W4-2: Japanese syllable-final consonants

JAPN398D: The Sounds and Dialects of Japanese

9/20/2023

Review

- In W4-1, we saw that traditional Japanese phonology and contemporary Japanese phonology have different sets of consonant phonemes.

- Younger speakers → Contemporary Japanese phonology
- Older speakers → Conservative Japanese phonology

Japanese consonants (conservative)

	Bilabial		Alveolar		Palatal		Velar		Glottal	
Stop	p (ぱ)	b (ば)	t (た)	d (だ)			k (か)	g (が)		
Fricative			s (さ)	z (ざ)						h (は)
Nasal		m (ま)		n (な)						
Tap				r (ら)						
Approximant		w (わ)				y (や)				

Japanese consonants (contemporary)

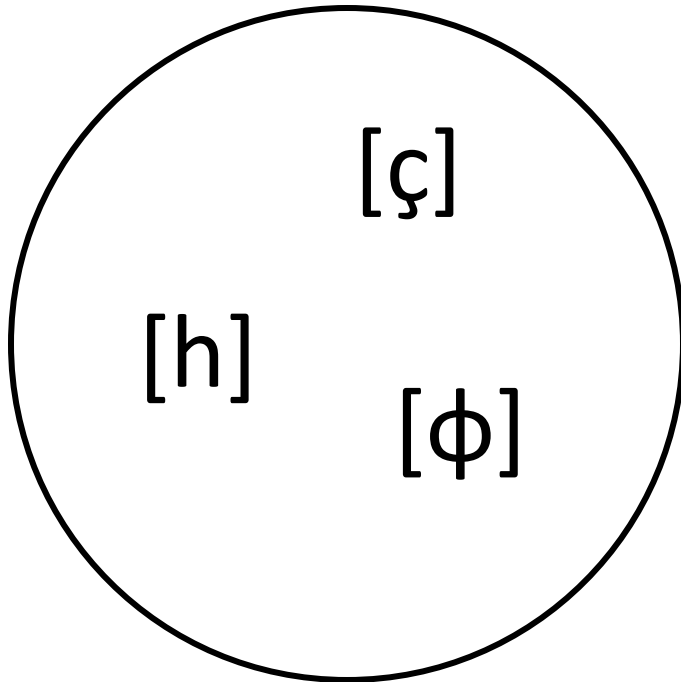|	Bilabial		Alveolar		Alveolo-palatal		Palatal		Velar		Glottal	
Stop	p (ぱ)	b (ば)	t (た)	d (だ)					k (か)	g (が)		
Affricate			c (ツァ)	z (ざ)	č (チャ)	ǰ (ジャ)						
Fricative	f (ファ)	v (ヴァ)	s (さ)		š (シャ)						h (は)	
Nasal		m (ま)		n (な)								
Tap				r (ら)								
Approximant		w (わ)					y (や)					

Review

- How ふ ([ɸɯ]) is treated is different between younger speakers and older speakers.

- (Younger) speakers with the phoneme /f/
  - [ɸ] is a phoneme (= /f/) that can occur before any vowel.
  - ファ・フィ・フ（ふ）・フェ・フォ

- (Older) speakers without the phoneme /f/
  - [ɸ] is an allophone of /h/ that can occur only before /u/.
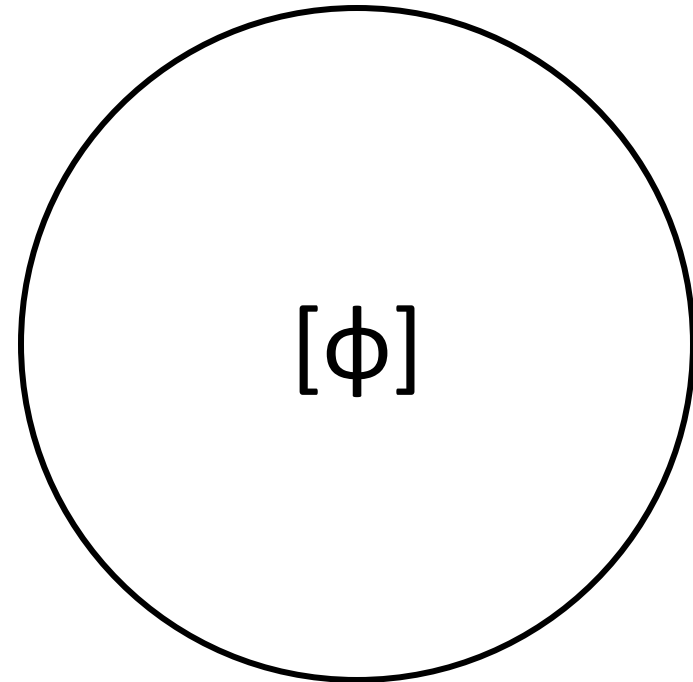 - ふ

Phonemes vs. Allophones

Older speakers

/h/

Younger speakers

/f/ = [ɸ]

[ç]

[h]

[ɸ]

[ɸ]

Today's class

- ん /N/
  - Word-medial ん /N/
  - Utterance-final ん /N/
  - Isolated ん /N/
- Phonotactics of ん /N/

- っ /Q/
- Phonotactics of っ /Q/
  - っ /Q/ before voiced obstruents
  - っ /Q/ before nasals and semi-vowels
  - Utterance-final っ /Q/
  - っ /Q/ before liquids

Discussion questions

- How have you pronounced ん?
  - How have you pronounced ほんを（本を）？

- Do you have trouble pronouncing つ？

ん /N/

- ん always occurs in syllable-final position.
  - ん has a different status from syllable-initial /n/ (なにぬねの) and /m/ (まみむめも).

- ん has a lot of allophones in complementary distribution.
  - The allophones belong to one category.
  - When each allophone occurs is predictable!

- The phoneme ん is transcribed as /N/ (moraic nasal).

Phonemes vs. Allophones

- Phonemes are categories of sounds.

- Allophones are sounds in the same category.

/N/ = ん

[m]

[n]

[ŋ]

[w̃]

etc.
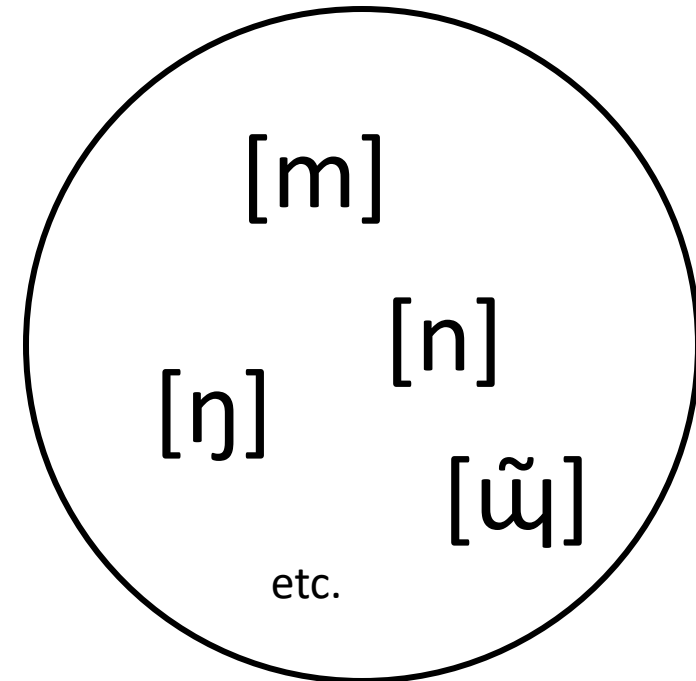
ん /N/ before stops (and /r/)

Japanese	Phonemic	Phonetic	Gloss
さんぱく（三泊）	/saNpaku/	[sãmːpɑkɯ]	'three nights'
さんぶ（三部）	/saNbu/	[sãmːbɯ]	'three copies'
さんとう（三等）	/saNtoH/	[sãnːtoː]	'third class'
さんつう（三通）	/saNcuH/	[sãnːtsɯː]	'three letters'
さんど（三度）	/saNdo/	[sãnːdo]	'three degrees'
さんぜん（三千）	/saNzeN/	[sãnːdzẽɴː]	'three thousand'
さんるい（三塁）	/saNrui/	[sãnːrɯi]	'third base'
さんちょう（三兆）	/saNčo/	[sãɲːcɕoː]	'three trillion'
さんじ（三時）	/saNji/	[sãɲːɟʑi]	'three o'clock'
さんかい（三回）	/saNkai/	[sãŋːkai]	'three times'
さんごう（三号）	/saNgoH/	[sãŋːgoː]	'number three'

ん /N/ before stops (and /ɾ/)

- ん /N/ and the following stop are homorganic.
  - /N/ → [mː] / ___ /p, b/   Bilabial
  - /N/ → [nː] / ___ /t, c, d, z, r/   Lamino-alveolar
  - /N/ → [ɲː] / ___ /č, ǰ/   Lamino-alveolo-palatal
  - /N/ → [ŋː] / ___ /k, g/   Dorso-velar

  /N/ becomes [ŋː] before /k, g/.

- Vance puts the diacritic ː (length mark) after ん in phonetic transcriptions.
  - The duration of ん /N/ is the same as CV.
  - i.e. パ, ン, and ダ in パンダ 'panda' have the same duration.

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ん /N/ before fricatives

Japanese	Phonemic	Phonetic	Gloss
よんフィート（四一）	/yoNfiHto/	[jõɰ̃ːɸiːto]	'four feet'
よんさい（四歳）	/yoNsai/	[jõɰ̃ːsai]	'four years old'
よんしょう（四章）	/yoNšo/	[jõɰ̃ːɕoː]	'four chapters/Ch. 4'
よんひゃく（四百）	/yoNhjaku/	[jõɰ̃ːçjakɯ]	'four hundred'
よんはい（四杯）	/yoNhai/	[jõɰ̃ːhai]	'four cupfuls'

ん /N/ before (semi-)vowels

Japanese	Phonemic	Phonetic	Gloss
さんヤード（三一）	/saNyaHdo/	[sãɰ̃ːjɑːdo]	'three yards'
さんい（三位）	/saNi/	[sãɰ̃ːi]	'third rank'
さんえん（三円）	/saNeN/	[sãɰ̃ːẽɴː]	'three yen'
さんアンペア（三一）	/saNaNpea/	[sãɰ̃ːɑmːpea]	'three amperes'
さんおく（三億）	/saNoku/	[sãɰ̃ːokɯ]	'three hundred million'
さんう（三有）	/saNu/	[sãɰ̃ːɯ]	'three (Buddhist) worlds'
さんわり（三割）	/saNwari/	[sãɰ̃ːɰɑri]	'three tenths'

ん /N/ before fricatives and (semi-)vowels

- ん /N/ is realized as [ũ̯ː] before fricatives.
  - [ɯ] is a (dorso-)velar unrounded semi-vowel. ≈ わ
  - It is nasalized due to ん /N/.

- ん /N/ is also realized as [ũ̯ː] before (semi-)vowels.

Of course, the velum is open when [ũ̯ː] is pronounced!
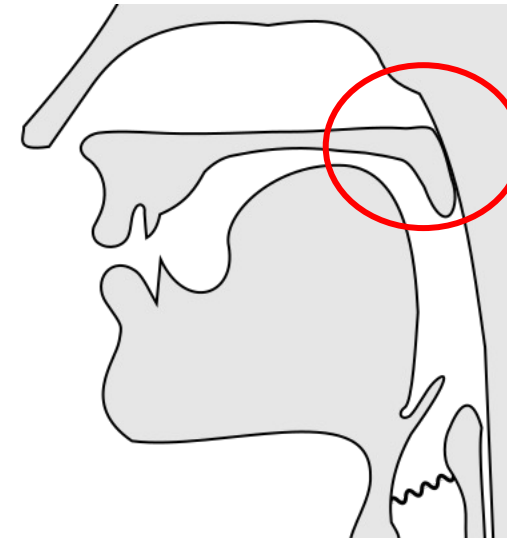
https://commons.wikimedia.org/wiki/File:
Voiced_velar_approximant_articulation.svg

ん /N/ before (semi-)vowels

- ん /N/ always occurs syllable-finally.

- 本（ほん）を /hoNo/ is always syllabified as /hoN.o/.
  - */ho.no/ (ほの) → ill-formed!

- 本屋（ほんや）/hoNya/ is always syllabified as /hoN.ya/.
  - */ho.nya/ (ほにゃ) → ill-formed!

ん /N/ before nasals

Japanese	Phonemic	Phonetic	Gloss
さんまい（三枚）	/saNmai/	[sãmːːɑi]	'three sheets'
さんねん（三年）	/saNnen/	[sãnːːeɴː]	'three years'
さんにん（三人）	/saNnin/	[sãɲːːiɴː]	'three people'

ん /N/ before nasals

- ん /N/ becomes extra-long before nasals.
  - /N/ → [mːː] / __ /m/
  - /N/ → [nːː] / __ [n]
  - /N/ → [ɲːː] / __ [ɲ]

- (Nasal) stop → Closure + Release
  - Roughly speaking, the duration of stop closure is twice as long as [mː, nː, ɲː].
  - [mː, nː, ɲː] → 1 beat (technically speaking, 1 mora)
  - [mːː, nːː, ɲːː] → 2 beats (technically speaking, 2 moras)

ん /N/ before nasals

- Since ん /N/ always occurs syllable-finally, [mːː, nːː, ɲːː] are disyllabic.

- Examples
  - さんまい（三枚） [sãmːːɑi]
 - さんねん（三年） [sãnːːeɴː]
  - さんえん（三円） [sãɲːːeɴː]

Word-final ん /N/

The allophones appear even before another word!

Japanese	Phonemic	Phonetic	Gloss
五本出た	/gohoN deta/	[nːd]	'5 emerged'
五本乾いた	/gohoN kawaita/	[ŋːk]	'5 dried'
五本燃えた	/gohoN moeta/	[mːː]	'5 burned'
五本咲いた	/gohoN saita/	[ɰ̃ːs]	'5 bloomed'
五本売れた	/gohoN ureta/	[ɰ̃ːɯ]	'5 sold'

Utterance-final ん /N/

- The traditional view is that ん is realized as a uvular nasal ([ɴ]) utterance-finally.

- Utterance-final ん /N/ is always preceded by a vowel.
  - → (C)VN

https://en.wikipedia.org/wiki/Voiced_uvular_nasal#/media/File:Voiced_uvular_nasal.svg
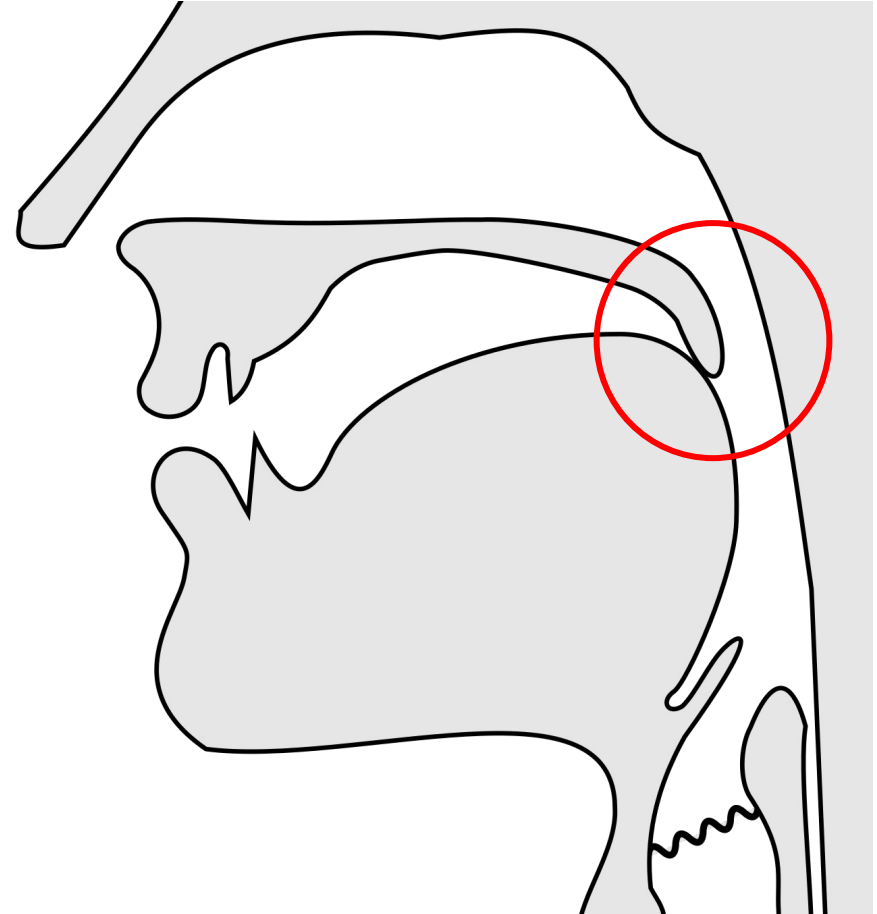
Utterance-final ん /N/

- Maekawa (2021) conducted a production experiment and showed that this is not correct!

- He recorded 15 Tokyo speakers (F: 5, M: 10) and 5 Osaka speakers (F: 2, M: 3), but analyzed data from 11 Tokyo speakers (F: 4, M: 7) with a real-time MRI movie.
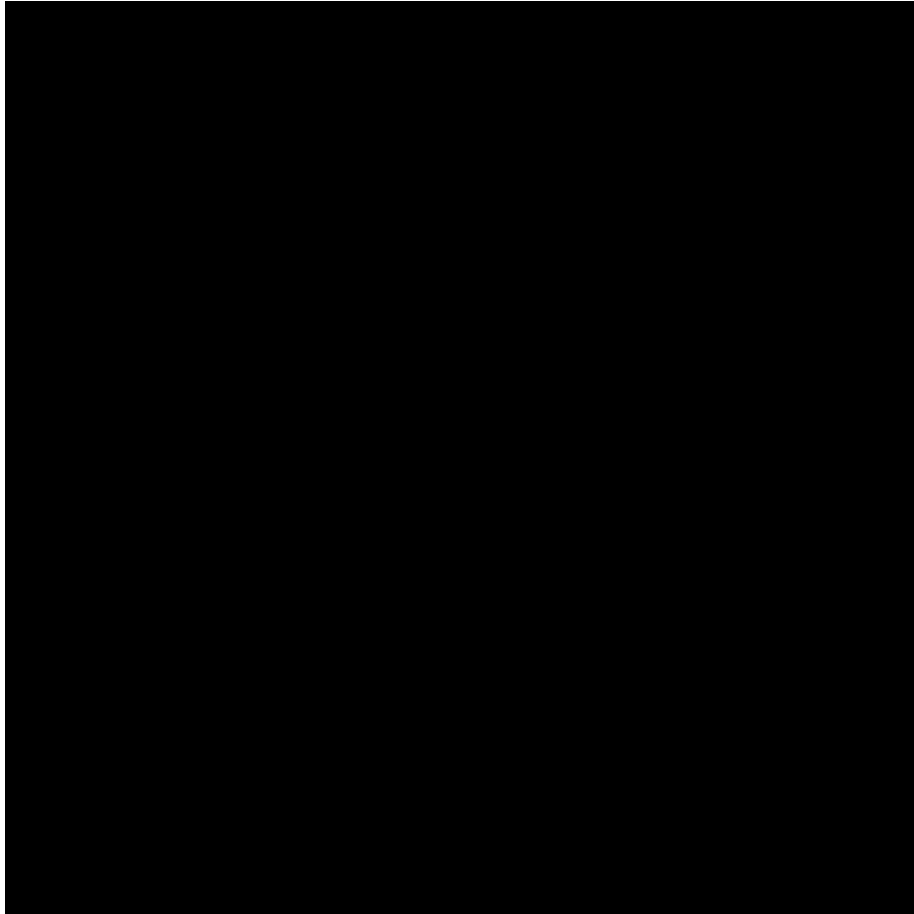
Utterance-final ん /N/

- Maekawa found that the place of articulation of utterance-final ん /N/ ranges from alveolar to uvular.

- The place of articulation depends on the preceding vowel.
  - Speakers raise the tongue at the same location as the preceding vowel.
  - There are three levels in the place of articulation. → /i/, /e, u/, /a, o/
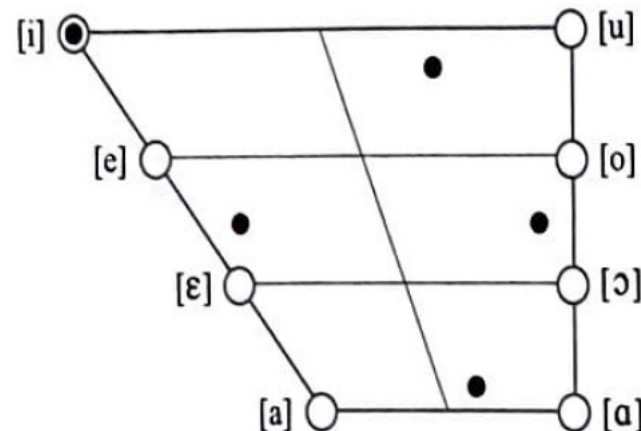
Vance (2008): Figure 3-1

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Maekawa's (2021) data

- カントン 'Canton, NY'
  → /oN/
- しんかん（新刊）'new publication'
  → /aN/
- しんぶん（新聞）'newspaper'
  → /uN/
- しんけん（真剣）'serious'
  → /eN/
- キリン 'giraffe'
  → /iN/

Isolated ん /N/

- It has been claimed that isolated ん /N/ is also realized as a uvular nasal.

- Maekawa (2021) found in the same experiment that the place of articulation varies depending on the speaker.
  - Bilabial [m] → 5 speakers (F: 3, M: 2)
  - Alveolar [n] → 3 speakers (F: 1, M: 2)
  - Velar [ŋ] → 1 speaker (F: 0, M: 1)
  - Uvular [ɴ] → 2 speakers (F: 1, M: 1)

Phonotactics of ん /N/

- The phoneme /N/ does not occur in syllable-initial position.

- You cannot play a word that ends in ん in しりとり.

Good example
- メリーランド 'Maryland'
- ドーナツ 'donut'
- つばめ 'swallow (bird)'
- メール 'mail'

Bad example
- メリーランド 'Maryland'
- ドーナツ 'donut'
- つばめ 'swallow (bird)'
- メロン 'melon'

Phonotactics of ん /N/

- However, there are some exceptions.

- なん（何）/naN/ has an alternative pronunciation ん /N/ in casual (emphatic) speech.
  - /N/ forms one syllable by itself and becomes syllabic; cf. *button* [bʌtn̩].

- なんじゅうおく（何十億）'several billion'
  - Phonemic /naNĵuHoku/ → Phonetic [nãɲːʥɯːokɯ]
- ンじゅうおく（ン十億）'several billion'
  - Phonemic /NĵuHoku/ → Phonetic [(ʔ)ɲ̩ːʥɯːokɯ]

Phonotactics of ん /N/

- African names:

- ンジャメナ
  - 'N'Djamena; Capital of Chad'
  - Phonemic: /Nǰamena/
  - Phonetic: [(ʔ)ɲːɟzãmẽnɑ]

- In しりとり, ンジャメナ is one of the most famous words that begin with ん.

https://dic.pixiv.net/a/%E3%83%B3%E3%82%B8%E3%83%A3%E3%83%A1%E3%83%8A

アフリカにおいては「ん」で始まる地名は珍しくないのだが、しりとりにおいては「ん」で始まる言葉として圧倒的に有名である。
「ンジャメナ」と言って、しりとりを続行しようとする人がいたりいなかったり。
もちろん、しりとりにおいて最後に「ん」がつく言葉を言ってしまうとそのプレイヤーが敗北となるのだが・・・

っ /Q/

- っ always occurs in syllable-final position.

- Unlike ん /N/, っ must be followed by a voiceless obstruent (i.e. /p, t, c, s, č, š, k, (h)/) in native phonology.
  - ん /N/ can be followed by any segment.

- っ has a lot of allophones in complementary distribution.
  - The allophones belong to one category.
  - When each allophone occurs is predictable!

っ /Q/

- っ cannot occur in utterance-final position in general.

- In Kagoshima Japanese, however, syllable-final っ can appear in utterance-final position (Hirayama 1979).
  - ゆっ（< 雪）, くっ（< 口）, くっ（< 首）, くっ（< 靴）, みっ（< 水）
  - This つ seems to be [ʔ] (glottal stop) in phonetic transcription.

- The phoneme っ is transcribed as /Q/.

っ /Q/ before voiceless obstruents

Japanese	Phonemic	Phonetic	Gloss
いっぱい（一杯）	/iQpai/	[ipːɑi]	'one cupful'
いってん（一点）	/iQten/	[itːẽɴː]	'one point'
いっつう（一通）	/iQcuH/	[itːsɯː]	'one letter'
いっさい（一歳）	/iQsai/	[isːɑi]	'one year old'
いっちょう（一兆）	/iQčoH/	[icːɕoː]	'one trillion'
いっしょう（一章）	/iQšoH/	[iɕːoː]	'one chapter/Ch. 1'
いっかい（一回）	/iQkai/	[ikːɑi]	'one time'

っ /Q/ before voiceless obstruents

- っ /Q/ becomes a long obstruent (Cː), which has exactly the same place of articulation as the following obstruent (Cːː).
  - e.g. /Qp/ → [pːː], /Qt/ → [tːː]

- Since っ /Q/ occurs syllable-finally, there is a syllable boundary (.) between ːː.
  - もっと 'more'   [motː.ːo] ([t] = stop)
  - よっつ（四つ）'four' [jotː.ːsɯ] ([ts] = affricate)

っ /Q/ before voiceless obstruents

- (Oral and Nasal) stop → Closure + Release
  - Roughly speaking, the duration of stop closure is twice as long as [pː, tː].
  - [pː, tː] → 1 beat (technically speaking, 1 mora)
  - [pːː, tːː] → 2 beats (technically speaking, 2 moras)

- Roughly speaking, バント 'bunt' and バット 'bat' have the same duration.
  - バント → バ [bã] + ン [nː] + ト [to]
  - バット → バ [bɑ] + ッ [tː] + ト [ːo]

Phonotactics of っ /Q/

- /f/ (= [ɸ]) and /h/ (= [h] or [ç]) are voiceless obstruents.

- /Qf/ and /Qh/ do not occur in native/Sino-Japanese words.
    - This is called an "accidental gap".

- /Qf/ and /Qh/ occur in (Western) loanwords.
    - (Western) loanwords fill the gap.

Phonotactics of っ /Q/

Japanese	Phonemic	Phonetic	Gloss
ワッフル	/waQfuru/	[ɰɑɸːɯɾɯ]	'waffle'
マッハ	/maQha/	[mɑhːɑ]	'Mach' (German)
ケーニッヒ	/keHniQhi/	[keːɲiçːi]	'König (< king)' (German)

っ /Q/ before voiced obstruents

- っ /Q/ can be followed by a voiced obstruent in (Western) loanwords.
  - /Qb/ → [bːː]   e.g. モッブ 'mob'
    - ッブ is less frequent than the others; I would say モブ.
  - /Qd/ → [dːː]   e.g. ベッド 'bed'
  - /Qg/ → [gːː]   e.g. バッグ 'bag'
  - /Qz/ → [dːːz]   e.g. グッズ 'goods'
  - /Qǰ/ → [ɟːːʑ]   e.g. バッジ 'badge'

っ /Q/ before voiced obstruents

- Vance's question:
  - Are these extra-long voiced obstruents voiced?

- Answer:
  - They are not voiced for physiological reasons (pp. 108-109).
  - バッグ /baQgu/ is [bɑkːɯ] (= バック) rather than [bɑgːɯ].
  - ベッド /beQdo/ is [betːo] (= ベット) rather than [bedːo].

っ /Q/ before voiced obstruents

「バック」

ほむ😴😴😴😴😴😴
@myfis_hmb

就活用のあの何も入らん バック 買わんでミッキーのトートバッグで面接行っても内定来たことは大きな声で訴えていきたい

Translate post

9:37 AM · Aug 9, 2020

https://twitter.com/myfis_hmb/status/1292454990460489729?s=20

https://twitter.com/M_nekosann/status/1699779596806472000?s=20

「ベット」

ももねこ
@M_nekosann

ベット から起き上がって横見たらこの光景でなんか動揺した

Translate post

9:40 AM · Sep 7, 2023 · **275** Views

っ /Q/ before voiced obstruents

- I do make a distinction between バック 'back' and バッグ 'bag' in pronunciation.

- Vance would transcribe my pronunciation of バッグ as [bɑɡ̚kːɯ].
  - [ɡ̚] = unreleased [g]

っ /Q/ before voiced obstruents

Japanese	Phonemic	Phonetic	Gloss
モッブ	/moQbu/	[mop˺ːɯ] or [mob̚pːɯ]	'mob'
ベッド	/beQdo/	[bet˺ːo] or [bed̚tːo]	'bed'
バッグ	/baQgu/	[bɑk˺ːɯ] or [bɑg̚kːɯ]	'bag'
グッズ	/guQzu/	[gɯt˺ːsɯ] or [gɯd̚tːsɯ]	'goods'
バッジ	/baQ ǰi/	[bɑc˺ːɕi] or [bɑɟ̚cːɕi]	'badge'

っ /Q/ before nasals and (semi-)vowels

- っ /Q/ can be followed by a nasal or a semi-vowel in emphatic pronunciation.
  - This /Q/ is realized as [ʔː] (long glottal stop).

- さっむい（< 寒い）'cold'   /saQmui/ → [saʔːmɯi]
- はっやい（< 早い・速い）'early, fast'   /haQyai/ → [haʔːjai]

- I have seen a mimetic that contains っ /Q/ followed by a vowel.
  - カッア

Utterance-final っ /Q/

- っ /Q/ does not occur in utterance-final position in general.
  - As we saw, it does occur in Kagoshima Japanese.

- However, utterance-final っ /Q/ can occur in informal speech.
  - さむっ！（< 寒い）'cold'   /samuQ/ → [sãmɯʔ]
  - はやっ！（< 早い・速い）'early, fast'   /hayaQ/ → [hɑjɑʔ]

- Utterance-final っ /Q/ is realized as a glottal stop [ʔ].
  - I think that っ /Q/ can occur in isolation: [ʔ].

っ /Q/ before liquids

- っ /Q/ appears before /r/ ([ɾ]; apico-alveolar tap) in emphatic pronunciation and in (Arabic and Italian) loanwords.

- きらきら 'shiny' → きっらきら 'very shiny'
  - Phonemic transcription: /kiQrakira/
  - Phonetic transcription: [kirːːɑkiɾɑ]
- タリアテッレ 'tagliatelle (a kind of pasta)'

つ /Q/ before liquids

- Morimoto (2020) conducted a production experiment.
  - She recorded 8 Tokyo speakers (F: 5, M: 3).

- Morimoto found that (Tokyo) Japanese speakers use multiple strategies to produce /Qr/ (= geminated liquids).
  - Speakers use different degrees of lateralization (/l/ in English) and tongue curling (/ɹ/ in American English).
  - /Qr/ is also affected by surrounding vowels.

- Geminates = long consonants (つ).

Japanese consonants

	Bilabial		Alveolar		Alveolo-palatal		Palatal		Velar		Glottal	
Stop	p (ぱ)	b (ば)	t (た)	d (だ)					k (か)	g (が)		
Affricate			c (ツァ)	z (ざ)	č (チャ)	ǰ (ジャ)						
Fricative	f (ファ)	v (ヴァ)	s (さ)		š (シャ)						h (は)	
Nasal		m (ま)		n (な)								
Tap				r (ら)								
Approximant		w (わ)					y (や)					

Japanese also has the moraic (obstruent) /Q/ and the moraic nasal /N/ in the consonant inventory.

Exercise

- Provide a phonemic transcription (= //) and (a phonetic transcription (= [])) for each word. (Based on Vance 2008: p. 112, (1))

1. はんたい（反対）'opposition'
2. はんのう（反応）'reaction'
3. にってい（日程）'schedule'

Exercise

- Provide a phonemic transcription (= //) and (a phonetic transcription (= [])) for each word. (Based on Vance 2008: p. 112, (1))

1. はんたい（反対）'opposition'   /haNtai/   [hanːtai]
2. はんのう（反応）'reaction'   /haNnoH/   [hanːːoː]
3. にってい（日程）'schedule'   /niQtei/   [nitːːei] (careful)

[nitːːeː] (rapid)

References

- Hirayama, Teruo. 1979. 全日本の発音とアクセント. In 日本語発音アクセント辞典. Tokyo: NHK Publishing.
- Maekawa, Kikuo. 2021. Production of the utterance-final moraic nasal in Japanese: A real-time MRI study. *Journal of the International Phonetic Association* 53(1), 189-212.
DOI: https://doi.org/10.1017/S0025100321000050
- Morimoto, Maho. 2020. Geminated liquids in Japanese: A production study. Doctoral dissertation, University of California, Santa Cruz.