

1 **On the evolution of heterophony:**
2 **semantic pressures on phonetic forms**
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11 **Generative Linguistics in the Old World 36**
12 **Lund University**
13 **Workshop 3: Diachronic Workings in Phonological Patterns**
14 **09:45 – 10:30, 6 April 2013**

Two introductory anecdotes about French

1. Bloomfield (1933):

- In certain Southern dialects, final **l** has merged with final **t**

- For example

bɛl → **bɛt** “pretty”

- However

gal -/> **gat** “chicken”

- Because **gat** is also “cat”, so instead

put (<**pul** “chick”)

- Bloomfield (/Gilliéron 1910): “This homonymy must have caused trouble in practical life; therefore **gat** was avoided and replaced by makeshift words”

2. Labov (1994):

- The plural marker -**s** has been lost except when a vowel follows, and thus, for example, the plural article **la** (earlier, **las** in all contexts) sometimes runs the risk of being homophonous with the singular
- However, the plural is now (usually) signaled by a change in vowel quality: **las** > **le**.
- Labov: “[This] show[s] how long-range changes in the French phonological, morphological, and syntactic systems compensated for sound changes, in ways that suggest a causal link”

- 40 • **Today's question:** are there semantic pressures on
41 phonetic forms such that heterophony is largely
42 maintained?
- 43 • **Today's answer:** yes, there are, and they exist at a
44 multitude of linguistic levels, exerting a passive usage-
45 based pressure on sound structure and sound change

How it works (a quick summary)

- Through a combination of factors

(1) The low level **phonetic variation** inherent to speech production

(2) The consequences of **lexical semantic ambiguity** and **misunderstanding**, when similar words sound the same, and

(3) The tendency for speakers to **reproduce** the variation they perceive (upon successful perception)

- Successful speech propagates; failed speech is passively filtered out of the system
- Communicative success or failure affects the trajectory of language structure and change such that it settles towards a semantically unambiguous state

- Labov (1994): “It is not the desire to be understood, but rather the consequence of misunderstanding that influences language change. This mechanism implies a mismatch between producer and interpreter: the type of built-in instability that we would expect to find behind long-term shifts in language behavior”

68 **Six linguistic domains over which heterophone**
69 **maintenance is observed:**

- 70 1. The **lexical** domain: Sound mergers are more likely to
71 proceed unimpeded (to the point of globality) if
72 heterophony is maintained
- 73 2. The **morphological** domain: root homophony is
74 tolerated, but any counter-functional consequences are
75 offset by a concomitant morphological response
- 76 3. The **phonological** domain: across-the-board alternations
77 are more likely to enter a language if heterophony is
78 largely maintained

- 80 4. The **phonotactic** domain: neutralizing alternations that
81 otherwise apply pervasively are blocked from applying
82 in particular phonotactic contexts, thus avoiding
83 excessive derived homophony
- 84 5. The **paradigmatic** domain: neutralizing
85 alternations/mergers or standard allomorph selection is
86 blocked in those morphological paradigms where
87 semantic ambiguity would otherwise result
- 88 6. The **pragmatic** domain: neutralizing alternations that
89 might otherwise apply pervasively are blocked “on line”,
90 due to situation-specific semantic factors

92 **(1) Heterophone maintenance in the lexical domain:**

93 Sound mergers are more likely to proceed unimpeded (to
94 the point of globality) if heterophony is maintained

95

96 **Wedel, Kaplan, and Jackson** (n.d.):

- 97 • “[P]honeme pairs undergoing merger [previously
98 distinguished] significantly fewer minimal pairs in the
99 lexicon than unmerged phoneme pairs”
- 100 • Eight languages: Korean, French, German, Dutch, Slovak,
101 Spanish, Hong Kong Cantonese
- 102 • Compared 634 phoneme pairs differing on one feature:
103 56 pairs merged; 578 pairs unmerged
104 27 context-sensitive mergers; 29 context-free mergers
- 105 • “The more minimal pairs, the less likely merger is”
106

107 **(2) Heterophone maintenance in the morphological**
108 **domain:** root homophony is indeed tolerated, but any
109 counter-functional consequences are offset by a
110 concomitant morphological response
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Chinese

- Middle Chinese possessed monosyllabic root-final consonants **p' t' k' m n ŋ** (still retained in Cantonese)
- Mandarin now has only two: **n ŋ**
- Mandarin possesses a significant amount of root homophony: Cantonese has about 1800 syllable shapes, but Mandarin has only about 1300, with largely equivalent semantic reference (Duanmu 2000)
- Mandarin—but not Cantonese—co-evolved a huge inventory of two-root compounds, which means that its words are now usually two syllables in length, and so have ample opportunity to maintain distinctness

125 **(3) Heterophone maintenance in the phonological**
126 **domain:** across-the-board alternations are more likely to
127 enter a language if heterophony is largely maintained
128

129 **Korean** (Silverman 2010, Kaplan 2011)

- 130 • Neutralizing alternations are rampant in Korean
- 131 • But out of 35,907 nouns in an online corpus, there are
- 132 only 42 sets of homophones as a consequence of six
- 133 categorical neutralizing alternations investigated

<u>Alternation</u>	<u>Number of nouns, both lexical and derived</u> (out of 34,803)	<u>Number of homophonic sets</u>	<u>Number of homophonic tokens</u> (out of 1,234,323)
Aplosivization	10,138	15	6,117 (46,781-40,664)
Nasal lateralization	1,001	10	1001
Liquid nasalization	695	6	520
Nasal assimilation	7,592	10	732
Coronal assibilation	131	1	14
Cluster reinforcement	4,048	0	0
Variable assimilation	(5,680)	(91)	(undetermined)
Totals:	13,258	42	8,384

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- Kaplan compared actual neutralization patterns to simulated “hypothetical” patterns structurally similar to the actual patterns

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- In most cases, the actual pattern created fewer homophones than the hypothetical ones

“Lenition and Contrast” (Gurevich 2004)

- Investigated 230 phonetically conditioned sound changes, mostly lenitions
- 92% are heterophone-maintaining
- Even in the case of loss/deletion, 71% of the processes are non-neutralizing/heterophone-maintaining
- “This suggests that such processes [lenitions] do not operate independently of functional considerations”

150 **(4) Heterophone maintenance in the phonotactic domain:**
151 neutralizing alternations that otherwise apply pervasively
152 are blocked from applying in particular phonotactic
153 contexts, thus avoiding excessive derived homophony
154

Hindi (Silverman 2011)

- Schwa alternates with zero in would-be **VCəCV** contexts (this is historic syncope, not epenthesis, Misra 1967)

pitfka squeezed

pitfək squeeze

piɡ^hla melted

piɡ^həl melt

dewrani brother-in-law's wife **dewər** brother-in-law

- The alternation is absent in would-be **VCCəCV** and **VCəCCV**. Here, the middle **C** would be perilously susceptible to misperception. That is, the loss of schwa in these contexts may lead to a percept involving only two—not three—consonants. **VCCəCV** and **VCəCCV** -> **VCCCV** -> **VCCV**. At this point, the chances of inducing homophony increase dramatically

- *By hypothesis*, syncope is blocked if it would induce significant homophony (study yet to be undertaken...!)
- But when **VCCCV**-creating syncope would *not* jeopardize the medial **C** (usually of the form *nasal - homorganic stop - sonorant*), it is variably observed:
 - kadəmbri ~ kadəmbəri** a novel, name for a girl
 - puŋʃrik ~ puŋʃəri** white lotus
 - məpdʒri ~ məpdʒəri** tiny cluster of flowers, name for a girl

178 7. (5) Heterophone maintenance in the paradigmatic
179 domain: neutralizing alternations/mergers or standard
180 allomorph selection is blocked in those morphological
181 paradigms where semantic ambiguity would otherwise
182 result
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184 **Trigrad Bulgarian** (Mondon 2009):

- 185 • **o** lowers to **a** under stresslessness (a neutralizing
186 alternation); consider the plural:

187 **'rog** “horn” - **'rog-ave** “horns” - **rag-a've-te** “the horns”

- 188 • Inflectional suffix **-a**: **'klob-a** “ball of thread”, **'rebr-a** “rib”

- 189 • But notice the *absence* of unstressed suffix lowering in a
190 large group of neuter nouns:

191 **'zorn-o** “grain, seed” (***'zorn-a**)

192 **'petal-o** “horseshoe” (***'petal-a**)

- 194 • If **a** were employed here, the singular forms would be
195 rendered homophonous with their plural counterparts,
196 since the nominative plural marker is *always* **a** in neuter
197 nouns:

198 **'zɔrn-o** (sg.) - **'zɔrn-a** (pl.)

199 **'petal-o** (sg.) - **'petal-a** (pl.)

- 200 • Mondon: “to prevent singular – plural homophony, vowel
201 reduction does not apply to these forms”
202

Banoni (Lincoln 1976, Mondon 2009, Blevins and Wedel 2009)

- A lexical vowel length distinction has evolved from deletion of a consonant between identical vowels:

vom “turtle” - **voim** “new”

- This length contrast is now being lost
- However, possessed nouns are marked *solely* by vowel length, and are resisting the length merger

tama “father” - **tama:** “my father”

kasi “brother” - **kasi:** “my brother”

- Lincoln (1976:58), “Banoni speakers tend to shorten long vowels, except when necessary for disambiguation”

216 **Yucunany Mixtepec Mixtec** (Paster 2010)

217 • Suppletive allomorphy in the clitic pronoun system
218 maintains heterophony

219 • 1s (/possessive) is ʼ with non-ʼ -final stems”

220 **nàamá** “soap” **nàmâ** “my soap”

221 **vílú** “cat” **vîlû** “my cat”

222 **sì'î** “leg” **sî'î** “my leg”

223 • But it's **yù** with ʼ -final stems

224 **sòkò** “shoulder” **sòkò yù** “my shoulder”

225 **tūtù** “paper” **tūtù yù** “my paper”

226 **chá'à** “short” **chá'à yù** “I am short”

227

228 • Paster provides a reconstructive history of the pattern

- “The majority of L-final stems that are understood...to be 1sg forms will have the **yù** allomorph rather than the floating L”

- Many examples considered by Gessner and Hansson (2004) Blevins (2004) and Blevins and Wedel (2009)
- Gessner and Hansson (2004) on “anti-homophony” syncope blocking in **Dakelh (Carrier)**
- Blevins (2004) on “anti-homophony”-“anti-gemination” syncope blocking, mostly in **Afro-Asiatic (Arabic dialects, Tiberian and Modern Hebrew, East Cushitic)**: “[S]yncope between identical consonants appears to be blocked just in case its output would give rise to neutralization of a *paradigmatic* opposition”
- Blevins and Wedel (2009) on “inhibited sound change” in **Classical Greek, Estonian and Livonian, and Yurok**

245 **(6) Heterophone maintenance in the pragmatic domain:**
246 neutralizing alternations that otherwise apply pervasively
247 are blocked “on line”, due to situation-specific semantic
248 factors

249

250 **Catalan** (Charles-Luce 1993):

- 251 • “[T]he perception and production of spoken words is
252 affected differentially by the presence and absence of
253 higher levels of linguistic information and...the degree
254 of precision of articulation is inversely proportional to
255 the presence of semantic information”
- 256 • Final devoicing is more likely to be nearly-neutralized
257 (as opposed to completely neutralized) in contexts that
258 would otherwise be semantically ambiguous

259 **rik-** (“rich”)

rig- (“I laugh, pres. ind.”)

260 **duk-** (“duke”)

dug- (“I carry, pres. ind.”)

261 **fat-** (“fate”)

fad- (“tasteless, masc.”)

262 **sɛk-** (“dry, masc”)

sɛg- (“I set down, pres. ind.”)

263 **sɛt-** (“seven”)

sɛd- (“thirst”)

- In semantically unambiguous contexts, devoicing was usually complete: complete neutralization was tolerated when it nonetheless resulted in a semantically unambiguous speech signal
- In semantically ambiguous contexts, devoicing was often incomplete: complete neutralization was observed less often if it would have resulted in a semantically ambiguous speech signal

273 **English** (Gahl 2008)

- 274 • Frequency-of-word-usage inversely correlates with word
275 duration: “homophones” (either lexical or derived) are
276 produced with different durations, depending largely on
277 their frequency-of-use: “thyme” is longer than “time”
- 278 • Incompatible with standard generative proposals regarding
279 lexical structure (Newmeyer 2006)
- 280 • Also incompatible with proposals implicating the frequency
281 of mere motor routines (Bybee 2001)

282

Related phenomenon #1: neighborhood density effects

- **English** (Wright 2004): in dense lexical neighborhoods, vowels may be hyperarticulated, presumably to ensure semantic clarity
- **English** (Munson and Solomon 2004): Dense neighborhood words are hyperarticulated and frequent words are produced with more contracted vowel spaces than infrequent words

Related phenomenon #2: the non-coarticulatory origins of language-specific patterns of coarticulation

- Language-particular patterns of coarticulation may be attributable to language-particular system of contrastive values
- Öhman (1966): In **Swedish** and **English VCV** contexts, trans-consonantal vowel coarticulation is less constrained than in **Russian**, in which the consonants may be contrastively palatalized.
- Coarticulation is limited in just those contexts where lexical contrasts might otherwise be jeopardized
- Manuel and Krakow (1984), Manuel (1990, 1999): In **CVC** contexts, five-vowel systems like **Shona** and **Swahili** may

display more vowel coarticulation than in a language like
English

- “Because the vowel inventories of Shona and Swahili are small, they can presumably tolerate larger ranges of production without running the risk of encroaching on each other’s distinctive spaces”
- See also Clumeck 1976, Beddor, Krakow, and Goldstein 1986, Recasens 1987, Recasens, Pallarès and Fontdevila 1998, Beddor and Krakow 1999, Beddor, Harnsberger and Lindemann 2002)
- Coarticulation may be conventionalized on a language-specific basis in ways that bear the clear mark of lexical semantic pressure; Language-particular patterns of coarticulation may have *semantic* origins

- 319 • So-called “low-level” or “phonetic” effects may in fact be
320 the result of deep, systemic, historical pressures many
321 times removed from the physical systems that proximally
322 underlie speech
323

Discussion

(1) “If sound change is triggered by local lexical pressures, why do systems come to respond globally in terms of the motor routines they deploy?”

- Speech consists of motor activities that are repeated and routinized; that is, speech involves *motor routines*
- When semantic pressures come to passively act on these motor routines, the consequent repetition of the altered pattern may activate change
- These changes may generalize exactly because they don't induce semantic confusion in the rest of the lexicon
- Lexical semantic pressures may trigger systemic changes

- 336 • Mergers may be avoided not to optimize the system as a
337 whole (Liljencrants and Lindblom 1972, Flemming 1995,
338 de Boer 2001)

339

340 (2) “Wait a minute. In Southern French global merger was
341 tolerated, and individual words responded, but don’t
342 you propose that mergers should be blocked under
343 such circumstances?

- 344 ● No. A few well-placed potential homophones should not
345 be expected to hold back a merger, especially since
346 languages may respond just as this French dialect did.
- 347 ● Predictive value is not lost: these issues are subject to
348 empirical verification

349

350 (3) “If language are structured so as to avoid semantic
351 ambiguity (in the form of heterophone maintenance,
352 among other pressures), then why should systems
353 ever put themselves at risk, only to “seek out” a
354 response that countervails the ensuing threat?”

- 355 • Language is *not* inexorably destined towards any
356 particular end-state, functionally efficacious or otherwise
- 357 • Just as in the evolution of, there is a plethora of
358 pressures, some working in harmony, others in a state of
359 antagonism, that are all subject to any number of
360 contingent factors
- 361 • There may be a slow-going diachronic tendency towards
362 a lack of acoustic clarity among neighboring speech
363 motor routines, resulting in coarticulation that, left

unchecked, might further evolve toward a genuinely assimilatory state, oftentimes resulting in neutralization and, in the limiting case, homophony

- But along with such slow-going **phonetic** pressures on language structure, there are also slow-going **semantic** pressures: any passive phonetic pressures towards acoustic indistinctness among lexical forms will ultimately encounter a counter-pressure that inhibits undue decreases in semantic indistinctness
- These pressures are “end-state-blind”: one pressure will not be inhibited because it “knows” that it might someday culminate in a counter-functional linguistic state
- It is consequence of language *use* that languages settle towards a semantically unambiguous state

378 (4) “If Heterophone maintenance really is a driving
379 (though passive) pressure on language structure and
380 language change, then why don’t we see evidence of
381 its power all over the place?”

- 382 • Heterophone maintenance is not an **active** pressure for
383 which there is an abundance of overt evidence
- 384 • Heterophone maintenance is a **passive** result of the
385 pressures that inherently act upon interlocutionary
386 events
- 387 • The very fact that language is not chock full of
388 homophones provides evidence—however indirect—
389 that heterophone maintenance is indeed a genuine
390 pressure passively acting on language structure and
391 language change

392 (5) “Regarding (6) “pragmatic pressures” in particular, are
393 you proposing that linguistic change is teleological?”

- 394 • No: in situations where a completely neutralized token
395 might result in confusing homophony, speakers dip into
396 their pool of tokens encountered in comparable listening
397 situations
 - 398 • As a mere by-product of their randomly sampling the
399 tokens in this pool, the probability is high that this token
400 is merely nearly-neutralized, as opposed to completely-
401 neutralized
- 402

- 403 • Speakers are not striving to make the speech signal
404 clearer for the listener “on the fly”. Rather, clear speech
405 signals are a passive consequence of speakers’ matching
406 their own speech patterns to those in their linguistic
407 experience
- 408 • Variable behaviors in lower animals may be characterized
409 comparably
- 410 • Gyger & Marler (1988) observed the natural food-calling
411 behavior of males in a free-ranging situation
- 412 • When a male found food and called, females approached
413 in 53-86% of cases, depending on the food
- 414 • When males called in the absence of food (i.e.,
415 dishonestly), females only approached 29% of the time

- 416 • Males were more likely to call honestly when females
417 were nearby, and to call dishonestly when females were
418 far away
- 419 • Do the males intend to deceive? No. *Variable behaviors*
420 *may be inherited*
- 421 • Labov (1994) “We should not be embarrassed if we find
422 that systematic readjustments in...language are governed
423 by the same cognitive faculty that governs the social
424 behavior of [lower animals]...We are products of evolving
425 history, not only our own but that of the animal kingdom
426 as a whole, and our efforts to understand language will
427 be informed by an understanding of this continuity with
428 other populations of socially oriented animals” *Variable*
429 *linguistic behaviors are learned*

- Oft-observed interaction of real-world pressures on language structure should be taken quite seriously in our linguistic analyses:

Meaning	Sound	
Realm of Ideas	Realm of Words	(Kruszewski)
Signified	Signifier	(Saussure)
Content	Expression	(Hjelmslev)
Semantic	Phonetic	(Kiparsky)
Functional	Formal	

Conclusion

- **Synchronic phonology is substance-free:** it investigates the mental organization of a particular body of knowledge, and should thus be pursued in coordinated tandem with learning theorists and cognitive psychologists. They learn from our data; we learn from their theories
- **Diachronic phonology is substance-rich:** the shape and change of phonological systems derive from an exceedingly complex interaction of **semantic (functional)** pressures and **phonetic (formal)** pressures that are, in turn, subject to passive, evolutive pressures that are decidedly functional in character

- Our job as phonologists is to isolate and untangle these highly distinct though highly interdependent pressures, and to explicate and motivate their interaction

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