

## Voiceless vowels in Japanese

The vowels [i̥] and [u̥] are voiceless (as indicated by the subscript [̥]).

(Sometimes they are perceptually indistinguishable from a neighboring voiceless fricative, but from a mental-grammar perspective, they are most insightfully analyzed as voiceless vowels.)

- [i̥] and [u̥] are the only (phonologically) voiceless vowels in Japanese. Use phonetic properties to state the natural class of “potentially voiceless vowels”.
- Consider the distribution of [i] vs. [i̥], and of [u] vs. [u̥]. In each pair, are the two sounds separate phonemes, or allophones of the same phoneme? If they are allophones of the same phoneme, what can we say about the environments where they occur?

[ika]	‘squid’	[ɕikaɾu]	‘scold’
[ki desu ka]	‘is it a tree?’	[kita]	‘north’
[tsuda]	(surname)	[tɕikai]	‘near’
[kɯsai]	‘smelly’	[kigen]	‘mood’
[ɕizuka]	‘quiet’	[kisen]	‘steamship’
[kagitai]	‘(I) want to sniff’	[totɕi da]	‘it’s land’
[suki da]	‘(I) like it’	[midzikai]	‘short’
[takusan]	‘a lot’	[kokuɡo]	‘Japanese language’
[udon]	‘type of noodle’	[izumo]	(place name)
[ɕitsujō:]	‘necessary’	[kaɕu ɕito]	‘winning person’
[uɕiro]	‘back’	[pikaso]	‘Picasso’
[kɕigai]	‘crazy person’	[fɯcin]	‘suspicion’
[ima]	‘living room’	[uma]	‘horse’

Data from Tsujimura (2007) and [OJAD](#)

- There is a little more to the story about voiceless vowels (Vance 2008, Tsuchida 2001):
  - (a) In the environment between {the relevant consonant class} and a pause, potentially voiceless vowels appear as voiceless sometimes, but not consistently. (The forms /des-u/ ‘COPULA.FORMAL-NONPAST’ and /-mas-u/ ‘FORMAL-NONPAST marker for verbs’, on the other hand, are *very* consistently devoiced in final position, so this is an exceptional fact about these items specifically.)
  - (b) Sometimes additional vowels are voiceless at the *phonetic*, rather than phonological, level — particularly in fast speech. But this phenomenon has to do with implementing the sounds with the physical articulators, not a change in sound properties caused by the mental grammar.
  - (c) Having two voiceless vowels in a row is sometimes avoided. If so, additional factors come into play to determine which vowel actually appears as voiceless.