

No Root-Root Merger in Chinese compounds

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Abstract

This paper argues against the Root-Root Merger (RRM) operation and defends the position that acategorical Roots can only participate in syntactic derivation via functional mediation. I start with a critical evaluation of [Zhang's \(2007\)](#) arguments for an RRM approach to Chinese compound words and [Bauke's \(2016\)](#) conceptual support for it based on the Edge Feature (EF) theory, arriving at the conclusions that the Chinese data do not entail an RRM analysis and that the place of EF in Distributed Morphology (DM) is on *f*-morphemes instead of Roots. Then, I present further semantic and phonological properties of Chinese compounds that are incompatible with RRM and provide an account for the apparently exceptional parallel compounds. The Root-and-category approach to compounding not only yields a more coherent analysis for the Chinese data, but also contributes to a global understanding of Roots in minimalist syntax.

1 Introduction

Merge is the most fundamental operation in minimalist syntax ([Chomsky 1995](#) et seq). It is defined as the “single operation for building the hierarchical structure required for human language syntax” and “just set formation” in its simplest terms ([Berwick & Chomsky 2016](#): 10). Despite the intended simplicity, however, various complications to Merge have been proposed in the literature, mainly concerning its mode (e.g. Pair Merge in [Chomsky 2004](#)) and participants (e.g. Parallel Merge in [Citko 2005](#), Self-Merge in [Guimarães 2000](#) and [Adger 2013](#), Unary Merge in [Zwart 2004, 2011](#), Merge with the empty set in [Fortuny 2008](#), etc.). Whether such supplementary definitions are well motivated or not gives rise to much debate. For instance, [Oseki 2014](#) and [Stockwell 2016](#) take issue with Pair Merge, and [Chomsky 2013](#) emphasizes there is no “remerge” but just simple Merge. The goal of this paper is to argue against a specific supplementary definition known as Root Merger ([Zhang 2007](#)) or Root-Root Merger ([Bauke 2014, 2016](#)), where both merging participants are acategorical Roots (in the sense of Distributed Morphology, henceforth DM, [Halle & Marantz 1993, 1994](#) et seq.).¹ Focusing on the case of Chinese

¹[Zhang's \(2007\)](#) “Root Merger” should not be confused with “root merger” in works like [Surányi \(2004\)](#) and [Fukui \(2006\)](#), which refers to an extension condition on phrase structure construction that requires Merge to always apply at the root node of a subtree (cf. [Chomsky 1995](#)).

compound words, I challenge conclusions of previous studies as well as provide original conceptual and empirical arguments to back up the position that Root-Root Merger is neither an adequate analysis for Chinese nor a licit operation in the minimalist theory.

The contribution of this paper is threefold. First, I defend the original DM position that a Root's participation in syntactic derivation crucially relies on functional mediation and give this functional mediation a more generalized interpretation than merely categorization. Second, some hitherto seldom discussed yet significant theoretical points are clarified in the course of my discussion, including the limited freedom of Merge and the place of Edge Feature in DM. Third, I develop a more up-to-date formalization for Chinese compound words, with the help of non-direct Root-joining mechanisms.

This paper is structured as follows. Section 2 re-examines Zhang's (2007) empirical arguments for Root-Root Merger and demonstrates that none of them is sufficient for such a conclusion. Section 3 discusses the conceptual motivation of Root-Root Merger and proves by careful reasoning that a Root can only merge with an f-morpheme. Next, after evaluating previous studies, I present more Chinese data in section 4 which form further evidence against a Root-Root Merger analysis. And in section 5, I elaborate on the apparently exceptional parallel compounds arguing that even they cannot be Root-Root Merger. Section 6 concludes.

2 Root-Root Merger and Chinese compounds

Zhang (2007) proposes Root-Root Merger (henceforth RRM) to account for various behaviors of Chinese compound words that are unexpected in a syntactic (DM) approach to word-formation. However, as I will demonstrate below, none of Zhang's observations necessarily entails RRM.

2.1 Exocentricity and projectivity freedom

Exocentric compounds are like those in (1) (literal and free translations separated by a semicolon).

- (1) a. [dà_A-xiǎo_A]_N “big-small; size”, [zuǒ_N-yòu_N]_V “left-right; control”
b. [zhī_V-jǐ_N]_N “know-self; confidant friend”, [guān_V-xīn_N]_V “attach-heart; care about”

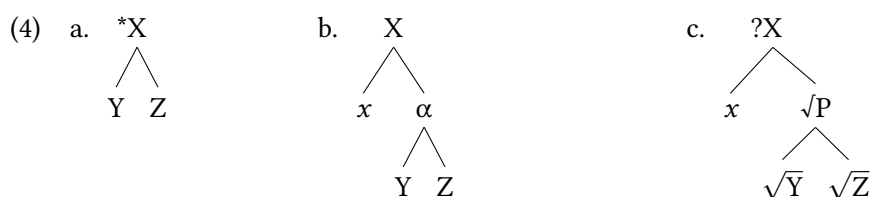
The compounds in (1a) are headless; those in (1b) appear to be headed, but a closer look reveals that the compound category is not projected from the “head”, for a “confidant friend” is not a “self” and to “care about” someone has nothing to do with “attaching” them. Rather, a “know-self” is someone else who knows oneself well, and to “attach-heart” someone is to attach one's heart (i.e. pay one's attention) to them. Zhang (2007) argues that such exocentricity is explained if the compounding components are not full-fledged words (2a), but acategorial Roots (2b), where the compound category is determined by a null categorizer.

- (2) a. $*[d\grave{a}_A-xi\check{a}o_A]_N$
 b. $[_N n [\sqrt{D\grave{A}}-\sqrt{XI\check{A}O}]]$

Projectivity freedom describes the observation that the N in a {V, N} structure can project in compounds (whereas it cannot in canonical phrases). Note, however, that this is not a proper formulation of the phenomenon, because, as we have seen, the N category of a V-N compound noun is not projected from the N component at all. In this sense, exocentricity and projectivity freedom are one and the same observation, i.e. that the category of an exocentric compound is determined by a null categorizer rather than the visible compounding components. And that is all. There is no further evidence that the components are acategorial. If the compound's categorizer can be null, so can those of the components. And if the categorizer x is the head of the phrase $\{x, \alpha\}$, its centricity and projectivity are expected regardless of the categorial status of α , as in (3a). A parallel example is in (3b).

- (3) a. $[_{nP(=N)} n [_\alpha d\grave{a}-xi\check{a}o]]$
 b. $[_{VP} [_V take] [_{DP} the\ train]]$

Obviously, that *take the train* is labeled by *take* does not mean *the train* is acategorial. Likewise, that *dà-xiǎo* is labeled by *n* does not mean α is acategorial, either. In structural terms, all exocentricity and projectivity freedom inform us is the inadequacy of (4a) and the adequacy of (4b), but not the adequacy or inadequacy of (4c).



2.2 Disappearance of subcategorization requirement

A canonical transitive verb in a compound need not be complemented by any argument, e.g. in *mǎi-mài* “buy-sell; deal, trade”, neither “buy” nor “sell” has a nominal complement. Their combination is used as a single word instead, as in (5).

- (5) *yì zhuāng mǎi-mài*
 one CL buy-sell
 “a transaction of trade” (Zhang 2007: 174)

Zhang argues that since subcategorization is an important verbal property, its disappearance means the components in question are not verbs, but Roots. There are two problems in this reasoning. First, the subcategorization theory is strongly lexicalist, as it assumes argument structure to be a property of the lexical verb (cf. Haegeman 1994: 41ff.)—a verb equipped with various grammatical information directly stored in the lexicon. However, this is not the case in the framework RRM is supposed to

reside in. In DM and neo-constructionism more generally, the number and type of VP arguments are configurationally determined by various argument-introducing heads, as in Table 1 (cf. Kratzer 1996; Pyllkkänen 2008; Siddiqi 2009; Lohndal 2014; Wood & Marantz 2017).²

Head	Argument type	Theta-role
Voice	External argument	Agent/Causer
Appl	Applicative argument	Beneficiary/Goal
Trans	Internal argument	Theme/Patient

Table 1: Argument-introducing heads

With the arguments severed out of the lexical verb, a minimal verbal unit (i.e. a $[v \sqrt{\quad}]$ unit) may be inserted into multiple argument structures. For example, we see alternations like (6) and non-canonical uses like (7) (derivational details omitted).

(6) a. *John sells the book.*

$[\text{VoiceP } [\text{DP } \textit{John}] [\text{VoiceP } \textit{Voice} [\text{TransP } [\text{DP } \textit{the book}] [\text{TransP } \textit{Trans} [v \sqrt{\text{SELL}}]]]]]]$

b. *The book sells well.*

$[\text{TransP } [\text{DP } \textit{the book}] [\text{TransP } \textit{Trans} [\text{VP } [v \sqrt{\text{SELL}}]]]]$

(7) *Maria smiled her thanks.*

$[\text{VoiceP } [\text{DP } \textit{Maria}] [\text{VoiceP } \textit{Voice} [\text{TransP } [\text{DP } \textit{her thanks}] [\text{TransP } \textit{Trans} [\text{VP } [v \sqrt{\text{SMILE}}]]]]]]]]$

In (6a), $[v \sqrt{\text{SELL}}]$ is merged in a Voice-Trans configuration which licenses two arguments (Agent, Theme); in (6b), the same unit is merged in a Trans configuration with only one argument (Theme). In (7), $[v \sqrt{\text{SMILE}}]$ is not merged in its canonical configuration (Voice, with a single argument Agent), but in a Voice-Trans configuration (with two arguments Agent and Theme). If subcategorization frames are not determined by the lexical verb alone, their “disappearance” cannot be used as evidence for the absence of verbal category; one can only infer the absence of a certain configuration instead.

Second, even if there is indeed no verbal category in *mǎi-mài*, we still cannot conclude that the components are Roots, for verbs and Roots are not in an either-or relationship. Among others, a non-verbal component may also be nominal, i.e. *mǎi_N-mài_N* “purchase-sale; trade”. Nothing rules out this possibility in our theory (and as we will see in section 5, this may actually be the more adequate identification).

2.3 Disappearance of Case/theta requirement

The verbal component in a compound can be associated with more arguments than its theta-grid permits, as in (8).

²The verbalizer does not create any argument position but introduces eventuality itself.

- (8) *chū-bǎn* *yì běn shū*
 produce-edition one CL book
 “publish a book”

In (8), since the Acc/Theme feature of “produce” can be satisfied by “edition”, there is no more unvalued feature to accommodate another argument of the same type. However, the compound does take an additional internal argument “a book”. Zhang argues that if *chū* and *bǎn* are Roots, then there remain one verb (the compound) and one Acc/Theme argument, as in (9).

- (9) $[_{VP} [_V v \sqrt{CHŪ} \sqrt{BǎN}]] [_{DP} yì běn shū]]$ ³

Apart from the basic fact that theta-grid—just like subcategorization—is a lexicalist notion whose place in DM is unclear, another significant issue Zhang neglects is that categorization can happen recursively (see i.a. Arad 2005; Marantz 2008; Harley 2009; Embick 2015; Panagiotidis 2015). So, categorizees do not have to exclusively consist of Roots. In theory, every time a categorizer is merged in, its sister becomes fossilized as a syntactic atom, as in (10) ($x_{1, 2, 3...}$ are categorizers, $\alpha, \beta, \gamma...$ are syntactic objects).

- (10) $...[_{X_3} x_3 [_\gamma ... [_{X_2} x_2 [\beta ... [_{X_1} x_1 \alpha] ...]]] ...]]$ *the recategorization schema*

In this schema, $\alpha, \beta, \gamma...$ are all categorizees. However complex the categorizee is, categories internal to it (i.e. $X_{1, 2...}$) are irrelevant to the outside derivation.⁴ Thus, the phenomenon in (8) has no direct correlation to the verbalizee-internal structure, but only suggests that the verbalizer is merged outside the compounding components, the same conclusion as that in section 2.1. For all we know, (8) may well have the structure in (11), which also obeys the one-verb-one-Acc/Theme principle. No determinate choice can be made between (9) and (11) without further evidence.

- (11) $[_{V_2P} [_{V_2} v_2 [_{V_1P} [_{V_1} v_1 \sqrt{CHŪ}]]]] [_{D_1P} bǎn]]$ $[_{D_2P} yì-běn shū]]$

2.4 Lexical integrity effects

Zhang’s last argument for RRM are two observations classified as lexical integrity effects. First, components cannot be moved out of compounds, e.g. in (12) *zé* “duty” cannot be preposed in the *lián... dōu...* “even...also...” focus construction.

- (12) a. *Tāmen yíxiàng fù-zé.*
 they always bear-duty
 “They are always responsible.”

³Or in the total decomposition system: $[_{TransP} [_{DP} yì běn shū]] [_{TransP} Trans [_V v \sqrt{CHŪ} \sqrt{BǎN}]]]$.

⁴In Marantz’s (2001, 2008) terms, this is because categorizers are phase heads.

- b. **Tāmen yíxiàng lián zé dōu fù.*
 they always even duty also bear

Intended: “They are always even responsible.” (adapted from Zhang 2007: 176)

Second, compounding components cannot be referred to by pronouns, e.g. in (13) *chá* “tea” cannot co-refer with *tā* “it”.

- (13) **Tā xiān ná-le yì bǎ chá_i-hú, ránhòu bǎ tā_i dào-rù bēizi-lǐ.*
 he first take-PRF one CL tea-pot then BA it pour-in cup-in

Intended: “He first took a tea-pot, and then poured the tea into a cup.” (Zhang 2007: 177)

Zhang argues that both observations can be explained if these compounds are products of RRM, for Roots, being featureless, cannot be syntactically manipulated.

Several problems exist in this argument. First, lexical integrity is yet another lexicalist assumption which, unless carefully adapted, is not readily applicable to non-lexicalist theorization. Lexical integrity states that “words are built out of different structural elements and by different principles of composition than syntactic phrases” (Bresnan & Mchombo 1995: 181), which is fundamentally incompatible with the Single Engine Hypothesis of DM (Marantz 2001), among other problems (cf. Bosque 2012; Bruening 2016). Moreover, (12) and (13) each have their own problems, which I elaborate below.

2.4.1 Movement failure or pragmatic infelicity?

(12b) is probably not ungrammatical after all, but merely pragmatically odd, for “they are even responsible” sounds bizarre out of context (especially with the adverbial *yíxiàng* “always, consistently”). The fronting of *zé* becomes much better (though still not perfect) if we put the sentence in negation (14).

- (14) (?)*Tāmen yíxiàng lián zé dōu bú fù.*
 they always even duty also not carry

“They are never even responsible.”

The movement is even more natural when a felicitous discourse is provided, as in (15).⁵

- (15) a. [Someone asks if anyone could attend a wedding as his girlfriend and gets this reply:]
Nǐ lián zé dōu bú fù, guǐ gēn nǐ qù!
 you even duty also not bear ghost follow you go
 “You aren’t even (willing to be) responsible. Only ghosts would go with you!”
 b. [Someone posts in a discussion about juvenile delinquency:]

⁵Unless otherwise specified, the examples in this paper are from real-life sources on the internet.

Bǐjiào ǚxīn de shì zhīqián nà gè shuāi yīng'ér de xiǎo gūniang, bù mǎn 14
 quite disgusting DE is earlier than CL throw baby DE little girl not fulfill 14
lián zé dōu bú fù.
 even duty also not bear

“What disgusts me is the little girl who threw away a baby some time ago. She was not even (considered) responsible as she was younger than 14.”

So, the unacceptability of (12b) should have more to do with the *lián...dōu...* construction itself. Further evidence is that the same situation also occurs with bona fide phrases, as in (16)-(17).

(16) a. **Tāmen yíxiàng lián wǎnfàn dōu chī.*
 they always even dinner also eat
 “They always even eat dinner.”

b. *Tāmen yíxiàng lián wǎnfàn dōu bù chī.*
 they always even dinner also not eat
 “They never even eat dinner.”

(17) a. **Tāmen yíxiàng lián diànshì dōu kàn.*
 they always even TV also watch
 “They always even watch TV.”

b. *Tāmen yíxiàng lián diànshì dōu bú kàn.*
 they always even TV also not watch
 “They never even watch TV.”

In sum, examples like (12) cannot inform us much, for without extra evidence it is hard to tell whether an apparent V-O chunk like *fù-zé* is an atomized compound (18a) or a phrase (18b).

(18) a. $[_V \nu [_{\alpha} \dots \sqrt{F\ddot{U}} \dots \sqrt{Z\acute{E}} \dots]]$
 b. $[_{VP} [_V \nu \sqrt{F\ddot{U}}] [_{DP} z\acute{e}]]$

Extra evidence can be an additional Acc/Theme argument, as in (19), which forces a compound analysis for *fù-zé*. However, such unambiguous evidence is not available in (12).

(19) *Nǐ lái fù-zé zhè jiàn shì.*
 you come bear-duty this CL matter
 “You take responsibility for this matter.”

2.4.2 Non-referential = acategorical?

The anaphora of the free pronoun *tā* “it” in (13), if any, must arise from discourse co-reference.⁶ That is, the context must include an entity that may co-refer with “it”. Considering that “it” is an Acc/Theme argument of “pour”, its reference must be something inanimate, non-plural, and pourable. Without further context, there is only one possible candidate, namely *chá* “tea”. Thus, that *chá* cannot be referred to can only be because its meaning is not in the reference assignment context.

However, this does not necessarily make *chá* a Root. It just needs to be non-referential instead. So, the question boils down to what objects are (non-)referential. The answer depends on one’s view of the nominal domain granularity. I summarize three views and their consequences in Table 2.

Nominal categories	Number	Grammatical information...
Only N	1	all on N, including referentiality (pre-DP era)
D-N	2	distributed on D and N, referentiality on D (DP hypothesis)
D...N	3+	more detailed decomposition (neo-constructionism)

Table 2: Three views on nominal domain granularity

In the first view, [-referential] equals [-N]. However, this is not the case in the second view and the third view (which underlies RRM), where [+N] items can also be [-referential], as long as they are [-D]. So, *chá* in (13) may well be [-D, +N], i.e. not an acategorical Root. In short, what the co-reference failure rules out is D instead of N.

What’s more, even if *chá* is indeed a Root, we still cannot conclude *chá-hú* to be RRM unless *hú* is also a Root, which requires more evidence than (13) can provide. In fact, since the compound category does not need to rely on the components’ categories (see section 2.1), suppose we have a simple non-referential inventory {N, V, \surd } and have successfully proven *hú* is also non-referential, there are nine possible categorial combinations for *chá* and *hú*. Even if we drop the intuitively less likely V, we still have at least four possible combinations N-N, \surd - \surd , \surd -N, and N- \surd . In any case, it is impossible to guarantee a \surd - \surd structure for *chá-hú* solely based on the co-reference failure observation.

2.5 Interim summary

In this section, I have argued that Zhang’s (2007) five observations cannot guarantee a RRM analysis for Chinese compound words. Alternatively, I have proposed that these compounds may involve categorized Roots plus recategorization. Under this view, many conventionally classified compounds turn out to be phrases, e.g. verb-object constructions like *fù-zé* “bear-duty; be responsible” are simply VPs

⁶According to Heim & Kratzer (1998: 241): “intersentential anaphora must always involve co-reference rather than variable binding.”

in most cases. In fact, [Zhang \(2007\)](#) recognizes the dual identities of V-O strings (a phenomenon generally known as *lǐhécí* “splittable words”), though she takes a weaker position on when they are phrases based on the (less reliable) movement failure test (section 2.4). In comparison, I hold the stronger view that all V-O strings are phrases unless there is clear evidence that they are further atomized, e.g. when they are used as nouns (section 2.1) or transitively (section 2.3).

At this point, one may wonder what a compound word really is. This is a difficult question to answer, not because compounds are any less definable, but because there is no single definition for “word” (cf. [Packard 2000](#)). Many V-O strings are classified as compound words mainly because they are disyllabic, which makes them standard prosodic words in Modern Chinese ([Feng 1997](#)). In a syntax-all-the-way-down framework like DM, however, we should not let compounding be subject to the various criteria for “word”, but ought to reclaim it as a syntactic mechanism, i.e. a compound word should first and foremost be a syntactic word. Insofar as the Chinese data are concerned, we can use the following working definition:

(20) A compound is a multi-Root syntactic object atomized by a single categorizer.

This definition is restrictive enough to delimit a unifying characteristic for compounds (i.e. an atomizing categorizer) yet also loose enough to allow for possible structural variation, e.g. the atomizing categorizer could be merged to a full-fledged phrase (as in recategorization) or to a group of uncategorized Roots (RRM would be an example if it were licit, and see another case in section 5).

3 Conceptual problems of Root-Root Merger

Zhang’s conceptual justification for RRM is that Merge is free and operates at no cost ([Zhang 2007](#): 171, cf. [Josefsson 1998](#): 69). [Bauke \(2014, 2016\)](#) spells out this motivation more explicitly in terms of [Chomsky’s \(2008\)](#) Edge Feature (henceforth EF). Her main argument is that since Roots are lexical items, they naturally bear EF and can merge ([Bauke 2016](#): 217). And if a Root can merge with something, it reasonably can merge with anything, including another Root. In this section, I discuss two conceptual pitfalls that might undermine this argumentation and make a proposal regarding the place of EF in DM.

3.1 Merge is free?

It is true the Merge is conceived to be free (see i.a. [Chomsky 1995, 2007, 2008, 2013](#)), but the freedom is attributed to the *operation*, in the sense that no extra motivation is needed in terms of “convergence and economy” ([Chomsky 1995](#): 226). That Merge is operatively free does not mean it is completely free in all aspects. For instance, [Chomsky \(2008: 137\)](#) points out that “the operation does not ‘come free’ in human evolution”. Here I emphasize that the input to this operation is not free, either. [Collins & Stabler \(2016: 47; based on Chomsky 1995, Collins 2002\)](#) formalizes Merge as a function:

(21) Given any two distinct syntactic objects A, B , $\text{Merge}(A, B) = \{A, B\}$.

The Merge function by definition has a domain, $\text{dom}(\text{Merge})$, and any supplementary definition ought to pass the domain test. To specify $\text{dom}(\text{Merge})$, four conditions need to be considered: *i*) since Merge operates on syntactic objects (e.g. a cat and a dog cannot merge), $\text{dom}(\text{Merge})$ should be built on the set of all and only syntactic objects (SO for short), i.e. maximally $\text{SO} \times \text{SO}$; *ii*) according to (21), the two syntactic objects forming the input must be distinct; *iii*) one of A, B must be a root node (see footnote 1); *iv*) if one of A, B is a lexical item, it must bear EF. I represent $\text{dom}(\text{Merge})$ in (22).

(22) $\text{dom}(\text{Merge}) = \{(A, B) \mid A, B \in \text{SO} \ \& \ A \neq B \ \& \ A \text{ or } B \text{ is a root node} \ \& \ \text{if } A \text{ or } B \text{ is a lexical item, it bears EF}\}$

Can RRM pass this domain test? The first three conditions are straightforward. First, since Roots are listed in the lexicon, they count as lexical items and syntactic objects (pass). Second, if Roots lack grammatical information, then they are formally non-distinguishable in syntax (not pass). Third, Root, being the most deeply embedded element in a workspace, is necessarily a root node (pass). What about the fourth condition? To verify its effect on RRM, we need to more carefully examine the relationship between lexical items and EF.

3.2 Roots bear EF?

Bauke assumes being a lexical item entails having an EF, but this is not necessarily true. First, Chomsky (2008: 139) acknowledges the existence of EF-less lexical items, such as interjections. Second, the type of lexical item assumed in the EF theory is fundamentally different from that assumed in DM. Take *cat* for example. This is a typical lexical item in the Chomskyan sense, but not in the DM sense, because what the DM lexicon stores is not the amalgamated end product, but its piecemeal information n , $\sqrt{\text{CAT}}$, $/kæt/$, and “cat”, each being a separate listeme. As Acquaviva (2014: 279) points out, issues like this “may look as superficial matters of detail, but they point to a deeper ambiguity”. In our case, ambiguity occurs when we try to re-colate the EF on a Chomskyan lexical item like *cat* to its DM counterparts—would EF be on n or $\sqrt{\text{CAT}}$ ($/kæt/$ and “cat” can be ruled out as they are post-syntactic), or both? Without further justification, we cannot reduce “*cat* bears EF” to “ $\sqrt{\text{CAT}}$ bears EF”.

In fact, there are good reasons to argue against EF-equipped Roots. According to Chomsky (2008: 139), a lexical item with EF is able to head a phrase and take a complement. In DM, between the categorizer and the Root, it is the former that inherits this capacity. Why not the Root? Because a head should be able to provide a label for its phrase, which in minimalism is essentially a formal feature. If the Root can head, then it should either bear some formal feature or be one itself. Neither option is legitimate. On the one hand, a formal-feature-bearing Root, which has no substantial/interpretable lexical category and performs some grammatical function, is in practice a traditional function word (like an auxiliary)⁷, as is

⁷Typical function words, e.g. tense-aspect-mood auxiliaries, may have few semantic (or other encyclopedic) features, but they are arguably not completely Σ -free, e.g. the choice between *shall/should*,

Roots are not confined to categorization, though only in categorization do they become content words. This will become relevant in section 5 when we discuss the structure of parallel compounds (and its broader theoretical impact is addressed in [Song prep](#)). Second, there is only one syntactic constraint on Roots, i.e. they can only participate in syntactic derivation via functional mediation. This is a plain paraphrase for “Roots can only merge with f-morphemes” and directly rules out Root-Root Merger.

Last but not least, the separation of Roots and EF is echoed in a parallelism between Roots and interjections (in fact [Corver 2015](#) explicitly argues that interjections are Roots). While interjections mostly stand alone, they are occasionally used as normal lexical categories, as in (25) (from Oxford English Dictionary online).

- (25) a. You “**ouch_V**” audibly...and sit down on the floor to meditate.
(The Westminster Gazette, 18 Apr. 2/1, 1898)
- b. If you fall off a roof you can be revived and go back to the point in the game just before you made that big **oops_N**.
(Library Journal, 15 Oct. 104/2, 2002)
- c. Joanna was loudly enthusiastic...She was trotting around, **oh_V-ing** and **ah_V-ing**.
(Dreadful Lemon Sky, J. D. MacDonald 1975: vii.109)

We could say that the interjections above are temporarily “lexicalized” by the respective categorizers, e.g. $ouch_V = \{v, OUCH\}$, $oops_N = \{n, OOPS\}$, etc., and a plausible explanation for such phenomena is precisely our generalization that EF-less lexical items can only get involved in syntax by merging with EF-equipped ones.

4 Back to Chinese: Compound phenomena RRM cannot explain

We have seen in section 2 that [Zhang’s \(2007\)](#) observations do not entail an RRM analysis for Chinese compounds and in section 3 that RRM as a supplementary definition for Merge is incompatible with the minimalist and DM assumptions. In this section, I present further properties of Chinese compounds that directly resist an RRM analysis. The conclusion is that RRM is not only empirically unnecessary, but also impossible.

4.1 Basic semantic properties

4.1.1 Specificity

Most compounding components have clear and specific meanings¹⁰, e.g. in *yǎn-hóng* “eye-be.red; be envious”, *yǎn* means exactly the body organ, and *hóng* exactly the state of being red. Native speakers have no hesitation in grasping these meanings. In fact, these literal meanings are even more salient

¹⁰Parallel compounds are an apparent exception, which I will return to in section 5.

than the idiomatic meaning “be envious”, which is just an English paraphrase and has another more direct counterpart *xiàn-mù* “lit. admire-yearn.for” in Chinese. *Xiàn-mù* and *yǎn-hóng* are synonyms but not equivalent, as in (26).

- (26) *Zài guòjié de shíhòu shōudào hěnduō de huā huòzhěshì lǐwù de nǚshēng, wǎngwǎng*
 at festival DE time receive many DE flower or gift DE girl usually
huì ràng rén xiàn-mù dào yǎn-hóng.
 can let people admire-yearn.for to eye-be.red
 “Girls receiving many flowers or gifts during festivals usually make people envious till eye-red.”

Specific meanings like “eye” and “be red” entail specific categories—body organs entail N and states V. This is impossible if the components are Roots, whose meanings (if any) must be vague enough not to show any categorial dependence, e.g. $\sqrt{YǎN}$ “somehow related with eye”, $\sqrt{HÓNG}$ “somehow related with red”. Only after syntactic derivation, when the categorial information becomes available, are the specific meanings retrieved. The semantic specificity of compounding components reveals that in most compounds, what we recognize are not Roots, but categorized Roots. We only come to know the existence of Roots by inference, because an open-class sound-meaning pair like (/yɛn/, “eye”) cannot exist without a Root in our theory.

4.1.2 Asymmetry

In mathematics, symmetric and asymmetric relations are defined as follows.

- (27) A binary relation R over a set X is
- symmetric if $\forall a, b \in X (aRb \Leftrightarrow bRa)$
 - asymmetric if $\forall a, b \in X (aRb \Rightarrow \neg(bRa))$

Now let’s consider the four basic inter-component relations in Chinese compounds (cf. [Song 2015](#)).

(28) Relation	Example
Verb-Object	<i>fù-zé</i> “carry-duty; be responsible”
Subject-Predicate	<i>yǎn-hóng</i> “eye-be.red; be envious”
Modifier-Head	<i>chá-hú</i> “tea-pot; teapot”
Parallel	<i>dà-xiǎo</i> “big-small; size”

Let X be the set of compounding components and R a binary relation on it, then among the above four relations, only Parallel is symmetric, while all the others are asymmetric. Take the Verb-Object relation for example. For $a, b \in X$, aRb holds if a is a verb and has b as its object, but if so b cannot be a verb that has a as its object, i.e. $aRb \Rightarrow \neg(bRa)$. In comparison, a Parallel relation aRb holds if a is grammatically parallel to b , which entails that b is also parallel to a , i.e. $aRb \Leftrightarrow bRa$.

A crucial difference between symmetric and asymmetric compounding is that asymmetric compounding has requirements on *a* and *b*'s categories, e.g. in a Verb-Object relation *a* must be V and *b* must be D (or N, depending on one's theoretical assumptions); the relation cannot hold without categorial specification. By contrast, symmetric compounding has no such requirement. As long as the components are parallel, they can be of whatever categories, be it V-V, N-N, or even $\sqrt{-}\sqrt{-}$. As such, among all the compound types, only parallel compounds could be potentially compatible with RRM.

4.1.3 Compositionality

Compound meanings are not randomly idiomatic, but mostly based on the components' transparent composition (again except parallel compounds, see section 5). For example, native speakers not only know that *yǎn-hóng* means "be envious", but also know that it means so because red eyes are related with envy in Chinese. Whether this is etymologically correct or not is less important.¹¹ What matters to us is the layered knowledge in (29).

- (29) a. $[[yǎn]] = \text{"eye"}, [[hóng]] = \text{"be red"}$ (component meaning)
 b. $[[yǎn-hóng]] = [[hóng]]([[yǎn]]) = \text{"eye be red"}$ (compositional meaning)
 c. $\text{"eye be red"} \Rightarrow \text{"be envious"}$ (idiomatic meaning)

The second layer, i.e. the literal compositional meaning, serves as the bridge between the first and the third layers and is crucial for the successful retrieval of the idiomatic meaning. And the literal-idiomatic correspondence in (29c), which presumably exists as a link in Encyclopedia, is one-to-one. As in (30), if we attempt to force another composition out of the same components or not compose them at all, the idiomatic meaning is no longer available.

- (30) a. $[[yǎn-hóng]] = [[yǎn]] \& [[hóng]] = \text{"red eye"} \Rightarrow ?$
 b. $[[yǎnhóng]] = [\emptyset] \Rightarrow ?$

Importantly, semantic composition is category-based. In (29b), it is the categories V and N on *hóng* "be red" and *yǎn* "eye" that dictate them to be composed as predicate and argument, and in (30a) it is the categories A and N that determine the same components to be composed as two properties. If *yǎn-hóng* were RRM, no inter-component composition could ever occur, let alone the correct one.

A caveat here is that (29) only represents an ideal scenario, where the compositional meaning is clearly recognizable and the literal-idiomatic link well preserved. In reality, neither of these is stable; they are both subject to diachronic change instead, which in turn affects how compound words are represented in speakers' minds. Take the strings in (31) for example.

¹¹As Chao (1968: xix) suggests: "Since we are taking the language of the average educated person's speech as the subject of our study and not that of the classical scholar, we shall follow the popular etymology in analyzing compounds, even though it is known to be wrong by the scholar."

- (31) a. *sī-jī* “control-vehicle; driver”
sī-mǎ “control-horse; an ancient military position (also a surname)”
sī-lìng “control-order; commander”
- b. *kāi-xīn* “open-heart; (feel comfortable >)feel happy”
huā-shēng “flower-grow; (grow after flower falls >)peanut”
xià-shuǐ “?down-water; (? >)animal offal”

Sī “control, manage” in (31a) is an ancient verb no longer in active use (except in compounds and idioms); today the morpheme is only productively used as a noun (meaning “official department”). As such, the literal compositions in these compounds are opaque to ordinary modern speakers. In (31b), the idiomatic meanings got further shifted and the original literal-idiomatic links (e.g. “open-heart” ⇒ “feel comfortable”) have become obsolete. In certain cases (e.g. *xià-shuǐ*), the shift has gone to such a degree that the original idiomatic meaning becomes hard to recover. This makes the components’ literal meanings more confusing than informative.¹² In the two scenarios in (31), what an acquirer is able to reconstruct from the input data is not the three-layered structure in (29), but a simplified one as that in (32), where the compound is in effect reanalyzed as a mono-Root simple word.¹³

(32) { /xwa ʃəŋ /, “peanut” }

In sum, synchronically speaking, the representation of a (non-parallel) compound string¹⁴ is either a full-fledged compound with categorized components or a reanalyzed simple word. There is no third choice like RRM.

4.2 Polysemous compounds

4.2.1 Category-dependent polysemy

There are many polysemous compound strings in Chinese, and very often the polysemy is structure- and therefore category-dependent, as in Table 3.

¹²The etymology of *xià-shuǐ* is unclear. Possible explanations include “go.down-water; body parts to be thrown away into water”, “let.down-water; body organs that let off excretion”, “lower-organ; lower visceral organs”, etc. (cf. Liu 2014; Wang 1999)

¹³There is a possibility that when speakers become etymologically better informed, they might re-learn the word as a compound and reconstruct the three-layer representation. However, for most people that situation only occurs later in life (e.g. after school education) and only if they are linguistically curious.

¹⁴I use “compound string” as a cover term for all strings that have ever had a compound status.

String	Meaning I	Meaning II
<i>láo-li</i>	V-N “labor-force; do physical work”	Mod ¹⁵ -N “laboring-force; labor force”
<i>shēng-rén</i>	Mod-N “unfamiliar-person; stranger”	V-N “give.birth-person; be born”
<i>lā-jù</i>	V-N “pull-saw; seesaw battle”	Mod-N “pulling-saw; dragsaw (a type of saw)”
<i>huǒ-xīng</i>	N-CL “fire-star.like.object; spark”	Mod-N “fire-star; Mars”
<i>shè-jì</i>	V-V “plot-plan; design, devise”	V-N “plot-ruse; plot a frame-up, deceive”
<i>xiōng-huái</i>	N-N “chest-bosom; mind, vision”	Mod-V “chest-embrace; remember in heart”

Table 3: Polysemous compound strings

In each pair of the meanings above, the contrast is merely given rise to by the different categorizations of one component (i.e. one Root), e.g. $\sqrt{\text{HUÁI}}$ “n. bosom” vs. “v. embrace”. Below I respectively discuss these examples and their implications. First, in cases like *láo-li* and *shēng-rén*, where both meanings rely on the composition of asymmetric components with specific meanings, RRM can be directly ruled out. Second, in *lā-jù* and *huǒ-xīng*, not only do the two meanings observe the three basic semantic properties, but they also belong to the same overall category. Since the single structure $[_N n [\sqrt{\quad} \sqrt{\quad}]]$ cannot yield two etymologically non-related¹⁶ meanings, polysemy of the this type provides the clearest evidence against RRM. The trickier examples in Table 3 are *shè-jì* and *xiōng-huái*, where one of the two meanings is parallel. So, even if we rule out RRM for the non-parallel meanings “deceive” and “remember in heart” based on their basic semantic properties, the polysemy is still derivable via an RRM vs. non-RRM distinction, as in (33). I leave parallel compounds to section 5.

- (33) a. $[_V v [\sqrt{\text{SHÈ}} \sqrt{\text{JÌ}}]]$ vs. $[_{VP} \text{shè}_V \text{jì}_N]$
b. $[_N n [\sqrt{\text{XIŌNG}} \sqrt{\text{HUÁI}}]]$ vs. $[_V v [xiōng_N huái_V]]$

4.2.2 Polysemy with PF effects

Sometimes the structure-dependent polysemy of Chinese compounds also has phonological reflection. First, the lexical tone of a component may change with its category, as in Table 4 (small caps indicate phonological variation).

¹⁵I use Mod instead of A to label modifier-head compounds because the modifiers are from various categorial sources (e.g. adjective, noun, and even verb) on the one hand, and the categorial status of “adjective” in Chinese is disputed on the other (cf. Li & Thompson 1981; Tang 1998).

¹⁶This excludes the scenario where two idiomatic meanings are related to the same structure (probably due to additional metaphorical shift), as in (31b).

String	Meaning I	Meaning II
<i>bō</i> -ZHONG	<i>bō</i> _V - <i>zhǒng</i> _N “spread-seed; sow”	<i>bō</i> _{Mod} - <i>zhòng</i> _V “spreading-plant; plant by sowing”
<i>shēng</i> -FA	<i>shēng</i> _V - <i>fā</i> _V “grow-develop; multiply”	<i>shēng</i> _V - <i>fà</i> _N “grow-hair; grow hair”
BEI- <i>fù</i>	<i>bēi</i> _V - <i>fù</i> _V “carry.on.back-bear; shoulder”	<i>bèi</i> _{Mod} - <i>fù</i> _V “back-bear; carry on back”
<i>shuì</i> -JIAO	<i>shuì</i> _V - <i>jiào</i> _N “sleep-a.sleep; sleep”	<i>shuì</i> _V - <i>jué</i> _V “sleep-wake; wake up from sleep” ¹⁷

Table 4: Polysemous compound strings with tonal change

Take *bō*-ZHONG for example, whose polysemy patterns with *lā*-*jù* in Table 3. Between its two meanings, ZHONG assumes the third (falling-rising) tone in category N and the fourth (falling) tone in category V.¹⁸ This contrast is consistent in the language, including when the morpheme is not used in compounds, as in (34). The same is true for the other compounds in Table 4.

- (34) a. *Zhè shì xīguā zhǒng*_N.
 this is watermelon seed
 “These are watermelon seeds.”
- b. *Zhè kuài dì zhòng*_V *shénme?*
 this CL field plant what
 “What to plant in this field?”

Second, in Mandarin Chinese, the rime of a syllable may be rhotacized in certain grammatical (e.g. diminutive) contexts (a phenomenon known as *érhuà* “r-coloring”), e.g. /i/→/jʃ/, /a/→/aʃ/, /əŋ/→/ʃ/, etc. Crucially, r-coloring only occurs in the nominal category, so a compound with a rhotacized component cannot be RRM. Below are some examples (r-coloring marked by *ʃ*).

¹⁷Note that in this case not only the tone changes, but also the vowel.

¹⁸The lack of tonal change on *bō* is not a coincidence. According to Song (2017, prep), the modifier in a modifier-head compound eventually gets categorially “assimilated” by the head (V in this case).

String	Meaning I	Meaning II
<i>xiǎo</i> -REN	<i>xiǎo</i> _{Mod} - <i>rén</i> _N “small-person; base person”	<i>xiǎo</i> _{Mod} - <i>rén</i> _{N.DIMI} “small-figure; puppet”
<i>bái</i> -MIAN	<i>bái</i> _{Mod} - <i>miàn</i> _N “white-flour; flour”	<i>bái</i> _{Mod} - <i>miàn</i> _{N.DIMI} “white-powder; heroin”
<i>qián</i> -MEN	<i>qián</i> _{Mod} - <i>mén</i> _N “front-gate; a gate in Beijing”	<i>qián</i> _{Mod} - <i>mén</i> _{N.DIMI} “front-door; front door”
<i>xiào</i> -HUA	<i>xiào</i> _{Mod} - <i>huà</i> _V “laugh-speak; ridicule”	<i>xiào</i> _V - <i>huà</i> _{N.DIMI} “laugh-words; joke”
<i>miào</i> -ZHUN	<i>miào</i> _V - <i>zhǔn</i> _V “gaze-be.accurate; take aim at”	<i>miào</i> _V - <i>zhǔn</i> _N “gaze-aim; take an aim”
<i>fān</i> -GAI	<i>fān</i> _{Mod} - <i>gài</i> _V “flip-build; renovate (house)”	<i>fān</i> _V - <i>gài</i> _N “flip-lid; clamshell (phone)”

Table 5: Polysemous compounds with rhotacized components

As we can see, r-coloring contrasts a diminutive noun with either a non-diminutive noun (e.g. *mén*^r “door” vs. *mèn* “gate”) or some other category (e.g. *gài*^r “lid” vs. *gài* “build (house)”). Note that compounds with rhotacized components still obey the basic semantic properties, e.g. *fān-gài*^r has specific component meanings (“flip-lid”), an asymmetric structure (V-N), and a composition-based idiomatic meaning (“flip-lid” ⇒ “clamshell (phone)”). In sum, the two PF effects above are further evidence that RRM is not an adequate analysis for Chinese compounds.

5 Are parallel compounds an exception?

5.1 Exceptional properties

A recurrent issue in the last section was the apparent exceptionality of parallel compounds.¹⁹ Compare the two compounds below, one non-parallel and the other parallel.

- (35) a. *yǎn-hòng* “eye-be.red; be envious”/*“to.eye-redness; ?” (cf. 4.1.1)
 b. *mǎi-mài* “buy-sell; deal”/“purchase-sale; deal, trade” (cf. 2.2)

Checking against the basic compound properties in section 4.1, we can see that parallel compounds fulfill none of them. First, their components do not have fixed specific meanings. While *yǎn* and *hòng* in (35a) can only be interpreted as “eye” and “be red”, *mǎi* and *mài* in (35b) can be interpreted as either “buy-sell” or “purchase-sale”.²⁰ The components’ categories have no substantial bearing on the

¹⁹This is the term used in the Chinese tradition (e.g. Chao 1968; Li & Thompson 1981; Packard 1997). Other terms in the literature include co-compound, dvandva compound, coordinate compound, etc. (Wälchli 2005); occasionally coordinative compound is also used (e.g. Zhou & Marslen-Wilson 1994; Scalise et al. 2009). Since the cross-linguistic phenomena covered by these terms may not be formally identical, I stick to the Chinese-oriented term “parallel compound” in this paper.

²⁰In the literature, they are usually labeled according to the morphemes’ typical uses in the language,

compound’s overall interpretation as long as they match each other. Second, *mǎi* and *mài* in (35b) are symmetric to each other in grammatical relation. Neither serves as a function or argument to the other; nor is there any modification relation. Third, the meaning of (35b) is non-compositional, as no familiar composition rule (e.g. functional application) can map “buy-sell”/“purchase-sale” to “deal, trade”.

As far as these three properties are concerned, parallel compounds could indeed involve RRM. However, they have two other properties that RRM cannot explain, which I discuss in 5.2 and 5.3.

5.2 Rule-based interpretation

Although the meanings of parallel compounds are not based on the familiar types of composition, they are by no means ruleless or randomly idiomatic. There is a systematic correlation between the components’ meanings and the compound meaning instead, as in (36).

- (36) a. *pāo-qì* “throw-abandon; abandon” *chī-hē* “eat-drink; consume”
 b. *dà-xiǎo* “bigness-smallness; size” *yōu-liè* “superiority-inferiority; quality”
 c. *chén-zhòng* “heavy-weighty; heavy” *měi-lì* “beautiful-pretty; beautiful”

All the compound meanings in (36) are, informally speaking, averaged from the components’ meanings. Sometimes this meaning averaging is straightforward, as in the synonymous pairs “throw-abandon” and “beautiful-pretty”. Sometimes it is achieved via a shared natural superordinate taxonomy (“natural coordination” in Wälchli 2005), as in “eat-drink; consume” and “bigness-smallness; size”. In short, there is an integration-like mapping between the components’ meanings and the compound meaning.

Can this meaning averaging mechanism be achieved by RRM? No, because two standardly merged syntactic objects remain semantically separate unless they are properly labeled and composed, and more fundamentally because our semantics component is merely interpretative (rather than generative). In other words, if we ever want to integrate the two concepts carried by the component Roots—whatever the integration function is—we can only do this in syntax. Under an RRM analysis, a compound word of category X has the following structure.

- (37) $[_X x [\sqrt{\quad} \sqrt{\quad}]]$

The only functional category here is the overall categorizer *x*, whose role is merely to retrieve stored idiosyncratic information for its categorizee, but not to look inside it and complete some function there. As such, we need some additional functional category to account for the systematic, predictable, and productive averaging mechanism in parallel compound interpretation. This need rules out RRM.

e.g. *mǎi* and *mài* are labeled V (hence the exocentricity, cf. section 2.2) based on distributions like *mǎi/mài dōngxi* “buy/sell stuff”. I do not adopt this methodology because in DM categories are syntactically rather than lexically determined. We cannot say a morpheme has category X in context A simply because it does so in context B, however typical B is.

5.3 Multi-Root parallel compounds

Syntactic recursion happens because Merge operates recursively. In the domain of compounding, this is reflected in long words like German *Kraftfahrzeughaftpflichtversicherung* “motor vehicle indemnity insurance”. In such compounds, multiple Roots are organized in an asymmetric fashion, and the entire compound is of the modifier-head type (with an increasingly longer modifier). The asymmetry naturally follows from the binarity of Merge. Given n ($n > 2$) Roots and nothing else—as is the case in RRM—from the third Root on, the structure necessarily becomes asymmetric, with each application of Merge introducing a new hierarchical level, as in (38).

$$(38) [\sqrt{n} [\dots [\sqrt{4} [\sqrt{3} [\sqrt{2} \sqrt{1}]]]]]]]]$$

What this means for multi-Root compounds is that they can only be modifier-head but never parallel. In other words, under an RRM analysis, parallel compounds maximally consist of two Roots. This is apparently not true, for there are plenty of multi-Root parallel compounds in Chinese, as in (39).

(39) a. 3 Roots:

jiǎ-dà-kōng “falseness-bigness-emptiness; empty words”

fú-lù-shòu “happiness-wealth-longevity; a happy life”

gāo-fù-shuài “tallness-richness-handsomeness; an ideal guy”

b. 4 Roots:

chī-hē-wán-lè “food-drink-game-fun; beer and skittles”

yī-shí-zhù-xíng “clothing-food-residing-traveling; basic necessities of life”

fēng-shuāng-yǔ-xuě “wind-frost-rain-snow; hardships of journey or life”

jīn-yín-cái-báo “gold-silver-money-valuables; treasure”

c. 5+ Roots:

wēn-liáng-gōng-jiǎn-ràng “temperate-kind-courteous-restrained-magnanimous; civil, gentle”

rén-kǒu-shǒu-shàng-zhōng-xià “person-mouth-hand-up-middle-down; basic characters”

chái-mǐ-yóu-yán-jiàng-cù-chá “firewood-rice-oil-salt-sauce-vinegar-tea; daily details”

The components of these big compounds are grammatically parallel to one another and semantically share a core meaning or some superordinate concept, just like their two-Root siblings. That these are compound words rather than coordination phrases can be justified from two aspects. First, they do not entail the components’ to be true in a given context, e.g. even if someone is merely not working enough but not overeating or overdrinking, they may still be described as *chéngtiān chī-hē-wán-lè* “be beer and skittles all day long”. Such integrated interpretation is not available for canonical coordination phrases, e.g. *apple, pear, and banana* can only mean the three kinds of fruit, nothing more and nothing less. Second, these multi-Root strings can be used in different lexical categories, as in (40)-(42).

- (40) a. *Zhè-gè yuán-zhuō huìyì jiù-shì gè jiǎ-dà-kōng_N.*
 this-CL round-table meeting exactly-is CL falseness-bigness-emptiness
 “This roundtable conference is nothing but empty words.”
- b. *Shǎo gěi-wǒ jiǎ-dà-kōng_V!*
 don't to-me be.false-be.big-be.empty
 “Don't speak empty words to me!”
- (41) a. *Zhè jiù-shì shìchǎng jīngjì, méi yǒu bàn-diǎn de wēn-liáng-gōng-jiǎn-ràng_N.*
 this exactly-is market economy not have half-bit DE temperateness-kindness-
 courteousness-restrainedness-magnanimousness
 “This is precisely market economy—there's not a bit of gentleness.”
- b. *Wǒmen bú-yào wēn-liáng-gōng-jiǎn-ràng_V le,*
 we not-shall be.temperate-be.kind-be.courteous-be.restrained-be.magnanimous LE
wǒmen yào tǎnshuài de tāolùn wǒmen zhījiān de fēnqí.
 we shall frank DE discuss we between DE difference
 “So let's not be civil. Instead, let's have a frank discussion of our differences.”
- (42) a. *Zhè shì yí-gè chānzá le chái-mǐ-yóu-yán-jiàng-cù-chá_N de píngfán de àiqíng gùshi.*
 this is one-CL mix LE firewood-rice-oil-salt-sauce-vinegar-tea DE ordinary DE
 love story
 “This is an ordinary love story mixed with daily details.”
- b. *Yì-qiān jù qínghuà, dōu bùrú hé nǐ yìqǐ*
 one-thousand CL lover's.prattle also not.as.good.as with you together
chái-mǐ-yóu-yán-jiàng-cù-chá_V.
 do.firewood-do.rice-do.oil-do.salt-do.sauce-do.vinegar-do.tea
 “A thousand romantic words is not as good as living an ordinary life together with you.”

In each group of examples above, a multi-Root parallel compound is used in the two lexical categories N and V, and in all these examples the compounds mean something more general than their components. The possibility of recursion in parallel compounding is unexpected in an RRM model (or any model that only builds up structures by the simplest Set Merge).

5.4 Approaching parallel compounds

5.4.1 Root coordination

To recapitulate, parallel compounds have Root components but no RRM. To achieve an adequate account for them, therefore, we need an alternative way to structure the Roots below the categorization level. A first option that suggests itself is coordination, especially considering parallel compounds are also called “coordinate/coordinative compounds” (see footnote 19).

However, this solution may not be readily applicable. Recall the distinction we made between parallel compounds and coordination phrases in section 5.3, i.e. the former’s overall meanings do not necessarily entail all the components, whereas the latter’s do. One way to explain this distinction is by resorting to different coordination levels. As Zhang (2010: 10) points out: “conjuncts, which are non-projecting elements in coordinate complexes, can be of any constituency level.” I understand this to include the Root level as well. Specifically, parallel compounds involve coordination below categorization, while coordination phrases are coordination above categorization. What characteristics does Root coordination have? Semantically, it yields a conceptual intersection, as in (43).

- (43) (\sqrt{x} “somehow related with X”, \sqrt{y} “somehow related with Y”)
& (“somehow related with X”, “somehow related with Y”) = “somehow related with X and Y”

What we get is an integrated concept, which can be conceived as an ad-hoc Root, in the sense that it relates an open-class concept to a sound but has no stored entry in the lexicon. Such an ad-hoc Root may be further lexicalized or even idiomatized, especially when a certain Root combination has high frequency, but the &-operation itself does not require “X and Y” to correspond to any independently lexicalized concept Z. In fact, when parallel compounding becomes productive, it is more economical not to lexicalize each and every “X and Y”. This means the English translations for Chinese parallel compounds are often merely paraphrases, e.g. *dà-xiǎo* “bigness-smallness” in the speaker’s mind does not need to translate to “size”, but can remain “a matter related with bigness and smallness”, which leads to the same superordinate concept “size” lexicalizes. A result of this is that one concept can have multiple parallel compound realizations, as in (44).

- (44) a. “size”: *dà-xiǎo* “bigness-smallness”, *chǐ-cùn* “ $\frac{1}{3}$ m- $\frac{1}{3}$ dm”
b. “parents”: *fù-mǔ* “father-mother”, *bà-mā* “dad-mom”
c. “abandon”: *pāo-qì* “throw-abandon”, *yí-qì* “leave.behind-abandon”
d. “beautiful”: *měi-lì* “beautiful-pretty”, *jùn-qìào* “good-looking-charming”

The formation of parallel compound is very flexible, e.g. we can easily coin two new compounds *jùn-měi* “good-looking-beautiful” and *qìào-lì* “charming-pretty” out of (44d), which also mean “beautiful”. Syntactically, since there is only one categorizer in a parallel compound, when the compound is categorized, so are the components, which explains why the components’ categories always match each other and co-vary with the compound’s category, as in (45).

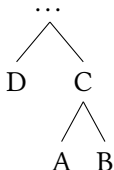
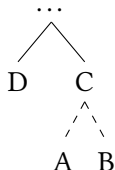
- (45) a. *Tā xiǎng chī-hē_V diǎn dōngxi.*
 he want eat-drink bit stuff
 “He wants to eat and drink something.”
- b. *Tā gōng gěi wǒ chī-hē_N.*
 he provide give me food-water
 “He provides me with food and water.”

This forms a clear contrast with non-parallel compounds, which may also be used in different lexical categories but only has categorial change at the compound level, while the individual components’ categories and meanings are left unaltered, as in (46).

- (46) a. *Tāmen jié-hūn_V le.*
 they tie-marriage LE
 “They got married.”
- b. *Jié-hūn_N shì yí-jìàn rén-shēng dà-shì.*
 tie-marriage is one-CL human-life big-matter
 “Getting married is a big thing in a person’s life.”

5.4.2 de Vries (2005): 3D coordination

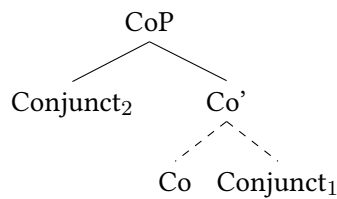
Now that we have hypothesized the inner structure of parallel compounds to be coordination, the remaining issue is how to realize it technically. There is a long list of references on the syntax of coordination (see i.a. de Vries 2005; Carston & Blakemore 2005; Zhang 2010 for overviews). What our current concern needs from a coordination model is that it preserve the intuitive symmetry among conjuncts (without violating minimalist principles like binary Merge). In this respect, de Vries’ (2005: 92) purpose coincides with ours, as he asks “how can we represent the intuitive symmetry of coordination, and in particular, how can we prevent the first conjunct from c-commanding the second?” His solution is a 3D model of coordination, i.e. syntactic derivation is not confined to a two-dimensional tree, but can take advantage of a three-dimensional space. Specifically, he proposes a new tree-geometrical relation “behindance” (in addition to dominance), as illustrated in (47).

- (47) a. Dominance
- 
- b. Behindance
- 

In (47a), A and B are dominated by C and c-commanded by D, whereas in (47b), they are “behind” C (indicated by dashed branches) and not c-commanded by D. In de Vries’ words, “the normal dominance

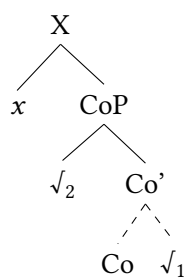
hierarchy is interrupted” at point C, whose constituents are “in a paratactic relation to the higher nodes” (ibid. p. 94). This paratactic relation is exactly what we need for symmetric coordination, as in (48).

(48)

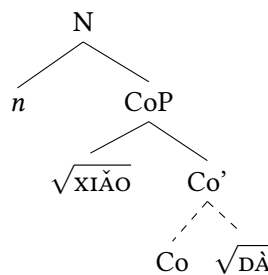


And now we can draw out the structure for a two-Root parallel compound. (49a) is the general schema and (49b) a specific example (*dà-xiǎo* “bigness-smallness; size”).

(49) a. Parallel compounding



b. *dà-xiǎo*



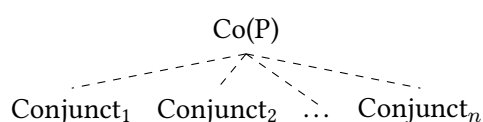
The first Root conjunct may directly merge with Co because, as I concluded in section 3.2, any f-morpheme can legitimately merge with a Root. However, we still face the problem of multi-Root parallel compounds, as de Vries (2005) does not specify how to structure multi-conjunct coordination. The path to a solution is clear, though. In order to maintain symmetry among multiple conjuncts, we need to let the behindance relation hold recursively. Building on this idea, I further adapt de Vries’ model in the remainder of this section, beginning with a striking similarity between de Vries’ b-Merge (i.e. Merge by behindance) and Chomsky’s (2004) Pair Merge:

(50) a. b-Merge: hides the merging sisters behind the current context;

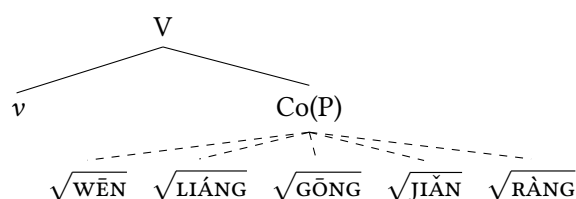
b. Pair Merge: happens on a separate plane invisible to the current plane.

Pair Merge is mainly used for adjunction. If we can identify the behindance relation with the separate-plane relation, then b-Merge can be reduced to Pair Merge, and recursive symmetric coordination is simply recursive adjunction, with each conjunct adjoining to the Co-spine from a different plane (or a difference workspace in less geometrical terms). The different planes are invisible to one another, and the multiple conjuncts are relatively symmetric/parallel. I illustrate this structure in (51), with the general schema on the left and a specific example (*wēn-liáng-gōng-jǎn-ràng* “temperate-kind-courteous-restrained-magnanimous; civil, gentle”) on the right.

(51) a. Multi-Root parallel compounding



b. *wēn-liáng-gōng-jiǎn-ràng*



Reducing b-Merge to Pair Merge not only gives us a solution for recursive parallel compounding, but also eliminates one more supplementary definition for Merge. Remember that the original motivation of this paper is to keep the definitional variants of Merge to a minimum.

6 Conclusion

Compounding is an ideal testing ground for Root-joining theories. However, we should be careful not to confuse Root-Root Combination (RRC) with Root-Root Merger (RRM). While they both join two or more Roots together, RRC does not specify how the joining proceeds, whereas RRM strictly refers to direct Merge. Consequently, the justification of RRM requires more effort, for we need to confirm *i*) that it yields all and only the correct empirical effects, and *ii*) that it fulfills the theoretical requirement of Merge. Both aspects are examined in this paper but, as it turns out, neither is met by RRM. Empirically, various properties of Chinese compounds have been claimed to be results of RRM (section 2), but none of the relevant arguments is adequately sufficient. In addition, RRM cannot predict the basic semantic properties or the commonly seen polysemy of Chinese compounds (section 4). Theoretically, Merge only accepts input within its function domain, which requires that the two participants be formally distinct and that one of them bear the Edge Feature (EF) (section 3). However, Roots are formally non-distinct by definition and do not bear EF by deduction. The only way for them to participate in syntactic derivation is via functional mediation (typically but not exclusively categorization).

As such, compounds can only involve RRC, but not RRM. Almost every Chinese compound type (section 4.1.2) corresponds to a Root-joining mechanism. I discussed two such mechanisms in this paper, i.e. recategorization (section 2.3) and Root coordination plus overall categorization (section 5.4), respectively for verb-object/subject-predicate and parallel compounds. The one not discussed here is that for modifier-head compounds, which are self-evidently not RRM (see Song 2017, prep for a proposal in the same framework). In sum, the Root-and-category approach to compounds deepens our understanding of both compounding and Roots, and the formal nature of Root is worth further reflection in future research.

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