Abstract and Keywords

This chapter surveys the impact of language contact on phonological systems. The phonology of one language may influence that of another in several ways, including lexical borrowing, rule borrowing, Sprachbund features, and interlanguage effects. Illustrations of these phenomena are drawn from interactions between English and French, Hawaiian, and Japanese at different historical periods; from Quichean languages; from Slavic-influenced dialects of Albanian; from Dravidian influences on Sanskrit; and from South African English, among other examples. The evidence indicates that language contact may lead to various changes in phoneme inventory, phonotactics, and rule inventory, or to no change at all. Analyses of the data argue against the view that language contact invariably involves simplification but suggest that markedness is an important notion in accounting for certain features of interlanguages.

Keywords: language contact, phonology, borrowings, Sprachbund, markedness, interlanguage, historical linguistics, speech perception

Introduction

This chapter examines the effects of language contact in the phonological domain. We survey and classify the variety of contact-related phenomena, covering loanwords, borrowed rules, Sprachbund phenomena, and interlanguage effects. The evidence suggests that there are several distinct mechanisms by which the phonology of one language may influence that of another. We also discuss markedness, in the context of the proposal by Trudgill (2009) and others that language contact tends to lead to simplification (see Thomason, 2008 for critical discussion and endnote 14 for further references).
Lexical borrowings

We begin by discussing loanwords: words from one language borrowed into the lexicon of another, specifically in situations where speakers of the languages are in contact and perhaps some speakers are bilingual. (We will not be considering loanwords borrowed without any speakers’ being in contact, such as the Latin or Greek loanwords in English.) The basic problem is, what happens when a language is confronted with distinctly nonnative phonological material? This can happen, for example, when a loanword contains a sound not present in the borrowing language’s inventory or a combination of sounds phonotactically forbidden in the borrowing language. When an incoming loanword and the borrowing phonological system conflict, one of them has to give; either the loanword is accepted unchanged, in which case the phonology of the borrowing language changes, or the loanword is altered in some way to conform to this native phonology. We will consider each of these possibilities in turn.

Unaltered loanwords

In the first scenario, the phonology of the borrowing language is implicitly altered by the introduction of new words not conforming to the rest of the lexicon. One example is the creation of a voicing contrast in English fricatives, particularly labials, by dint of loanwords from French. Old English (OE) had fricative phonemes /f, θ, s/ with voiced allophones [v, ð, z] between voiced sounds (Minkova, 2013: 90):

- *wīf* [wiːf] “woman” but *wīfes* [wiːves] “of a woman”;
- *bæþ* [bæθ] “bath” but *baþes* [baðes] “of a bath”;
- *hūs* [huːs] “house” but *hūses* [huːzes] “of the house.”

In Modern English (MnE) voicing is now phonemically contrastive, as revealed by minimal pairs such as *ferry*-very, *thistle*-this, sue-zoo; this opposition appeared in the early Middle English (ME) period and was in part affected by input from Old French (OF).

Already in the fourteenth century, we have ME minimal pairs such as *fēle* (“many”) against *vēle* (“veal” < OF veel). This is particularly striking in the case of /v/, where more than 800 French forms beginning with [v-] were borrowed after the eleventh century (Minkova, 2013; see Eckman and Iverson, 2015, for more detailed discussion of allophonic splits). Another interesting source of /v/ is West Country varieties of English, where fricatives in native words were (and sometimes still are) voiced word-initially (Altendorf and Watt, 2004); the three examples of this surviving into MnE are *vat* (OE *fæt*), *vixen* (OE *fixen*, cf. *fox*), and *vane* (OE *fana* “banner”). Instances of a phonemic */z/* in initial position were also created by loanwords, albeit with only about thirty examples, such as *zeal* and *zone*. OF had no */ð/*, however, so all cases of */ð/* in MnE have arisen via system-internal factors, such as the loss of unstressed final vowels and the degemination of medial geminates, which obscured the environment for voicing of fricatives and
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created a contrast with voiceless word-final [θ] (as well as adding to the /v/ and /z/ phonemes).

Loanword alterations: Perception

In many cases, borrowing fails to affect the phonology of the target language, because loanwords are nativized to accord with the phonology of the borrowing language (Van Coetsem, 1988; Matras, 2009; Winford, 2010). The phoneme inventory, the phonotactics, and the rules are unaffected. This is particularly notable in a language like Hawaiian (Elbert and Pukui, 2001), which has a relatively minimal consonant inventory lacking voiced obstruents and coronal obstruents, as shown in (1).

(1) the Hawaiian consonant phoneme inventory
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Hawaiian phonotactics disallows codas and complex onsets, and all syllables are therefore of the form (C)V. The hundreds of existent English loans (Smith, 2007; see also Parker-Jones, 2009) in Hawaiian have been altered dramatically from their English forms to obey these constraints. Traditionally English /b, f/ become Hawaiian /p/; /v/ becomes /w/; /r/ becomes /l/; /ŋ/ becomes /n/; and most strikingly, /t, d, θ, ð, s, z, ʃ, tʃ, dʒ, k, g/ all merge as /k/. So while the differences are often maintained orthographically, sister, tiger, cider, and cassia all merge with native kika “slippery,” while kini means “gin, ... tin ... king, kin, zinc, Guinea, Jean, Jane, and Jennie” (Elbert and Pukui, 2001), as well as being the native word for “multitude.”

Why do these alterations occur? The dominant theory is espoused by Peperkamp (2005), who proposes that “a principled solution lies with the hypothesis that all loanword adaptations are phonetically minimal transformations that apply during speech perception” (emphasis in original). That is, the changes made to loanwords are artifacts of their perception by speakers of the borrowing language. Peperkamp and Dupoux (2003) review psycholinguistic evidence for “all aspects of non-native phonological structure, including segments, suprasegments, and syllable phonotactics, [being] systematically distorted during speech perception.” In the Hawaiian case, for instance, a perceptual account would have it that of the native phonemes of Hawaiian, /p/ is acoustically most similar to [b], and so /p/ is used in the Hawaiian forms of loanwords originally containing [b], but a stronger case would be that Hawaiian speakers perceive [b] as /p/ and are perhaps even unable to distinguish the two. A famous example is the experiment by Dupoux et al. (1999) purporting to demonstrate that Japanese speakers cannot distinguish [ebzo] from [ebɯzo], instead perceiving an epenthetic vowel [ɯ] breaking up the [bz] cluster, which would be illicit in Japanese. This epenthetic vowel is an exaggeration of faint cues in the acoustic signal, suggested to be more likely to be perceived by Japanese speakers owing to the constraints of Japanese phonology. (See Bruhn, 2009, for evidence that, contra Dupoux, speakers do in fact have access to “fine phonetic detail” beyond that required by their native phonology; as such, the difference between [ebzo] and [ebɯzo] can be perceived by Japanese speakers under the right experimental conditions.)

Loanword alterations: Not just perception

Whether or not Peperkamp and Dupoux’s theory of perceptually controlled loanword adaptation holds for the Hawaiian case, not all instances of adaptation can be accounted for in this way; as we will see, this is essentially because loanwords can travel from one language to another through different routes. To take another Japanese example, many loanwords borrowed from American English (as the majority of English loans are; Irwin, 2011) would originally have contained a tap [ɾ], as in butter [ˈbʌɾɚ] or cider [ˈsɑɪɾɚ]. Japanese contains a phoneme /ɾ/, which a perceptual account would predict to be the natural outcome of the English sound; in fact, however, the normal Japanese outcomes of these two words are batâ [ˈbatʰaː] and saidâ [ˈsaidaː], respectively (Masuda, 1974),
containing phonemes closer to the original underlying English phonemes /t/ and /d/ than to their surface manifestation [ɾ].

Clearly, perceptual similarity is not the only motivation here; instead, one of two other factors is likely to be involved. If these words were imported directly from their English underlying forms into new Japanese underlying forms—that is, transferred from one lexicon to another in a bilingual speaker’s head—these consonants would surface as [tʰ] and [d], respectively, in the Japanese surface forms, rather than being tapped as in English. The other possibility is that the words entered Japanese through their written forms. Given that the tap is still spelt <t> or <d> in English orthography, Japanese speakers have cause to pronounce these words in Japanese as containing [t] and [d]. Whichever of these possibilities is correct, the reason these two routes of borrowing don’t show the effects of perception is simply that nothing has been perceived; loanwords can be borrowed from underlying forms or from written forms, rather than necessarily from surface forms.

Even when loanwords are borrowed from spoken surface forms, the outcome isn’t always what the perceptual account might predict; something phonological can still go on such that surface forms can be “reverse-engineered” to create the underlying forms that would have produced them according to the phonological rules of the borrowing language. An example is the treatment of word-final [t] in loanwords into Korean (Kang, 2003; Iverson and Lee, 2006). The Korean phonemes /t, tʰ, t’, tɕ, tɕʰ, tɕ’, s, s’/ all merge word-finally after a vowel as surface unreleased [t̚]. A borrowed surface form containing [t] could be assigned to the phoneme /t/ based on phonetic similarity, but in both loans and nonce words, the phone is normally borrowed as an allophone of /s/. When the word Internet [intənet̚] is followed by the marker -e “on,” for example, the form is [intənese] (since the relevant consonant is no longer word-final). It appears that speakers perceive [t] and work backward to an underlying form /s/, which would have produced [t] as a surface form had Internet been a native Korean word; the underlying form with /s/ is then adopted, which through Korean’s phonological rules produces a perceptually similar surface form [intənet̚].

To summarize, there are a number of logically possible routes for the borrowing of loanwords into a language, and each of them is associated with a different kind of transformation. If loanwords are directly imported from their perceived surface forms to underlying forms, the adaptations made will be phonetically minimal and arise from slight perceptual biases by speakers; these biases are language-specific. If instead the input is worked backward to produce underlying forms that would have produced the relevant surface forms, transformations needn’t be phonetically minimal but will depend on the rules of the borrowing language’s phonological component. And if loanwords are borrowed from underlying forms in bilingual speakers’ heads or from written forms, perception plays no role in the adaptation process at all.
Borrowed phonological rules

We now move away from the realm of borrowed content—actual material transferring from one language to another—to the transfer of abstract phonology between languages. In cases of borrowed phonological rules, a synchronic process from the source language becomes part of the grammar of the borrowing language. This is easy enough to account for theoretically, in that bilingual speakers can inadvertently transfer rules from one language to another in a rule-based theory. (In a constraint-based theory such as optimality theory, this would be seen as borrowing rankings of constraints.) In second language acquisition, the evidence for this kind of native language interference is copious: Russian L1 speakers transfer their rules of palatalization to their L2 English; English L1 speakers transfer their rule(s) of aspiration to their L2 French; Japanese L1 speakers transfer their rules of epenthesis and palatalization to their L2 English; and so on (Matras, 2009).

Can languages (as opposed to individual L2 speakers) borrow rules? Our answer is “yes”—all this requires is for transfer in second language acquisition to spread enough to become part of a widely spoken variety. We can trace the spread of these features geographically. For example, the European uvular realization [ʁ] of /r/ (Trudgill, 1974) is thought to have begun in Paris in the seventeenth century, have spread first to urban centers in France (even today in some rural areas of France, a uvular realization can be uncommon among older generations), and reached Danish in Copenhagen by the late eighteenth century (Skautrup, 1968). It has spread to dialects of Breton and Provence dialects of Provençal and has ultimately entered German, Norwegian, Yiddish, and Hebrew.3

The uvular case involves only a shift in the realization of a phoneme, rather than the borrowing of a rule as such. Good examples of rule borrowing proper come from the history of the Quichean languages (Campbell, 1977). A large number of those languages have a rule palatalizing velar stops before a uvular stop or velar fricative (with an intervening unrounded vowel: k → kʲ / _ [−round] {q, x}).4 The evidence that this is a borrowed rule comes from the distribution of the rule among the Quichean languages. It applies to Western Cakchiquel, but not Eastern Cakchiquel; to Pokomchí in San Cristóbal but not Tucurú; and to Quiché in Sacapulas but not Cuyotenango. In other words, given that the isogloss defined by this rule cuts across groupings we know to be genetic, the rule is unlikely to have existed in Proto-Quichean. Dictionaries of Cakchiquel and Quiché in the seventeenth century also attest to forms of native words with no palatalization of velars, meaning the rule must have spread to those languages “horizontally”—as borrowings, rather than being inherited from a protolanguage—after that time.
Sprachbund effects

This next category of contact-related phenomena differs from the rule borrowings just considered in not involving a synchronic rule’s being borrowed directly from one grammar into another; rather, one language undergoes changes such that it appears to adopt some feature or property of another (for example, a new contrast or series of phonemes). This category encompasses areal/Sprachbund effects, where languages appear to converge such that they resemble one another, independently of genetic relatedness.

Language contact effects of this kind are widely described in the literature (e.g., Thomason, 2001, Appel and Muysken, 2005, and Muysken, 2008; cf. the summary in Campbell, 1998). In mainland Southeast Asia, genetically unrelated languages such as Chinese, Thai, and Vietnamese have all developed lexical tone (Hombert et al., 1979); in the Balkan Sprachbund, Albanian, Serbo-Croatian, Bulgarian, and Romanian have all developed a central vowel (Joseph, 1992); in southern Africa, the Khoisan and Bantu families both contain languages with multiple click consonants (Blevins, 2004); in the Pacific Northwest, we see large numbers of lateral fricatives and affricates (Campbell, 1998); and so on.

The difference between this phenomenon and the straightforward rule borrowing seen in the previous section is that here, the borrowing language appears to “borrow” the relevant feature in a roundabout way, by innovating its own sound changes with the end product of producing a phonological entity mimicking that of its neighbors. For example, Sanskrit (from the Indic family) has a full retroflex series /ʈ ɖ ʂ ɳ ɽ/ not present in its parent language, Proto-Indo-Iranian (Lipp, 2009). The neighboring Dravidian languages in south India did have a retroflex consonant series at the time (one can be reconstructed for Proto-Dravidian, implying that their series is much older than Sanskrit’s), so the development of retroflexes in the Indic family can be sensibly attributed to language contact. But Indic’s retroflex stops are present in native words with Indo-European etymologies, so the existence of these retroflexes cannot be attributed to loanwords. It also cannot be attributed to the borrowing of rules, because Dravidian’s retroflex series was phonemic; there were no synchronic phonological rules in Dravidian creating retroflexes from non-retroflexes that Indic might have borrowed. And the situation did not simply involve Indic’s existing dental series /t d s n r/ becoming uniformly retroflex in all positions; there was a split between dentals and retroflexes.

The retroflexes in Indic appear to have arisen by dint of a new phonological process, not present in Dravidian. In brief, what appears to have happened was this (Zwicky, 1965):
The realization of Proto-Indo-Iranian *š shifted to retroflex /ʂ/ after the segments {r, u, w, k, i, y} (famously called the “ruki” rule), and dental *r became retroflex /ɽ/ unconditionally. New rules were then created causing assimilation of neighboring segments to the place of articulation of /ʂ/ and /ɽ/; so /n/ became [ɳ] if either of those retroflexes was present earlier in the word, and /t d/ became [ʈ ɖ] immediately preceding...
them. These shifts happened within the native lexicon, independently of any borrowing of words or rules from Dravidian. Even though Indic did borrow a small few words from Dravidian, retroflexes appear in native words, and even if there were some rules in Indic borrowed from Dravidian, none of the rules above were.

The creation of retroflexes in the languages of the Indian subcontinent has in fact occurred multiple times in different families. Hyslop (2008) reports that Kurtöp, a Tibeto-Burman language spoken in Bhutan, has innovated a retroflex stop series: \( \text{ʈá} \) “flushed” contrasts with \( \text{tá} \) “axe,” for example. Other Tibetan dialects do not have retroflexes, so this is an innovation within Kurtöp, which we propose is due to influence from nearby Indic and Dravidian languages. The mechanism of this change was a rule creating retroflexes from “velar or dental plus rhotic onset clusters” (Hyslop, 2008), so written Tibetan \( \text{khri} \) “throne” becomes \( \text{ʈʰi} \), while \( \text{drel} \) “mule” becomes \( \text{ɖee} \). This results in Kurtöp’s having retroflexes, like Indic, but from different sound changes. That a retroflex-producing sound change of this kind can happen in multiple languages in the same area, each language not necessarily changing in an identical way, is important to the nature of areal phenomena like this. There seems to be no common rule or change uniting all the languages involved. Instead, all that connects the processes of internal change is their surface result—namely, converging on some common features.

A final, modern case of the creation of retroflex sounds comes from Malayalee English (Mohanan and Mohanan, 2003), influenced by the Dravidian language Malayalam. In this case, the retroflex realizations [ʈ ɖ ɳ ɽ ɭ] are conditioned allophones of the English alveolar series /t d n r l/. The conditions as described by Mohanan and Mohanan are complex, but broadly, alveolar realizations are conditioned by front vowels and retroflexes by back ones: sit is [sɪt], but put is [pʊʈ]. This case is important, because it illustrates something obscured by the historically reconstructed cases above: languages appear to be able to undergo changes with the “goal” of creating certain surface effects. Malayalee English may not ever phonemicize its retroflex series, but the influence of Indic and Dravidian is still clear, so we can view it as a historical accident that the retroflex realizations in Sanskrit and in Kurtöp eventually became phonemic by further sound changes. What the “influence” of other languages consists of, in the first instance, is the creation of a new phonological rule that brings the surface phonology of the target language closer to those of the source languages.

How does this happen? There seems to be a mysterious, teleological aspect to these rules, in that they come from nowhere and conspire to produce a certain surface effect. An explanation involving some deliberate action by speakers to cause their language to look like another is undesirable, given the rule-like phonological regularity of the changes and the fact there is little evidence that speakers have this ability to alter their grammars. Thomason (2001) conversely reports that Ma’a in Tanzania has a voiceless lateral fricative, unlike any of the Bantu languages in the area, and that Ma’a speakers deliberately introduce this phoneme into Bantu speech “to emphasize the differentness of their other language.” It is unlikely, however, that speakers of a language could introduce
a new surface sound by deliberately creating a new phonological rule, as would need to have happened in the case of these areal features.

We propose that a sensible explanation for these facts is similar to one described in the earlier section on loanwords, where the alterations made are artifacts of perception. When learning a second language, speakers must acquire the phonological rules of that language based on the evidence of the surface forms; in this process, new phonological rules can be inferred to exist. As we saw in the case of loanwords, the phonology of speakers’ L1 can affect their perception of sounds in foreign languages. A small “post-grammatical” effect (Hale, 2007) could then be amplified into a phonological rule by foreign learners attuned to perceiving such an effect. For example, lexical tone in the mainland Southeast Asia linguistic area is taken to have begun as an effect of consonant voicing on the pitch of the following vowel (Haudricourt, 1954). Speakers of languages with tones, who were already accustomed to perceiving pitch differences in vowels, took the pitch difference present in previously non-tone languages and “phonologized” it, inferring the existence of a new phonological rule causing allophonic differences in pitch conditioned by the preceding consonant. When that rule was counterbled by the merger of voiced and voiceless stops (as is evidenced to happen in the languages of this area; Hombert et al., 1979), this pitch difference was phonemicized, and phonemic tone was created.

Dombrowski (2013) gives a good example of the role of perception in the creation of new rules in situations of language contact. Albanian has among its phonemes two laterals /l̪/ and /ɫ/ (a “dark,” or velarized, lateral) and two interdental fricatives /θ/ and /ð/; neighboring Slavic languages contain no interdental fricatives. We would expect Slavic-influenced dialects of Albanian to differ in their treatment of these sounds from the standard language, then, given that speakers may have at least some difficulty distinguishing foreign sounds, as we have seen. In fact, Albanian /ð/ is often velarized as [ðˠ], causing it to be perceptually very similar to [ɫ]; the two sounds often merge in dialects with Slavic influence, usually as /l/, which some Slavic languages (e.g., Bulgarian; Ternes and Vladimirova-Buhtz, 1999) do have. (This change occurs only in dialects spoken among populations of Slavic speakers and is otherwise very unusual for Albanian, so the claim of Slavic influence is relatively secure.) As Dombrowski (2013: 153) comments: “The presence of [l] may have facilitated a mapping from Albanian [ð] to [ɫ] based on the perceptual similarity between these sounds. This mapping was then borrowed back into Albanian under conditions of complex multilingualism.” In the dialect of Hoti, for example, we have ðjete “ten” > ɫet and eðe “also” > eɫe.

What is interesting for our purposes is that since only the surface sound [ðˠ] merges with perceptually similar [ɫ], other realizations of the phoneme /ð/ survive in other environments. Specifically, /ð/ is devoiced word-finally to [θ], leading to some alternations within paradigms in Slavic-influenced Albanian. Dombrowski (2013: 153) quotes an example from Shkurtaj (1974): “the adjective *i madë ’big-MASC.SG.NOM.DEF’ originally alternated with *to maðe ’big-FEM.SG.ACC.INDEF.’” But in Hoti, these become masculine nominative imad and feminine accusative tmale; an alternation between [θ] and [ð] has
become one between [θ] and [ɫ]. The alternation between the two interdental fricatives in standard Albanian can be easily described as the consequence of a final devoicing rule, but the [θ]/[ɫ] alternation cannot.⁹

In other words, a new phonological rule must be added to the grammar of these Slavic-influenced dialects, realizing /ɫ/ as [θ] word-finally. This new rule does not come from the speakers’ L1 but is (incorrectly) inferred to exist in Albanian, thanks to the categorical perception of [ð] by Slavic speakers, and then becomes a synchronic rule of the grammar.¹⁰

Note that this kind of explanation solves the problem of the apparent teleology of these innovated rules, mentioned earlier. These rules are created with a surface form in mind precisely because they are created by second language learners inferring “backward” from a surface form. This is the same mechanism by which any phonological rule is created, as artifacts of articulation or perception become phonologized (Hale, 2007) when speakers perceive them to be the output of phonological rules. The effect of the lens of native phonology through which sounds are perceived can be seen in the typology of changes such as compensatory lengthening, which is more common in languages already possessing a length contrast in vowels; speakers of such a language are primed to recognize longer vowels and so are more likely to notice and phonologize any phonetic effects of vowel length (Blevins, 2004). The difference in the case of language contact is that the lens through which a language is viewed is a foreign one (Hansen, 2006), and so the kinds of rules inferred to exist are weighted in favor of those producing a surface phonology like the one the foreign speakers are familiar with. In the historical record, this appears as internal change “conspiring” to make one language resemble another.

Emergent or interlanguage processes

Similar to Sprachbund effects are so-called emergent, or interlanguage, processes. Like the Sprachbund cases we have just seen, these involve the creation of processes unmotivated by both the source and the target language. However, while Sprachbund processes produce a surface phonology resembling that of another language, this need not be so for emergent or interlanguage contact. The example investigated here is the so-called kip/kit split (“kip split” for short) in many varieties of South African English, whereby the single phoneme /ɪ̈/ exhibits the following allophony: [i]~[i] (a) word-initially, (b) after velars and /h/, (c) before velars, and (d) for some speakers, before /ʃ/ and /ʒ/ (Bekker and Eley, 2007: 109). In all other positions, it is a central vowel, which has variously been transcribed as [ɪ̈]~[ə] (Wells, 1982) and [ɨ]~[ɘ] (Lanham and Traill, 1962). We will use [i] in transcriptions of this centralized realization, following Wells (1982). We define emergent processes, in the sense we are using, to be processes that are innovated despite being unmotivated by both the native language and the target language; we will begin by investigating whether this is true of the South African English kip split.
Of course, most British Englishes do not exhibit this [ɪ]-[ɪ̈] allophony, so we can be fairly confident that it was not inherited from British English. Another important input language in the creation of South African English was Afrikaans (Bowerman, 2008), which also lacks this kind of allophony in its high vowels. For example, the Afrikaans word /skit/ “to shoot” is pronounced [skɪ̈t] even though the vowel is after the velar [k] (Donaldson, 1993); in South African English, such a word would be pronounced [skit]. However, Afrikaans does have /i/ and /ɪ̈/ as separate phonemes. In some varieties of South African English, the allophones are indeed [i] and [ɪ̈] (Finn, 2008: 204), so that influence from Afrikaans looks like a plausible explanation for the origin of the ᴋɪṭ split. In other words, it appears to be a motivated by the native language. So why should we treat it as an emergent process rather than a Sprachbund effect?

The answer may lie in the sociolinguistic situation of early twentieth-century South Africa. In the late nineteenth century, English was used as the language of education. By 1915, schools were allowed to teach in Afrikaans, but many schools continued teaching in English until the 1950s, when apartheid legislation forced many schools to switch to Afrikaans education (Finn, 2008: 203). As Finn (2008: 203) explains:

Being forced to use Afrikaans in this way was bitterly resented by coloured parents and teachers, some of whom circumvented the law.... A very widespread belief developed among parents and children that children got a better education in English schools and classes than in the Afrikaans counterparts, and therefore would have better opportunities for further study and employment.

Indeed, Afrikaans became known as “the language of the oppressor” and is sometimes still seen this way (Makoni, 2005: 146). Thus, the status of Afrikaans was low, and for speakers who did not have it as their first language, it would probably not have been seen as worth imitating. So while Afrikaans speakers themselves might have had influence from their L1 on their English, this does not seem to have been the case for speakers of other languages. And yet we know that the ᴄɪṭ split is not limited to speakers of Afrikaans; instead, it tends to cut across dividing lines between social, ethnic, and linguistic groups (Bowerman, 2008; Finn, 2008: 206; Bekker, 2014). This suggests that innovation is the source of the ᴄɪṭ split in at least some speakers of South African English.

Consider a South African speaker of Zulu. Zulu has two high vowels, /i/ and /u/, both of which are realized fairly close to the cardinals [i] and [u] (Doke, 1923: 689). So what explanation, other than innovation, could there be for the Zulu speakers of South African English having a centralized English ᴄɪṭ vowel in the positions mentioned above?

We will now examine some analyses of this innovated allophony in optimality theory (OT) and rule-based phonology. We will begin with a rule-based analysis. Recall that the non-centralized vowel [ɪ]~[i] surfaces word-initially, after /h/, and before and after velar consonants. (We abstract away from the speaker variation in positions before /ʃ/ and /ʒ/.) Note also that there is a rule of glottal stop insertion word-initially in South African
English (Bekker, 2014: 121). We can now informally write the rule for deriving surface instances of [i] from underlying /ɪ̈/ as in (2).

(2) South African high front vowel allophony

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<td>b. _K</td>
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<td>c. ?_</td>
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K is used as a shorthand for all velars in this formulation of the rule. Thus, [i] occurs after velars (a), before velars (b), and after glottal stops (c). This rule is preceded by one of glottal stop insertion word-initially:

(3) word-initial glottal stop insertion

Ø → ? / #__

Ordering rule (3) before rule (2) ensures that the output of glottal stop insertion feeds into the input of i allophony, giving the correct [i] quality after initial glottal stops.

What would an OT analysis of these data look like? Within OT, innovated processes are often explained using “the emergence of the unmarked” (TETU). Consider a pair of conflicting constraints M1 and F1, where M1 is a markedness constraint and F1 a faithfulness constraint, which are ranked such that F1 >> M1. Given this ranking, the optimal candidate for some input may contain the marked configuration that M1 militates against. But in a situation where F1 has been demoted or is not active for some other reason, the now high-ranking constraint M1 prohibits this marked configuration, thereby allowing something less marked to “emerge.” Let us look at the details of the ḳɪ ᵃɪ split and see whether a TETU analysis is possible.

We will make use of the four constraints in (4). We will use as an example a speaker with L1 Zulu. Recall that Zulu has two high vowels, /i/ and /u/, both realized fairly close to the cardinals [i] and [u]. Given these data, the ranking of these constraints in Zulu produces the desired outputs as long as *CENTRAL is undominated.

(4) constraints for South African high front vowel allophony

<table>
<thead>
<tr>
<th><strong>CENTRAL:</strong></th>
<th>Assess a violation for every output segment specified as [−front, −back]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BACKCENTRAL:</strong></td>
<td>Assess a violation for every set of two adjacent output segments where one is “back,” i.e., {k, g, h, ʔ}, and one is [−front, −back]</td>
</tr>
</tbody>
</table>
However, *CENTRAL is not crucially ranked with respect to *BACKCENTRAL. Assuming that the initial ranking provided by universal grammar places all markedness constraints above all faithfulness constraints (see Hale and Reiss, 2008, chapter 3, for a critique of this assumption), we would have the following ranking for Zulu:

(5) Zulu ranking

*CENTRAL, *BACKCENTRAL >> *i >> IDENTIO(FRONT)

We may see this constraint ranking in action using the four inputs /ti, tɪ̈, ki, kɪ̈/. With ranking (5), the inputs /ti, tɪ̈/ have [ti] as their optimal candidate, and /ki, kɪ̈/ both have [ki] as their optimal candidate.

(6) OT derivations of [ti] and [ki] in Zulu
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<table>
<thead>
<tr>
<th></th>
<th>*CENTRAL</th>
<th>*BACKCENTRAL</th>
<th>F</th>
<th>*ᵢ</th>
<th>IDENTIO(FRONT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/t̠i/</td>
<td>[t̠i]</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[t̠i]</td>
<td></td>
<td>1</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>/k̠i/</td>
<td>[k̠i]</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[k̠i]</td>
<td></td>
<td>1</td>
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<tr>
<td></td>
<td>[ka̠i]</td>
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<tr>
<td>[k]</td>
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<tr>
<td>[i]</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[kɯ]</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Note that [ti] and [ki] are only optimal assuming that IDENTIO(FRONT) and *i are dominated by relevant faithfulness constraints, represented as “F” in (6); this rules out other repair strategies, such as epenthesis (ruling out, for example, *kaɪ), deletion (ruling out *k and *ɪ from /kɪ/), and backing (ruling out *kɯ). To make things clearer for the reader, we have also ignored the constraint *BACKRTR, which is necessary to rule out the suboptimal *ki.

Now, what is the ranking of these constraints in South African English, and which demotions are necessary to achieve that ranking? Inputs /ti, tɪ̈/ have [tɪ̈] as their optimal candidate, while /ki, kɪ̈/ have [ki]. This is achievable with the ranking *BACKCENTRAL >> *i >> IDENTIO(FRONT), *Central. Any output of the type [ki] fatally violates the undominated *BACKCENTRAL, while any output of the type [ti] fatally violates *i. To get from the Zulu phonology to that of South African English, we have simply demoted *CENTRAL so that it ranks below *i.

Looking back at our definition of TETU, the θɪ_t split does not fit the mold perfectly. Instead of demoting a faithfulness constraint, allowing the unmarked to emerge, we have demoted a markedness constraint, allowing for faithfulness to decide the output. We conclude that within an OT worldview, the θɪ_t split does not exemplify TETU but does show that markedness constraints can also be demoted as a result of second language acquisition.

Whichever theory one uses to analyze effects of the sort just seen in South African English, it is clear that an interlanguage may involve processes neither found in nor motivated by the source and target languages. This goes against earlier claims that interlanguages are a blend of the source and target languages (e.g., Lado, 1957; for more work on Lado’s so-called contrastive analysis hypothesis, see, e.g., Wardhaugh, 1970, Whitman, 1970, and Yang, 1992). However, we have not yet attempted to explain why this particular innovation took place. It can be argued that the presence of an [i] in South African English arises as part of a chain shift beginning with the raising of the other short front vowels. The trap vowel in South African English has been raised from [æ] to [ɛ], and the dress vowel is [e] (Finn, 2008: 204). Thus, we can think of these raised vowels “pushing” the trap vowel so high in the vowel space that it has nowhere left to go and must centralize instead. This seems to have happened in New Zealand English, whose trap and dress vowels are similarly raised and which has no high front realization of the trap vowel (Bauer and Warren, 2008: 41). However, some varieties of South African English evidently do possess a high front allophone [i] (Bekker and Eley, 2007: 109), so crowding in this region does not seem like a plausible explanation.

Other explanations for phonological change might include perceptual or articulatory ease. But the process here is, phonetically speaking, one of dissimilation: fronting before back consonants. This does not make the articulation of either consonant or vowel easier, and it is unclear what perceptual advantages it could offer. And as our OT analysis has shown, the traditional assumption that interlanguage innovations exhibit TETU effects does not seem satisfactory either. It is thus not clear to us why the θɪ_t split has arisen, and we will not attempt further to provide an account of it here. However, note that
emergent processes are different from the other phenomena discussed in this article, simply by not involving language contact. Thus, the innovation of the ᴋɪᴛ split is surely comparable to innovations that lack grounding in articulation, perception, or markedness in other languages.

Markedness

Having outlined the types of phonological effects of language contact, we will now discuss properties of the phonological systems that result from borrowing. It has been claimed that language contact tends to lead to simplification. Trudgill (2009), for example, argues that this is true of morphology (which we will not comment on here). Can the same be said for phonology? There are certainly cases where language contact has introduced marked structures. This section classifies some types of markedness that arise and discusses what their motivations may be.

The phonology of a language can be marked in several ways. It can contain marked segments (e.g., /q'/), a marked distribution of segments (e.g., word-initial /ŋ/), an otherwise marked phoneme inventory (e.g., /p, t, k, pʷ, tʷ/ without /kʷ/), or a marked phonological process (e.g., labializing consonants before front vowels). All of these types of markedness exist as a consequence of language contact. Sometimes an increase in markedness is due to a simplification elsewhere in the phonological system. Markedness considerations can thus conflict with one another, leading to one of them winning out.

Let’s begin by considering cases of borrowing marked sounds. Musa Dagh is a Syrian dialect of Armenian (Vaux, 1998) that is unique among Armenian dialects in several ways. The most relevant peculiarity here is in the consonant system. As a consequence of language contact with Arabic, Musa Dagh has a uvular stop /q/ in words like dæqiqæ “minute.” This word is borrowed from Arabic /daqiːqa/ with the same meaning. However, /q/ is also found in some native vocabulary, such as /qənnil/ “find,” where Classical Armenian has /gtanel/ (the word is originally from Proto-Indo-European *weyd- “to see/know”). If language contact led to phonological simplification, one might expect marked sounds not to be borrowed (based on the assumption that a “simpler” phonology is one that is less marked). The Musa Dagh case shows that not only can marked phonemes be borrowed, but they can even be overgeneralized to native vocabulary.

Language contact can also lead to a marked distribution of sounds. This has happened in the Thurgovian dialect of German, spoken in northeastern Switzerland. (Our data on this variety come from Kraehenmann, 2001.) The consonant system of Thurgovian features single and geminate pairs of /p, t, k, f, s, ʃ, x, m, n, l/. The striking feature of Thurgovian is that the phonemes /pː, tː, kː/ can all appear word-initially. To understand how this came to be, one must examine the history of the variety. Thurgovian is a descendant of Old Alemannic, where geminates existed only in word-medial and word-final positions, while
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affricates were found in all positions. Earlier voiced stops became single voiceless consonants, as in /poːna/ “bean” (cf. standard German /boːna/).

The initial geminates arose in borrowed vocabulary. The problem for Thurgovian was how to treat loanwords where the donor language makes a distinction between voiced and voiceless stops. Perhaps surprisingly, there is no merger of voiceless and voiced sounds in loans; for example, borrowed /p/ and /b/ do not merge as /p/. Kraehenmann suggests that this is due to speakers’ being able to perceive voicing differences even though they are not contrastive in Thurgovian. So how does the voicing distinction translate into Thurgovian? The answer is that borrowed /b/ becomes /p/, as in /palaʃt/ “ballast” (standard German /balast/). This is the same as the diachronic outcome of Old Alemannic /b/. But borrowed /p/ instead geminates to /pː/, as in /pːalaʃt/ “palace” (standard German /palast/). The result of this system of borrowing is a highly marked one, which might not have come into existence were it not for the loss of phonemically distinctive voicing and the desire to maintain a contrast between voiced and voiceless stops in loanwords.

It could be that the word-initial geminates of Thurgovian are in part internally motivated. Note that /p, t, k, pf, ts, kx/ appear in all positions, while /pː, tː, kː/ formerly appeared everywhere except word-initially. Thus /pːalaʃt/ fills a gap in the phonotactics of the language. However, the same gap exists for English /ŋ/, and many people do not fill this gap for names like “Nguyen,” preferring instead pronunciations like /ŋgujən/, at least according to our own intuitions. So the fact that there are loanwords that could fill a phonotactic gap does not necessarily mean that the gap will be filled. Long voiceless stops are extended to word-initial position in Thurgovian German, but English /ŋ/ is not allowed in this position in spite of loanwords like “Nguyen.” Whatever the reasons why some languages choose adaptation to native phonotactics while others do not—a matter we will not discuss further here—Thurgovian demonstrates that markedness can be trumped by other factors, such as a need to maintain contrast in stops.

Another way in which contact languages can be marked is in having a gap in the phoneme inventory vis-à-vis their source languages. One language exemplifying this is Mednyj Aleut, also known as Copper Island Aleut. This language is spoken by a handful of people now living on Bering Island in the Bering Sea and has both Aleut and Russian elements. The discussion here draws on data from Thomason (1997). Aleut has two series of sonorants, one voiced and the other “either preaspirated or fully voiceless phonetically” (Thomason, 1997: 455). Following Thomason’s practice of transcribing the second series with a preceding /h/, the sonorants in Aleut are thus /m, n, η, l, (r), w, j, hm, hn, hŋ, hl, hw, hj/. The distinction between voiced and voiceless sonorants is retained in Mednyj Aleut, with a few changes. For clarity’s sake, we will illustrate Mednyj Aleut’s sonorant system using only the nasals.

Mednyj Aleut has five nasal sonorants: /m, n, η, hm, hn/. The voiceless velar nasal /hŋ/ is absent, leaving a gap in the phoneme inventory. These types of systems are sometimes mentioned in relation to economy: Aleut is economical in applying the voicing contrast to
all sonorants, while Mednyj Aleut is uneconomical since it does not apply it to /ŋ/. The same lack of economy is found in non-contact languages. Lavukaleve, spoken on the Solomon Islands, has the stop system /(p), t, k, b, (d)/, where the parenthesized phonemes are marginal (Terrill, 2003). The motivation behind Mednyj Aleut’s uneconomical inventory is worth noting. To remove /ŋ/ is to remove a marked segment and, viewed alone, is a way of making Mednyj Aleut’s phoneme inventory less marked. However, the loss of this phoneme causes a gap in the voiceless nasal series. So reduction of markedness in one area causes markedness in another.19

Contact languages may also innovate marked phonological processes. This happened in the Turkic language Karaim, spoken in parts of Lithuania and Ukraine, which has consonant harmony for the feature [back]. Harmony effects are not uncommon in languages, and they are often innovated by children when learning to speak (e.g., Goad, 1997, and Vago, 1980). However, some harmony processes are more common than others. One of the rarest kinds requires the secondary articulations on all consonants within a word to be the same; Hansson (2007) writes about the only three cases known to him. Nevertheless, in Karaim, this type of harmony system is exactly what we find. The data on the northwestern dialect of Karaim presented here come from Nevins and Vaux (2003). It seems likely that the [back]-based consonant harmony system innovated in Karaim has its origin in language contact. The division of consonant phonemes into [+back] and [−back] pairs is familiar from the Slavic languages, with which Karaim has been in contact for over 600 years. And language contact with Slavic languages is probably why the front rounded vowels of Karaim have “at best an extremely limited distribution” (Hansson, 2007: 90).

Since Karaim is a Turkic language, harmony effects based on [back] are expected. However, it is unusual that consonants harmonize instead of vowels, as they do in /kʼel/d/ɪm/ “I came,” (cf. /kaldı̯m/ “I stayed”).20 How has vowel harmony shifted to consonants? Consider the Turkish accusative for “lake,” /gøl/I/. In words with front vowels, [dorsal] consonants are known to exhibit palatalization (Hansson, 2007: 92), giving [gølY] in this case. This is originally a coarticulatory effect caused by the vowels being [−back]. If we had not known the phoneme inventory of Karaim, we would not be able to tell what the underlying representation of [gølY] might be. It could be /gøly/, where the palatal consonants are simply coarticulations; /gółu/, where the front vowels are simply coarticulations; or /gö̞lY/, where all segments are [−back]. A list of Karaim phonemes actually does not help much, since both front rounded vowels and palatalized consonants are part of the inventory. However, these three possible underlying representations make different predictions.

More specifically, /gółu/ predicts that [g StringSplitOptions /ω] is a possible realization of this word. If the vowels were underlyingly /ω/ and /Y/, there would be no reason for them to surface as [+back]. This prediction is verified by phonetic data showing a noticeably low second formant for at least some tokens of /u/, which is the phonetic correlate of backness. In other words, the Karaim cognate of Turkish [gʼɔlY] must be /gʼolu/, since the vowels are optionally fully back. The centralized realizations are easily explained as precisely the
type of coarticulation that caused the reanalysis to happen in the first place. We have independent evidence from other languages where the same kind of reanalysis has happened: [C’y] is analyzed as /C’y/ rather than /Cy/, where C is any consonant. This evidence comes from Russian, where loanwords like French /vol’yem/ “volume” and Turkish /tyk/ “bundle” become Russian /vol’yum/ and /t’yuk/, respectively (see Paradis, 2006).

So far, little has been said about the motivations for the shift of harmony to consonants. It is certainly a possibility, but why does it actually happen? The presence of plain-palatalized consonant pairs in the surrounding languages is evidently an important factor. But one wonders why Karaim has not kept its front rounded vowels and chosen /g’oḷ’y/ over /g’oḷ’u/. There are at least three plausible reasons for this development: markedness, contact, and gradual spreading. Front rounded vowels are marked with respect to front unrounded ones, and this may be part of the reason why Karaim marginalizes them. It is also important that surrounding Slavic languages do not have front rounded vowels. Further evidence of Slavic influence on the Karaim vowel system is that Karaim [i] and [u] have a distribution “remarkably similar to that of [i] vs. [ɨ]/[ɯ] in neighbouring languages” (Hansson, 2007: 91). Finally, orthographic evidence suggests that the backing of front vowels began in common suffixes before spreading elsewhere (Németh, 2014). So the difference was not, and indeed is not, fully lost. But neutralization in common suffixes might have been enough to initiate a spread to other environments.

Speakers of Karaim have arguably reinterpreted their original system of vowel harmony as one of consonant harmony because of contact with Slavic languages. Vowel frontness was perceived as an effect of coarticulation caused by surrounding palatal consonants, rather than the frontness of consonants being perceived as an effect of coarticulation caused by surrounding front vowels. The combination of a marked feature, Slavic palatal consonants, and the Turkic harmony system has brought about this typologically rare situation.

Karaim was confronted with two systems: the Slavic [back] distinction in consonants, on the one hand, and the Turkic [back] distinction in vowels, on the other. For surface forms such as [g’oḷ’y], the language chose to treat the palatal consonants as underlying and the front vowels as mere coarticulations. However, languages do not necessarily have to opt for one system only. The next language to be discussed has simply kept both.

The language in question is Saramaccan, a Creole with an English/Portuguese superstrate and a largely Fongbe substrate (McWhorter, 2004). Saramaccan is famed for what Good (2004) has called its “split lexicon,” where some words are marked for tone and others for word accent. Confronted with tonal Fongbe words and accentual European ones, Saramaccan has allowed both systems to coexist. For a precise definition of tone and accent in relation to Saramaccan, see Good (2004), from which the data presented here come. Saramaccan has two tones: high, as in /fā/ “fun,” and low, as in /fà/ “manner.” As this pair shows, there are words distinguished only by tone. Some of the emphatic
forms of personal pronouns show the same pattern: /mì/ “non-emphatic 1st-person singular” and /mí/ “emphatic 1st-person singular.” Abstracting away from intonational variation, all vowels in Saramaccan surface with either high or low tone.

The difficulty is that there is a class of words, constituting a majority of the lexicon, whose tones may change. Sometimes the relevant vowels behave as if they have low tone, and sometimes as if they have high tone. For example, consider the realizations [pàí] “give birth,” [káîmà] “alligator,” and [lùkù] “look.” Now observe what happens when the agentive suffix -ma is added: [pàímà] “mother of many children,” [káîmàmà] “alligator man,” and [lùkùmà] “spectator.” In spite of its final low tone, “look” does not pattern with “alligator.” Instead, it behaves as if its final tone were high. Moreover, some low tones may raise to high tones, while others never do. “Flower,” [fòló], becomes [fóló] in [di fóló bɛ̀] “the flower is red.” The low tones in “alligator” never raise in this way. So there is some difference in the representation of tone in the words for “alligator” and “flower.” In fact, the accentual words never have the low tone in “alligator.” What seems to be the case is that the first vowel in “flower,” and all other vowels like it, is actually unspecified for tone and receives a low tone by default.

The accentual words have several properties that distinguish them from the tonal ones. It is unnecessary to mark every vowel for tone, since the tone on every vowel is predictable from a single accent mark. There is also a strong correlation between tone and stress in these words, something that is not found in the tonal component of the Saramaccan lexicon. The rest of this section deals exclusively with the accentual words unless otherwise specified.

There are six attested tonal patterns on words of three syllables or more. These do not combine freely with stress, as one might expect if the words were tonal. Instead, there are only six tone-stress combinations. Put differently, tone never varies independently of stress. For the same set of words, the leftmost vowel with high tone is always stressed, whether primarily or secondarily. The correlation is even clearer for shorter words, where all stressed syllables contain a vowel with high tone.

There are also phonetic phenomena that target only the non-tonal words. Good (2004) gives an illustrative example of unstressed vowel deletion. Compare [ˈbɔ́kúsù] ~ [ˈbɔ́ksù] “box” with [pùkùsù] “bat,” where *[pùksù] is unattested. Only unstressed vowels are subject to deletion, and stress is active only in the accentual part of Saramaccan. The tonal words can never undergo unstressed vowel deletion, since there are no unstressed vowels.

The split between tonal and accentual words is based on the donor language. Tonal languages have given Saramaccan its tonal words, while accentual languages have given them its accentual ones, “without leveling of the language’s prosodic structure in favor of one type of system over another” (McWhorter and Good, 2012: 30). The motivation for
the marked Saramaccan system should thus be clear. Instead of leveling, two systems are applied to different parts of the language.

**Conclusion**

This chapter has surveyed the ways in which the phonology of one language can influence the phonology of another. In the case of loanwords, we saw that they could remain unchanged, thereby potentially changing the phoneme inventory of the borrowing language, its phonotactics, or both. However, there are also cases where loanwords are altered to respect the borrowing language’s phonology. The reasons for this vary from case to case but seem to be motivated by factors such as perception, degree of phonological knowledge of the donor language, and the orthography of the donor language. It also seems as if languages can borrow phonological rules, as was illustrated by the Quichean palatalization example. Such effects differ from Sprachbund effects, where no rules are borrowed, but one language nevertheless incorporates some feature of another language. Sprachbund effects seem to be more widespread than rule borrowing, possibly because the degree of bilingualism required for a rule to be borrowed is so great that speakers are normally able to keep the two languages apart.

We have also examined emergent or interlanguage effects, where the changes undergone by a contact language seem to have no motivation in the source or the target language. Such effects presumably arise in the same way as innovated processes in non-contact languages. Our final section surveyed the role of markedness in language contact, finding that many kinds of markedness do arise as a consequence of language contact. This observation is consistent with the idea that considerations of markedness do not play a large role in language contact.

**References**


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Notes:

(1) Whether or not these particular spellings with <f>, <þ>, and <s> represented voiced fricatives at the time they were spelled, the historical development described in the following is evidence that these intervocalic fricatives were at some point all voiced.

(2) We hypothesize that this reflects some implicit knowledge of the frequency of /s/ against other phonemes in Korean, but this needs to be investigated.

(3) This could be argued to be a Sprachbund effect, as we will see in the next section. Whichever type it is, the point stands that we can often accurately trace the spread of these abstract phonological changes geographically. See also Ratte (2011) for evidence of contact-induced change in the realization of Taiwanese stops.

(4) Formulation of rule taken from Campbell.

(5) This will include phonotactic constraints, for those linguists who believe phonotactic constraints are not explicitly represented anywhere in the grammar. For those who give phonotactic constraints a status alongside rules as formal constraints on the grammar, the borrowing of constraints is more like the rule borrowing of the previous section.

(6) We have no evidence that the families of the Pacific Northwest are genetically related, but as an anonymous reviewer pointed out, it’s logically possible that they might be, in which case, the lateral obstruents do not constitute a Sprachbund effect in our sense.

(7) This was blocked by a later /r/; for details regarding the blocking of each of the rules mentioned here, see Zwicky (1965).

(8) Indeed, all sound changes might be argued to have started off as synchronic phonological rules, hence their regularity, rather than changing the phonemes of a language in one step. See Bermúdez-Otero (2007) for more discussion of the sources of sound changes.

(9) It could be argued that the surface [ɫ] in these Slavic-influenced Albanian dialects represents underlying /ð/, but this would require special pleading, given that [ð] never itself surfaces.

(10) This example does not consist of a phonetic effect’s (such as that of consonants on the pitch of the following vowel) being interpreted as the output of a rule by foreign listeners; that kind of explanation would be required to explain the other areal phenomena mentioned above.

(12) It may be that the South African English situation arose through dialect contact between varieties where کیت was always [i] and ones where it was always [ɪ̈]. However, there is little indication in the earliest sources that a high front quality was present, and the indications we do have seem to be doubtful (Bekker, 2014: 119). The existence of push chains also has been questioned, on the basis that languages do tend to tolerate mergers. However, in this case, there is acoustic evidence to suggest that a push chain was actually involved (Langstrof, 2006).

(13) However, see Ohala’s (1993) discussions of dissimilation as hypercorrection of articulatorily natural processes of assimilation.

(14) Useful discussions on language contact and simplification include McWhorter (2000), Siegel (2000), Miestamo et al. (2008), and Thomason (2008).

(15) Note that this is an irregular change affecting only a handful of native words, all with Classical Armenian /g/, with no apparent conditioning environment. None of the explanations proposed in this chapter can account for irregular changes of this sort.

(16) An anonymous reviewer suggests this is because standard German, which does contrast voicing in stops, is used as a medium of instruction in schools.

(17) Kraehenmann explicitly writes that every word-initial geminate must be from a loanword, but she still transcribes the native word “day” as /tːak/ rather than /tak/. We do not know the reason for this.

(18) In Aleut /ɾ/ is a marginal phoneme found only in loanwords.

(19) An anonymous reviewer points out that this is true only if one accepts the rather controversial claim that phoneme inventories with gaps are marked.

(20) This example makes it look as if Karaim has syllable harmony, where all segments must agree for [back]. However, /i/ and /ɨ/ are the only vowels that contrast in this way. See Nevins and Vaux (2003) for details.

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