Copying Without Reduplication:
Fanqie language formation in Chinese

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I. How are segments copied?

(1) In derivational theories of autosegmental phonology, there were two formal mechanisms for copying segments:

(a) Long-distance spreading

Example: Biliteral roots in Arabic (McCarthy 1981)

➪ samam 'poison-PERFECTIVE'

(b) Reduplication

Example: Plural in Agta (Marantz 1982, citing Healey 1960)

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takki  takki
|||    |||||
CVC    CVCCV   ➪   taktakki   'legs'
(σμμ)
```

(2) Gafos (1996) on *articulatory locality*:

• No long-distance spreading can occur that does not also spread to all segments between the trigger and the target.

➡ Consequence: long-distance spreading is not available as a copying mechanism (at least for consonants).

Does this mean that all copying comes from reduplication?
➡ **NO.** ⬅

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(3) **Proposal:**
The formal mechanism of Correspondence Theory (McCarthy & Prince 1995) allows for another kind of copying, *split-output copying.*

• INTEGRITY on the I(nput)-O(utput) dimension can be violated.
• Therefore, *one input correspondent* can have *two output correspondents.*[2]
• Split-output copying is formally distinct from reduplication:
No BR-correspondence relation exists between the two output segments.

The structure of this talk:
II. Split-output copying in *fanqie* language formation
III. Formal implications for a theory of segmental copying
IV. Other applications of split-output copying

II. Split-output copying in *fanqie* language formation

NB: [fɑn3 tɕʰje4]

(4) What is *fanqie*? ➡ A kind of spelling system for Chinese syllables.

(a)	Take a syllable	ma			'mother'
(b)	Separate onset from rime	m	+	a	
(c)	Combine onset with fixed rime, rime with fixed onset	may	+	ka	

(5) Chao (1931) describes eight secret languages based on the *fanqie* process.
He distinguishes two kinds of *fanqie* languages:

(a)	Sequential:	May-ka (Mandarin)	pen	→	pay-ken	'book'
		Man-t'a (Mandarin)	pey	→	pen-t'ey	'north'
(b)	Inverted:	Wa-mən (Suzhou)	pə	→	wə-pən	'?carry'
		La-mi (Cantonese)	tɔ	→	lɔ-ti	'numerous'

• Note: Chao (1931) names a *fanqie* process according to the output it produces from [ma].

(6) Is *fanqie* a reduplicative process? Yip (1982), Bao (1990) claim that it is.
• Yip's (1982) strongest argument: the "reduplication of information"
Example: Medial-glide copying in May-ka (Mandarin)

xwey ➡ xway-kwey 'return'

[2]Urbanczyk (1998) makes a similar proposal. Thanks to Ania Łubowicz for bringing this reference to my attention.

(7) How it works in Yip's analysis
- The *fanqie* morpheme is a CV-skeleton with prespecified material
- The skeleton has <u>two syllables</u>; this triggers reduplication of the base melody
- Nothing overwrites the medial glide [w] in either syllable, so it appears twice

```
xwey   xwey          Input:    xwey
||      |||
CGVC   CGVC          Output:   xway-kwey
  ||   |
  ay   k     (⇦ Prespecified material has precedence)
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(8) BUT: if we follow Yip (1982) and say that *fanqie* processes involve reduplication with melodic overwriting (cf. Alderete et al. 1997), there are problems.

(a) Why are parts of *both syllables* overwritten?
- Which syllable is the base, and which is the reduplicant?

(b) In all eight of the *fanqie* processes discussed by Chao (1931), *all the segments of the input syllable* emerge somewhere in the output (though they may be scrambled). What ensures this?
- The overwriting melody must be lexically specified. So it could be anything. Why is overwriting restricted to one onset and one rime?

(9) **Proposal:** *Fanqie* language formation does <u>not</u> involve reduplication.

(a) In each *fanqie* language, the base syllable is simply <u>combined</u> with an affix.

(b) What *fanqie* languages have in common: High-ranked ANCHORING constraints that force material from the base toward the edges of the PWd.

➡ What I will show next:
- An ANCHORING account works for both a sequential *fanqie* language (May-ka) and an inverted one (Wa-mən).
- Doubling of input segments, such as medial glides in May-ka, occurs to improve satisfaction of CONTIGUITY. This is split-output copying, <u>not</u> reduplication.

A. An ANCHORING account of a sequential *fanqie* language: May-ka
(Mandarin)

(10) *Examples:* (a) pey → <u>p*ay*-k*e*y</u> 'north'
(b) xwey → <u>xw*ay*-k*w*ey</u> 'return'

(11) *Analysis:* In a sequential *fanqie* pattern, ANCHORING constraints (McCarthy & Prince 1995) for the base are undominated.

ANCHOR-LEFT(Base, PWd): Every input segment that stands at the left edge of a base must have an output correspondent that stands at the left edge of a PWd.

ANCHOR-RIGHT(Base, PWd): Every input segment that stands at the right edge of a base must have an output correspondent that stands at the right edge of a PWd.

➡ Result: Base material must appear at the left and right edges of the PWd. This forces the affixal material to appear as an infix.

(12) Constraints needed for May-ka:

ANCHOR-L, ANCHOR-R	These derive the base-to-edges "sequential" pattern.
MAX_{IO}	Input segments are never deleted.
>>	
CONTIGUITY	Segments that are adjacent must have correspondents that are adjacent.

- This is violated to satisfy the other constraints.
- But: Apparent "extra copying" occurs in order to better satisfy CONTIGUITY. (See (14) below.)

(13) The basic pattern: /pey/ 'north' → <u>p</u>ay-k<u>e</u>y

/<u>pey</u> + ayk/	[MAX ,	ANCHOR-L ,	ANCHOR-R] >>	CONTIGUITY
a. <u>pey</u>-ayk			*!	
b. <u>pey</u>-kay			*!	*(ka) *(-yk)
c. ayk-<u>pey</u>		*!		
d. <u>pey</u>	*!**			
☞ e. <u>p</u>ay-k<u>e</u>y				*(pa), *(ke), *(-pe)

- Notation for CONTIGUITY violations:

*(AB) = IO-CONTIG violation; A and B adjacent in input, but not in output
*(-AB) = OI-CONTIG violation; A and B adjacent in output, but not in input

(14) With a medial glide: /xwey/ 'return' → xway-kwey

/xwey + ayk/	[MAX ,	ANCHOR-L ,	ANCHOR-R] >>	CONTIGUITY
a. xwey-kay			*!	*(ka), *(-yk)
b. xay-kwey[3]				*(xa), *(kw), *(-xw)!
☞ c. xway-kwey				*(xa), *(kw)

• Compare candidates (b) and (c) in (14).
CONTIGUITY is better satisfied when the input /w/ has *two output correspondents.*

➡ Of course, the winning candidate in (14) also violates:

(16) INTEGRITY No element of S_1 has multiple correspondents in S_2 .
(McCarthy & Prince 1995)

• Therefore, CONTIGUITY must dominate INTEGRITY, giving the final ranking

(17) [MAX-IO, ANCHOR-L, ANCHOR-R] >> CONTIGUITY >> INTEGRITY

B. An ANCHORING account of an inverted *fanqie* language: Wa-mən (Suzhou)

Note: This section analyzes only the basic Wa-mən pattern. There are many complex segmental alternations, especially in the affix.

(18) *Examples:* (a) pə → *wə-pən* '?carry'
(b) laŋ → *ɦaŋ-lən* '?wave'

(19) *Analysis:*

(a) As in the sequential case, ANCHORING constraints are high ranking.

(b) However, the positional faithfulness constraint MORPHINTEG_{Rt} outranks the ANCHORING constraints, so the segments of the base *can not be divided*. Instead, they are reordered.

[3]There is another candidate to consider, analogous to (b) but with the glide appearing in the initial syllable: xw*ay-k*ey. This candidate performs just as well on CONTIGUITY as the winning candidate (c), and moreover avoids the INTEGRITY violation that (c), with its copied glide, incurs. There is great debate over whether the so-called "medial glides" of Chinese should be considered part of the onset or part of the rime, but here is one way to rule out this additional candidate. Perhaps the /w/ is not part of a complex onset, but is instead the initial member of a rising diphthong. It would then seem reasonable to say that dividing the nucleus of a syllable is worse than simply dividing the onset from the rime.

(20) Constraints needed for Wa-mən:

MAX_{IO}	
MORPHINTEG_{Rt}	Nothing may intervene among the segments of a *root* morpheme.
>>	
ANCH-L >> ANCH-R	Ranked this way, because the root ends up closer to the left edge than to the right.
>>	
CONTIGUITY	Dominated. So as in May-ka, input order is sacrificed.

(21) Example: /laŋ/ 'wave' → *ɦaŋ-lən*

/laŋ+ɦən/	MAX ,	MORPHINT_{RT} >>	ANCHOR-L >>	ANCHOR-R
a. laŋ-ɦən				***!
b. ɦən-laŋ			**!*	
c. laŋ	*!**			
d. lən-ɦaŋ		*!		
e. ɦəŋ-lan			**!	*
☞ f. ɦaŋ-lən			*	**

[correction, Jan 2002: (a) incorrectly defeats (f) by ANCHOR-L. Thus, an approach involving conjoined ANCHOR-L and ANCHOR-R is probably needed.]

(22) Conclusions:

- *Fanqie* language formation is characterized by:
  - (a) Affixation to a root
  - (b) Segmental permutation driven by ANCHORING constraints
- Any segmental copying that may occur happens for phonological reasons.
- *Fanqie* languages thus provide a case of *copying without reduplication.*

III. Formal implications for a theory of segmental copying

(23) What is reduplication? (from McCarthy & Prince 1993)

(a) Reduplication is initiated by a morpheme /RED/ in the input.

(b) When there is a /RED/ in the input, there is a BR-correspondence relation established between the base and the reduplicant in the output; the force of BR-faithfulness constraints is felt.

(24) How is split-output copying different from reduplication?

(a) There is no /RED/ in the input; split-output copying is phonological.

(b) As a result, there is no BR-correspondence relation between the two output copies. The two output segments have no faithfulness constraints relating them directly (although they are both correspondents of the same input segment, so they are related indirectly).

(c) Furthermore, in reduplication, the copying "happens" in the output. In split-output copying, it "happens" from the input to the output. This difference has potential implications for, e.g., opacity effects.

(25) Reduplication and split-output copying

(a) Reduplication: /RED + $t_1$ama/ → tama-$t_1$ama
BR-correspondence relation

(b) SO copying: /x$w_1$ey + ayk/ → x$w_1$ay-k$w_1$ey
no BR-correspondence relation

(26) How is split-output copying different from segmental spreading?

- In split-output copying, there are no autosegmental associations between the copies. They are completely distinct segments, related only indirectly, through IO correspondence.
- Is this a relevant distinction to make? Answer: *Maybe.*

IV. Other applications of split-output copying

- Fanqie processes are, after all, language games. Is there any evidence that spit-output copying occurs in "real" natural language?

(27) What it would take: Split-output copying as the most harmonic repair option

- Some markedness constraint must dominate INTEGRITY
- The constraints against other potential "repairs" must also dominate INTEGRITY
- Example: ONSET, MAX, DEP >> INTEGRITY

(28) A hypothetical example

Note: the numbered subscript refers to the IO-correspondence relation

/ok$_1$opo/	[ONSET ,	MAX ,	DEP] >>	INTEGRITY
a. ok$_1$opo	*!			
b. k$_1$opo		*!		
c. tok$_1$opo			*!	
☞ d. k$_1$ok$_1$opo				*

(29) Any real examples?

- Single-segment "reduplication" in Mon-Khmer languages (Gafos 1996, and refs.)
- Halq'eméylem (Salish; Urbanczyk 1998)

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