Placeless vs. Pharyngeal for Japanese /h/*

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ABSTRACT. Japanese glottal fricative /h/ is often considered as placeless, as (1) /h/ undergoes regressive place assimilation; (2) it is transparent in echo epenthesis; (3) there are no other pharyngeal segments in Japanese. But argument (1) raises questions: Why are the triggers only high vowels? Are there no effects on /h/ before nonhigh vowels? Why are the arguments about the allophonic assimilation only? If /h/ is analyzed as being pharyngeal rather than placeless, these questions can be answered. Furthermore, it is pointed out that argument (2) is dependent on the representational approach, and there are insufficient empirical grounds for argument (3). Thus, the inventory-driven hypothesis has to be rejected. Instead, Japanese /h/ could be argued as pharyngeal.

Keywords: placeless, pharyngeal, glottal fricative, articulatory conflict

1. Introduction

Crosslinguistic evidence has shown that glottal fricatives often behave as if they were phonologically placeless, being transparent to harmony (Steriade 1987a), and are phonetically underspecified, showing an interpolative quality between adjacent vowels (Keating 1988). Phonological acquisition data also suggests that glottal fricatives in English are underspecified and lack a place node (Stemberger 1993). However, previous studies have shown the laryngeals /ʔ, h/ could be i) pharyngeal, ii) placeless, or iii) both pharyngeal and placeless. It is not known whether their specification must be stipulated from language to language, or is predictable from other aspects of the language. There has been controversy over whether the specification of /h/ is predictable from the segmental inventory of the language, i.e., whether or not the pharyngeal specification of laryngeals is a consequence of a rich guttural inventory (see McCarthy 1991, Lloret 1995, Rose 1996, Bessell 1992, Bessell and Czaykowska-Higgins 1992). In this context, languages with a rich guttural inventory have been often brought up, but languages without them have been largely left out of the discussion.

Japanese, which has only /h/, /N/ and /k, ɡ/ in the post-palatal area, has not been discussed much in this context. Furthermore, many researchers have believed that Japanese /h/ is placeless because its tongue posture seems to be same as that of the following vowel, which suggests no independent place is specified on its own. This paper explores the validity of the arguments for the placelessness hypothesis and argues that Japanese /h/ is not placeless but rather pharyngeal phonologically.

This paper is organized in the following way. Section 2 shows arguments for /h/ in Japanese being placeless. Section 3 puts forwards arguments against the placeless /h/ analysis. Section 4 is a conclusion.

2. Arguments for Placeless /h/

This section lays out three arguments for placeless /h/ in Japanese.

2.1 Undergoer of Regressive Place Assimilation

There are two generalizations about Japanese /h/ that researchers have reached consensus on:

(1) General consensus about Japanese /h/

a. Synchronically, /h/ becomes [ç] before /i/, and [ɕ] before /u/.

b. Phonetically, the oral posture of /h/ is the same as that of the following vowel.
Generalization (1a) is based on the complementary distribution of [h] and the other two allophones [ɕ] and [ɸ], (e.g., Koizumi 1990), and generalization (1b) is based on the comparison of the vocal tract shapes between /h/ and the following vowels (Uemura and Takada 1990: 274-282, 503-511). Both support the idea that /h/ is placeless. These two statements may seem to be contradictory, in that the former is based on the distribution of the consonants and the latter is based on the physiological observation on the CV sequence, but have been considered to be compatible. However it is realized, the /h/ portions of the acoustic signal in both assumptions are different from the following vowel only in terms of what the glottis is doing. Assumption (1a) suggests that the following /i, u/ force /h/ to change to [ɕ] and [ɸ]. A possible phonological analysis would be that /h/ undergoes place assimilation via featural spreading from the coronal gesture of /i/ and the labial effect of /u/, which seems compatible with unified feature geometry (Clements and Hume 1995). In this picture, /h/ is an undergoer of assimilation. If being an undergoer (or non-blocker) of assimilation can be a diagnostic for placelessness (e.g., Paradis and Prunet 1991, but see also de Lacy 2006 for criticism), /h/ can be analyzed as placeless underlyingly.

Furthermore, generalization (1b) has been demonstrated with X-ray tracings of Tokyo Japanese (Uemura and Takada 1990), although this study looks at only one speaker.

Both observations (1a, b) generally suggest that /h/ has no independent constriction location. (But see section 3.1, 3.2 and 3.5 for the counter-arguments.)

2.2 Transparency in Echo Epenthesis

Japanese loanword phonology provides us with the view that /h/ may be left unspecified in the output of phonology. The default Japanese epenthetic vowel for loanwords is /u/ (e.g., [rakku] ‘luck’, [kisu]/[kissu] ‘kiss’, [ho.ru] hooru ‘hall’); however, after /h/, the epenthetic vowel has the same quality as the vowel preceding it (e.g., [bahha] ‘Bach’, [mahha] ‘Mach (a measurement of speed)’, [gohho] ‘Gogh’, [eerurihhi] ‘Ehrlich’, [kehheru] ‘Kochel’), and this phenomenon can be interpreted as “echo epenthesis.” (The condition of the gemination is a different issue; see Arai and Kawagoe 1998.)

Kawahara (2004, 2007) analyzes this as V-place spreading from the preceding vowel, as given below.

(2) Echo epenthesis as V-Place spreading

\[
\begin{array}{c}
\text{Rt} \\
\text{V-Place}
\end{array}
\quad \rightarrow 
\begin{array}{c}
\text{Rt} \\
\text{Rt} \\
\text{V-Place}
\end{array}
\]

This analysis argues that the intervening /h/ can be transparent and lacks a place node (Steriade 1987a, Stemberger 1993). (But see section 3.3 for the counter-argument.)

2.3 Japanese lacks true pharyngeals

Unlike Semitic and Salish languages, where pharyngeals and pharyngealized consonants exist in the segmental inventories, Japanese has never been claimed to have the pharyngeals [h, ɕ] in the phoneme inventory. The Japanese phoneme inventory is given below (from Kubozono and Ota 1998:116).
Phoneme inventory of Japanese

<table>
<thead>
<tr>
<th>Type</th>
<th>Voiceless</th>
<th>Voiced</th>
<th>Palatal</th>
<th>Velar</th>
<th>Uvular</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>plosive</td>
<td>p</td>
<td>b</td>
<td></td>
<td>k</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fricative</td>
<td>s</td>
<td>z</td>
<td></td>
<td></td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>nasal</td>
<td>m</td>
<td>n</td>
<td></td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tap or flap</td>
<td>r</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>semivowel</td>
<td>w</td>
<td></td>
<td></td>
<td>j</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is a standard view that Japanese has 15 phonemic consonants. Even in the version of the inventory including allophones (Ota and Ueda 2007:458-9), the pharyngeal column is left blank. The “Q” beside the table in (3), called sokuon, is traditionally used in Japanese linguistics to denote the first half of a geminate, typically appearing before a voiceless stop or a voiceless fricative (e.g., /iQpoN/ ‘one bar’, /kiQsa/ ‘cafe’). Based on this distribution, Kubozono and Ota (1998) state that Q is a type of consonant, but put it outside the table because geminates can be treated as long consonants and represented without Q (e.g., /kissa/ [kis:a]).

Related to inventories, Rose (1996) argues that whether /h/ is placeless or place-specified is predictable from another aspect of the grammar: the segment inventory. I call this hypothesis the Inventory-driven hypothesis for laryngeals.

(4) Inventory-driven hypothesis for laryngeals

Laryngeals are specified as Pharyngeal only when pharyngeals or uvular continuants are also present in the inventory of the language; otherwise, they are Placeless. (Rose 1996:73)

The laryngeals specified as Pharyngeal are those in Arabic and Hebrew (Semitic) (McCarthy 1994), Nisgha (Tsimshianic) (Shaw 1991), Gitksan (Tsimshianic) (Rigsby 1986), and Iraqw (Cushitic) (Mous 1993), where laryngeals phonologically pattern with pharyngeals and uvulars, and the parallel patternings are explained because laryngeals have a Pharyngeal place feature just like “true” pharyngeal consonants [h, ʕ]. This way of featural specification is also supported by the Node Activation Convention (Avery & Rice 1989a, b), which states that a featural node must be activated only when it is contrastive.

According to this view, laryngeals and pharyngeals for languages which have true pharyngeals can be represented below as in (5a). In contrast, laryngeals for languages without true pharyngeals can be represented without the place node as in (5b).

(5) Representations with and without true pharyngeals

a. Languages with true pharyngeals

<table>
<thead>
<tr>
<th>Laryngeals</th>
<th>/ʔ, h/</th>
<th>Pharyngeals</th>
<th>/h, ʕ/</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROOT</td>
<td></td>
<td>ROOT</td>
<td></td>
</tr>
<tr>
<td>Pl</td>
<td></td>
<td>Pl</td>
<td></td>
</tr>
<tr>
<td>Pharyngeal</td>
<td></td>
<td>Pharyngeal</td>
<td></td>
</tr>
<tr>
<td>[+glottal]</td>
<td></td>
<td>[-glottal]</td>
<td></td>
</tr>
</tbody>
</table>
b. Languages without true pharyngeals

Laryngeals /ʔ, h/

ROOT

The representations in (5a) are based on Lloret (1995:265) and Lombardi (2001:29). The contrast between laryngeals and pharyngeals is shown in the value of [glottal]. Lombardi (2001) speculates that the property [-glottal] is highly marked. In the representation in (5b), there is no need to specify Pharyngeal because there is no contrast. 1

If we follow this argument for Japanese /h/, since Japanese has no true pharyngeals, laryngeals do not have to have any place feature, just as in (5b). (But see section 3.4 for the counter-argument.)

3. Arguments Against Placeless /h/

In section 2, three arguments for /h/ being placeless were given. In this section, I show that they do not give enough support the placelessness analysis.

3.1 Undergoer? Articulatory conflict of *hi

The evidence presented in the preceding section suggests /h/ is placeless. However, I argue that the place of /h/ be pharyngeal.

One way of thinking about the generalization in (1a) is that Japanese /h/ shifts to other consonants because of the articulatory conflict between the tongue root and the tongue dorsum. Gick and Wilson (2006) argue that conflicting targets between tongue root backing/lowering and tongue dorsum fronting/raising develop crosslinguistically diverse repair strategies. Furthermore, in the well-known cases in which /h/ is pharyngeal, the sequence of /h/ and a high vowel is banned (*hi, *hu). Such cooccurrence restrictions are repaired typically by vowel lowering or laxing (for Semitic see McCarthy 1988, 1991, 1994; for English and Salish languages see Gick and Wilson 2006; for Saanich see Bird and Leonard 2009; for Interior Salish see Bessell 1992; for Nisg̱a’a see Shaw 1991; for Gitksan see Rigsby 1986, Brown 2008, Yamane-Tanaka 2007; for Oowekyala see Howe 2000, etc.). (In most of these cases, the repair occurs to a vowel (e.g., /hit-xw/ > [hɛtɛxw ~ hetxw] ‘stand’ (vi sg) in Gitksan (Tsimshian) (Rigsby 1986:205), but there are cases where the consonant is also repaired. For example, in Saanich (Northern Straits Salish), /i/ sequences are pronounced with a transitional fricative [ixq]. In Chumburung (Kwa; Niger-Congo), [l] and [r] alternate depending on the advanced/retracted context (see Pulleyblank 2011).) These phonological patterns are phonetically grounded, in that certain featural combinations are avoided because they are difficult in term of articulation (Archangeli and Pulleyblank 1994).

One might argue against the idea presented above by saying that the consonantal change induced by cooccurrence restrictions (*hi > çi, *hu > ɸu) lacks empirical grounding, as in Japanese, /h/ historically originated from /p/, which shifted to /ɸ/ and then to /h/ (e.g., Shibatani 1990:166-7; Yamaguchi 1997:153-4). In other words, [hi] and [hu] have never occurred as valid combinations in Japanese history; instead, [ɸi, ɸu] > [çi, ɸɯ] occurred, so there has never been the sequence that could induce the change. However, why has the shift to /h/ happened before nonhigh vowels, and never occurred before high vowels? The articulation of /a, o/ pull the tongue root backward and the tongue dorsum is lowered, which is similar to the articulation of pharyngeals. But /i, u/ pull the tongue root relatively forward and the tongue dorsum is raised, meaning the directions of each tongue movement are opposite from the ones required for the articulation of pharyngeals. Thus, non-occurrence of /hi, hu/ throughout history could be ascribed to the articulatory conflict in the CV sequence.

Dialectal evidence also supports the articulatory conflict between [h] and high vowels. Shitamachi or ‘downtown’ speakers (speakers from the eastern part of Tokyo, which is older
than the western half of Tokyo) pronounce [jɪ] for /hi/ (e.g., hibachi ‘brazier’ as shibachi (Vance 1986:22). Hashimoto (1927) provides philological evidence that this kind of pronunciation already appeared in the beginning of the 18th century in the Kanto area. I myself have heard some speakers say [fɪko:ki] for hikooki ‘airplane.’ The emergence of [jɪ] can be considered as another response to *hi. Vance (1986) generalizes this as a merger of [ci] and [jɪ], which does not conflict with my view. If [h] were pharyngeal, this avoidance would have both phonetic and phonological grounds; that is, articulatory conflict with [i], or “antagonistic” featural combinations (Archangeli and Pulleyblank 1994) between pharyngeals [−high, +low, +back] (SPE: 307) and high vowels [+high, −low, −back]. (We assume [i, u] are both [-back]. See Nogita, Yamane and Bird 2013 for phonetic evidence for [-back] of Japanese /u/.)

Therefore, diachronic evidence suggests that the cooccurrence restriction has existed, and synchronic dialectal evidence among some speakers from Tokyo supports the restriction as well.

3.2 Are assimilation triggered by high vowels only? Pharyngealization adjacent to /a, o/

If assumptions (1a) and (1b) are combined, it becomes unclear whether the trigger for assimilation is (only) high vowels or all vowels. [ci] has strong palatal frication, and [u] has lip rounding (Nogita, Yamane and Bird 2013); these properties are easily distinguishable from [he, ho, ha], thus [h], [c] and [ϕ] have been established as allophones in Japanese phonology. This implies a phonological asymmetry distinguishing high vs. nonhigh vowels. But neither the auditory judgment or visual impression proves that [h] is the same before all nonhigh vowels. Fine phonetic details, which are sometimes audible and visibly unclear, may exhibit covert contrasts in phonological systems (e.g., Kim and Pulleyblank 2009; Li, Munson, Edwards, Yoneyama and Hall 2011; Munson, Edwards, Schellinger, Beckman and Meyer 2010; Goldstein and Fowler 2003; Mielke, Baker and Archangeli 2010).

The articulations of /h/ of native speakers of Japanese who participated in our studies auditorily sound so similar to my ears. But it is found that there are individual differences in articulation. Yamane, Gick & Pulleyblank (2011), based on ultrasound experiments of six native speakers Japanese articulating /ahha/, classifies the articulation of /h/ into three groups: (i) three speakers show that the tongue shape of /h/ is significantly retracted or raised from both the preceding /a/ and the following /a/, (ii) two speakers show /h/ is significantly retracted only from the preceding /a/, and (iii) one speaker shows /h/ completely overlaps with the preceding /a/ and the following /a/. Articulation type (i) suggests a specific target in the articulation of /h/. Overall, five out of six speakers show retraction or raising around uvular/pharyngeal area, the feature of /h/ could be [pharyngeal] (McCarthy 1991).

Moreover, a strong featural affinity between [a] and [h] has been suggested in feature geometry: /a/ should not be categorized either as coronal or labial, but rather a distinct category of pharyngeal (Hayward and Hayward 1989, McCarthy 1988, E. Pulleyblank 1989, Lombardi 2002, Mudzingwa 2010). If /a/ is pharyngeal in Japanese, it may not be unreasonable to think that /a/ causes /h/ to shift to pharyngeal [h] or pharyngealized [h] as well.

If /a/ is pharyngeal, /a/ may be expected to cause a shift from /ka/ to /qa/ or [ha]. In fact, there are a few examples to suggest the alternation between [k] and [q, h] (or some uvularized or pharyngealized sound). In the casual speech style of old men, /k/ seems to be perceived as [q] or [h] before /a/ and perhaps /o/ as well. Examples include /waqatta/ [waqatta, wahatta] ‘understood’, /okotta/ [oqotta, ohotta] ‘got angry’.

The alternation between [k] and [h] is systematically attested in several sub-dialects of the broader North Okinawan dialect (NOJ). For example, word-initial /k/ before /a, o/ in Tokyo Japanese (TJ) corresponds to /h/ in Nakijin dialect. Examples include [hac’n] NOJ [kaku] TJ, to
write,’ [hadu:]\textsuperscript{NOJ} [kado]\textsuperscript{TJ} ‘corner,’ [muhu]\textsuperscript{NOJ} [muko]\textsuperscript{TJ} ‘husband’ (Shimabukuro 1997:358).\textsuperscript{1}

The reason that this shift only occurs with /a, o/ can be ascribed to the inherent pharyngeal property of these vowels, i.e., [a’, o’]. In other words, high front vowels [i, e] cannot trigger a [k] to change to [h] because they do not have pharyngeal constriction.

3.3 Transparency? Representational approach

Echo epenthesis in (1) apparently suggests the lack of a place node, but the lack of a place node is not crucial in capturing the transparency effect for the following reasons.

It was already pointed out in the derivational framework that spreading can occur even if /h/ has a place node (see Rose 1996, Stemberger 1993). In the bifurcational feature geometry model where the place node consists of subnodes of Oral and Pharyngeal (McCarthy 1991, 1994; Cole 1987; Trigo 1991), a line-crossing constraint (Goldsmith 1976) would rule out spreading across consonants if the consonant is Oral. This is shown in (6a).

\begin{table}[h]
\begin{tabular}{|c|c|c|c|c|c|}
\hline
a. & oral consonant & b. & placeless /h/ & c. & pharyngeal /h/ \\
\hline
V1 & C & V2 & V1 & h & V2 & V1 & h & V2 \\
\hline
Place & Place & Place & Place & Place & Place & Place & Place & Place \\
\hline
\hline
\end{tabular}
\end{table}

Vowels are Oral, so the spreading from Oral of V\textsubscript{1} onto V\textsubscript{2} would interfere with the Oral node of the intervening consonant; such spreading cannot be allowed. But if the consonant has no place node, as in (6b), the spreading would be possible since there is nothing intervening between the vowels. If the intervening consonant has a Pharyngeal node, as in (6c), spreading of Oral from the vowel would be still possible, because Oral and Phar are different subnodes and the lines should not cross.

In addition to such a representational approach, guttural transparency is typologically predicted in the constraint-based approach (Gafos and Lombardi 1999, Yamane 2007). So echo epenthesis is not a strong support for placeless /h/.

Another argument for placeless /h/ is the Coda Condition in Japanese (Itô 1986). But if [h] is placeless, as is claimed for /N/ in Japanese, then [bah] from ‘Bach’ [baχ] should be perfectly fine without the vowel epenthesis after [h], since /N/ does not require an epenthetic vowel. The epenthesis can be argued for on the view that /h/ has a pharyngeal place, which has to survive (Lombardi 2001).\textsuperscript{5}

3.4 No true pharyngeal? Independent issues

Since Japanese has no true pharyngeals, laryngeals do not have to have any place feature, just as in (5b). One may argue against this, since Japanese /N/ is a uvular continuant, so it should have a class of Pharyngeal. As expected, uvulars in other languages have been argued to be complex segments having a Pharyngeal node and an Oral node (McCarthy 1991, 1994; Cole 1987; Trigo 1991). But Lloret (1995) states that whether laryngeals have a Pharyngeal node or not is independent of the segmental inventory:

It is crucial to note here that Pharyngeal is necessarily specified in any complex segment, whether the sound system of a language has true pharyngeals or not. The existence of complex segments with a Pharyngeal node has no bearing on whether the Pharyngeal node occurs in laryngeals. (Lloret 1995:265)
She provides evidence that Oromo, which has no true pharyngeal sounds, may have ejectives marked with Pharyngeal, but the glottal stop is placeless, based on the phonological evidence of translaryngeal harmony. Bessell (1992) and Bessell and Czaykowska-Higgins (1992) hold a similar stance.

3.5 Undergoer of assimilation only? Undergoer of morphophonological rules

This section argues that /h/ has some place, based on the parallel behavior of /h/ with other consonants. If /h/ is placeless, /h/ should never be a trigger or target of phonological processes involving place. This contradicts my earlier statement that being a target of assimilation is a (possible) diagnostic for placelessness. However, I show below that the ability to be a target of assimilation could be used as evidence for either side of the argument.

In Japanese phonology, many processes target /h/ just like other consonants. What is interesting is that the output becomes a labial consonant [b, p, pp]. This alternation is often used as evidence to say that /h/ historically developed from /p/, but here I will argue these actually show that /h/ is not placeless.

Rendaku is a voicing process in Japanese. The voicing applies to the initial consonant of the non-initial member of a compound (see Otsu 1980; Itô and Mester 2003; Rosen 2003; Rice 2005 for the details). Rendaku targets /h/ just as it does the obstruents.

Unlike other targeted segments, /h/ shifts to [b] rather than [ɦ]. Thus many researchers have posited /p/ for this /h/ as an underlying form.

(6) Rendaku targets /h/ to output /b/

a. yude ‘boiled’ + tako ‘octopus’ → yudedako ‘boiled octopus’
b. ama ‘rain’ + kaeru ‘frog’ → amagaeru ‘rain-frog’
c. nihon ‘Japan’ + saru ‘monkey’ → nihonzaru ‘Japanese monkey’
d. mitu ‘honey’ + hati ‘bee’ → mitubati ‘honeybee’

If /h/ is placeless, morphemes beginning with /h/ as in form (6d) should be invisible to the rendaku rule. But rendaku applies to them and shifts /h/ to [b], so /h/ should not be treated as a placeless consonant.

Another source of evidence is the visibility of /h/ for intensive affixation (Kuroda 1979; McCawley 1968; Martin 1952; Poser 1984a, b; Vance 1987: 44-47; Itô & Mester 1996: 24-5; Hirayama 2005). Intensive affixation is a morphi-phonological process that contracts two consonants that straddle two morphemes to produce a geminate. Itô & Mester (1996) calls it root fusion.

(7) Root fusion of verbal compounds (Examples from Itô and Mester 1996:24-5)

a. but ‘strike’ + toosu ‘pass’ → buttoosu ‘continue non-stop’
   + kiru ‘cut’ → bukuru ‘hack’
   + hanasu ‘let go’ → buppanasu ‘fire (a bullet)’
b. tuk ‘thrust’ + kakaru ‘start’ → tukkakaru ‘plunge’
   + nomeru ‘slant’ → tumnomeru ‘fall forward’
   + hasiru ‘run’ → tupperasu ‘run without break’
c. hik ‘pull’ + kaku ‘scratch’ → hikkaku ‘scratch violently’
   + saku ‘tear’ → hissaku ‘tear apart’
   + haru ‘tighten’ → hipparu ‘pull, jerk’

A similar root fusion takes place in Sino-Japanese k-stems, but not t-stems (e.g., /gak/ + /kai/ ‘society’ → gakkai ‘learned society’). In Yamato morphemes, “[v]erb-root-final /k/ triggers gemination of any following [+cons] segment [emphasis N.Y.], not just /k/ (Ito and
Mester 1996: 25),” thus /h/ should be visible just like any other consonant. But in Sino-Japanese, /h/ as well as other consonants cannot be targeted for k-stem fusion (/gak/ ‘study, learning’ + /hi/ ‘expenses’ → gakuhi *gappi ‘education expenses’). /h/ patterns with other segments that have a place.

Furthermore, Itô and Mester imply that /h/ is [+consonantal], rather than [-consonantal]. On the other hand, Trigo (1988) assumes glottal segments are [-consonantal], and should get the value [+consonantal] at a later stage and acquire a dorsal place in the phonetic implementation (sec. 1.1.1.). But if we follow this idea, it is not compatible with the fact that /h/ is targeted in morpho-phonological processes, which should occur before the phonetic implementation. Thus /h/, at least the one appearing in this context, must be [+consonantal] in the phonology, and should not be categorized as a placeless segment.

A similar piece of evidence comes from the adverbial intensifier infixation. This process forms a geminate from the medial consonant of a bimoraic base, and attaches /ri/ (see e.g. Martin 1952:71, Itô and Mester 1986:275). This pattern can be generalized as follows: \( C_1V C_2V \rightarrow C_1V X C_2V \) where \( X = C_2 \) if \( C_2 \) is voiceless, while \( X = /N/ \) if \( C_2 \) is voiced. Examples are given in (8).

(8) Adverbial intensifier infixation (data from Itô and Mester 1986:275)

- a. pata ‘palpitating’ + ri (adv) → pattari
- b. niko ‘smiling’ + → nikkori
- c. jobo ‘lonely’ + → jōNbori
- d. uza ‘bored, disappointed’ + → uNzari
- e. sina ‘supple’ + → siNNari
- f. simi ‘quiet, abject, spiritless’ + → siNNmiri
- g. boya ‘vague’ + → boNyarī
- h. fuwa ‘light’ + → fuNwari

The words in this list are examples of onomatopoeia, and /h/ is rare in this vocabulary type. But a similar process is attested in Yamato words, as in /yahari/ → [yappari] ‘after all’.

More importantly, Itô and Mester (1986) claim that rhotic /r/ is placeless in Japanese, because it is excluded from many phonological processes, including a gemination process, as shown in (9).

(9) /r/ cannot be a target of gemination (data from Itô and Mester 1986:275)

- a. hura ‘swaying’ + ri (adv) → hurari *huNrari *hurrari
- b. horo ‘weeping’ + → horari *hoNrori *horrori
- c. yura ‘swinging’ + → yurari *yuNrari *yurrrari
- d. kara ‘drying’ + → karari *kaNrari *karrari

If we follow the above-stated generalization, the intensive morpheme is predicted to be /N/, but this does not occur. Another prediction is /rr/, which is not permitted, either. The actual form is a non-geminated one. This can be taken as evidence that /r/ is placeless in Japanese phonology (see Mester and Itô 1989 for the invisibility of /r/ for palatalization).

This section has shown that /h/ is targeted for rendaku and two kinds of gemination (i.e., intensive affixation and adverbial intensifier infixation). In these morpho-phonological processes, /r/ exhibits a special placeless behavior, while /h/ and other consonants pattern together, with having a place. /h/ has a place.
4. Conclusion

In this paper, I have argued that Japanese /h/ is not placeless but has a pharyngeal place of articulation. I discussed three arguments put forward for the placelessness analysis in section 2, and then counter-argued them in section 3.

The first argument for the placelessness of /h/ is that /h/ in Japanese seems to be the undergoer of regressive place assimilation triggered by the following vowel (section 2.1), thus the place of /h/ is completely predictable from the allophonic rule (1a) or the following vowels (1b). This argument is countered by the following three points. First, why are the assimilation triggers only high vowels /i, u/ in (1a)? If the vocal tract of /h/ is determined by the following vowel as in (1b), then why are non-high vowels not triggers in the allophonic rules? The placelessness hypothesis does not answer these questions. If /h/ is pharyngeal, the answer would fit to the general tendency of articulatory conflict (section 3.1). Second, the allophonic rules (1a) assume that /h/ remains as [h] before the non-high vowels, but pharyngealization of /h/ is attested in variants used by older speakers and more regularly observed in dialects. Thus, if we admit that the pharyngeal property of non-high vowels triggers pharyngealization of /h/, then the mystery of high vowels would disappear and it would get along with the observation in (1b) (section 3.2). Third, I have pointed out that /h/ is not only an undergoer of the allophonic place assimilation but also a target of morphophonological rules such as root fusion of verbal compounds and adverbial intensifier infixation; thus, it has to be visible and place-specific (section 3.5).

The second argument for /h/ being placeless is that /h/ lacks a place node in a feature geometry approach, and therefore the intervening /h/ is transparent for the echo epenthesis expressed by a spreading rule of Oral feature from left to right (section 2.2). But even pharyngeal /h/ which has a Pharyngeal node could have a transparency effect for the spreading rule of echo epenthesis, as /h/ and vowels are different subnodes and the spreading of Oral feature will not violate the Line Crossing Constraint. In addition, the Coda Condition could also support the pharyngeal status of /h/, in that if /h/ is placeless then /h/ in coda should be able to survive without the epenthesis, just like the allegedly placeless nasal. But /h/ survives only with the epenthesis, thus we have to conclude /h/ has a place (section 3.3).

The third argument for placelessness is that the Japanese segment inventory lacks true pharyngeals, therefore Pharyngeal node does not need to be invoked (section 2.3). This implies that Pharyngeal node is only necessary for languages which have a rich guttural inventory. If this is true, then no language should have pharyngealized segments without a true pharyngeal. But such a prediction turns out to be wrong, and there are languages which have pharyngealized segments without any true pharyngeal. It is concluded that the segmental inventory alone cannot be a predictor of the phonological status of /h/ (section 3.4).

Thus, all three arguments for the placeless hypothesis of /h/ are counter-argued, which suggests that none of the arguments sufficiently supports the placeless status of /h/. Rather, a pharyngeal status of /h/ would give us richer and more coherent insights about the widely-accepted generalizations about /h/, phonological phenomena regarding /h/, and the segment inventory in relation to the status of /h/. I conclude that Japanese /h/ is pharyngeal.

Notes

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1 Although laryngeals here are represented as a bare root node, another possibility is a root
node with an empty place node. Whichever representation is taken, it does not affect the point that there is no true pharyngeal in Japanese. (cf.Avery & Rice 1989a, b, Rice 1996)

Covert features are “features not obviously contrastive based on the surface inventory but that play a contrastive role based on their interaction with constraints” (Kim and Pulleyblank 2009:568). See also Scobbie et al. (2000), Li et al. (2009).

Thanks go to Bryan Gick for communication regarding this topic.


There is a significant difference in the root fusions between Sino-Japanese and Yamato (i.e., native) vocabulary (Tateishi 1990, Itô and Mester (1996:25)). It has been claimed that Japanese has a stratified lexicon, which consists of at least Yamato (native), Sino-Japanese, and foreign strata. See Itô and Mester (2003), Ito, Mester and Padgett (1999), Tateishi (2003).

References


