Metathesis is not transposition

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1   Introduction

- Metathesis is typically used to describe when two segments transpose (AB ↔ BA)

- While simple enough to describe, metathesis is typologically rare:

    - It rarely occurs in the world's languages
    - Even languages that have metathesis only have it in certain cases

- For example, metathesis is often limited to particular sounds:

(1) Faroese metathesis sk → ks   (Hume and Seo, 2004: 38)
    a. /tʊsk-t/   → tʊks-t   'German (fem.sg)'
    b. /nask-t/   → naks-t   'impertinent (fem.sg)'
    c. /baisk-t/   → baiks-t   'bitter (fem.sg)'
    d. /fransk-t/   → franŋks-t   'French (fem.sg)'

- or metathesis is often limited to certain morphemes:

(2) Georgian metathesis of infinitival *-v*   (Butskhrikidze and van de Weijer, 2003)
    a. /xar-v-a/   → xvr-a   'to gnaw (inf)'
    b. /k'ar-v-a/   → k'vr-a   'to tie (inf)'
    c. /sxal-v-a/   → sxvl-a   'to chop off (inf)'
    d. /jer-v-a/   → jvr-a   'to move (inf)'

- Questions:

    - Why is metathesis so rare in comparison to deletion or epenthesis?
    - Why do most languages that have metathesis only apply it sporadically?

- **Main claim:** metathesis is not transposition, instead it is a type of gestural overlap

    - The reason why it is rare is because this overlap requires two separate operations (deletion and spreading)
    - The output of deletion + spreading is distinct from transposition

1.1 Data

- I focus on the Molo dialect of Uab Meto (Austronesian, West Timor), where metathesis is quite robust

    - it occurs for any C/V combination
    - it is not morphologically specific

- If there is a language with true transposition, we'd expect for it to be a language like this, where metathesis is entirely predictable based on surface phonology

- It reduces lapses (strings of unstressed syllables) between the stressed syllable and the edge of the phonological phrase/word

(3) Meto "metathesis" reduces right-edge lapses

a.	/ˈkokɪs/	→ [ˈkokɪs]	'bread'		$σ́σ$	→ $σ́σ$
	/ˈkokɪs-e/	→ [ˈko͡ɪks-e]	'the bread'		$σ́σ̲σ̲$	→ $σ́σ̲$
b.	/baˈkaseʔ/	→ [baˈkaseʔ]	'horse'		$σσ́σ$	→ $σσ́σ$
	/baˈkaseʔ-e/	→ [baˈka͡es̲ʔ-e]	'the horse'		$σσ́σ̲σ̲$	→ $σσ́σ̲$
c.	/ʔa-ˈmepo-t/	→ [ʔa-ˈmepo-t]	'worker'		$σσ́σ$	→ $σσ́σ$
	/ʔa-ˈmepo-t-in/	→ [ʔa-ˈme͡op-t-in]	'workers'		$σσ́σ̲σ̲$	→ $σσ́σ̲$

(4) Meto "metathesis" also reduces left-edge lapses

a.	/ˈmanu/	→ [ˈmanu]	'chicken'		$σ́σ$	→ $σ́σ$
	/ˌmanu ˈmutiʔ/	→ [ˌma͡on ˈmutiʔ]	'white chicken'		$σ̲σ̲σ́σ$	→ $σ̲σ́σ$
b.	/ˈʔami/	→ [ˈʔami]	'look for'		$σ́σ$	→ $σ́σ$
	/ˌʔami baˈkaseʔ/	→ [ˌʔa͡im baˈkaseʔ]	'look for a horse'		$σ̲σ̲σσ́σ$	→ $σ̲σσ́σ$

- I claim metathesis is not transposition based on three general arguments:

1. **Phonetics.** (Section 2)

    - Meto metathesis can be phonetically incomplete
    - I take this as evidence that on an abstract level, no phonological features have changed places

2. **Phonological interactions.** (Section 3)

    - Metathesis does not bleed/feed other phonological operations
    - The surface phonology behaves as if nothing has transposed

3. **Overgeneration issues in Optimality Theory.** (Section 4)

    - A language with dominated LINEARITY should not have any contrast based on precedence alone
        - Uab Meto *does* care about precedence, since CVVC/CVCV minimal pairs exist in the language
    - Analyzing metathesis as gestural compression & overlap predicts the typology better

- The first two arguments are theory-neutral, and the third is specific to Optimality Theory

2 Phonetics

- Meto metathesis is often phonetically incomplete

- CV → VC metathesis leaves excrescent vowels behind around 10% of the time

  – Partial metathesis has also been reported for Kwara'ae (Heinz, 2005) and Leti (Renhard Saupia, p.c.)
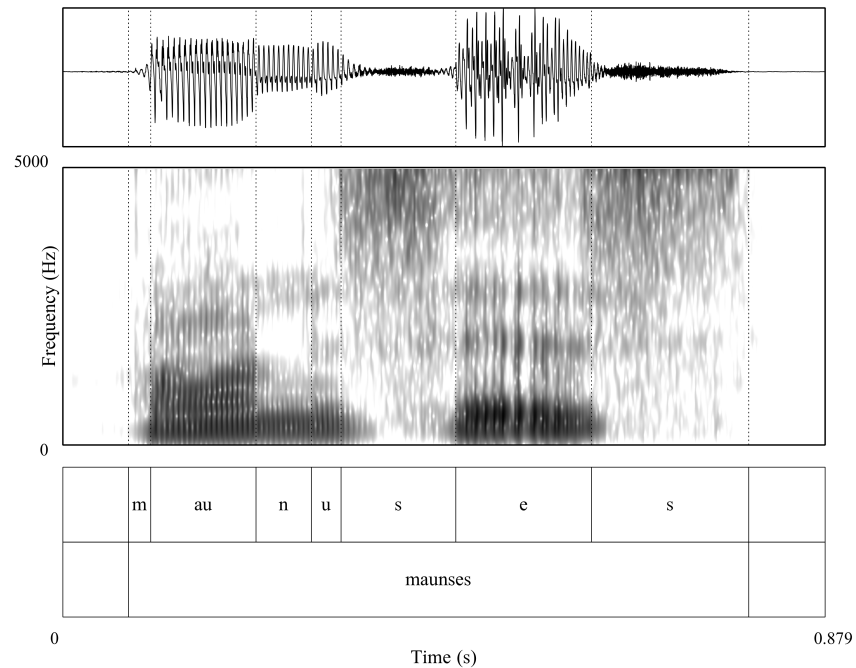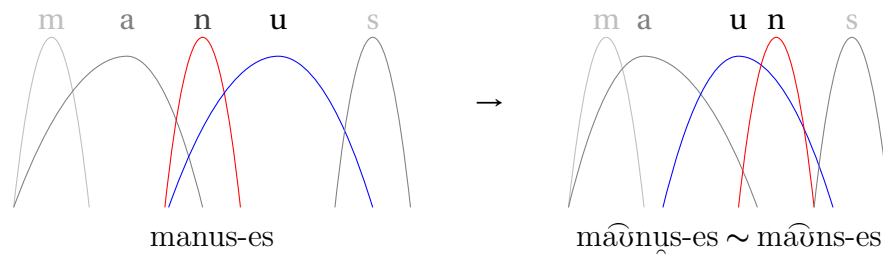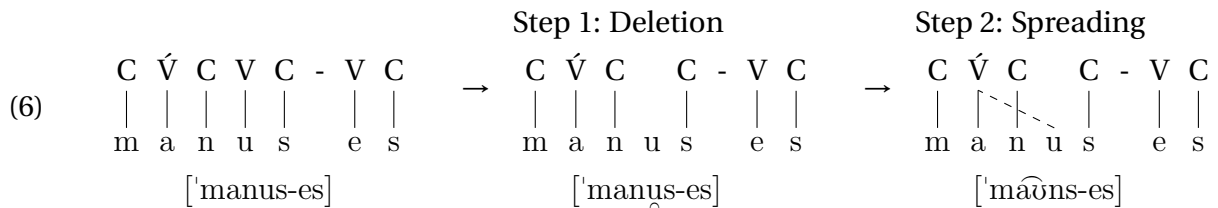

Figure 1: Spectrogram of partial metathesis (/manus-es/ → [ma͡ʊns-es] 'a betel vine')

- I treat metathesis as a type of gestural overlap

- First the syllable associated with [u] deletes, and then the gesture slides leftwards to associate with the [a]

(5) Gestural score for Uab Meto metathesis

- n.b. you can also think of this as deletion + spreading in autosegmental terms

3

	Step 1: Deletion	Step 2: Spreading

(6)

C Ý C V C - V C → C Ý C   C - V C → C Ý C   C - V C
| | | | | | | | | | | | | | | | | | |
m a n u s   e s   m a n u s   e s   m a n u s   e s

['manus-es]   ['man‿us-es]   ['ma͡ʊns-es]

- Partial metathesis occurs because the feature/gesture is still anchored to the right of the consonant!

- By contrast, these facts are puzzling in a model where metathesis is transposition

  – If metathesis doesn't fully change the order of two segments, then what is it doing?

- Here, I claim that phonological metathesis is always incomplete in this sense, because it's about realigning the onset/offset of the gesture without changing underlying abstract precedence relationships

3   Phonological interactions.

- Despite metathesis being common in Meto, it rarely feeds/bleeds other phonological operations in the ways we might expect

- Instead, metathesized sequences often have phonological behavior consistent with their underlying form

- I argue that this occurs because metathesis is not transposition, and so features remain in their underlying positions

  1. Metathesis fails to bleed consonant epenthesis (Section 3.1)
  2. Metathesis fails to feed coda deletion (Section 3.2)

3.1   Vowel hiatus and consonant epenthesis

- Vowel hiatus is not possible across a morpheme boundary (*V-V) in Meto

- Meto resolves this with consonant epenthesis

- This is unexpected because metathesis alone should suffice (e.g. /fatu-e/ → *[faut-e] 'the stone')

(7)   Consonant epenthesis resolves vowel hiatus   *Kotos Amarasi, Oekabiti speaker*

a.	/fatu-e/	→ fa͡ʊtg̱-e	'the stone'	*fa͡ʊt-e
b.	/kero-e/	→ ke͡org̱-e	'the monkey'	*ke͡or-e
c.	/tasi-e/	→ ta͡ısg̱-e	'the sea'	*ta͡ıs-e
d.	/roti-e/	→ ro͡ıtg̱-e	'the bread'	*ro͡ıt-e
e.	/meo-e/	→ meog̱-e	'the cat'	*me͡o-e

(8) No consonant epenthesis where there is no vowel hiatus

   a. /tai-s-e/ → tai-s-e 'the sea' *tai-sg̲-e
   b. /loi-t-e/ → loi-t-e 'the money' *loi-tg̲-e
   c. /manus-e/ → mãʊ̃ns-e 'the betel vine' *mãʊ̃nsg̲-e

- Why is an epenthetic consonant needed in (7)?

- Intuitively, it's because the vowel is still in its original position

(9) Vowel hiatus remains after metathesis

fatu-e → *fãʊ̃t-e
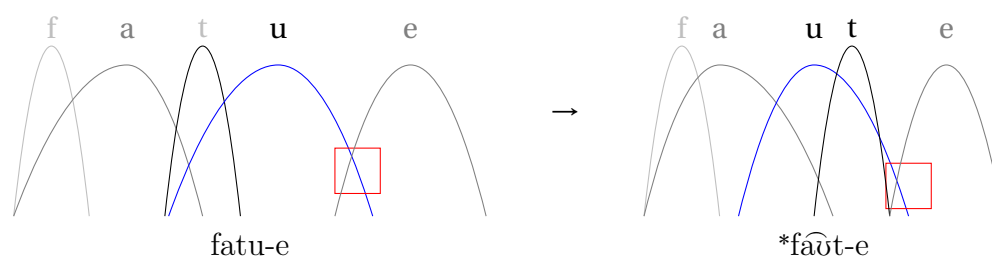
- In this way, the surface phonology behaves *as if the vowel remains in its original position*

3.2 Coda deletion

- This behavior is not limited to consonant epenthesis

- Meto deletes word-final consonants when they do not bear primary stress

(10) Underlying word-final consonants delete when the word does not bear primary stress

   a. /tai-s metan/ → [ˌtãĩ ˈmetan] 'black sarong'
   b. /loi-t mate/ → [ˌlõĩ ˈmate] 'green money'
   c. /kokɪs moloʔ/ → [ˌkõĩk ˈmoloʔ] 'yellow bread'
   d. /ʔa-mepo-t lele/ → [ʔa-ˌmẽõp ˈlele] 'field worker'
   e. /fof leko/ → [ˌfo ˈleko] 'good smell'
   f. /hun mate/ → [ˌhu ˈmate] 'green grass'
   g. /snaen mutiʔ/ → [ˌsnãẽ ˈmutiʔ] 'white sand'

- But, codas generated via metathesis do NOT delete

(11) Word-final consonants derived via metathesis do not delete

   a. /tasi metan/ → [ˌtãĩs ˈmetan] 'black sea' *[ˌtãĩ ˈmetan]
   b. /manu mutiʔ/ → [ˌmãʊ̃n ˈmutiʔ] 'white chicken' *[ˌmãʊ̃ ˈmutiʔ]
   c. /kolo-ʔane/ → [ˌkol-ˈʔane] 'finch' *[ˌko-ˈʔane]
   d. /napan moloʔ/ → [ˌnap ˈmoloʔ] 'yellow butterfly' *[ˌna ˈmoloʔ]
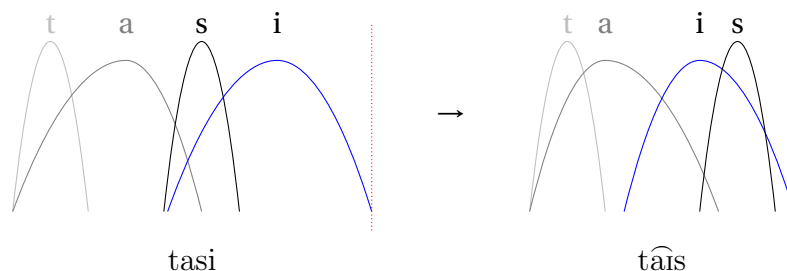
- Again, surface phonology behaves as if the vowel is still in its original position

5

- This can be modelled by saying the vowel feature remains abstractly to the right of the consonant:

(12) Consonants delete when word-final

tɑɪ-s → tɑɪ
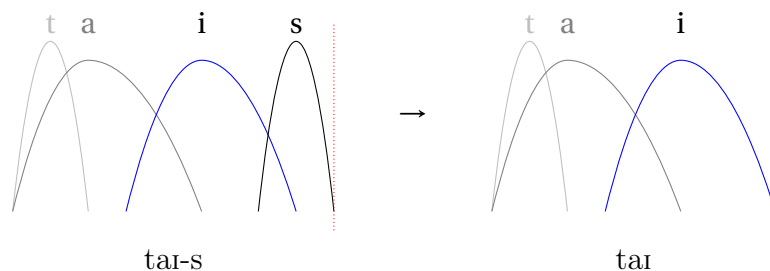
(13) Metathesized codas aren't really word-final, and therefore do not delete

tasi → t͡aɪs

- In other words, metathesized codas do not delete because they are not really codas

- This is further evidence that what we're seeing here is not perfect transposition: Meto metathesis does not rewrite the phonological status of the consonant

4 Overgeneration issues with LINEARITY

- In Optimality Theory, segment order is protected by the faithfulness constraint LINEARITY

(14) LINEARITY: S_1 is consistent with the precedence structure of S_2, and vice versa.
Let x, y ∈ S_1 and x', y' ∈ S_2. If xRx' and yRy', then x<y iff ¬(y'<x'). (McCarthy and Prince, 1995: 123)

- As long as LINEARITY is dominated, we expect a candidate only unfaithful to LIN to win

(15)

/pta/	*CC	DEP	MAX	LIN
a. pta	*!			
b. pata		*!		
c. ta			*!	
☞d. pat				*

- This predicts long-distance metathesis patterns

- Suppose you have a language that only allows sC clusters and has metathesis:

– Multiple transpositions should still be preferred to epenthesis or deletion

(16)

/pats/	*¬sC	DEP	MAX	LIN
a. pats	*!			
b. pat<u>as</u>		*!		
c. pat			*!	
☞d. spat				***

- The problem: No language has synchronic long-distance metathesis, and so this is a bad prediction

- Re-ranking the constraints doesn't remove the possibility that *some language* could have this ranking

- Some possible solutions:

  1. Multiple transpositions are universally impossible.
     - Horwood (2004) proposes $\text{LIN}^2{}_{seg}$, which prohibits metathesis that creates two violations of LIN at once
     - This essentially amounts to an adjacency requirement on all metathesis
  2. All transposition comes from tier-based representations (McCarthy, 2000)
     - If you separate consonants and vowels onto separate tiers, then the only precedence relationships that exist are consonant-consonant or vowel-vowel

CONSONANT TIER   m   p
VOWEL TIER   e   o

/ m p / e o	LIN	ONSET	*DIPH
meop			*!
☞mepo			
empo		*!	

- The reason why this doesn't work is because it predicts all Uab Meto words follow a strict CV template – they don't, or at least not around 10-15% of the time
  3. Phonology just can't transpose (Takahashi, 2019)
     - This amounts to saying that the *type* of phonological rule needed for metathesis does not exist

- Solutions 1 & 2 predict that transposition should be possible, just highly restricted

- Uab Meto metathesis does not have phonetic or phonological characteristics of true transposition

  - it is phonetically incomplete
  - it never bleeds/feeds other phonology
    (the rest of phonology behaves as if segments remain in their original order)

- I therefore follow Solution 3 – transposition is universally impossible in phonology, and what we are seeing in Meto is a type of gestural compression/overlap

5 Implications

- Even languages with robust metathesis do not have the behavior expected of dominated LINEARITY

- So, can phonology proper *ever* transpose?

- No. Phonology must not include transposition as an operation, otherwise we predict that *some language* should have the long-distance metathesis patterns from Section 4.

- However, many other branches of linguistics do assume that phonological transposition rules exist

- An example of this is in Distributed Morphology, where "morphological metathesis rules" have been used to determine the order of clitics or agreement morphemes (e.g. Arregi and Nevins, 2012)

- This account suggests we must be very careful with such rules, because it would be a mechanism unique to morphology

6 Conclusion

- This talk shows that even in a language with robust metathesis, transposition is not the best mechanism to model it

- Phonological metathesis *is not* transposition

- What appears to be metathesis is simply two sounds being produced at the same time (overlap)

- Phonological operations are not the same as morphosyntactic operations

7 Acknowledgements

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