Korean Aspiration, Japanese Voicing, and Emergent Features

Timothy J. Vance

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INTRODUCTION
Jeff Mielke (2008) argues that phonological features are emergent rather than innate.
Thus, “Because features are abstract, there need not always be a connection between phonetics and phonological patterns, and features do not necessarily always refer to phonetically natural classes” (Mielke 2008:9).
Saussure (1916:164) tells us, “Linguistic signals are not in essence phonetic. They are not physical in any way. They are constituted solely by differences which distinguish one sound pattern from another.”
But surely the phonetic substance that manifests spoken language has a profound influence on the formal patterns we find.
Saussure’s characterization contrasts sharply with what Postal (1968:55-77) called the naturalness condition, according to which classes of segments that behave together phonologically must be definable in phonetic terms.
The naturalness condition is weaker than the claim that features are drawn from an innate, phonetically grounded set.

A phonetically definable class is not necessarily “featurally” natural (unless there is a feature for every conceivable phonetic property).
In the words of Stephen Anderson (1981:504): “Even if it is indeed the case that sounds which behave similarly have something in common phonetically, we must still ask whether a system of features which is appropriate for phonological analysis can serve directly as a system for phonetic description as well.”
Bob Ladd, in his provocative 2014 book, argues that even the weaker naturalness condition cannot be maintained.

Both Ladd and Mielke cite relevant statements by Peter Ladefoged (1984:85; 1990:404).
Today’s presentation will look at two phenomena that are difficult to reconcile with universal innate features but are compatible with the notion of emergent features.
KOREAN ASPIRATION
As has been documented in many studies (e.g., Kim, Beddor and Horrocks), the laryngeal features of word-initial lax and aspirated stops in Seoul Korean have been shifting rather dramatically in recent decades.
A contrast between unaspirated and aspirated has, for some speakers, become a contrast between relatively weakly aspirated and relatively strongly aspirated.
Low f0 in the immediately following vowel serves as an increasingly important cue for the lax (now weakly aspirated) stops.
In the wake of the pioneering work by Lisker and Abramson (1964), it was widely accepted that there were three universally available VOT categories: lead (voiced), short lag (voiceless unaspirated), and long lag (voiceless aspirated).
However, subsequent research in the half century since (e.g., Raphael et al. 1995; Riney et al. 2007) indicates that Seoul Korean is just one many cases that do not fit comfortably into these putatively universal categories.
On the other hand, the difference between lax and aspirated stops is represented consistently in Hangeul orthography, and the traditional labels (평음 平音 pyeong-eum and 격음 激音 gyeok-eum) presumably denote psychologically real categories for native speakers.
In 2009, the psycholinguist Jessica Maye gave a talk at the Cross-Language Speech Perception Workshop, held at the Acoustical Society of America meeting in Portland.
After playing a recorded token of Korean word with an initial stop, she asked the audience members to raise their hands if they thought that stop was aspirated.

Except for the Korean speakers, everyone’s hand went up.
If features are emergent, such ongoing changes in phonetic realization need not disrupt the system and make it problematic for future generations of speakers.
The two phonological classes can, of course, be characterized in phonetic terms throughout the progress of the change, although not with innate features.

This phenomenon is therefore not a problem for the naturalness condition.
Japanese *rendaku* is almost always described as a voicing process.

But because of well-understood diachronic changes, *rendaku* actually pairs voiced and voiceless consonants that, in most cases, differ in more than just the presence vs. absence of vocal-fold vibration.
<table>
<thead>
<tr>
<th>VOICELESS</th>
<th>VOICED</th>
</tr>
</thead>
<tbody>
<tr>
<td>/f/  [φ]</td>
<td>[b] /b/</td>
</tr>
<tr>
<td>/h/ [h]~[ç]</td>
<td>[b] /b/</td>
</tr>
<tr>
<td>/t/ [t]</td>
<td>[d] /d/</td>
</tr>
<tr>
<td>/c/ [ts]</td>
<td>[dz]~[z] /z/</td>
</tr>
<tr>
<td>/s/ [s]</td>
<td>[dz]~[z] /z/</td>
</tr>
<tr>
<td>/č/ [tɕ]</td>
<td>[dz] /j/</td>
</tr>
<tr>
<td>/š/ [ɕ]</td>
<td>[dz] /j/</td>
</tr>
<tr>
<td>/k/ [k]</td>
<td>[g] /g/ (OR [ŋ]/ŋ/)</td>
</tr>
</tbody>
</table>
On the other hand, the orthographic representation of *rendaku* in *kana* is straightforward and consistent.
For example, the difference between the /h/[h] in *hana* ‘flower’ and the /b/[b] in *beni+bana* ‘safflower’ is represented in exactly the same way as the difference between /t/[t] in *tana* ‘shelf’ and /d/[d] in *hon+dana* ‘bookshelf’.
/hana/ ‘flower’
/beni+bana/ ‘safflower’
/tana/ ‘shelf’
/hōn+dana/ ‘bookshelf’
There are traditional orthographic terms for syllables beginning with a voiceless obstruent (but excluding [p]) (清音 seion), and for syllables beginning with a voiced obstruent (but for some speakers including [ŋ]) (濁音 dakuon).
There is little doubt that these categories (*seion* and *dakuon*) are psychologically real for native speakers.

But it is not clear how to separate phonology from orthography in a case like this.
When my daughter was in first grade at a Tokyo elementary school, she and her friends played a language game that involved substituting a dakuon for every seion as they spoke otherwise normal Japanese.
For example:

Watashi mo kudamono tabeta.
Wadaji mo gudamono dabella.

わたしそくだもののたべた。
わたしそくだもののたべた。
Shigeto Kawahara has made the case that it might be better simply to view *rendaku* as an orthographic phenomenon rather than as a phonological one (*Glossa*, to appear).

But in what follows, I will assume that *rendaku* is phonological, at least in part.
Given this assumption, the class of all voiceless obstruents (i.e., /p f t s c š č k h/) and the class of all voiceless obstruents except /p/ (i.e., /f t s c š č k h/) are both phonologically active in Japanese, as Mielke (2008:51-54) points out.
The phonetically natural class, which includes /p/, is the complete set of consonants that ordinarily trigger vowel devoicing (although the [h] allophone of /h/ is actually not as reliable a devoicer as the others; see Fujimoto 2015:176).
Recent work by Mieko Takada (2011) indicates that the phonetic realization of the voiced and voiceless categories has been shifting in recent years, but I leave this complication aside today.
The phonetically unnatural class, which excludes /p/, is the set of consonants that can undergo *rendaku*.

This same class is also involved in Sino-Japanese doublet pairings — understood by ordinary speakers as alternative “readings” of *kanji*.
| 分 | /fuN/ | /buN/ | ふん | ぶん |
| 貧 | /hiN/ | /biN/ | ひん | びん |
| 土 | /to/  | /do/  | と   | と   |
| ○ | /c/   | /z/   |      |      |
| 財 | /sai/ | /zai/ | さい | さい |
| 地 | /či/  | /ji/  | ち   | じ   |
| 神 | /šiN/ | /jiN/ | しん | しん |
| 街 | /kai/ | /gai/ | かい | かい |
If features are emergent, it is not problematic to posit paired categories for which diachronic changes have disrupted the parallelism in phonetic realization.
In contrast to the Korean aspiration phenomenon, this Japanese phenomenon is a serious challenge for the naturalness condition.

The voiceless *seion* category cannot reasonably be construed as phonetically based, nor can the voiced *dakuon* category if it includes [ŋ].
The Descriptivist linguist Martin Joos (1958:96) famously wrote that “languages can differ from each other without limit and in unpredictable ways.”

Are things really this bad?
Clements and Hume (1995:245) say that “[innate] feature theory has provided strong confirmation for the view that languages do not vary without limit, but reflect a single general pattern which is rooted in the physical and cognitive capacities of the human species.”
But innate feature theory seems to be too restrictive and consequently incompatible with the development of Korean “aspiration” and Japanese “voicing”.
It is not hard to understand and sympathize with the impulse behind substance-free phonology (e.g., Hale and Reiss 2000), but it seems to take us back to Saussure’s position.

I am not yet ready to abandon the idea that phonology has something to do with phonetics.
Emergent feature theory predicts that a phonetically natural class type will be crosslinguistically common.
A phonetically unnatural class type is possible, but it will be relatively uncommon or even unique, depending on how unusual the confluence of factors was that led to its emergence.
We see an early recognition of this problem in a famous 1972 article by Bach and Harms: “How Do Languages Get Crazy Rules?”. Bach and Harms suggest that there are constraints on possible rules but that they are “much weaker than those restricting rule initiation . . . .”
In Mielke’s (2008:87-88) words, “The main point of emergent feature theory is that phonetically natural classes are the result of common sound changes or phonetically based generalizations, while phonetically unnatural classes are the result of less common generalizations or sequences of events.”
Mahalo nui loa
References


