

Alternation Not Segmentation

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Q: Where do we find evidence for sub-morphemic phonological structure, and where do we find the evidence for the phonological relatedness among these sub-morphemic elements?

A: In *alternation*, not *segmentation*.

Key terms: alternation, segmentation, complementary distribution, phonological relatedness, minimal pairs, formants, phonotactics

13 ALTERNATION...

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- 15 • Traditionally, sounds are considered phonologically related (“allophones of a single phoneme”) provided
 - 16 1) They are in complementary distribution AND
 - 17 2) They are phonetically similar (consider **ŋ** and **h** in English: in complementary distribution, but
 - 18 phonetically *dissimilar*—they are not regarded as phonologically related)
 - 19
 - 20 • I argue today that **(3)** is the *only* thing that matters in the determination of phonological relatedness:
 - 21
 - 22 **3)** Phonetic properties (of any shape or size) *alternate* (they substitute for one another when
 - 23 morphemes attach, for example, ‘atom’ **ʔæɾəm** ‘atom+ic’ **ʔəʔ^hamɪk**)
 - 24
 - 25 • NEITHER (1) nor (2) is a reliable test for the phonological relatedness among sounds
 - 26 • Functional identity overrides phonetic similarity in the determination of category membership or non-
 - 27 membership
 - 28

29 THREE CASES OF PHONOLOGICALLY RELATED SOUNDS

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31 **CASE 1: ENGLISH LATERALS**

32 Complementary distribution:

<p>33 Clear “l” (tongue body is forward) alternates with Dark “l” (tongue body is back)</p>	
Before a vowel: Clear “l”	Elsewhere: Dark “l”
fil +ɪŋ fill+ing	fl fill
ful +ɪʃ fool+ish	fu fool

- 34
- 35 ● The sounds are in complementary distribution? YES
 - 36 ● The sounds are phonetically similar? YES
 - 37 ● The sounds *alternate* with one another? YES
 - 38 ● The sounds are phonologically related? YES (by anyone’s definition of the term)
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- 40 ● So, this case is not too revealing...
- 41

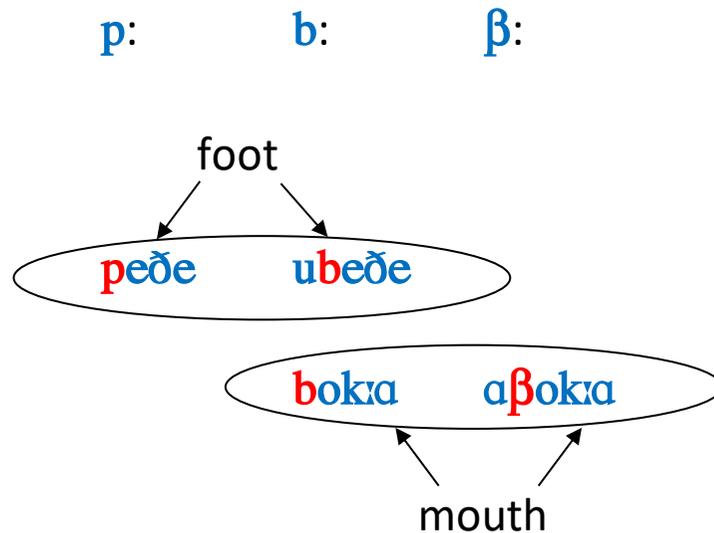
42 **CASE 2: CORSICAN OBSTRUENTS**

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Voiceless stops alternate with Voiced stops			
Word-initially: Voiceless stops		Between vowels: Voiced stops	
p eḏe	foot	u+ b eḏe	the foot
t eŋgu	I have	u+ d eŋgu	I have it
k aza	house	a+ g aza	the house

Voiced stops alternate with Voiced fricatives			
Word-initially: Voiced stops		Between vowels: Voiced fricatives	
b okʌ	mouth	a+ β okʌ	the mouth
d ente	tooth	u+ ð ente	the tooth
g ola	throat	di+ ɣ ola	of throat

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- 54
- 55 • **p**a would alternate with a+**b**a, but **b**a would alternate with a+**β**a, and so each
- 56 contrast is inevitably preserved.
- 57
- 58 • The sounds are in complementary distribution? **NO**
- 59 • The sounds are phonetically similar? **NO**: they are more similar to *other* sounds
- 60 • The sounds *alternate* with one another? YES
- 61 • The sounds are phonologically related? YES (by anyone's definition of the term)
- 62
- 63 • Neither similarity nor complementary distribution is playing a role in the Corsican pattern, as learners do
- 64 not mistakenly group the two voiced stops into the same category
- 65
- 66

67 **CASE 3: TAIWANESE TONES**

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Complementary distribution:

Tone alternations	
At the end of a phrase	Not at the end of a phrase
H# ts̄in p ^h an̄ very fragrant	M p ^h an̄ tsûi fragrant water
LH# p ^h ē wē leather shoes	M wē tuè shoe laces
M# wì pī stomach ailment	L pì lǎn sick person
L# k ^h i ts ^h ù build a house	HL ts ^h ù t̄in roof top
HL# tuè h̄ai big ocean	H h̄ai kǐ ocean front

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	LH:	M:	L:	HL:	H:	
71						
72						
73		phāŋ			p ^h áŋ#	fragrant
74						
75	wě#	wē				shoes
76						
77		pī#			pì	sick
78						
79				ts ^h ù#	ts ^h ú	house
80						
81				hái#	hái	ocean
82						

- The phonetic difference within one set of alternants is completely dissimilar to the phonetic difference within the other sets; they are all changing in their own independent ways (cf. Corsican).
- But Taiwanese children master their tonal alternations just as readily as Corsican children master their consonant alternations

- 88 ● The sounds are in complementary distribution? **NO**
- 89 ● The sounds are phonetically similar? **NO**
- 90 ● The sounds *alternate* with one another? YES
- 91 ● The sounds are phonologically related? YES (by anyone's definition of the term)

92 Interim summary (disparities are shaded)

	English laterals	Corsican obstruents	Taiwanese tones
Sounds are in complementary distribution?	YES	NO	NO
Sounds are phonetically similar?	YES	NO	NO
Sounds <i>alternate</i> with one another?	YES	YES	YES
Sounds are phonologically related?	YES	YES	YES

97 TWO CASES OF MISTAKEN IDENTITY

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99 **CASE 1: NEW YORK ENGLISH SUFFIXATION AND TRUNCATION**

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The low front lax vowel and the low front tense vowel in New York seem to be in complementary distribution			
'mænədʒ	manage	'mæɹən	man
'dʒænis	Janice	'plæɹən	plan
k ^h æfət ^h ɪiə	cafeteria	'læɹəf	laugh
'k ^h ænəbəl	cannibal	'mæɹəndəbəl	mandible
'plæni?	planet	'plæɹən i?	plan it

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102 Descriptively, **æɹ** is found here: __ C]_σ (where C= voiced obstruents, voiceless fricatives, anterior nasals);

103 **æ** is found elsewhere

104 Do æ and æ̥ alternate?

105
106 Suffixation and some strange New York English quasi-minimal pairs

	contrasts with
'bæ̥nɪ banner (pennant)	'bæ̥̥nɪ banner (ban+er) (not 'bæ̥nɪ; no alternation) (one who bans)
'ædɪ adder (species of snake)	'æ̥̥dɪ adder (add+er) (not 'ædɪ; no alternation) (one who adds)
'hæ̥v have	'hæ̥̥v halve (denominal of 'half')

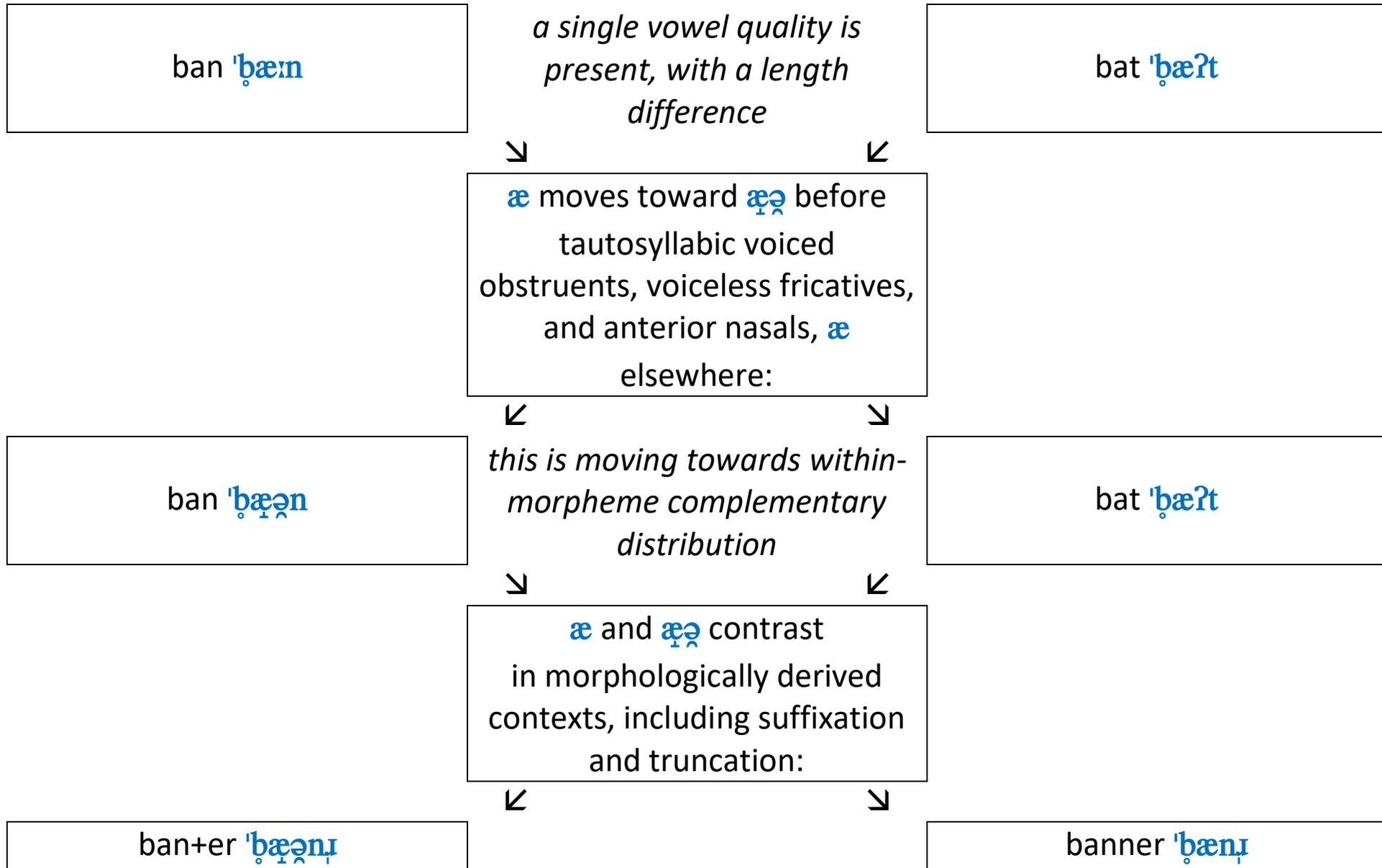
107
108 New York English Truncation

Full form	Truncated form (bimorphemic): no alternation	Quasi-minimal distinction (monomorphemic)
k ^h æbərnej Cabernet	'k ^h æb cab-	'k ^h æ̥̥b cab (taxi)
k ^h æfət ^h ɪliə cafeteria	'k ^h æf caf-	'k ^h æ̥̥f calf
mæsətʃ ^h usits Massachusetts	'mæs Mass- (Ave.)	'mæ̥̥s mass
'dʒænis Janice	'dʒæn Jan-	'dʒæ̥̥n Jan (full name)

- 109
110 • So, the sounds don't alternate, even when given the opportunity to do so!

111

- Simplified timeline of the emerging æ - æ̃ split:



112
113 • So æ and æ̥ are *historically* related, but are not *cognitively* related: they don't alternate

114
115 • Sounds are in complementary distribution? YES (within morphemes)

116 • Sounds are phonetically similar? YES

117 • Sounds *alternate* with one another? **NO**

118 • Sounds are phonologically related? **NO**: if they were, we would expect them to alternate
119 when they have the opportunity to do so upon suffixation
120 and truncation

121
122 Some well-understood exceptions:

læboratory	læ̥b	"lab" is lexicalized, i.e. monomorphemic
blæ̥ster	mæster blæster	Stevie Wonder intended these to rhyme

123
124 • Stated simply, if an alternation is absent elsewhere, it is absent upon truncation as well

- 126 • But if an alternation is present elsewhere, it is present upon truncation as well
- 127 • Some genuine alternations upon truncation:

	alternates with	we don't see	because X - Y engage in alternation elsewhere
Cabernet 'kʰæbərnej	Cab- 'kʰæb	'kʰæb	b - b̥ clubbing 'klʌbɪŋ - club 'klʌb̥
Melanie 'mɛləni Philip 'fɪləp	Mel- 'mɛɫ Phil- 'fɪɫ	'mɛɫ 'fɪɫ	ɫ - ɫ̥ falling 'fɔɫɪŋ - fall 'fɔɫ̥

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129 **CASE 2: AKAN REDUPLICATION**

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131 Complementary distribution:

Preceding front vowels (i ɪ e ɛ), we can find tɕ		Preceding the other vowels (u ʊ o ɔ a), we can find k	
tɕim	umbrella	kun	kill
tɕitɕɛ	divide	akoma	the heart
ɔtɕe	river	kɔ?	go
tɕɛ	divide	ka	to bite

- 132
- 133 • In Akan, there are no cases of one morpheme ending with a consonant, followed immediately by
- 134 another morpheme beginning with a vowel.
- 135 • Never found:k+u → ku /k+i → tɕi
- 136 • k and tɕ never alternate with each other in Akan. The only circumstances in which we encounter k or tɕ
- 137 in Akan is when a vowel immediately follows *within the same morpheme*.
- 138
- 139

- Are **k** and **tɕ** phonologically related? Let's find out...
- Akan has a process of partial reduplication in which a root-initial CV is copied with a high vowel. This morphological process creates verbs.

Akan reduplication

si-si?	stand	bu-bu(?)	bend
fi-fi?	vomit	su-su(?)	carry on the head
si-se?	say	su-so?	seize
si-se?	resemble	su-so?	light

ki-ka?	bite	(not tɕi-ka? !)
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- In the one circumstance when **k** and **tɕ** finally have the opportunity to alternate with each other, still, they remain oblivious to each other's existence.

A proposed timeline of the pattern:

early form:	palatalization:	reduplication:	present-day form:
* ka? (bite)	---	ki - ka?	ki - ka?
* kɛr (bind)	tɕɛr	tɕɪ - tɕɛr	tɕɪ - tɕɛr
time →			

- 152 • Sounds are in complementary distribution? YES (within morphemes)
- 153 • Sounds are phonetically similar? YES
- 154 • Sounds *alternate* with one another? **NO**
- 155 • Sounds are phonologically related? **NO**: if they were, we would expect them to alternate
156 when they have the opportunity to do so
- 157
- 158 • So again, the sounds in question may be *historically* related, but not *cognitively* related
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Summary (critical correlations are bold-boxed; critical disparities are shaded)

	English laterals	Corsican obstruents	Taiwanese tone	NY English truncation	Akan reduplication
Sounds are in complementary distribution	YES	NO	NO	YES	YES
Sounds are phonetically similar?	YES	NO	NO	YES	YES
Sounds <i>alternate</i> with one another?	YES	YES	YES	NO	NO
Sounds are phonologically related?	YES	YES	YES	NO	NO

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- So, both phonetic similarity and complementary distribution are fully nonpredictive when it comes to the issue of phonological relatedness among sounds
- The only thing that matters is if the sounds alternate with each other

165 **...NOT SEGMENTATION**

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- 167 • Complexes of phonetic cues alternate in their entirety, regardless of their so-called segmental status;
- 168 the alternating phonetic complex is an integrated *Gestalt*.
- 169

170 **CASE 1: FINNISH VOWEL HARMONY**

171 Front vowel words:

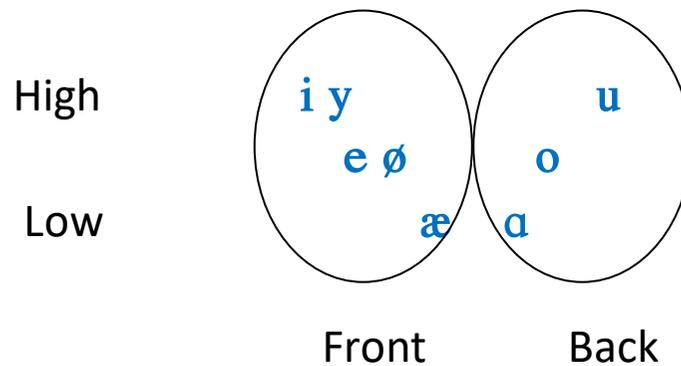
Finnish	transcription	translation
väkära	vækæræ	pinwheel
pöytä	pøjtæ	table
käyrä	kæjræ	curve
tyhmä	tyhmæ	stupid

172 Back vowel words:

Finnish	transcription	translation
makkara	makkara	sausage
pouta	powta	fine weather
kaura	kawra	oats
tuhma	tuhma	naughty

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Vowel plot



- Finnish vowels are harmonic in terms of front/back. (There are certain exceptions to vowel harmony in Finnish, but these exceptions do not bear on the current argument.)
- This means that the sound substitution is changing *part* of a vowel quality across *more than one* vowel (including the intervening consonants)
- So **tyhmæ** and **tuhma** are actually minimal pairs!
- It is clear that phonology does not consist of the speech-segment – by – speech-segment chunks, as traditionally assumed
- Rather, the components of the system that alternate cannot be fit into the segmental straightjacket; they may be of any shape or size

CASE 2: NASAL CONSONANTS

- Nasal consonants possess three major cues to their oral configuration:
 - (1) Formant frequencies into, and especially out of, the oral closure (on the flanking vocalism)
 - (2) The frequency of the anti-formant during the nasal murmur (the further front the oral closure, the lower the frequency of the anti-formant)
 - (3) The degree of nasalization on preceding vocalism (vowels have more nasality when an immediately following nasal consonant is made further back in the mouth, and have less nasality when an immediately following nasal is made further front in the mouth: the vowel in **dĩŋ** is more nasalized than the vowel in **din**)
- Cues to nasals pervade far more of the speech stream than a so-called segment does; they involve surrounding vocalism as well
- We exploit all these cues listeners, and we reproduce them all as speakers, and so they are all relevant to the linguistic system.

207 CONCLUSIONS

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- 209 • The traditional tests for phonological relatedness—**phonetic similarity** and **complementary**
 - 210 **distribution**—fail to make the right predictions regarding the phonological relatedness among sounds
 - 211 • The only reliable test for whether sounds are phonologically related is: “*Whatever their shape or size,*
 - 212 *do they alternate?*”
 - 213 • Ultimately, this depends on our definition of **phonological relatedness**. But if the term is to have any
 - 214 theoretic relevance, it should be based on the *behavior* of sounds in the linguistic system, not on the
 - 215 mere phonotactic (sound-sequencing) regularities that phonologists might take note of.

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217 (*References available in my 2017 book...*)

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219 **THANK YOU!!**