

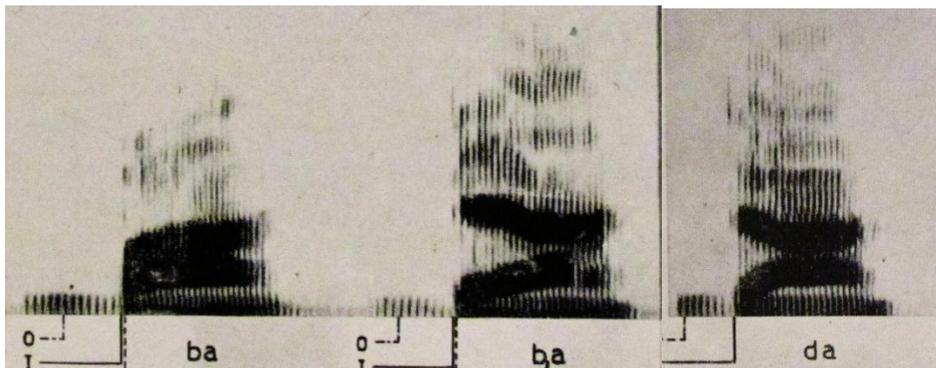
## The actuation of sound change is a matter of chance.

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Weinreich, Labov, and Herzog (1967) present the issue of the actuation of language change as: "Why do changes in a structural feature take place in a particular language at a given time, but not in other languages with the same feature, or in the same language at other times?" As far as the *initiation* of sound change is concerned, I will argue that it is a matter of chance. As for particular sound changes, e.g. velar softening, tonogenesis, back vowel fronting, etc., the probabilistic initiation is not contradicted by the processes that lead to their spread through the population and through the lexicon.

The precondition for a sound change is the inherent auditory confusability of speech sounds. The basis for the confusability of the sounds, in turn, is due to universal articulatory and acoustic factors and these are not a matter of chance; but it is a matter of chance that the behavior of one or more speaker-hearers will manifest the confusion. (Similarly, it is a universal physical fact that a falling meteor can destroy buildings and kill or injure anyone within range of such an event, but it is chance that a meteor will fall and that any particular structure or any particular individual will be affected by it.) A listener can infer a pronunciation norm different from that of a speaker's. The confusability is evident from the fact that even in controlled, high-fidelity listening conditions, listeners exhibit perceptual errors, e.g., a [ʒ] is confused as [f] (Miller and Nicely 1959). And such misperceptions parallel well-documented sound changes.

A salient example is found in the study of Winitz, Scheib and Reeds (1972) who presented listeners with CV stimuli where C was /p /, /t/ or /k/ and V was /i/ /a/ or /u/. and where the stimuli were presented under two conditions: just the C burst or the C plus 100 msec of the following vowel. The CV stimulus /pi/ was one that showed significant misperceptions and, most importantly, was one the few stimuli that exhibited an increase in misperceptions in the CV conditions in comparison to the C condition. The most common misidentification of /pi/ was as /ti/. That this misidentification is due to the similar acoustic properties of these two sounds comes from work by Fant (1960). The figure below from Fant's work presents spectrograms of /ba/ and /b'a/and /da/ (spoken by a speaker of Russian). Obviously /b'a/ and /da/ are very similar in spite of having different places of articulation. (For the point being made it is irrelevant that Winitz et al. dealt with voiceless stops whereas Fant worked with voiced stops.)



We can understand this similarity by considering that although the transitions for a plain bilabial consonant involve low F2, when coarticulated with a palatal gesture as when it is palatalized or when it appears before a palatal glide or vowel, the high F2 of the palatal element dominates the spectrum and this results in the F2 being raised to the point that it resembles that of an apical consonant. (For further details and nomograms relating formant values as a function of place of constriction, see Fant (1960).)

The preceding gives a basis for making sense of the following sound changes from a variety of languages.

Czech (data from Bělič 1966 and Andersen 1973).

<i>Standard Czech</i>	<i>East Bohemian</i>	<i>English gloss</i>
[m <sup>j</sup> ɛstɔ]	[nɛstɔ]	“town”
[p <sup>j</sup> ɛt]	[tɛt]	“five”
[p <sup>j</sup> i:vɔ]	[ti:vɔ]	“beer”
[p <sup>j</sup> ɛknjɛ]	[tɛkn <sup>j</sup> ɛ]	“nicely”

Tai (data from Li 1977).

<i>Siamese (Thai)</i>	<i>Lungchow</i>	<i>T'ien-chow</i>	<i>English gloss</i>
plaa	pjaa	čaa	“fish”
plau (plaaw)	pjau	čuu	“empty”
phaai (phaj)	phjaai	čaaau	“to walk”

Spanish and Portuguese (data from Malkiel 1963) (Here and in some data presented later one must assume – plausibly – that the prevocalic lateral at some intermediate stage become a palatal glide.)

<i>Latin</i>	<i>Spanish</i>	<i>English gloss</i>
amplu	ancho	“large, spacious”
implēre	<i>Old Spanish</i> (f)enchir	“to fill”
plōrāre	<i>Portuguese</i> chorar	“to weep”
flamma	chama	“flame”
plumbu	chumbo	“lead (metal)”

Italian (data from Jaberg and Jud 1928-1940; transcription simplified).

<i>Roman dialect</i>	<i>Genoese</i>	<i>English gloss</i>
pjeno	tʃena	“full”
pjanta	tʃanta	“to plant”
er fjiato	uʃa	“breath”
bjaŋko	dʒaŋku	“white”

Classical Greek (data from Meillet and Vendryes 1924).

<i>Pre-Classical Greek</i>	<i>Classical Greek</i>	<i>English gloss</i>
*gwam-yo	βαίνω (cf. Latin <i>venio</i> )	“I come”
*kom-yo (cf. Latin <i>cum</i> )	κοινός	“common”
*χαλε-yω	χαλέπτω	“provoke”
*θαφ-yω	θάπτω	“bury”

Gwari (No. Nigeria) (data from Hyman and Magaji 1970); note: tone not marked.

<i>Kuta</i>	<i>Ganagana</i>	<i>Nupe</i>	<i>English gloss</i>
bye	dywe	dzo	“sow”
byi	dywi	dzu	“bury”
opya	eɸa	etswa	“moon”

[For more examples of such sound changes, especially from Bantu, see Ohala 1978.]

There is also anecdotal evidence<sup>1</sup>: I once overheard someone say what I thought was ‘duty’; I later found out the word he uttered was ‘beauty.’”

Given the evidence of what is essentially the same sound change, i.e., a palatalized labial changing to an apical, occurring in different languages and dialects, with different histories, different societies, different geographic regions, different syntactic and morphological structures, it seems inescapable to conclude that the cause is to be found in the only thing that is common to them all: the universal factors of articulation, acoustics, and perception. This conclusion is reinforced by the perceptual and acoustic data and principles referred to above. That the misperceptions which lead to such sound changes are a matter of chance, the type of perception experiment of Winitz et al. (and many others that could be cited) demonstrate that.

This leaves open the question of how a new pronunciation norm which originally would be limited to one (or a few) speaker-hearer(s) spreads to other speakers and through the lexicon. The spread to other speakers doesn’t necessarily involve auditory confusability but rather social or psychological forces which would induce speakers to copy the pronunciation of the initiator. Among the social factors that have been proposed are the prestige of the speaker who was the initiator of the change or how many other speakers s/he comes in contact with. Although these factors may be involved in spread of a sound change, the phonetic character of the sound change that gets spread is still essentially a matter of chance since that was the case

with its initiation. Thus the question as to why Latin *dentem*, “tooth”, became *diente* [djente] in Italian but *dinte* [dinte] in Romanian is also a matter of chance.

As to the spread through the lexicon, the evidence is that it is gradual (Wang 1969). Thus although many Latinate derived words in the English lexicon exhibit vowel raising (via the so-called 'English Vowel Shift) plus trisyllabic laxing, e.g., (*extr[i]me* ~ *extr[ε]mity*), some do not, e.g., (*ob[i]se* ~ *ob[i]sity*). In any case, although there may be some identifiable factors **that** further the spread of a given sound change, **what** that sound change is, is still a matter of chance.

Among other important consequences of this view is that sound change can (and has been) studied in the lab, i.e., *in vitro*. This puts sound change into the realm of the natural sciences by involving universal physical factors, i.e., not unique to speech and language or to particular languages.

### Notes:

<sup>1</sup> Anecdotal evidence doesn't have the same weight as that from experiments but in this case I swear on Passy's *Étude sur les changements phonétiques...* (1890) – a book sacred to me, at least -- that the anecdote is true.

**References** (full references not given in this “long abstract,” but most of them can be found in Ohala (1978).

Ohala, J. J. 1978. Southern Bantu vs. the world: the case of palatalization of labials. *Berkeley Ling. Soc., Proc., Ann. Meeting* 4.370 - 386.