Numeral Allomorphy of 'One' and 'Two' in Mandarin Chinese

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Overview

- The numerals 1 and 2 in Mandarin display allomorphy:
  1: $yi_H/yi_F/yi_R$ 2: er/liang
  Mandarin tones: H = High, R = Rising, L = Low, F = Falling
- We propose a phonological rule and lexical insertion rule to account for their distribution, with a focus on:
  (a) Numeral allomorphy before classifiers
  (b) Numeral allomorphy in multi-digit numerals

Implications:

- The behavior of 1 and 2 in multi-digit numerals indicate that Chinese actually distinguishes between synthetic and analytic forms (*contra* Li & Thompson 1981).

Numeral Allomorphy

- Single-digit numerals use the **contextual form** before classifiers, and the **absolute form** when in isolation.

(1) *1 allomorphy*

a. yi_F zhi_H mao
1.CONT CLAS cat

b. yi_H $ling_R$ yi_H shi_F
1.ABS zero 1.ABS room
'Room 101'

(2) *2 allomorphy*

a. liang zhi mao
2.CONT CLAS cat

b. er ling er shi
2.ABS zero 2.ABS room
'Room 202'

- Allomorphy of 1 is expressed by tone.
- Contextual 1 yi_F is subject to a lexical tone sandhi rule:

(3) $yi_F \rightarrow yi_R/\_\_\ CV_F$

(4) *Contextual yi lexical sandhi*

a. yi_F zhi_H mao
1.CONT CLAS cat

b. yi_R ge_F li
1.CONT CLAS pear

- Absolute 1 yi_H is always in the high tone ('Room 101').

1	Contextual: yi_F/yi_R	Absolute: yi_H
2	Contextual: *liang*	Absolute: *er*

Also Observed in Min Chinese (Lin 2015)

1	Contextual: *chi̍t*	Absolute: *it*
2	Contextual: *nn̄g*	Absolute: *jī*

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We thank Adam Albright, Neil Banerjee, Michael Kenstowicz, Patrick Niedzielski, Yuta Tatsumi, and David Pesetsky, for valuable discussion. We are also grateful for audience feedback at MIT Morphun.

Allomorphy before Classifiers

(5) *1 apple vs. 101 apples*

a. [yi_R 1.CONT] [ge_F CLAS pingguo] apple '*1 apple*'

b. [[yi_F 1.CONT bai$_L$ hundred ling zero] [yi_H 1.ABS] [ge_F CLAS pingguo] apple '*101 apples*'

(6) *2 apples vs. 202 apples*

a. [liang 2.CONT] [ge CLAS pingguo] apple '*2 apples*'

b. [[liang 2.CONT bai hundred ling zero] [er 2.ABS] [ge CLAS pingguo] apples '*202 apples*'

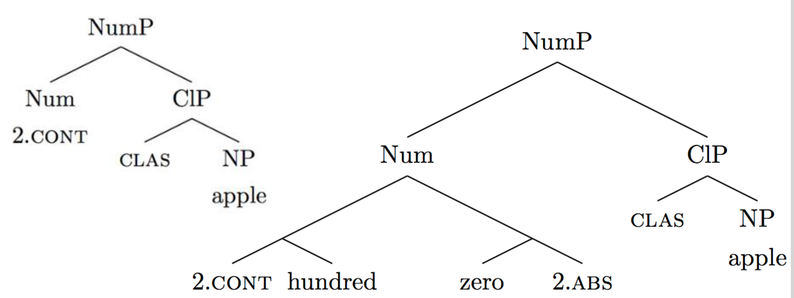
- Absolute form used instead when it is the final digit of a multi-digit numeral before a classifier.

Our proposal:

(7) C-command Rule: The numerals '1' and '2' surface as the contextual form when they c-command the following word. Otherwise they are in the absolute form.

Adapted from He's (2015) sisterhood rule, modified given classifier noun structure proposed by Cheng & Sybesma (1998).

(8)



- C-command Rule also predicts absolute forms in isolation.

Ordinals

(9) *Absolute forms in ordinals*

a. [di yi_H] $tang_R$ ke
-th 1.ABS CLAS lesson
'the first lesson'

b. [di er] ben shu
-th 2.ABS CLAS book
'the second book'

c. [Ø yi_H] lou_R
-th 1.ABS floor
'the first floor'

d. [Ø er] yue
-th 2.ABS month
'February'

- Ordinals do not c-command the following word.

Multi-digit Numerals

- Higher bases (100, 1000) behave like classifiers (Tatsumi 2021), but base of 10 does not.

(10) *The tens digit vs. hundreds, thousands digit*

a. yi_F $qian_H$ yi_F bai$_L$ yi_H shi_R
1.CONT thousand 1.CONT hundred 1.ABS ten '1110'

b. liang qian liang bai er shi
2.CONT thousand 2.CONT hundred 2.ABS ten '2220'

Our proposal:

(11) Morpheme Boundary Rule: the absolute form is used when it is followed by a morpheme boundary '+'.

yi_H + shi_R:10	er + shi:10
yi_F # bai$_L$:100	liang # bai:100
yi_F # $qian_H$:1000	liang # qian:1000

Synthetic vs. Analytic

- Mandarin is synthetic for numerals of base 10, but analytic for higher bases.
- Also monomorphemic archaic forms *nian* '20', *sa* '30'.
- Similar to English: *fifty 50* v. *five hundred 500*,
  French: *soixante 60* v. *quatre vingts 80*.

*ABA

- A monotonic trend in numeral bases:
  Greenberg (1978): Use of contextual multiplier in lower bases imply its use in higher bases.
- Also a case of *ABA, where A = synthetic, B = analytic

(12) *er qian liang bai er shi
2.ABS thousand 2.CONT hundred 2.ABS ten '2220'

- Bobaljik's (2012) containment analysis for *ABA in adjectives: *good, better, best*, not *good, better, *goodest*
- Superlatives (*best*) contain comparatives (*better*).
- But it cannot account for numeral bases: higher bases cannot be said to "contain" lower bases.

Selected References: Bobaljik, J. 2012. Universals in comparative morphology: Suppletion, superlatives, and the structure of words. Cheng, L. & R. Sybesma 1998. Yi-wan tang, yi-ge tang: Classifiers and massifiers. Greenberg, J. 1978. Generalizations about numeral systems. He, C. 2015. Complex numerals in Mandarin Chinese are constituents. Lin, P. 2015. Taiwanese grammar: a concise reference. Tatsumi, Y. 2021. Linguistic realization of measuring and counting in the nominal domain: A cross-linguistic study of syntactic and Semantic variations.