Root-supported categories and their morphosyntactic characteristics (Part II)

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Theoretical and Applied Linguistics
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3. Derive half-lexical categories: Root support theory

4. Further implications
   - Head movement and analyticity
   - Root support beyond Chinese

5. Summary

Derive half-lexical categories

Part I summary

Chinese functional items like *dǎ* 'hit; DO', *gěi* 'give; PASS; DISPOSAL', *tóu* 'head; CL', etc. have **dual semantics**.

Item	Function	Idiosyncrasy
dǎ	DO	/daˇ/, ∼some force?
gěi	PASS	/geiˇ/, ∼some loss?
tóu	CL/DIV	/touˊ/, ∼animal, domestic?

DM (Halle & Marantz 1993 et seq.):

- functional category (FF bundle) vs. Root (idiosyncratic Π–Σ pair)

➽ Chinese functional items have **both**!

Derive half-lexical categories

Idea (cf. Borer 2005, Hu 2015, Biberauer 2016 for similar ideas)

Half-lexical category = functional category + Root

Categorization Assumption

Difficulty: how and where do they merge?

- Roots must and only merge with categorizers (Embick & Marantz 2008)
- Roots are most deeply embedded (DM, XS)
- No Tampering & Extension Condition (Chomsky 1995 et seq.)

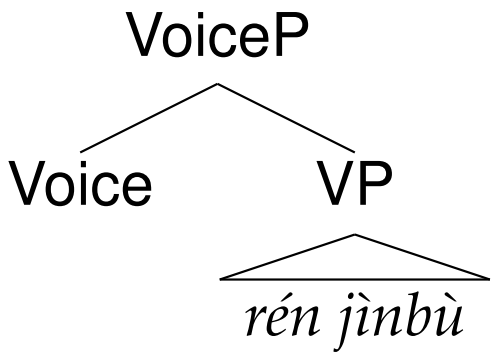
A toy example

☞ *qiānxū shǐ rén jìnbù* (=Part I, (8a))
modesty CAUSE people progress
'Modesty helps one to make progress.'

Some stage S:

Numeration: {$\sqrt{\text{QIĀNXŪ}}$, ~~$\sqrt{\text{RÉN}}$~~, ~~$\sqrt{\text{JÌNBÙ}}$~~, $n_{2\to1}$, v, $\sqrt{\text{SHǏ}}$, ~~Voice~~ }

Workspace W:



① Voice $\neq$ categorizer
② lowest position occupied
③ minimalism has no 'insertion'

What next?

A general problem

Not only $\sqrt{\text{SHǏ}}$, but also $\sqrt{\text{RÉN}}$ and $\sqrt{\text{QIĀNXŪ}}$ can't find their way.

☞ There is only **one** Root position in a tree.

(De Belder & van Craenenbroeck's 2015: 1 workspace 1 root)

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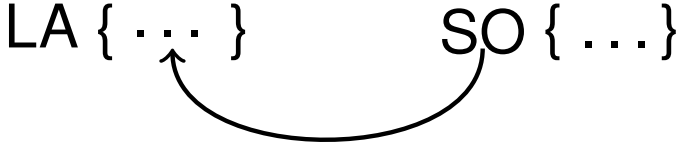
Some potential solutions:

- Renumeration (Johnson 2003)
- Layered derivation (Zwart 2011)
- Root position relativized to Phase (Marantz 2013)
- Post-syntactic Root insertion (De Belder & van Craenenbroeck 2015)

Potential solutions

Johnson (2003), Zwart (2011), B&C (2015)

Recursive LA formation.



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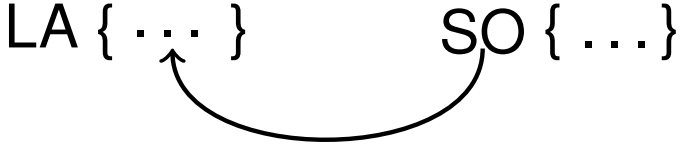

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But:

- tailored to satellites (Johnson) 🤔
- asymmetric/unary Merge (all three) 😐
- packaged with spell-out (Zwart, B&C, and Marantz) 🧐
- categorization assumption unchanged (B&C, Marantz) 💀

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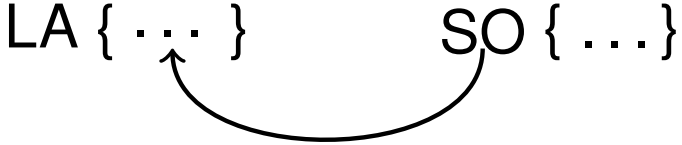

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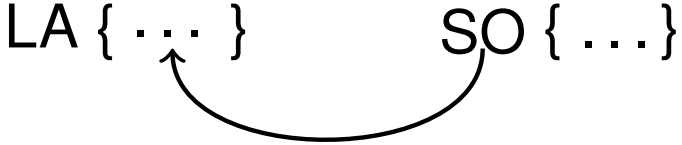

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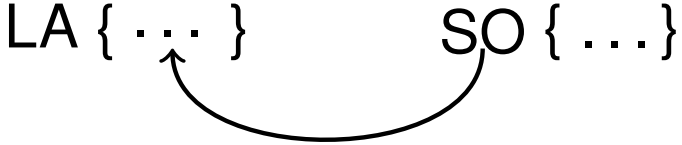

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Problems in potential solutions

Two crucial problems:

- Categorization assumption confines Roots to little xs.
- uFs can't survive spell-out, but are needed on the renumerated heads.
  - e.g. Voice$_{\sqrt{}}$ still selects VP and agrees with some DP

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Accordingly:

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Proposal I: Generalized Root Categorization Schema

Why does the categorization assumption matter?

> *Roots cannot appear (cannot be pronounced or interpreted) without being categorized; they are categorized by merging syntactically with category-defining functional heads[. . .] [w]e assume that there exist different types of* n, v, *and so on, distinguished by virtue of their feature content. (Embick & Marantz 2008)*

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Mostly coherent, but "category-defining functional heads" needn't be restricted to little xs (DM incarnations of traditional lexical categories).

- a categorizer = a construct that passes its category to another construct
- little xs = traditional lexical categorizers $\neq$ the only kind of categorizer
  - there are also many functional categories
  - our entire world is based on cognitive categorization (Cohen & Lefebvre 2005)
- other functional and cognitive categories can also be categorizers
  - e.g. we can use FLOWER to categorize 🌹
- under this broad interpretation of 'categorizer', little xs are not special

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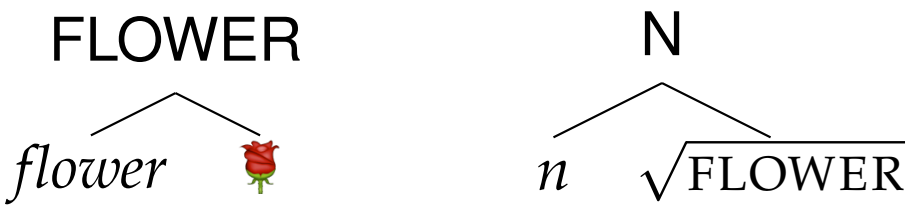
  - a known category categorizes an unknown object in cognition
  - an FF-equipped category categorizes an FF-less object in syntax
  - ★ in both cases the categorizer labels the categorizee



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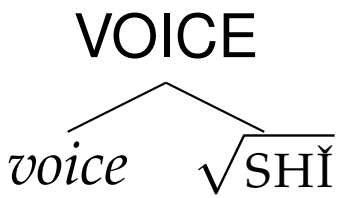

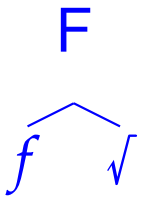

Root categorization schema

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- Categorizer–Root selection is not at the EP (i.e. spine) level.
  - Layered derivation: [x-$\sqrt{}$] is an atom on the spine.
  - EP bottom = root-supported $x_{\sqrt{}}$, not x alone.

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  - EP bottom = root-supported $x_{\sqrt{}}$, not x alone.
  - EP embeds $x_{\sqrt{}}$, x alone embeds $\sqrt{}$.

✗ C–T–Voice–v–$\sqrt{}$ ✓ C–T–Voice–$v_{\sqrt{}}$ $\xrightarrow{\text{GRCS}}$ $\text{C}_{\sqrt{}}$–$\text{T}_{\sqrt{}}$–$\text{Voice}_{\sqrt{}}$–$v_{\sqrt{}}$

Proposal I: Revised Categorization Assumption

Roots cannot appear without being categorized; they are categorized by merging syntactically with category-defining functional heads. All functional categories define categories and can serve for this purpose.

- If categorizer $= x$, we get a traditional lexical category.
- If categorizer $\neq x$, we get a **half-lexical item**.

Problems in potential solutions (reminder)

Two crucial problems:

- Categorization assumption confines Roots to little xs.
- uFs can't survive spell-out, but are needed on the renumerated heads.
  - e.g. Voice$_{\sqrt{}}$ still selects VP and agrees with some DP

Accordingly:

- Some **revision** of the categorization assumption is needed. 👌
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Proposal II: Untie Renumeration from Spell-Out

Why? Because we need uFs to stay on Root-supported categories.

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How? Stick to Chomsky's original definition of Spell-Out trigger.

- Spell-Out is triggered by **strong phase heads**: C, v^* for the clause.
- Renumeration and Spell-Out have different purposes:
  - Renumeration/layered derivation: recursive structure-building.
  - Spell-Out: cyclic computation burden reduction.
  - ★ We need layered derivation even if there is only one Spell-Out cycle!

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What triggers renumeration then?

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Renumeration happens under **three** conditions:

- when a derivation sequence finishes, there is still uF
- there is no strong phase head in the derived object
- the overall Numeration has not been exhausted

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- when a derivation sequence finishes, there is still uF
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This means renumeration and spell-out **never** coincide.

- A conclusion exactly opposite to the Phase-based original proposal.

Illustration

☞ *qiānxū shǐ rén jìnbù* (=Part I, (8a))
modesty CAUSE people progress
'Modesty helps one to make progress.'

Numeration (simplified): { $\sqrt{\text{QIĀNXŪ}}$, $\sqrt{\text{RÉN}}$, $\sqrt{\text{JÌNBÙ}}$, <n, 2>, v, $\sqrt{\text{SHǏ}}$, Voice }

- LA_1: { $\sqrt{\text{QIĀNXŪ}}$, n }
- LA_2: { $\sqrt{\text{RÉN}}$, n }
- LA_3: { $\sqrt{\text{SHǏ}}$, Voice }
- LA_4: { $\sqrt{\text{JÌNBÙ}}$, v }

Derivation layer #1 (based on Collins & Stabler's 2016 model):

- $S_{1.0}$ = <$LA_{1.0}$, $W_{1.0}$> = <{ $\sqrt{\text{QIĀNXŪ}}$, n }, $\emptyset$> Select $\times 2$
- $S_{1.2}$ = <$LA_{1.2}$, $W_{1.2}$> = <$\emptyset$, { $\sqrt{\text{QIĀNXŪ}}$, n }> Merge
- $S_{1.3}$ = <$LA_{1.3}$, $W_{1.3}$> = <$\emptyset$, { { $\sqrt{\text{QIĀNXŪ}}$, n } }> Renumerate

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Derivation layer #2:

- $S_{2.0}$ = <$LA_{2.0}$, $W_{2.0}$> = <{ $\sqrt{\text{RÉN}}$, n }, $\emptyset$> Select $\times 2$
- $S_{2.2}$ = <$LA_{2.2}$, $W_{2.2}$> = <$\emptyset$, { $\sqrt{\text{RÉN}}$, n }> Merge
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Derivation layer #3:

- $S_{3.0}$ = <$LA_{3.0}$, $W_{3.0}$> = <{ $\sqrt{\text{SHǏ}}$, Voice }, $\emptyset$> Select $\times 2$
- $S_{3.2}$ = <$LA_{3.2}$, $W_{3.2}$> = <$\emptyset$, { $\sqrt{\text{SHǏ}}$, Voice }> Merge
- $S_{3.3}$ = <$LA_{3.3}$, $W_{3.3}$> = <$\emptyset$, { { $\sqrt{\text{SHǏ}}$, Voice } }> Renumerate

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Derivation layer #4:

- $S_{4.0}$ = <$LA_{4.0}$, $W_{4.0}$> = <{ $\sqrt{\text{JÌNBÙ}}$, v }, $\emptyset$> Select $\times 2$
- $S_{4.2}$ = <$LA_{4.2}$, $W_{4.2}$> = <$\emptyset$, { $\sqrt{\text{JÌNBÙ}}$, v }> Merge
- $S_{4.3}$ = <$LA_{4.3}$, $W_{4.3}$> = <$\emptyset$, { { $\sqrt{\text{JÌNBÙ}}$, v } }> Renumerate

Illustration

☞ *qiānxū* *shǐ* *rén* *jìnbù* (=Part I, (8a))
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Renumeration result LA_5: { { $\sqrt{\text{QIĀNXŪ}}$, n }, { $\sqrt{\text{RÉN}}$, n }, { $\sqrt{\text{SHǏ}}$, Voice }, { $\sqrt{\text{JÌNBÙ}}$, v } }

Simplified notation LA_5: { $\text{N}_{\sqrt{\text{QIĀNXŪ}}}$, $\text{N}_{\sqrt{\text{RÉN}}}$, $\text{Voice}_{\sqrt{\text{SHǏ}}}$, $\text{V}_{\sqrt{\text{JÌNBÙ}}}$ }

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- $S_{5.2}$ = <$LA_{5.2}$, $W_{5.2}$> = <{ $N_{\sqrt{\text{QIĀNXŪ}}}$, $\text{Voice}_{\sqrt{\text{SHǏ}}}$ }, { $N_{\sqrt{\text{RÉN}}}$, $V_{\sqrt{\text{JÌNBÙ}}}$ }> Merge
- $S_{5.3}$ = <$LA_{5.3}$, $W_{5.3}$> = <{ $N_{\sqrt{\text{QIĀNXŪ}}}$, $\text{Voice}_{\sqrt{\text{SHǏ}}}$ }, { {$N_{\sqrt{\text{RÉN}}}$, $V_{\sqrt{\text{JÌNBÙ}}}$ } }> Select
- $S_{5.4}$ = <$LA_{5.4}$, $W_{5.4}$> = <{ $N_{\sqrt{\text{QIĀNXŪ}}}$ }, { { $N_{\sqrt{\text{RÉN}}}$, $V_{\sqrt{\text{JÌNBÙ}}}$ }, $\text{Voice}_{\sqrt{\text{SHǏ}}}$ }> Merge
- $S_{5.5}$ = <$LA_{5.5}$, $W_{5.5}$> = <{ $N_{\sqrt{\text{QIĀNXŪ}}}$ }, { { { $N_{\sqrt{\text{RÉN}}}$, $V_{\sqrt{\text{JÌNBÙ}}}$ }, $\text{Voice}_{\sqrt{\text{SHǏ}}}$ } }> Select
- $S_{5.6}$ = <$LA_{5.6}$, $W_{5.6}$> = <∅, { { { $N_{\sqrt{\text{RÉN}}}$, $V_{\sqrt{\text{JÌNBÙ}}}$ }, $\text{Voice}_{\sqrt{\text{SHǏ}}}$ }, $N_{\sqrt{\text{QIĀNXŪ}}}$ }> Merge
- $S_{5.7}$ = <$LA_{5.7}$, $W_{5.7}$> = <∅, { { { { $N_{\sqrt{\text{RÉN}}}$, $V_{\sqrt{\text{JÌNBÙ}}}$ }, $\text{Voice}_{\sqrt{\text{SHǏ}}}$ }, $N_{\sqrt{\text{QIĀNXŪ}}}$ } }>
- Numeration exhausted, spell-out $W_{5.7}$. (NB no Spell-Out yet in a full derivation with T–C)

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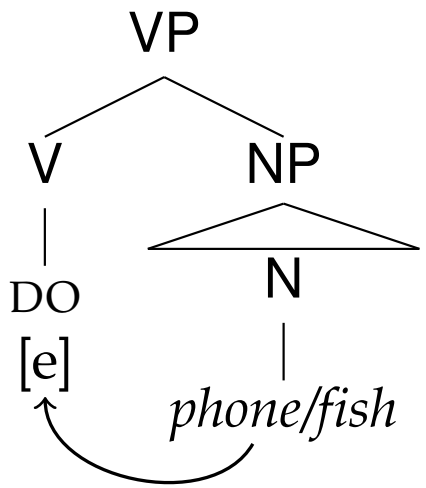
Outline

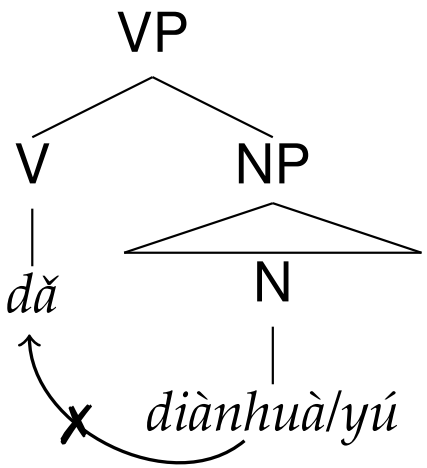
Implications: Head movement and analyticity

Some existing hypotheses:

- Huang (2015): HM ➙ synthetic; in-situ ➙ analytic.
  - correlated with phonological nature of light categories.



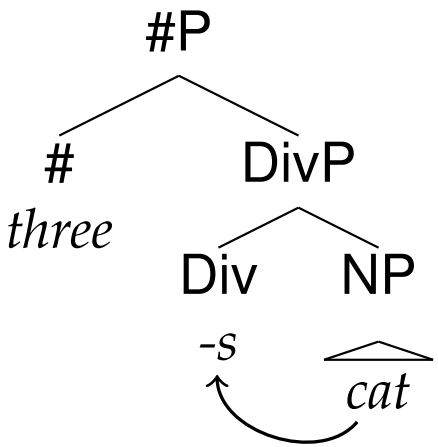
(English)



(Mandarin)

Implications: Head movement and analyticity

- Borer (2005): free f-morph ➙ no HM; no f-morph ➙ HM.
  - correlated with phonological nature of functional categories.



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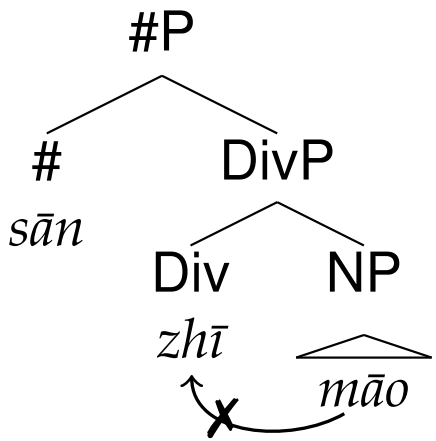
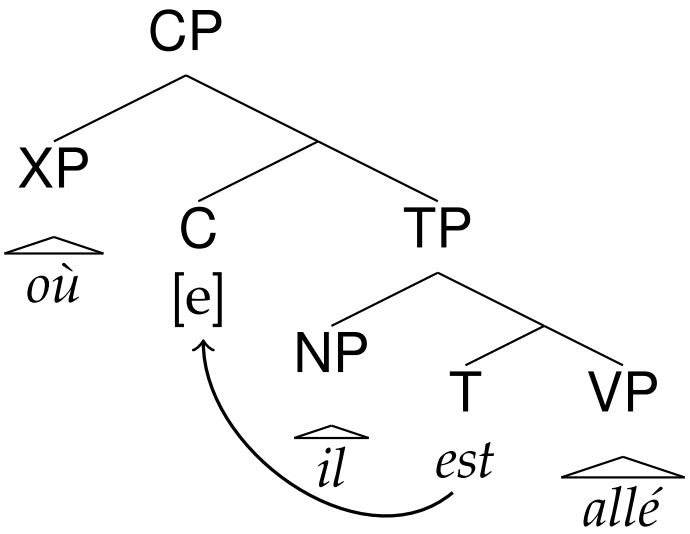


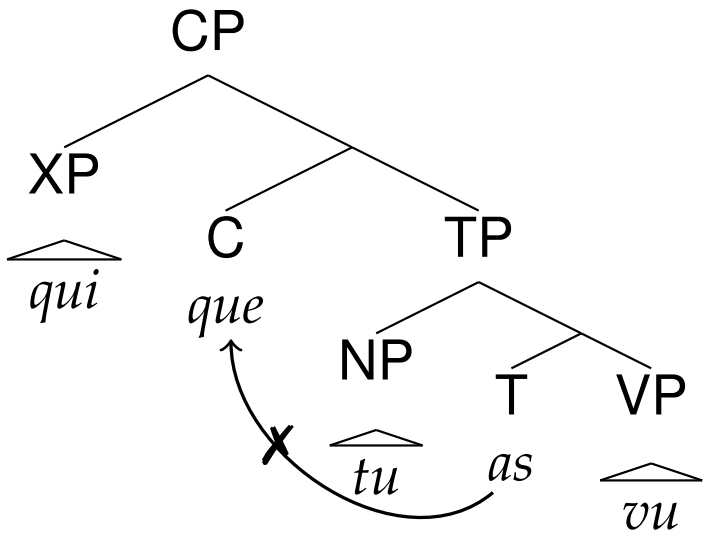
(Mandarin)

Implications: Head movement and analyticity

- Rizzi & Roberts (1989): free morphemes block HM.
  - HM cannot substitute into an overtly filled head.



(French)



(Québec French)

Implications: Head movement and analyticity

Huang (2015), Borer (2005), Rizzi & Roberts (1989)

Functional heads overtly filled by free morphemes cannot host HM.

But minimalist syntax doesn't see phonological features!

Root support is a solution without look-ahead or special diacritics.

Root **content** is not visible in syntax, but Root **shell** is.

Specifically:

- Functional category: <$\pm\Pi$, $\pm\Sigma$, F>
- Root: <$\pm\Pi$, $\pm\Sigma$> (modulo <$-\Pi$, $-\Sigma$>)

☞ Roots and f-categories share the same shell construct (tuple).

Proposal III: Root support conditionally blocks HM

Conditions:

- same EP (hence not blocking e.g. pronoun cliticization, NI)
  - Huang's NI analysis for LVC needs reformulation
  - possibly $\{ v, \sqrt{\text{PHONE}} \}$ vs. $\{ \text{V}_{\sqrt{\text{DǍ}}}, \{ \text{N}_{\sqrt{\text{DIÀNHUÀ}}} \ldots \} \ldots \}$
  - i.e. Root categorization (word) vs. renumeration (phrase)
- HM otherwise motivated
  - as side effect (e.g. Defective Goal, Roberts 2010) 👌
  - not as side effect (any example?) – crash 💣

Proposal III: Root support conditionally blocks HM

How?

- Renumeration $\neq$ spell-out: **no structure flattening**.
  - e.g. $W_{i.m\circ}$ { { Voice, $\sqrt{\text{SHǏ}}$ } } $\rightarrow$
    $LA_{j.1}$ { { Voice, $\sqrt{\text{SHǏ}}$ } . . . } $\rightsquigarrow$ $W_{j.n}$ { { { Voice, $\sqrt{\text{SHǏ}}$ } . . . } . . . }
- At actual spell-out, suppose V-to-Voice movement is DG-triggered.
  - Upon Agree, FF(v) $\subset$ FF(Voice).
  - Though no IM happens, FF(v) 'moves into' Voice, i.e. substitution.
  - The Root categorized by v may pied-pipe to signal the procedure.
  - Pied-piping must **not** tamper Merge-created relation!

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- At actual spell-out, suppose V-to-Voice movement is DG-triggered.
  - If Voice is **null**: Voice + V $= <\emptyset, \text{FF(Voice)}, \emptyset> + \{ <\emptyset, \text{FF}(v), \emptyset>, <\Pi, \Sigma> \}$
    $= \{ <\emptyset, \text{FF(Voice+}v\text{)}, \emptyset>, <\Pi, \Sigma> \}$ 👌
  - If Voice has **PF-inserted exponent**: Voice + V
    $= <\Pi, \text{FF(Voice)}, \emptyset> + \{ <\emptyset, \text{FF}(v), \emptyset>, <\Pi, \Sigma> \}$
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  - If Voice is **root-supported**: Voice + V
    $= \{ <\emptyset, \text{FF(Voice)}, \emptyset>, <\Pi, \Sigma> \} + \{ <\emptyset, \text{FF}(v), \emptyset>, <\Pi, \Sigma> \}$
    ①$= \{ <\emptyset, \text{FF(Voice+}v\text{)}, \emptyset>, <\Pi, \Sigma>, <\Pi, \Sigma> \}$ ✗ ☜ ternary
    ②$= \{ \{ <\emptyset, \text{FF(Voice+}v\text{)}, \emptyset>, <\Pi, \Sigma> \}, <\Pi, \Sigma> \}$ ✗ ☜ root-over-f
  - ★ Pied-piping is doomed to crash. 💣

Implications: Head movement and analyticity

So root support blocks HM due to **No Tampering Condition**.

Advantages of this approach:

- no recourse to “affixal feature strength” (Huang 2015)
- no stipulated affixal vs. free morpheme status (Borer 2005)
- a new angle to substitution vs. adjunction (Rizzi & Roberts 1989)

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If Huang's parametrization of analyticity is on the right track, root support is a natural part of it. As Borer (2005: 264) states:

> *What is proposed here is a system where all [syntactic] variation, both within a language and across languages, is reducible not only to the properties of range assigners to functional open values, but [also] to their morphophonological properties.*

☞ [±root] is precisely such a property.

Outline

Implications: Root support beyond Chinese

Chinese is a root-support language par excellence:

- consistent across domains (see Part I)
- empty f-category + full root, i.e. <$-\Pi$, $+$F, $-\Sigma$> + <$+\Pi$, $+\Sigma$>

Half-lexical item	F-category	Root
dǎ	<$-\Pi$, FF(v_{DO}), $-\Sigma$>	</daɻ/, 'HIT'>
shǐ	<$-\Pi$, FF(Voice$_{CAUS}$), $-\Sigma$>	</shiɻ/, 'USE'>
yǒu	<$-\Pi$, FF(Asp$_{PERF}$), $-\Sigma$>	</youɻ/, 'HAVE'>
néng	<$-\Pi$, FF(Mod$_{DYNA}$), $-\Sigma$>	</nengˊ/, 'ABLE'>
ma	<$-\Pi$, FF(Force$_{Q}$-SA), $-\Sigma$>	</ma/, 'NOT.HAVE 🙂'>
zhī	<$-\Pi$, FF(Div$_{CL}$), $-\Sigma$>	</zhi¯/, 'SINGLE'>
sī	<$-\Pi$, FF(Per$_{1st}$), $-\Sigma$>	</si¯/, 'PRIVATE'>
bǎ	<$-\Pi$, FF(P$_{DISP}$), $-\Sigma$>	</baɻ/, 'HOLD'>

Implications: Root support beyond Chinese

Other languages also have quasi root-supported categories, e.g. English

- Auxiliary and modal verbs: *have*, *be*, *can*, etc.
- Complementizers: *that*, *if*, *whether*, etc.
- Prepositions: *at*, *on*, *in*, etc.
- Pronouns: *he*, *she*, *it*, etc.
- Demostratives: *this*, *that*, *these*, etc.
- Numerals: *one*, *two*, *three*, etc.

☞ Kayne (2016): none of these is functional head exponent!

Implications: Root support beyond Chinese

They resemble root support for being free morphemes and not hosting HM (Borer 2005), but intuitively aren't the type of root employed in Chinese:

- Chinese: predominantly **recycled from content words**.
- English: often **dedicated morphemes**.
- With regard to the lexico-morphological characteristics in Part I

	Lexical origin	Lexical usage	Extra-syntactic restriction
Chinese	Y	Y	Y
English	some	some?	some?

My claim: same root support mechanism, different root content.

Proposal IV: Generalized Root

The nature of Root is a long-standing debate (cf. i.a. *Theoretical Linguistics* 2014 40(3/4), Alexiadou, Borer & Schäfer 2014, Bauke & Blümel 2017).

Perhaps Root is not a homogeneous notion (cf. Biberauer 2017).

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Perhaps Root is not a homogeneous notion (cf. Biberauer 2017).

Root support isn't picky – any type of Root would do!

- ① <$+\Pi$, $+\Sigma$> (full); ② <$+\Pi$, $-\Sigma$> (expletive); ③ <$-\Pi$, $+\Sigma$> (null).

Supporting Roots in Chinese are mostly ①, and those in English are mostly ②. They are both Roots (or 'listemes', Borer 2005) in the sense that they **lack F**.

Implications: Root support beyond Chinese

Taking the f-category variation into account, we get the following table:

	$\sqrt{}$: <+Π, +Σ>	$\sqrt{}$: <−Π, +Σ>	$\sqrt{}$: <+Π, −Σ>
f: <+Π, +F, +Σ>	Derivational morphology, e.g. $teach_{\sqrt{(-v)}}$-er_{f}	-	Derivational-suffix-like f-category supported by expletive Root
f: <−Π, +F, +Σ>	Null f-category supported by full Root, e.g. $y\check{o}u_{\sqrt{}}$-$\emptyset_{\text{Asp}}$	-	Null f-category supported by expletive Root, e.g. $it_{\sqrt{}}$-$\emptyset_{\varphi}$
f: <+Π, +F, −Σ>	-	-	Suffixal f-category supported by expletive Root
f: <−Π, +F, −Σ>	-	-	-

(red = prevalent, black = might exist, '-' = I'm not aware)

Summary

Data (Part I): Chinese functional items are not purely functional, but have a non-trivial lexical side.

- lexical origin/usage; many-to-many; lexical semantic/stylistic restriction; somewhat open class.

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Theory: Root support (f-$\sqrt{}$ merger + renumeration)

- Proposal I: Generalized Root Categorization Schema
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Conclusion: Root support gives syntactic categories flexible shapes and is a point of parametric variation.


THANKS!

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