjective, the entire subject-predicate compound be analyzed as an adjective.

Predicate-object compounds, when used as verbs are head-initial and endocentric in construction. Moreover, as the predicate stem is a transitive verb and has its own object noun stem within the compound, the compound verb may not take another object NP outside the compound, resulting in an intransitive verb, as illustrated below:

13. According to the Government-and-Binding Theory of Principles-and-Parameters Theory, sentences and clauses are analyzed as CPs and IPs which are, respectively, the maximal projections of Complementizer) and Inflation.
14. Note, however, that a limited number of subject-predicate compounds (e.g.地震·便秘·頭痛) can be used as verbs by conversion or zero-affixation.
23. a. Vt  'Vt  'N  'N
   'Vt  'N  'N
   'Vt  'N  'N
   raise  flag  tie  marriage  bend  body
   “hoist a flag”  “marry(vi.)”  “make a bow”

24. a. †陳先生昨天結婚李小姐。
   b. 陳先生昨天跟李小姐結婚。
     “Mr. Chen married Miss Li yesterday.”

25. a. †學生鞠躬老師。
   b. 學生向老師鞠躬。
     “The students bowed to the teacher.”

There are predicate-object compound verbs, however, in which the predicate
verb stem retains transitivity by incorporating or reanalyzing with the object
noun stem into a transitive verb. In this case, the compound verb functions as a
transitive verb and may take an object NP outside the compound, as illustrated
below:

26. a. Vt  b. Vt  c. Vi/t
    'Vt  'N  'Vt  'N  'Vt  'N
    'Vt  'N  'Vt  'N  'Vt  'N
    move  personnel  get  offense  render  service
    “mobilize”  “offend”  “render service; serve”

27. a. 他們正在動員軍隊。
    “They are mobilizing an army.”
   b. 我們不應該得罪顧客。
     “We should not offend our customers.”
   c. 你們願意為國家效勞／效勞國家嗎？
     “Are you willing to render service to/serve your country?”

In addition, there are predicate-object compound verbs which may take degree
adverbs and thus behave like transitive or intransitive adjectives, as illustrated
below:
The discharge of transitivity (as in (30a)) and incorporation of the object noun stem by the transitive verb stem (as in (31a)) as well as the modification of the compound verb by a degree adverb (as in (32a)) with regard to predicate-object compound verbs are essentially analogous to the discharge of transitivity (as in (30b)), reanalysis of the transitive verb and its object NP into a transitive verb (as in (31b)), and modification by degree adverbs (as in (32b)) with regard to VPs. Compare:

(30a) a.  
\[ \text{VP} \]  
\[ \text{V'} \]  
\[ \text{PP} \]  
\[ \text{P} \]  
\[ \text{NP} \]  
\[ \text{向老師} \]  
\[ \text{toward teacher} \]  
\[ \text{點了一下} \]  
\[ \text{nod} \]  
\[ \text{head} \]  
\[ \text{“nod (one’s head) to the teacher”} \]

b.  
\[ \text{VP} \]  
\[ \text{V'} \]  
\[ \text{PP} \]  
\[ \text{P} \]  
\[ \text{NP} \]  
\[ \text{向老師} \]  
\[ \text{toward teacher} \]  
\[ \text{點了} \]  
\[ \text{頭} \]  
\[ \text{nod} \]  
\[ \text{his head} \]  
\[ \text{“nod his head to the teacher”} \]
Finally, predicate-complement compounds, when used as verbs, are head-initial and endocentric in construction, as illustrated below:

15. Other examples are 很有成就感, 順理成章, 蓄意好感, etc.
The “Generalized” X-bar Conventions and Word-Formation Typology

\[
\begin{align*}
\text{d.} & \quad \text{Vt} \\
& \quad \hspace{1cm} \text{Vt} \\
& \quad \quad \text{'Vt} & \quad \text{'Vt} \\
& \quad \quad \text{聽} & \quad \text{懂} \\
& \quad \quad \text{listen} & \quad \text{understand} \\
\text{e.} & \quad \text{Vt} \\
& \quad \hspace{1cm} \text{Ve} \\
& \quad \quad \text{'Vt} & \quad \text{'Ve} \\
& \quad \quad \text{推} & \quad \text{開} \\
& \quad \quad \text{push} & \quad \text{open} \\
\text{f.} & \quad \text{Vt} \\
& \quad \hspace{1cm} \text{Ve} \\
& \quad \quad \text{'Vt} & \quad \text{'Ve} \\
& \quad \quad \text{擊} & \quad \text{落} \\
& \quad \quad \text{shoot} & \quad \text{fall} \\
\end{align*}
\]

“understand by listening” \quad “push \{open/away\}” \quad “shoot down”

\[
\begin{align*}
\text{g.} & \quad \text{Ve} \\
& \quad \hspace{1cm} \text{Ve} \\
& \quad \quad \text{'Ve} & \quad \text{'Ve} \\
& \quad \quad \text{搖} & \quad \text{動} \\
& \quad \quad \text{shake} & \quad \text{move} \\
\end{align*}
\]

“(cause to) shake”

(34) a. 我走不動了。“I can’t walk any more.”

b. 他聽不懂我的話。“He can’t understand what I say.”

c. 我們擊落了敵人的飛機。“We shot down the enemy’s airplanes.”

d. 風把樹枝搖動了。“The wind shook the branches of trees.”

e. 樹枝在風中搖動了。“The branches of trees shook in the wind.”

However, when the complement stem is ergative and, furthermore, the predicate stem is an empty verb (as in (35a)), a dejectival verb (as in (35b)), or a denominal verb (as in (35c)), or when the complement stem is a dejectival ergative verb (as in (35d) through (35f)),\textsuperscript{16} predicate-complement compound verbs can be head-final, as illustrated below:

\[
\begin{align*}
\text{(35) a.} & \quad \text{Ve} \\
& \quad \hspace{1cm} \text{Ve} \\
& \quad \quad \text{'Vt} & \quad \text{'Ve} \\
& \quad \quad \text{打} & \quad \text{開} \\
& \quad \quad \text{hit} & \quad \text{open} \\
& \quad \quad \text{“open”} & \\
\text{b.} & \quad \text{Ve} \\
& \quad \hspace{1cm} \text{Ve} \\
& \quad \quad \text{('A)>'Vi} & \quad \text{('A)>'Ve} \\
& \quad \quad \text{累} & \quad \text{壞} \\
& \quad \quad \text{tire} & \quad \text{spoil} \\
& \quad \quad \text{“(cause to) get exhausted”} & \\
\end{align*}
\]

\textsuperscript{16}The use of adjectives as causative-transitive verbs not only dates back to Old Chinese (e.g. “登泰山而小天下”) but also is frequently seen in Modern Chinese (e.g. 硬着頭皮・挺着胸膛・直着脖子・彎着腰・壯大陣容・充實內涵・豐富人生). For more detailed discussions of Chinese predicate-complement compound verbs, see Tang (1991a, 1993).
Note that the possibility for predicate-complement compound verbs to be either head-initial or head-final is quite analogous to the fact that syntactic predicate-complement constructions may form V-not-V questions either with predicate verbs or complement verbs:

(37) a. 他（的）英語說得很流利。 “He speaks English fluently.”
   b. 他（的）英語說不說得很流利？“Does he (or doesn’t he) speak English fluently?”
   c. 他（的）英語說得流利不流利？“Does he speak English fluently (or not fluently)”

Not only compound words consisting of stems but also complex words
containing stems and affixes can be licensed by our generalized X-bar conventions. Though Chinese is generally classified as an analytic or isolating language which rarely undergoes inflectional or derivational change, there is a small number of bound morphemes which may be considered derivational affixes (e.g. noun suffixes -頭, -子, -兒 and verb suffixes -兒, -化) or “quasi-suffixes” (e.g. noun quasi-suffixes -者, -家, -人, -師, -員, -士, -生, -手, -屬, -派, -眾, -物, -品, -度, -性, -法, -學, -力, -氣, -attributive adjective quasi-suffixes -式, -型, -號, -等, -級, -性, -and adverb quasi-suffixes -然, -爾, -乎). If these bound morphemes are to be treated as suffixes or quasi-suffixes, they can be analyzed as heads of complex words and, moreover, their categorial features “noun” and “verb” will percolate up and become the categorial feature of entire complex words. On the other hand, aspect markers (e.g. the perfective -了, the progressive -着 and the experiential -過), and perhaps phrase markers (e.g. -到, -完, -好, -光, -盡, -得, -住, -着[zhao], -了[liao], -消, -成, -起) also, can be considered inflectional suffixes of verbs, in which case heads of complex words are verb stems rather than inflexional suffixes. While various derivational suffixes function as heads of complex nouns, verbs, adjectives and adverbs that occur word-finally, derivational prefixes (e.g. 好 and 難-in [好/難]) -看/聽/過/吃/受/聞/用} and 可-in 可- {愛/憐/惜/恨/惡/憎/嘆/靠/取} -19) function as heads of complex adjectives that occur word-initially, -20 in which case the categorial features or prefixes percolate up and become the categorial feature of entire compounds. This means that complex words are also endocentric in construction and obey our generalized X-bar conventions. -21

The discussion above reveals the fact that, with a very few exceptional cases such as subject-predicate and predicate-object compounds, Chinese compound and complex words are generally endocentric in construction and can be

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17. While -兒 can be suffixed to only a few stems such as 玩, 火, 烏, 頭, 萬, -化 is quite productive and can occur with a large number of nouns and adjectives to form ergative verbs.

18. The English nomenclature is ours but the Chinese term 類後綴 (quasi-suffix) appears in Lü (1984:517). It is suggested in Tang (1993) that the verb suffix 化 and noun quasi-suffixes may also be analyzed as head stems forming modifier-head compounds.

19. 可 can be analyzed either as an adjective meaning “適當” or as a modal adjective meaning “(很)可以”.

20. Though most of English derivational complex words take derivational suffixes and thus are right-headed in structure, a small number of derivational complex words take derivational prefixes (e.g. en-large/rich/able/noble/danger) and thus are left-headed in structure.

21. Ordinary morphemes such as “老, 初, 老” are treated in our analysis as determiners (along with 這, 那, etc.) rather than prefixes.
left-headed, right-headed or double-headed. The occurrences of exocentric constructions are due mostly to conversions from one category into another. Categorial conversions, or zero-affixations, from nouns and adjectives into verbs as well as from verbs and adjectives into nouns date back to Old Chinese and have been quite frequent through Middle Chinese up to Modern Chinese (e.g. “老吾老以及人之老，幼吾幼以及人之幼”, “夫子欲其過而未能也”, “王諸大之，先天下之憂而憂，後天下之樂而樂”, “打是疼，罵是愛”, “狠着心”, “直一直腰”, “鐵着心腸”, “鐵青著臉”). Moreover, conversions from nouns to verbs or adjectives are not only seen in compound words, inside (e.g. 小/大 便(n) > 小/大 完(v)) or outside (e.g. 寶貝(n) > 寶貝孩子(v) > 很寶貝(a)), but also in transliterated words (e.g. humor > 幽默(n) > 很幽默(a) > 幽他一默(v)). For lack of space and time, however, we will discuss here only conversions from predicate-object compound verbs to compound nouns. Predicate-object compound nouns may denote (i) a person (e.g. 管家 管事 司機 監工 監學), (ii) a thing (e.g. 枕頭 扶手 靠背 鎖紙), (iii) a disease or event (e.g. 中風 傷風 結核 咳嗽 敗血 革命 開會), (iv) a place (e.g. 隔壁 轉彎) or (v) a time (e.g. 晚上, 凌晨, 迎春, 立冬, 臨月). Conversions from predicate-object compound verbs to various types of compound nouns may be schematically represented in (38a,b) through (42a,b) and, furthermore, contrasted with their corresponding NPs:

(38) a. 

Vi → b. N c. CP N

管家

keep house

“keep house”

管家的

人

“a person who keeps house”

(40) a. 

Vi → b. N c. CP N

枕頭

pillow

“rest one’s head (on a pillow)”

枕頭的

東西

“a thing that one rests his head on”
In (38b) through (42b), conversions from predicate-object compound verbs to compound nouns are represented by zero-affixation, in which phonetically empty yet semantically relevant features matrix stands for the “zero” morpheme. A structural comparison between compound nouns (b) and corresponding noun phrases (c) seems to indicate that these compound nouns with covert head noun stems are essentially analogous to modifier-head compound nouns with overt head noun stems.\textsuperscript{22}

Note also that compound nouns such as \{積殘\}雪 and \{枯／落\}葉，though

\textsuperscript{22} Note that structural comparisons between compound nouns such as 管家 and 管家婆，轉彎 and 轉彎處，傍晚 and 晚時 also reveal the same fact.
superficially resembling predicate-object compound nouns, are in fact modifier-head compound nouns, as their English glosses “piled-up/unmelted snow, 
{withered/fallen} leaves” and Japanese glosses “積み重なった／融け残った”雪，{枯れ／落ち}（た）葉” may suggest.\textsuperscript{23}

4. The Hierarchical Structures and Linear Order of 
Constituent Stems: Contrastive Study of Chinese, 
English and Japanese Compound Words

The Generalized X-bar Conventions (1) define only the hierarchical structure 
or dominance relation among the constituent stems and say nothing about the 
linear order of these constituent stems, which must be relegated to other princi-
pies or parameters of grammar. Tang (1993), for example, has suggested a refor-
mulation of the original Case Filter (43) as (44), so that it will apply not only in 
s-syntax but also in w-syntax:

(43) Case Filter
Phonologically realized NPs must be assigned Case.
(44) Generalized Case Filter (Chinese)
Phonologically realized NPs and ’Ns must be assigned case.

He also assumes that there is a Case-assignment directionality parameter whose 
value (i.e. the choice between “from left to right” and “from right to left”) is left 
for the individual language to fix.

(45) Case-Assignment Directionality Parameter (Chinese)
  a. Transitive verbs (and adjectives) assign accusative Case from left to right.
  b. Prepositions assign oblique Case from left to right.\textsuperscript{24}

Transitive verbs (Vt or Ve) and adjectives (At) have accusative Case to dis-

\textsuperscript{23} Thus these compound nouns are equivalent in their internal structure \textsuperscript{1} modifier-head compounds nouns like 飛魚 (“flying fish; 飛び（ふ）魚”), 流水 (“running water; 流れ（ている）水”), 浮雲 (“floating cloud; 浮かん（かん）でいる云”), 舞女 (“dancing girl; 舞子”). Note 
that when the predicate stem is an intransitive achievement verb, the past participial 
form is used in English glosses and the perfective or root form in Japanese glosses. When the 
predicate stem is an activity verb, however, the present participial or gerundive form is 
used in English glosses and the progressive or root form in Japanese glosses.

\textsuperscript{24} We will postulate that genitive Case in Chinese is assigned by the genitive marker 的 to 
NPs, but not to ’Ns, occurring in the specifier position of NP.
charge, and NP and 'N in argument positions must be satiated by Case. The
generalized Case Filter (44), along with the Case-Assignment Directionality
Parameter (45), will require that object noun stems in predicate-object com-
ounds appear to the right of predicate verb stems to receive accusative Case. In
addition, the transitive verb stem 敬 in (46), which takes the noun stem 礼 as
object inside the compound verb 敬礼 and has thus discharged its transitivity,
may not take an object NP 老師 outside the compound verb. In this case the NP
老師 must be introduced by a preposition like 向 so as to receive oblique Case.

(46) a. 學生敬禮 (†老師)。
   b. 學生向老師敬禮。

The transitive verb 出 in (47), on the other hand, may either incorporate the
object noun stem 版, thereby retaining its transitivity and taking object NP 你的
新書 outside the compound (as in (47a)), or discharge its transitivity to the object
noun stem 版, thereby resulting in an intransitive verb (as in (47b)):

(47) a. 書局什麼時候要出版你的新書？
   b. 你的新書什麼時候要出版？

This analysis runs into difficulty, however, when we consider noun stems
occurring as subject in subject-predicate compounds (e.g.地震) or as modifier in
modifier-head compounds (e.g.空襲). If noun stems as well as NPs require Case as
is suggested in (44), what assigns nominative Case to the subject noun stem and
oblique Case to the modifier noun stem? And how are we going to account for the
distinction as well as parallelism between the compound noun 地震 and the sen-
tence 大地震動, between the compound verb 空襲 and the verb phrase 從空中襲擊,
or between the compound noun 英語老師 and the noun phrase 英語的老師? Thus
Tang (1994a) is forced to reject (44) and opts for (48).

(48) Argument-Placement Parameter (Chinese)

Predicate verb (and adjectives) place the internal argument (i.e. object and
complement) on their right, and the external (i.e. subject) and semantic (i.e.
adjunct or adverbal) arguments on their left.

Note that the Argument-Placement Parameter (48) requires not only that
objects and complements appear to the right of predicate verbs but also that
subjects and adjuncts appear to the left of predicate verbs. The loss and reten-
tion of transitivity can still be accounted for depending on whether the transitive verb stem discharges its transitivity and thus becomes intransitive, as in (46a), or retains its transitivity by incorporating the object noun stem and thus remains transitive.

In contrast to Chinese compound nouns, which consist of various types of grammatical structure, English compound nouns manifest only one type of grammatical structure — modifier-head compounds. The grammatical relations between modifier and head stems, however, are quite varied, as illustrated in (49):

(49) a. compound nouns consisting of adjective modifiers and noun heads, which may be schematically represented as “[A/N]ₙ,” with the head N and the modifier A bearing the relation between the subject noun, and the predicate adjective (i.e. [N∥A]): darkroom, madman, loudmouth, redcap
b. compound nouns consisting of noun modifiers and deverbal noun heads, which may be schematically represented as “[N/(Vi>)N]ₙ,” with the modifier N and the head V bearing the relation between the subject noun and the predicate (intransitive) verb (i.e. [N∥Vi]): sunrise, toothache, rainfall
c. compound nouns consisting of verb (including gerund) modifiers and noun heads, which may be schematically represented as “[Vi/N]ₙ,” with the head N and the modifier V bearing the relation between the subject noun and the predicate (intransitive) verb (i.e. [N∥Vi]): rattlesnake, flashlight, crybaby (Vi/N); dancing girl, washing machine, working party (Vi-ing/N)
d. compound nouns consisting of verb (including gerund) modifiers and noun (including gerund and agential noun in “-er”) heads, which may be schematically represented as “[Vt/N]ₙ,” with the modifier V and the head N bearing the relation between the predicate (transitive) verb and the

25. The exemplifying compound nouns and analyses of the grammatical relations between constituent stems are essentially based on Quirk et al. (1972:1021–1026).
26. For example, the compound noun “darkroom” is related in meaning and grammar to the sentence (or NP) “the room (that) is dark.”
27. For example, the compound noun “sunrise” is related in meaning and grammar to the sentence “the sun rises.”
28. For example, the compound nouns “rattlesnake” and “dancing girl” are related in meaning and grammar to the sentence (or NP) “the snake (that) rattles” and “the girl (who) dances,” respectively.
object noun (i.e. \([Vt|N]\)) call-girl, scarecrow, drawbridge (Vt-N); chewing gum, drinking-water, cooking apple (Vt-ing; N)

e. compound nouns consisting of noun modifiers and deverbal noun (including gerund and agential noun in "-er") heads, which may be schematically represented as \(\langle N/(Vt > N)\rangle_s\), with the head V and the modifier N bearing the relation between the predicate (transitive) verb and the object noun (i.e. \([Vt|N]\)): blood test, haircut, book review (N/(Vt > N); sightseeing, housekeeping, brainwashing (N/Vt-ing); taxpayer, song writer, stock holder (N/Vt-er)

f. compound nouns consisting of noun (including deverbal noun and gerund) modifiers and noun (including deverbal noun and gerund) heads, which may be schematically represented as \(\langle N/N\rangle_s\), with modifier or head nouns functioning as various types of adverbials object or oblique objects of omitted prepositions: swimming pool, diving board, adding machine (V-ing/N); daydreaming, churchgoing, handwriting (N-V-ing); baby-sitter, back swimmer, playgoer (N/V-er); homework, boat-ride, gunfight (N; (V > N); searchlight, springboard, plaything ((V > N)N)

g. compound nouns consisting of noun modifiers and noun heads, neither of which is deverbal (including the gerundive V-ing and the agential V-er), namely, \([N/N]\): windmill, toy factory, bloodstain, doorknob, girlfriend, frogman; paperback, egghead.

29. For example, the compound noun “call-girl” is related in meaning and grammar to the sentence “someone calls the girl” or the NP “the girl that is on call,” and “chewing gum” to “someone chews gum” or “gum for chewing.”

30. For example, “blood test” is related to “someone tests blood” or “the testing of blood,” “sightseeing” to “someone sees sights” or “the seeing of sight,” and “taxpayer” to “someone (who) pays tax(es).”

31. For example, “swimming pool” is related to “someone swims in the pool” or “a pool for swimming,” “daydream” to “someone dreams during the day” or “dreaming during the day,” “baby-sitter” to “someone sits with the baby,” “homework” to “someone works at home,” “searchlight” to “someone searches with a light,” and “springboard to spring from a board.”

32. Quirk et al. (1972:1024) term compound nouns of this type as “verbless compounds,” because when such compound nouns are paraphrased into corresponding sentences, verbs must be provided from outside the compound nouns. Thus, “windmill” can be paraphrased as “the wind powers the mill,” “toy factory” as “the factory produces toys,” “bloodstain” as “the blood produces stains,” “doorknob” as “the door has a knob,” “girlfriend” as “the friend is a girl,” and “frogman” as “the man is like a frog.”

33. The last two examples are termed by Quirk et al. (1972:1026) as “bahuvrihi compounds,” because they name an entire thing by specifying some feature of it. Thus “a paperback” is “a book that has a paperback” and “an egghead” is “a person who has a head like an egg, namely, an intellectual.”
As illustrated above, despite the differences in semantic-syntactic relations between constituent stems, all English compound nouns fall under the modifier-head type and thus are endocentric and head-final (or rightheaded) in construction, in marked contrast with Chinese compound nouns which may be head-initial (e.g. predicate-object and predicate-complement compound nouns from which compound nouns may be converted), head-final (e.g. modifier-head compound nouns), double-headed (e.g. coordinative and reduplicative compound nouns) or headless (e.g. subject-predicate compound nouns). In addition, unlike Chinese compound nouns which may consist of free or bound morphemes, English compound nouns are generally composed of free morphemes. Otherwise, English and Chinese compound nouns are both endocentric in construction and binary in branching and can be generated or licensed by our generalized X-bar conventions, as illustrated below:

\[(50)\]

\[a. \quad \begin{array}{c}
 \text{N} \\
 \text{dark room}
 \end{array} \quad b. \quad \begin{array}{c}
 \text{N} \\
 \text{sunrise}
 \end{array} \quad c. \quad \begin{array}{c}
 \text{N} \\
 \text{rattlesnake}
 \end{array} \]

\[d. \quad \begin{array}{c}
 \text{N} \\
 \text{call girl}
 \end{array} \quad e. \quad \begin{array}{c}
 \text{N} \\
 \text{taxpayer}
 \end{array} \quad f. \quad \begin{array}{c}
 \text{N} \\
 \text{swimming pool}
 \end{array} \]

\[g. \quad \begin{array}{c}
 \text{N} \\
 \text{windmill}
 \end{array} \]

Note that with the exception of (50a), which contains an adjective stem as modifier, all the other English compound nouns consist of noun stems (including

34. A few exceptions are "cranberry" and "bilberry."
deverbal and gerundive ones).

English compound adjectives, like compound nouns, seem to fall under the modifier-head compound type, as illustrated below:35

\[56\]

(a) compound adjectives consisting of noun modifiers and present-participle heads (\[[N/Vt\text{-}ing]\]), with the head Vt-ing and the modifier N bearing the relation between the predicate (transitive) verb and the object noun (i.e. \[[Vt|N]\]):36 breathtaking, fact-finding, life-giving, self-justifying

(b) compound adjectives consisting of noun modifiers and present-participle heads (\[[N/V\text{-}ing]\]), with modifier Ns functioning as various types of adverbal objects or oblique objects of omitted prepositions:37 ocean-going, fist-fighting, law-abiding, mouth-watering

c. compound adjectives consisting of noun modifiers and past-participle heads (\[[N/V\text{-}en]\]), with modifier Ns functioning as various types of adverbal objects or oblique objects of omitted prepositions38 heart-felt, handmade, custom-built, town-bred

d. compound adjectives consisting of adverb or adjective modifiers and present-participle heads (\[[A(d)/V\text{-}ing]\]), with modifier As and Ads functioning as adverbs or complements39 hard-working, far-reaching, well-meaning, high-sounding

e. compound adjectives consisting of adverb or adjective modifiers and past-participle heads (\[[A(d)/V\text{-}en]\]), with modifier As and Ads functioning as adverbs:40 quick-frozen, widespread, new-laid, far-fetched

f. compound adjectives consisting of noun modifiers and adjective heads (\[[N/A]\]), with modifier Ns functioning as adverbal objects or oblique objects of omitted prepositions41 class-conscious, tax-free, home-sick, war-weary; grass-green, snow-white, brick red, ash-blonde

35. Examples and their grammatical analyses are from Quirk et al. (1972:1027–1028).
36. "Breathtaking," for example, is related to "someone takes breath."
37. For example, "ocean-going" is related to "something goes across oceans," "fist-fighting" to "someone fights with his fists," and "law-abiding" to "someone abides by the law."
38. For example, "heart-felt" is related to "something is felt in the heart," "handmade" to "something is made by hand," and "custom-built" to "something is built in accordance with the customer's wishes."
39. For example, "hard-working" is related to "someone works hard," "far-reaching" to "something reaches far," and "well-meaning" to "someone means well."
40. For example, "quick-frozen" is related to "something is frozen quickly," "widespread" to "something is spread wide," and "new-laid" to "something is newly laid."
41. For example, "class-conscious" is related to "someone is conscious with respect to class," "tax-free" to "something is free of tax," and "homesick" to "someone is sick for his home."
g. compound adjectives consisting of two coordinative adjectives 
\([-A\&A_{.,.}]_{,}\);\(^{42}\) bitter-sweet, deaf-mute, Anglo-American, Sino-Japanese, phonetic-syntactic, socio-economic

h. compound adjectives consisting of adjective modifiers and head nouns with the adjective suffix “-ed” \([-A/N-\text{ed}]\);\(^{43}\) white-bearded, longhaired, blue-eyed, three-cornered

Like English compound nouns, English compound adjectives fall under the modifier-head type, which is endocentric and head-final or right-headed (perhaps, with the exception of coordinative compound adjectives \((51g)\), which may be considered as double-headed), as illustrated below:

\((52)\) a. \( \begin{array}{c}
\text{A} \\
\text{\textquotesingle N \ 'A} \\
\text{breath} \\
\text{\textquotesingle Vt \ 'N} \\
\text{take -ing} \\
\text{\textquotesingle Vt \ 'A} \\
\text{feel -en} \\
\text{\textquotesingle Vi \ 'A} \\
\text{go -ing} \\
\text{\textquotesingle Vt \ 'A} \\
\text{heart} \\
\text{\textquotesingle N \ 'A} \\
\text{ocean} \\
\text{\textquotesingle N} \\
\text{\textquotesingle A} \\
\text{\textquotesingle A} \\
\end{array} \)

b. \( \begin{array}{c}
\text{A} \\
\text{\textquotesingle N \ 'A} \\
\text{breath} \\
\text{\textquotesingle Vt \ 'N} \\
\text{take -ing} \\
\text{\textquotesingle Vt \ 'A} \\
\text{feel -en} \\
\text{\textquotesingle Vi \ 'A} \\
\text{go -ing} \\
\text{\textquotesingle Vt \ 'A} \\
\text{heart} \\
\text{\textquotesingle N \ 'A} \\
\text{ocean} \\
\text{\textquotesingle N} \\
\text{\textquotesingle A} \\
\text{\textquotesingle A} \\
\end{array} \)

c. \( \begin{array}{c}
\text{A} \\
\text{\textquotesingle N \ 'A} \\
\text{breath} \\
\text{\textquotesingle Vt \ 'N} \\
\text{take -ing} \\
\text{\textquotesingle Vt \ 'A} \\
\text{feel -en} \\
\text{\textquotesingle Vi \ 'A} \\
\text{go -ing} \\
\text{\textquotesingle Vt \ 'A} \\
\text{heart} \\
\text{\textquotesingle N \ 'A} \\
\text{ocean} \\
\text{\textquotesingle N} \\
\text{\textquotesingle A} \\
\text{\textquotesingle A} \\
\end{array} \)

d. \( \begin{array}{c}
\text{A} \\
\text{\textquotesingle Ad \ 'A} \\
\text{hard} \\
\text{\textquotesingle Vt \ 'A} \\
\text{work -ing} \\
\text{\textquotesingle Vt \ 'A} \\
\text{freeze -en} \\
\text{\textquotesingle Vt \ 'A} \\
\text{bitter} \\
\text{\textquotesingle Ad \ 'A} \\
\text{quick} \\
\text{\textquotesingle Vt \ 'A} \\
\text{\textquotesingle Vt \ 'A} \\
\text{\textquotesingle Ad \ 'A} \\
\text{\textquotesingle A} \\
\text{\textquotesingle A} \\
\end{array} \)

e. \( \begin{array}{c}
\text{A} \\
\text{\textquotesingle Ad \ 'A} \\
\text{hard} \\
\text{\textquotesingle Vt \ 'A} \\
\text{work -ing} \\
\text{\textquotesingle Vt \ 'A} \\
\text{freeze -en} \\
\text{\textquotesingle Vt \ 'A} \\
\text{bitter} \\
\text{\textquotesingle Ad \ 'A} \\
\text{quick} \\
\text{\textquotesingle Vt \ 'A} \\
\text{\textquotesingle Vt \ 'A} \\
\text{\textquotesingle Ad \ 'A} \\
\text{\textquotesingle A} \\
\text{\textquotesingle A} \\
\end{array} \)

f. \( \begin{array}{c}
\text{A} \\
\text{\textquotesingle Ad \ 'A} \\
\text{hard} \\
\text{\textquotesingle Vt \ 'A} \\
\text{work -ing} \\
\text{\textquotesingle Vt \ 'A} \\
\text{freeze -en} \\
\text{\textquotesingle Vt \ 'A} \\
\text{bitter} \\
\text{\textquotesingle Ad \ 'A} \\
\text{quick} \\
\text{\textquotesingle Vt \ 'A} \\
\text{\textquotesingle Vt \ 'A} \\
\text{\textquotesingle Ad \ 'A} \\
\text{\textquotesingle A} \\
\text{\textquotesingle A} \\
\end{array} \)

“grass-green” to “something is green like grass,” and “snow-white” to “something is as white as snow.”

42. Thus “bitter-sweet” means “bitter and sweet,” and “Swedish-American” means “between Swedish and American (people).”

43. This type of compound adjective, though very productive, is not listed in Quirk et al. (1972). “White-bearded,” for example, may be paraphrased as “someone has a white beard,” and “three-cornered” as “something has three corners.”
Note that both in compound nouns and adjectives, predicate verb and adjective stems still retain their theta-marking or argument-taking properties. Thus, when predicate stems are adjectives (e.g. "darkroom white-bearded") or intransitive verbs (e.g. "sunrise, rattlesnake, oceangoing, hard-working"), they may take noun stems as internal arguments (e.g. "darkroom, long-haired, sunrise, rattlesnake") or take noun, adverb or adjective stems as semantic arguments or adjuncts (e.g. "oceangoing, hard-working, far-reaching") inside compounds. If entire compounds are adjectives, moreover, they may take nouns as external arguments or heads outside compounds (e.g. "a white-bearded gentleman, oceangoing fishermen, hard-working students, bitter-sweet romance"). When predicate stems are transitive verbs (e.g. "call-girl, tax-payer, breathtaking"), however, they must take noun stems as internal arguments (e.g. "call-girl, tax-payer, breathtaking") or in the case of past participles, which have lost their transitivity by becoming verbal adjectives, take adjectives, adverbs or nouns as semantic arguments or adjuncts (e.g. "quick-frozen, well-educated, heartfelt"). If, moreover, entire compounds are adjectives, they may take nouns as external arguments or heads outside compounds (e.g. "quick-frozen food, well-educated ladies, heartfelt gratitude").

Note also that when transitive verb stems in compound nouns and adjectives are converted into noun stems by zero-affixation (e.g. "haircut"), by taking the present participle "-ing" (e.g. "fact-finding") or by taking the agential "-er" (e.g. "taxpayer"), they seem to have lost their (accusative-) Case-Assignment capacity; thus object noun stems appear to the left (e.g. "haircut, fact-finding, taxpayer") instead of the right, as is the case with transitive verbs followed by object NPs in VP (e.g. "cut someone's hair, find facts, pay taxes"). As for noun

44. Note that the present participial "-ing" and the agential "-er" differ from the past participial "-en" in that the former still retain their transitivity or internal-argument-taking capacity inside compounds (e.g. "breathtaking performance, taxpayers' money").

45. Note that these nouns are internal arguments when past participles function as transitive verbs (e.g. "freeze food quickly, educate ladies well, feel gratitude in the heart").
and adjective stems occurring in the head position (e.g. “sunrise, rattlesnake, call-girl, swimming pool, windmill, tax-free, grass-green”), they are incapable of assigning Cases just as nouns and adjectives in syntactic constructions. Thus, all modifier stems in English compound nouns and adjectives, regardless or their categorial (i.e. noun, adjective, adverb or verb) and grammatical (i.e. internal, external or semantic argument) status, appear to the left of head stems. This has led us to postulate the following head-final parameter for English compounds:

(53) Head-Final Parameter (English)

All modifiers, regardless of their categorial and grammatical status, appear to the left of their heads in English compounds.

The Head-Final Parameter (53) for English is markedly different from the Argument-Placement Parameter (48) for Chinese. This is because, while English compounds are without exceptions head-final (or right-headed) and thus may be stated strictly in terms of “head parameter,” Chinese compounds may be head-final, head-initial or headless. The most essential difference between English and Chinese compounds, however, seems to lie in the fact that, while English transitive verb stems occurring in the head or modifier position of compounds lose their transitivity by converting into noun stems and thus may not take internal arguments or object noun stems to their right, Chinese transitive verb stems occurring in the head position of compounds retain their transitivity in the sense that they may take object noun stems and complement verb or adjective stems to their right. Thus, in order to facilitate a comparison between English and Chinese compounds in terms of the linear order of constituent stems, the Argument-Placement (48) for Chinese may be reformulated as follows.

(54) Restricted Head-Final Parameter (Chinese)

Chinese compounds are head-final, except for those containing transitive verbs taking object nouns and transitive and intransitive verbs taking non-ergative complement verbs and adjectives, in which case predicate verbs

46. We will consider double-headed coordinative compound adjectives also as head-final or right-headed.
47. That is, “accusative” or “unergative.”
are heads and complements as well as objects appear to the right of their heads.48

Note that it seems impossible to reformulate the Head-Final Parameter (53) for English compounds in terms of the Argument-Placement Parameter like Chinese, because, in English, compounds external arguments (e.g. "sunrise, rattlesnake") and internal arguments (e.g. "haircut, scarecrow") may appear to either the left or right of their predicative verbs. Note also that while the predicate verb in Chinese compounds retains its verbhood and transitivity, the predicate verb in English compounds loses its verbhood and transitivity by converting from verb to noun or by taking the gerundive "-ing," the present participial "-ing," the past participial "-en" or the agential "-er." In both languages, however, the theta-marking or argument-taking properties of predicate verbs remain intact. Thus, when the predicate verb is intransitive, it may take an external argument, and when the predicate verb is transitive, it may take an internal argument in addition to an external argument.

English compound verbs, unlike English compound nouns and adjectives, are characterized by their smallness in number and paucity of variety. They are results of back-formation from compound nouns, and there are only two types of compound verbs:

(55) a. compound verbs consisting of predicate transitive verbs and the preceding object nouns: (sightseeing >) sightsee, (brainwashing >) brainwash, (house-hunting >) househunt, (housekeeping >) housekeep

b. compound verbs consisting of predicate verbs and the preceding adverbial nouns: (spring-cleaning >) spring-clean, (globe-trotter >) globe-trot, (air-conditioner >) air-condition, (browbeaten >) browbeat, (housebroken >) housebreak, (mass-production >) massproduce.

Selkirk (1982:15), however, gives only one type of compound verb consisting of what she calls a preposition and a verb ([P/V]v): "outlive, overdo, underfeed, offset, uproot, overstep." She also adds compound types "[P/N]N" and "[P/A]A" to compound nouns (e.g. "overdose, underdog, outbuilding, uprising, onlooker, afterthought, uptown, inland") and compound adjectives (e.g. "overwide, overabundant, underripe, ingrow, underprivileged, above-mentioned") and postulate

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48. This parameter is reminiscent of Huang's (1982:41) "X-bar Structure Constraint," which states that "The X structure of Chinese is of the form:
   a. \[ x_n \ Y^{n-1} \ YP^* \] iff \( n = 1 \) and \( X \neq N \ [\text{and}] \)
   b. \[ x_n \ YP^* \] otherwise."
the following context-free word structure rules:

\[(50)\]

\[\begin{align*}
\text{a. } N & \cdot \begin{array}{c}
\text{A} \\
\text{V} \\
\text{P} \\
\text{N}
\end{array} \begin{array}{c}
\text{N}
\end{array} \\
\text{b. } A & \cdot \begin{array}{c}
\text{A} \\
\text{P} \\
\text{N}
\end{array} \begin{array}{c}
\text{A}
\end{array} \\
\text{c. } V & \cdot \text{PV}
\end{align*}\]

Her "prepositions," however, seem to fall under "adverbial particles" and "prefixes." For example, "out-" (e.g. "outgrow, outline, outrun, outweigh"), "over-" (e.g. "overdo, overeat, overdressed, overconfident") and "under-" (e.g. "undercook, underfeed, underworked, underprivileged") are listed as "prefixes of degree or size" and "over" (e.g. "overspill") and "under" (e.g. a "underpath") as "particles" in Quirk et al. (1972:98-986). Thus it can be said that lexical categories occurring in both Chinese and English compounds are mainly N, A, V and Ad. English compound verbs, like English compound nouns and adjectives, are endocentric in construction, binary in branching, and head-final or rightheaded, as illustrated below:

\[(50)\]

\[\begin{align*}
\text{a. } V & \begin{align*}
\text{'N} & \text{'V} \\
\text{see} & \text{sight}
\end{align*} \\
\text{b. } V & \begin{align*}
\text{'N} & \text{'V} \\
\text{clean} & \text{spring}
\end{align*} \\
\text{''sightsee''} & \text{''spring-clean''}
\end{align*}\]

English compounding, like Chinese compounding, is in principle recursive. This is especially so with compound nouns, as illustrated below: \(^{49}\)

\(^{49}\) Examples are from Selkirk (1982:15).
Japanese, a most typical head-final language, is also head-final in compounding (perhaps, with the exception of certain V-V compounds), as illustrated below:\(^{50}\)

\(^{50}\) compound nouns

a. those consisting of adjectives modifiers and noun heads ([A/N]_N): 青い空, 弱火, 白雪, 近道, 厚紙, 汗酒, 薄雲, 赤土, 厚化粧, 嬉し涙

b. those consisting of noun modifiers and noun heads ([N/N]_N): 石橋, 北風, 朝酒, 夕飯, 葉山, 表門, 毛蟹, 夏風, 土佐犬

c. those consisting of intransitive verb modifiers and noun heads ([V\_\(i\)-\(\_\(0\)) N]_N), with the head N and the modifier Vi bearing the relation between the subject noun and the predicate intransitive verb ([N∥Vi]): 枯れ草,
d. those consisting of transitive verb modifiers and noun heads ($[V_{t-0}/N]_n$), with the modifier $V_t$ and the head $N$ bearing the relation between the predicate transitive verb and the object noun ($[V_tN]$): 落ちた枝、生け花、貫い子、飼い犬、折り鶴

e. those consisting of noun modifiers and nominalized intransitive verb heads ($[N/V_{t-0}]_n$), with the modifier $N$ and the head $V_i$ bearing the relation between the subject noun and the predicate intransitive verb ($[N\|V_i]$): 雨降り、地鳴り、心変わり、気抜け、胸騒ぎ、肩凝り、化粧崩れ、拍子抜け

f. those consisting of noun modifiers and nominalized transitive verb heads ($[N/V_{t-0}]_n$), with the head $V$ and the modifier $N$ bearing the relation between the predicate transitive verb and the object noun ($[VtN]$): 人殺し、水撒き、顔合せ、魚釣り、靴磨き、金儲け、石蹴り、息抜き、草取り、暇乞い、口止め、魔法使い

g. those consisting of noun modifiers and nominalized (transitive or intransitive) verb heads ($[N/V_{t-0}]_n$), with modifier $Ns$ functioning as adverbials of head verbs ($[N/V]$): 前払い、賃貸し、音読み、先送り、子飼い、横流し、門前払い、猫可愛がり、夜飛び、口答え、床擦れ、目見け、雨宿り、男泣き、雑魚倉、目障り、世帯差れ、板の間稼ぎ

h. those consisting of adjectival modifiers and nominalized (transitive or intransitive) verb heads ($[A/V_{t-0}]_n$), with modifier $As$ functioning as adverbials of head $Vs$ ($[A/V]$): 早起き、運喰き、高飛び、荒稼ぎ、固太り、長続き、厚切り、白焼き、早変わり、若死に

i. those consisting of adjectival noun modifiers and nominalized (transitive or intransitive) verb heads ($[AN/V_{t-0}]_n$), with modifier $ANs$ functioning as adverbials of head $Vs$ ($[AN/V]$): 無理強い、馬鹿騒ぎ

j. those consisting of verb modifiers and nominalized (transitive or intransitive) verb heads ($[V_{-0}/V_{t-0}]_n$), with modifier $Vs$ functioning as adverbials of head $Vs$ ($[V/V]$): 立ち食い、立ち聞き、待ち促け

k. those consisting of onomatopoeic or adverb modifiers and nominal heads: にこにこ顔 ($[O_{n}/N]_n$); しい飲み、がた落ち、ごろ寝 ($[O_{n}/V_{-0}]_n$); 又聞き、共稼ぎ ($[Ad/V_{-0}]_n$)

1. those consisting of coordinative nouns, verbs, adjectives and adjectival

52. The "-(i)" stands for the nominalizing morpheme, whose distribution is exactly the same as that of the thematic vowel "-(i)"; the thematic "-(i)" and the nominalizing "-(i)" can be considered as one and the same morpheme.
nouns: 親子・月日・草木・山川 ([N&N]N); 実り買い・行き来・上げ下げ ([V-()&V-()]N); 白黒・高低 ([A&A]N); 53上手下手 ([AN&AN]N)
m. those consisting of adverb modifiers and root adjective heads ([Ad/A]N):
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(60) compound adjectives and adjectival nouns
a. those consisting of noun modifiers and adjective heads ([N/A]AM), with
the modifier N and the head A bearing the relation between the subject
noun and the predicate adjective ([A][N]): 耳遠い・力強い・腹黒い・淚腺い・
縁遠い・口堅い・大事な・気味悪い・意地汚い 54([N/A]A); (手荒／身近／
口重／口薄／気早／気垢／幅広) い／な ([N/A]A/A)
b. those consisting of noun modifiers and adjective heads ([N/A]A), with
modifier Ns functioning as adverbiais; 新しい・塩辛い

c. those consisting of adjectival or adjectival noun modifiers and adjective
heads ([A(N/A)]A), 55 with modifier As functioning as adverbiais; 深黒い・
薄暗い・重苦しい ([A(A)]A); 馬鹿でかい ([AN/N]A)
d. those consisting of verb modifiers and adjective heads ([V-()&A]A), 56 with
modifier Vs functioning as adverbiais; 見苦しい・蒸し暑い・眠み辛い・飽
き易い・回りづらい・粘り強い

e. those consisting of onomatopoeic adverb modifiers and adjective heads
([On/A]A); ひょう長い・むず癒しい・ほろ苦い

f. those consisting of coordinative adjectives ([A&A]A); 甘酸っぱい・甘辛い・
青白い・苦しむしい・狭苦い 57
g. those consisting of reduplicative adjectives ([A=A]A); 苦苦しい・重重し
い・軽々しい・荒らしい・猛猛しい・初初しい・痛痛しい・仰仰しい・神神し
い・憎憎しい・瞑滅しい・騒騒しい 58

53. The root form (A) of adjective (A い) in Japanese can be used as a noun or an adjectival
noun (e.g. “腹黒・色白・身重・身軽”); thus compound nouns consisting of coordinative
root-form adjectives can be considered as endocentric (or double-headed) in construction.
54. In “塩辛い” the modifier noun “塩” seems to function as adverbial (cf. “塩のように辛
い”) rather than as subject.
55. “馬鹿でかい” for example, can be paraphrased in Japanese as “馬鹿にでかい。”
56. “見苦しい” and “蒸し暑い” for example, can be paraphrased as “見るに苦し” and “蒸
すように暑い”
57. (60e) differs from (60b) in that only the former type can be paraphrased in Japanese as “A
くて A い” or “A くく A い.”
58. This is quite a productive type of compound adjective. In addition, the root form of “苦苦
しい” etc. is “苦苦し” rather than “苦苦” etc.
(61) compound verbs
a. those consisting of noun modifiers and intransitive verb heads \([N/V_i]_v\), with the modifier N and the head Vi bearing the relation between the subject noun and the predicate intransitive verb \([N[V_i]]_v\): 気（が）付く、泡立つ・血走る・色付く・黒張る・傷つく・度重なる・目覚める
b. those consisting of noun modifiers and transitive verb heads \([N/Vt]_v\), with the head Vt and the modifier N bearing the relation between the predicate transitive verb and the object noun \([Vt[N]]_v\): 気（を）遣う・傷つける・息づく・陣取る・腰掛ける・紛解く・口出すす・盾突く・物語る・押出す・巻立つ・天翔ける
c. those consisting of noun modifiers and transitive or intransitive verb heads \([N/V]_v\), with modifier Ns functioning adverbials of head verbs \([N/V]_v\): 旅（に）立つ・心（に）掛ける・爪（で）繰る・月（で）指す・爪（先で）立つ
d. those consisting of adjective modifiers and verb heads \([A/V]_v\), with modifier As functioning as adverbials of head verbs \([A/V]_v\): 長引く・若返る・近寄る・遠ざかる・薄汚れる
e. those consisting of onomatopoeic modifiers and verb heads \([On/V]_v\): そよ（そよて）吹く・ごった返す・すっぽ抜ける・べたつく・ぐらつく・ざわつく・だぶつく・ごったつく
f. those consisting of (transitive or intransitive) verb modifiers and (transitive or intransitive) verb heads \([V_{(n)}/V]_v\), with the modifier V and the head V bearing a “manner-activity” relation. In this type of \(V_1-V_2\) compound verb, it is the second verb, rather than the first, that determines not only the subcategorization but also the theta-grid of the entire compound: 泣き喚く (Vt.<Theme, Agent>\textsuperscript{59}), 泣き崩れる (Vt.<Patient>), 泣き諦す (Vt.<Patient, Agent>), 遊び暮らす (Vt.<Time(Location)Agent>). Note that this type of \(V_1-V_2\) compound verb can be paraphrased as “\(V_1\cdot \text{Te} \ V_2\)” (e.g. “泣いて喚く・遊んで暮らす” or “\(V_1\cdot \text{Te} \ V_2\)” (e.g. “泣きながら喚く・遊びながら暮らす”).
g. those consisting of (transitive or intransitive) verb modifiers and (transitive or intransitive) verb heads \([V_{(-n)}/V]_v\), with the modifier V and the head V bearing a “cause-effect” relation. It is also the second verb that determines the subcategorization and theta-grid of the entire compound: 押し潰す (Vt.<Theme, Agent>), 取り除く (Vt.<Theme, Agent>), こじ開ける (Vt.<Theme, Agent>), 通り着く (Vt.<Goal, Agent>), 泣き溜らす (Vt.

59. For the format and content of the theta-grids used in this paper, see Tang (1992c, 1994c).
(Theme, Patient)). Note that this type of \( V_1 \cdot V_2 \) compound verb can be paraphrased as “\( V_1 \cdot V_2 \)” (e.g. “押して潰す・逾って着く”).

h. those consisting of two coordinative verbs, both of which should be identical in terms of subcategorization, theta-grid and semantic import ([V & V]: 搖れ動く ([Vt.<Theme, Agent>]60), 搖すり動かす (Vt.<Theme, Agent>)).

i. those consisting of transitive or intransitive verb heads and aspectual or phasal verbs (e.g. “掛ける・掛かる・出す” (inchoative), “始める” (inceptive), “終る” (completive), “終える” (terminative), “上げる” (accomplished), “懸く・切る” (exhaustive), “結ける・続く” (continuative), “過ぎる” (excessive)), complement ([V & V]). This is the only Japanese compound type in which heads occur word-initially rather than word-finally, because the theta-grid as well as verb subcategorization is determined by the first (i.e. head) verb rather than the second (i.e. complement) verb: 書き (掛ける／出す／始める／終える／上げる／懸く／切る／結ける／過ぎる) (Vt.<Theme(Goal)Agent>),降り (掛かる／掛る／出る／続く／過ぎる) (Vt.<Theme>). Note that these aspectual and phasal complement verbs are very productive in that they can be suffixed to almost any subcategorial type of verbs; there are certain cooccurrence restrictions holding between the head and complement verbs, though. Note also that we cannot paraphrase this type of \( V_1 \cdot V_2 \) compound verb either as “\( V_1 \cdot V_2 \)” (e.g. “書いて始める・降って出る”) or as “\( V_1 \)ながら\( V_2 \)” (e.g. “書きながら始める・降りながら出る”).

The above Japanese compounds can be generated or licensed by our generalized X-bar conventions; in addition, they are all endocentric, binary-branching and head-final (with the exception of subtype (61i)) in construction:

62 a. \[ N \]
\[ 'A ‘N \]
\[ tika miti \]
\[ “近道” “石橋” \]

b. \[ N \]
\[ 'A ‘N \]
\[ ishi hasi \]
\[ “石橋” “近道” \]

c. \[ N \]
\[ 'A ‘N \]
\[ kare kusa \]
\[ “枯れ草” “石橋” \]

60. (61h) can also be included under (61g). Thus “揺すり動かす” (move (something) by shaking (it)); “shake and move” and “揺すり起こす” (wake (someone) up by shaking (thim)) will fall under the same subtype. See also Kageyama (1993; 74 177) for a detailed discussion of Japanese V-V type compound verbs from a slightly different point of view.
d. N
   'Vt
   yude
   "茹で卵"

e. N
   'N
   ame
   "雨降り"

f. N
   'N
   fur -i
   ma
   hoo
   tukaw -i
   "魔法使い"

g. N
   'N
   mae
   "前払い"

h. N
   'A
   haya
   "早起き"

i. N
   'AN
   muri
   "無理強い"

j. N
   'V
   tat
   "立ち食い"

k. N
   'On
   gui
   "ぐい飲み"

l. N
   'N
   oya
   "親子"

m. (Apare
   'Ad
   goku
   "極細"

|a. A
   'N
   mimi
   "耳遠い"

b. A
   'A
   too
   "目新しい"

c. A
   'A
   me
   "浅黒い"

d. A
   'V
   mi
   "見苦しい"

e. A
   'On
   kurusi
   "ひょろ長い"

f. A
   'A
   hyoro
   "甘酸っぱい"
As for the linear order of the constituent stems of Japanese compounds, it can be stated in terms of either head position or argument-placement directionality.

a. Head-Final Parameter (Japanese)

Japanese compounds are head-final, except for those containing an aspectual or phrasal verb as the right-most constituent.

b. Argument-Placement Parameter (Japanese)

Predicate verbs and adjectives place nominal, adjectival and adverbial arguments (internal, external or semantic) on their left and verbal complements on their right.
A comparison of parameters (48), (53), (54) and (65) reveals that it is much simpler and more general to state the linear order of compound constituent stems in terms of head position than in terms of argument-placement directionality. Much simpler because notions such as head-initial (or left-headed) and head-final (or right-headed) are much easier to define and understand than notions such as internal, external and semantic arguments, and more general because distinctions of arguments are relevant only to predicate verbs and adjectives (and, perhaps, predicate nouns also), but not to ordinary nouns. Thus argument placement parameters may refer to compounds with verb and adjective heads, but not necessarily to compounds with noun heads. It is by no means the case, however, that the newly-proposed argument-placement parameter offers no merits. For one thing, the proposed parameter applies not only to w-syntax but also to s-syntax, which is not the case with the head-position parameter. For another, this parameter brings out more clearly the relation between w-syntax and s-syntax, at least for certain aspects of certain languages. For a much more detailed discussion on this topic with regard to Chinese compounds, see Tang (1993, 1994a, 1994b).

5. Conclusion

In this paper, we have presented our generalized X-bar conventions and discussed how they apply to three typologically distinct as well as genetically unrelated languages — Chinese, English and Japanese — to license compound word formation. We have shown that our generalized X-bar conventions are justified to the extent that word-formation in these languages is characterized by endocentricity (egocentricity is a rare exception rather than a general rule), binary branching and recursiveness, all of which are provided by our additional conventions. The new variable symbol “X,” which stands for a stem or morpheme, free or bound, also enables us to account for, quite straightforwardly, why a word is “syntactic island” and even to define the notion of an island more elaborately.

We have also tried to incorporate in our discussion certain well-established concepts and principles of the Principles-and-Parameters Theory in order to investigate whether they may help explain or clarify idiosyncratic as well as general constraints on word-formation in these three languages. We have found out, among other things, the value of not only such concepts such as incorporation, feature percolation, argument-taking, argument-type distinction (i.e. internal, external or semantic argument), but also that of such principles as Projection Principle (or Full Interpretation Principle), Theta-Criterion and Case Filter. Equipped with relevant parameters, our generalized X-bar conventions also high-
ly interact with each other to license “possible words” and filter out “impossible words” in these languages. This has, furthermore, led us to examine the correlation or parallelism between s-syntax and w-syntax. If, for example, a predicate verb or adjective must take arguments to satisfy Projection Principle or Full Interpretation Principle, and if, moreover, only transitive verbs may take internal as well as external arguments (while intransitive verbs may only take external arguments and ditransitive verbs may take indirect internal arguments in addition to (direct) internal arguments) to satisfy Theta-Criterion, then a transitive verb stem must take a noun stem as internal argument before taking another noun stem as external stem (and ditransitive verbs must take direct internal arguments before taking indirect internal arguments), not only in s-syntax but also in w-syntax, then any two-stem compound words consisting of an intransitive verb stem and an object noun stem, a transitive verb stem and a subject noun stem, or a ditransitive verb stem and an indirect object noun stem, are impossible words in any language, thereby making unnecessary Roepers and Siegels’s (1978) “First Sister Principle” and Selkirk’s (1982) “First Order Condition.”

If principles and parameters of grammar are applicable, at least partially, to both s-syntax and w-syntax, does this have any relevance to the typological study of word-formation? We have found out in our paper that correlation and parallelism between s-syntax and w-syntax, or between s-constructions and w-constructions, is much, much closer in Chinese and Japanese than in English. Thus, for example, in Chinese and Japanese the linear order of constituents between compound nouns, adjectives and verbs, on one hand, and noun, adjective and verb phrases, on the other, is essentially parallel to each other; the same parallelism, however, simply does not hold in English. But why is this so or, more precisely, what syntactic factors cause this syntactic fact? We will leave an investigation of this question to a future paper.

BIBLIOGRAPHY


——. (1993) 《文法語形》, 東京ひつの書房。

Lu, Z.W. (陸志韋) (1975) 《漢語語法的形式法（修訂本）》, 香港, 中華書局香港分局 (原於 1964 年在北京出版)。


Tang, Ting-chi (湯廷池) (1989, 1992) 《漢語的「字」、「詞」、「語」與「語素」》, 《華文世界》53 期, 18, 22 頁; 64 期, 48, 56 頁; 65 期, 81, 87 頁; 66 期, 77–84 頁; 收錄於湯 (1992c:157)。


——. (1991c) 《漢語語法與複合動詞的結構・功能與起源》, 第二屆中國國內語言暨語言學國際研討會論文, 收錄於湯 (1992b:95–164)。

——. (1992a) 《漢語語法成句法三集》，台灣學生書局。

——. (1992b) 《漢語語法成句法四集》，台灣學生書局。

——. (1992c) 《語法理論與機器翻譯》，《中華民國第五屆計算語言學研討會論文集》53–84 頁。


——. (1994b) “Further Remarks on the Relation Between Word-Syntax and Sentence-

「概化的 X 標槓公約」與構詞類型

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摘 要

本文繼湯（1990, 1993, 1994a, 1994b）之後，以「概化的 X 標槓公約」（即在原有的「X 標槓公約」(i) XP（詞組）→ XP（指示語）·X'（詞節）·(ii) X'（詞節）→ XP（附加語）·X'（詞節）·(iii) X'（詞節）→ XP（補述語）·X（主要語）之外，另加(iv) X（詞語）→·X'（語素）·'X（主要語素）與(v)·X（語素）→·'X（語素）·'X（主要語素）兩則複合詞或合成詞規律）來探討漢語、英語、日語複合詞與合成詞的內部結構以及外部功能，並從「原則參數語法」的觀點來剖析詞法與句法的關係以及不同語言之間構詞類型上的異同。

本文分五節。在第一節前言之後，第二節介紹「概化的 X 標槓公約」的內容，並說明如何適用這個公約來衍生或認可漢語的複合詞與合成詞。第三節界定主要語的概念，並探討主要語的詞類屬性如何滲透到整個複合詞或合成詞，以及如何發生「轉類」的現象。第四節詳論構成語素的「階層組織」與「線性次序」，並就漢語、英語與日語三種語言比較複合名詞、動詞、形容詞的內部結構、外部功能以及二者的關係。最後，第五節的結語略述在「原則參數語法」理論下詞法與句法的關係以及「概化的 X 標槓公約」與不同語言的構詞類型之間的可能關係。

關鍵詞：漢語、英語、日語語法，概化的 X 標槓公約，構詞類型