Copying Without Reduplication: Fanqie language formation in Chinese
Jennifer Smith
RumJClam III, 2/28/98

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)
   \[
   \begin{array}{c}
   a \\
   C V C V C \\
   s m \\
   \end{array}
   \] samam 'poison-PERFECTIVE'

(b) Reduplication
   Example: Plural in Agta (Marantz 1982, citing Healey 1960)
   takki takki
   CVC CVCCV \( \sigma_{\mu\mu} \)
   \( \sigma_{\mu\mu} \) \( \mu \mu \)
taktki 'legs'

(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. ←

(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.

(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 \( \rightarrow \) pay-k\(\tilde{e}\)n 'book'
       Man-t\(\tilde{a}\) (Mandarin) pen \( \rightarrow \) pay-t\(\tilde{e}\)n 'north'

   (b) Inverted:
       W\(\tilde{a}\)-m\(\tilde{o}\)n (Suzhou) p\(\tilde{o}\) \( \rightarrow \) w\(\tilde{a}\)-p\(\tilde{o}\)n 'north'
       La-mi (Cantonese) t\(\tilde{o}\) \( \rightarrow \) l\(\tilde{a}\)-t\(\tilde{o}\) '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)
     x\(\tilde{w}\)ey \( \rightarrow \) x\(\tilde{w}\)ay-k\(\tilde{w}\)ey 'return'

---

1Thanks to John Alderete, Toni Borowsky, Katy Carlson, Isadora Cohen, Paul de Lacy, Mark Harvey, Caroline Jones, Ania Lubowicz, and John McCarthy for comments and discussion. This research was partially supported by NSF grant SBR-9420424.

2Urbanczyk (1998) makes a similar proposal. Thanks to Ania Lubowicz for bringing this reference to my attention.
How it works in Yip's analysis

- The fanqie morpheme is a CV-skeleton with prespecified material
- The skeleton has two syllables; this triggers reduplication of the base melody
- Nothing overwrites the medial glide [w] in either syllable, so it appears twice

\[
\begin{array}{c|c|c|c}
\text{Input: } & xw & xw & yk \\
\text{Output: } & xw & ay-k & wey \\
\end{array}
\]

BUT: if we follow Yip (1982) and say that fanqie processes involve reduplication with melodic overwriting (cf. Alderete et al. 1997), there are problems.

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

Proposal: Fanqie language formation does not involve reduplication.

- In each fanqie language, the base syllable is simply combined with an affix.
- 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-ma).
    - Doubling of input segments, such as medial glides in May-ka, occurs to improve satisfaction of CONTIGUITY. This is split-output copying, not reduplication.

A. An ANCHORING account of a sequential fanqie language: May-ka

Examples:
(a) pey \rightarrow \text{pay-key} 'north'
(b) xwey \rightarrow \text{xw(ay)-kwey} 'return'

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.

Constraints needed for May-ka:
- ANCHOR-L, ANCHOR-R These derive the base-to-edges "sequential" pattern. 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.)

The basic pattern: /pey/ 'north' \rightarrow \text{pay-key}

\[
\begin{array}{ccc}
\text{MAX} & \text{ANCHOR-L} & \text{ANCHOR-R} \\
\text{CONTIGUITY} & \text{Segments that are adjacent must have correspondents that are adjacent.} \\
\end{array}
\]

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
There is another candidate to consider, analogous to (b) but with the glide appearing in the initial syllable: \textit{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.

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:

\begin{equation}
\textbf{INTEGRITY}\quad \text{No element of } S_1 \text{ has multiple correspondents in } S_2 \quad (\text{McCarthy \& Prince 1995})
\end{equation}

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

\begin{equation}
[\text{MAX-IO, ANCHOR-L, ANCHOR-R}] \gg \text{CONTIGUITY} \gg \text{INTEGRITY}
\end{equation}

\section*{B. An ANCHORING account of an inverted fanqie language: Wa-măn (Suzhou)}

\textit{Note:} This section analyzes only the basic Wa-măn pattern. There are many complex segmental alternations, especially in the affix.

\begin{equation}
\text{Examples:} \quad (a) \quad \text{p} \quad \Rightarrow \quad \text{w-p-} \text{măn} \quad \text{‘carry’} \\
(b) \quad \text{l} \quad \Rightarrow \quad \text{hun-} \text{măn} \quad \text{‘wave’}
\end{equation}

\begin{equation}
\text{Analysis:} \quad (a) \quad \text{As in the sequential case, ANCHORING constraints are high ranking.} \\
(b) \quad \text{However, the positional faithfulness constraint MORPHINTEG outranks the ANCHORING constraints, so the segments of the base can not be divided. Instead, they are reordered.}
\end{equation}

\begin{equation}
\text{(20) Constraints needed for Wa-măn:} \\
\quad \text{MAX}_{\text{IO}} \quad \text{MORPHINTEG}_{\text{R}} \quad \text{Nothing may intervene among the segments of a root morpheme.} \\
\gg \quad \text{ANCH-L} \gg \text{ANCH-R} \quad \text{Ranked this way, because the root ends up closer to the left edge than to the right.} \\
\gg \quad \text{CONTIGUITY} \quad \text{Dominate. So as in May-ka, input order is sacrificed.}
\end{equation}

\begin{equation}
\text{(21) Example: } /\text{lan/ ‘wave’} \Rightarrow /\text{fun-lan/}
\end{equation}

\begin{equation}
\begin{array}{llll}
\text{a. lan} & \Rightarrow & \text{hun-lan} & \quad \text{**!} \\
\text{b. hun} & \Rightarrow & \text{lan} & \quad \text{**} \\
\text{c. lan} & \Rightarrow & \text{fun} & \quad \text{**} \\
\text{d. fun} & \Rightarrow & \text{lan} & \quad \text{!} \\
\text{e. fun} & \Rightarrow & \text{lan} & \quad \text{**} \\
\text{f. fun} & \Rightarrow & \text{lan} & \quad \text{**} \\
\end{array}
\end{equation}

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

\begin{equation}
\text{(22) Conclusions:} \\
\quad \text{Fanqie language formation is characterized by:} \\
\quad (a) \quad \text{Affixation to a root} \\
\quad (b) \quad \text{Segmental permutation driven by ANCHORING constraints} \\
\quad \text{Any segmental copying that may occur happens for phonological reasons.} \\
\quad \text{Fanqie languages thus provide a case of copying without reduplication.}
\end{equation}

\begin{equation}
\text{III. Formal implications for a theory of segmental copying} \\
\text{(23) What is reduplication? (from McCarthy \& Prince 1993)} \\
\quad (a) \quad \text{Reduplication is initiated by a morpheme /RED/ in the input.} \\
\quad (b) \quad \text{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.}
\end{equation}
(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 + tama/ "!1 tama-tama
(b) SO copying: /xw1+ayk/ "!1 xw1-ay-kw1-ayk

(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

<table>
<thead>
<tr>
<th>/ok,opo/</th>
<th>[ ONSET, MAX, DEP ] &gt;&gt; INTEGRITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ok,opo</td>
<td>*!</td>
</tr>
<tr>
<td>b. k,opo</td>
<td>*!</td>
</tr>
<tr>
<td>c. tok,opo</td>
<td>*!</td>
</tr>
<tr>
<td>d. k,ok,opo</td>
<td>*!</td>
</tr>
</tbody>
</table>

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

References