

# 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*.

## 1. ALTERNATION...

- Traditionally, sounds are considered phonologically related provided
  - 1) They are in complementary distribution AND
  - 2) They are phonetically similar (consider **ŋ** and **h** in English: in complementary distribution, but phonetically *dissimilar*—they are not regarded as phonologically related)
- I argue today that **(3)** is the *only* thing that matters in the determination of phonological relatedness:
  - 3) Phonetic properties (of any shape or size) *alternate* (they substitute for one another when morphemes attach, for example, ‘atom’ **ʔæɾəm** ‘atom+ic’ **ʔə<sup>h</sup>amɪk**)
- NEITHER **(1)** nor **(2)** is a reliable test for the phonological relatedness among sounds.

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24 THREE CASES OF PHONOLOGICALLY RELATED SOUNDS

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26 CASE 1: ENGLISH LATERALS

27 Complementary distribution:

Clear “l” (tongue body is forward) alternates with Dark “l” (tongue body is back)	
Before a vowel: Clear “l”	Elsewhere: Dark “l”
fil+mŋ fill+ing	fiɫ fill
fuɫ+ɪʃ fool+ish	fuɫ fool

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- 30 • The sounds are in complementary distribution? YES
  - 31 • The sounds are phonetically similar? YES
  - 32 • The sounds *alternate* with one another? YES
  - 33 • The sounds are phonologically related? YES (by anyone’s definition of the term)
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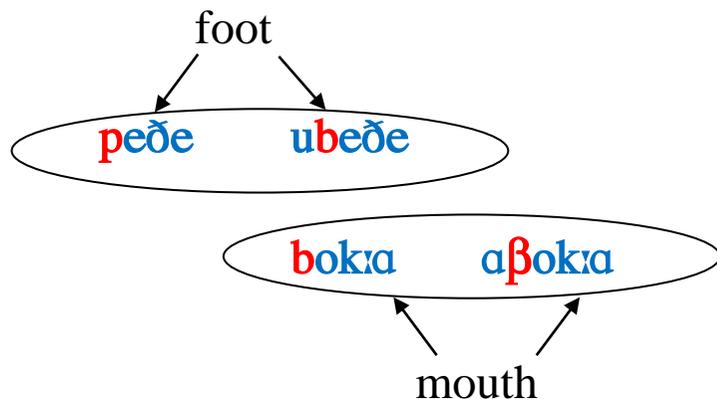
35 **CASE 2: CORSICAN OBSTRUENTS**

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37 Complementary distribution:

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

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

p:            b:            β:



- The sounds are in complementary distribution?    YES
  - The sounds are phonetically similar?    **NO**: they are more similar to *other* sounds
  - The sounds *alternate* with one another?    YES
  - The sounds are phonologically related?    YES (by anyone's definition of the term)
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- Similarity is clearly not playing a role in the Corsican pattern, as learners do not mistakenly group the two voiced stops into the same category.
  - So, **phonetic similarity is not a good test for phonological relatedness.**

59 **CASE 3: TAIWANESE TONES**

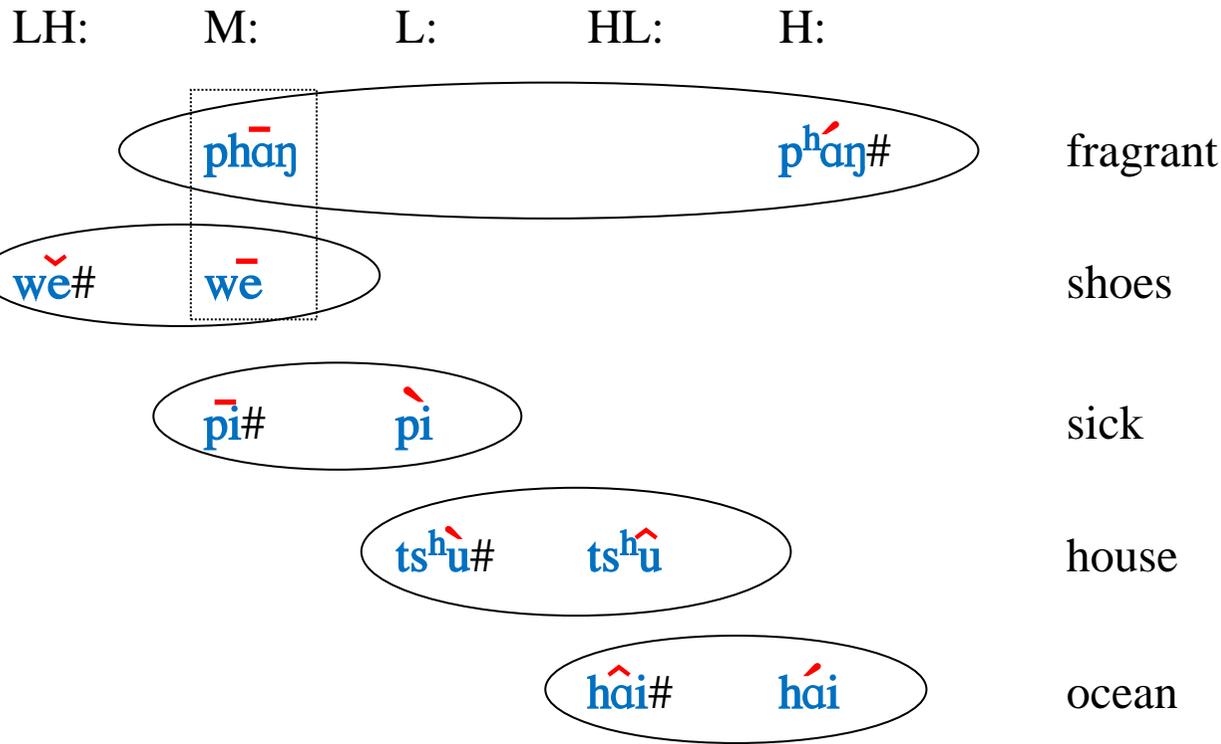
60 Complementary distribution:

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Tone alternations

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

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- The phonetic difference within one set is completely dissimilar to the phonetic difference within the other sets; they are all changing in their own independent ways.
- But Taiwanese children master their tonal alternations just as readily as Corsican children master their consonant alternations
- The sounds are in complementary distribution? YES
- The sounds are phonetically similar? NO
- The sounds *alternate* with one another? YES
- The sounds are phonologically related? YES (by anyone's definition of the term)

Interim summary (disparities are shaded)

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

- So phonological relatedness does not require phonetic similarity. Does it require complementary distribution?

90 TWO CASES OF MISTAKEN IDENTITY

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92 CASE 1: NEW YORK ENGLISH SUFFIXATION AND TRUNCATION

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The <b>low front lax vowel</b> and the <b>low front tense vowel</b> in New York seem to be in complementary distribution			
<b>'mænədʒ</b>	manage	<b>'mæɹ̃n</b>	man
<b>'dʒænis</b>	Janice	<b>'plæɹ̃n</b>	plan
<b>k<sup>h</sup>æfət<sup>h</sup>i:ə</b>	cafeteria	<b>'læɹ̃f</b>	laugh
<b>'k<sup>h</sup>ænəbəl</b>	cannibal	<b>'mæɹ̃ndəbəl</b>	mandible
<b>'plæni?</b>	planet	<b>'plæɹ̃ni?</b>	plan it

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95 Descriptively, **æ** → **æɹ̃** / \_\_ C]σ (where C= voiced obstruents, voiceless fricatives, anterior nasals)

96 Do **æ** and **æ̘** alternate?

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98 New York English Truncation

Full form	Truncated form	Another word
<b>k<sup>h</sup>æbərnej</b> Cabernet	<b>k<sup>h</sup>æb̘</b> cab-	<b>k<sup>h</sup>æ̘b̘</b> cab (taxi)
<b>k<sup>h</sup>æfət<sup>h</sup>i:ɪə</b> cafeteria	<b>k<sup>h</sup>æf</b> caf-	<b>k<sup>h</sup>æ̘f</b> calf
<b>mæsətʃ<sup>h</sup>usits</b> Massachusetts	<b>mæs</b> Mass- (Ave.)	<b>mæ̘s</b> mass

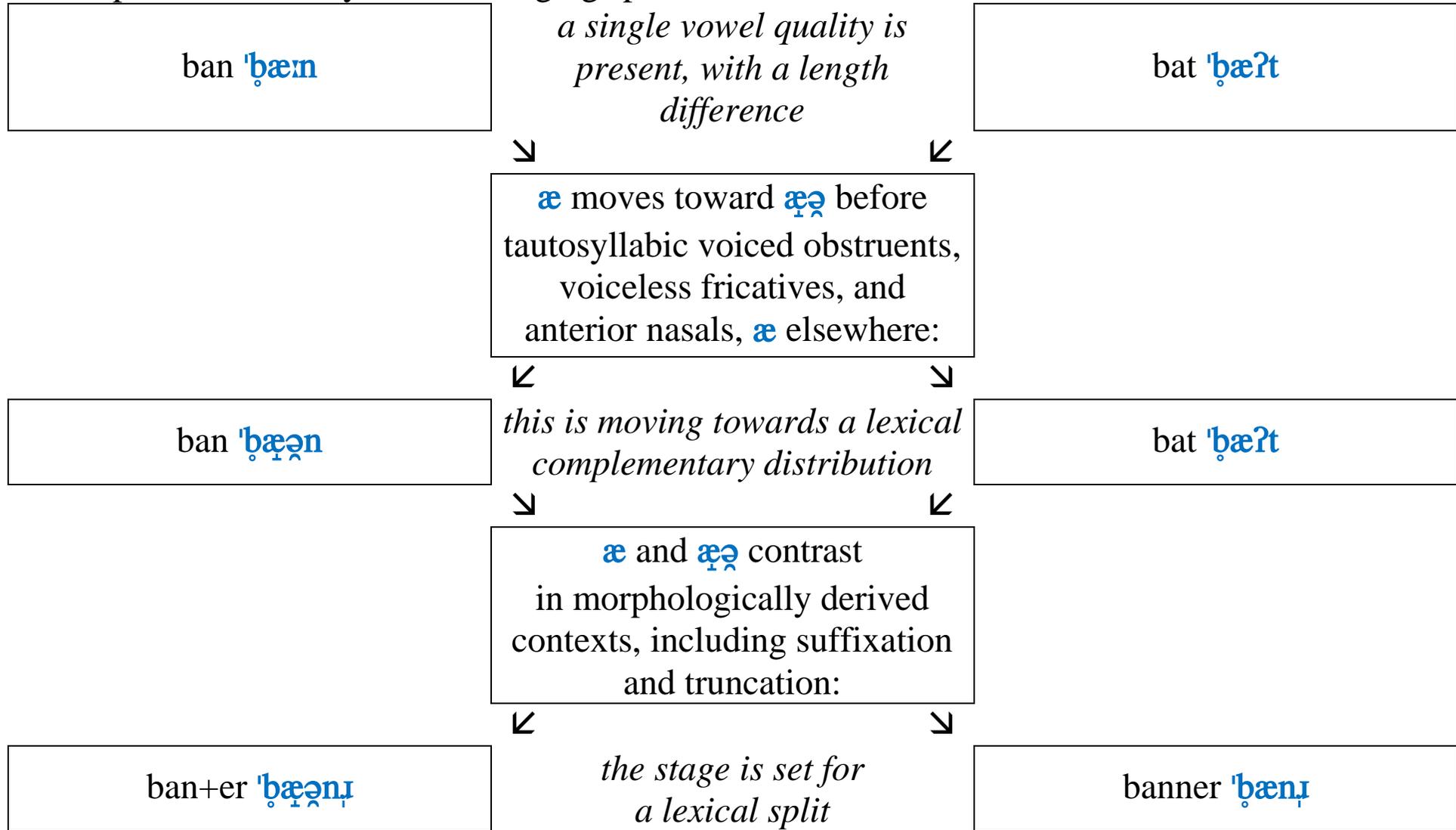
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100 Some strange New York word pairs; the vowels don't alternate:

	contrasts with
banner <b>'bæ̘nɪ</b> (pennant)	banner (ban+er) <b>'bæ̘nɪ</b> (one who bans)
adder <b>'æ̘dɪ</b> (species of snake)	adder (add+er) <b>'æ̘dɪ</b> (one who adds)
have <b>'hæ̘v</b>	halve <b>'hæ̘v</b> (denominal of 'half')
Janice <b>'dʒæ̘nis</b> truncates to Jan- <b>'dʒæ̘n</b>	Janny <b>'dʒæ̘ni</b> (from "Jan")  Jan (full name) <b>'dʒæ̘n</b>

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

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• Simplified diachrony of the emerging split:



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

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• Sounds are phonetically similar? YES

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- Sounds *alternate* with one another?
- Sounds are phonologically related?

**NO**

**NO:** if they were, we would expect them to alternate when they have the opportunity to do so

Exceptions:

læboratory	læɔ̃b	“lab” is <i>lexicalized</i>
blæɔ̃ster	mæster blæster	Stevie Wonder intended these to rhyme

- Stated simply, if an alternation is absent elsewhere, it is absent upon truncation/reduplication as well; if an alternation is present elsewhere, it is present upon truncation/reduplication as well (OT-etic Base-Truncatum/Base-Reduplicant Identity thus fails to predict anything)

	alternates with	we don't see	because <b>X - Y</b> is phonologically <u>active</u>
Cabernet 'k <sup>h</sup> æbərnej	Cab- 'k <sup>h</sup> æb	*'k <sup>h</sup> æb	<b>b - b̥</b> clubbing 'k <sup>h</sup> lʌbɪŋ - club 'k <sup>h</sup> lʌb
Melanie 'mɛləni Philip 'fɪləp	Mel- 'mɛl Phil- 'fɪ	*'mɛl *'fɪ	<b>l - l̥</b> falling 'fɔɪlɪŋ - fall 'fɔɪ

- So, when there is no alternation upon reduplication/truncation, just rank the IDENTITY constraint higher; when alternation is present upon reduplication or truncation, just rank the PHONOTACTIC constraint higher. That is, the OT account is fully non-predictive.

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## CASE 2: AKAN REDUPLICATION

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

- In Akan, there are no cases of one morpheme ending with a consonant, followed immediately by another morpheme beginning with a vowel.
- Never found: ...**k**+**u** → **ku** / ...**k**+**i** → **tɕi** (where **k** belongs to a single morpheme)
- **k** and **tɕ** *never* alternate with each other in Akan. The only circumstances in which we encounter **k** or **tɕ** in Akan is when a vowel immediately follows *within the same morpheme*.
- Sounds are in complementary distribution?      YES (but...)
- Sounds are phonetically similar?                      YES
- Sounds *alternate* with one another?                      **NO**
- Sounds are phonologically related?                      *LET'S FIND OUT...*

- Akan has a process of partial reduplication in which a root-initial syllable is copied with a high vowel. This morphological process creates verbs.

### Akan reduplication

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

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

### A proposed diachrony of the pattern:

early form:	palatalization:	reduplication:	present-day form:
<b>ka?</b> (bite)	---	<b>ki - ka?</b>	<b>ki - ka?</b>
<b>kɛr</b> (bind)	<b>tçɛr</b>	<b>tçi - tçɛr</b>	<b>tçi - tçɛr</b>
time →			

- Sounds are in complementary distribution? YES (but...)
- Sounds are phonetically similar? YES

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- Sounds *alternate* with one another?
- Sounds are phonologically related?

**NO**  
**NO**: if they were, we would expect them to alternate when they have the opportunity to do so

Summary (disparities are shaded; critical correlations are bold-boxed)

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

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## 2. ...NOT SEGMENTATION

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

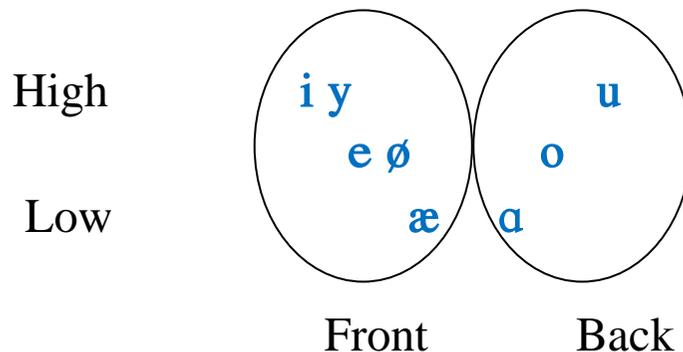
### CASE 1: VOWEL HARMONY

#### Finnish vowel harmony

Finnish	transcription	translation
väkära	<b>vækæræ</b>	pinwheel
pöytä	<b>pøjtæ</b>	table
käyrä	<b>kæjræ</b>	curve
tyhmä	<b>tyhmæ</b>	stupid

Finnish	transcription	translation
makkara	<b>makkara</b>	sausage
pouta	<b>powta</b>	fine weather
kaura	<b>kawra</b>	oats
tuhma	<b>tuhma</b>	naughty

#### Vowel plot



- 173 • Finnish vowels are harmonic in terms of front/back. (There are certain exceptions to vowel harmony in  
174 Finnish, but these exceptions do not bear on the current argument.)
- 175 • Changing the tongue position in this way affects the F2 of the first vowel, also the following  
176 consonants, and the following vowels as well.
- 177 • This means that the contrastive sound substitution is changing *part* of a vowel quality across *more than*  
178 *one* vowel (including the intervening consonants as well)!
- 179 • Although Finnish uses an alphabet that provides an effective method of visually encoding spoken  
180 language, there is no way that this alphabetic, symbol-by-symbol system can effectively capture the  
181 genuine nature of this sort of sound substitution.
- 182 • It is clear that phonology does not consist of the speech-segment – by – speech-segment chunks implied  
183 by a segmental notation.
- 184 • Rather, the components of the system do alternate cannot be fit into the segmental straightjacket; they  
185 may be of any shape or size.

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### 187 CASE 2: NASAL CONSONANTS

- 188 • Nasal consonants possess three major cues to their oral configuration:
- 189 (1) Formant frequencies into and especially out of the oral closure
- 190 (2) The frequency of the anti-formant (the further front the oral closure, the lower the frequency of  
191 the anti-formant)
- 192 (3) The degree of nasalization on preceding vocalism (vowels have more nasality when an  
193 immediately following nasal consonant is made further back in the mouth, and have less nasality  
194 when an immediately following nasal is made further front in the mouth: the vowel in **dĩŋ** is  
195 more nasalized than the vowel in **din**)

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- We exploit all these cues listeners, and we reproduce them all as speakers, and so they are all relevant to the linguistic system.

## CONCLUSIONS

- The traditional tests for phonological relatedness—**phonetic similarity** and **complementary distribution**—fail to make the right predictions.
- The only reliable test for whether sounds are phonologically related is: “*Whatever their shape or size, do they alternate?*”
- Ultimately, this depends on our definition of **phonological relatedness**. But if the term is to have any theoretic relevance, it should be based on the functional role of sounds in the linguistic system, not on the mere phonotactic regularities that phonologists might take note of.
- And, oh yeah: no distinctive features, no segments, no underlying representations...

*(References available in my 2006 book...)*

**THANK YOU!!**