# Neutralization of vowel length contrast in Hong Kong Cantonese checked syllables

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Historically, Cantonese checked syllables (i.e., those with coda -p, -t, or -k) used to have only high and low register tones, and the high tone further split into two based on vowel length: T1 (high-level tone, 55) for short vowels, and T3 (mid-level tone, 33) for long vowels (see Fig.1). Although most checked syllables still follow this pattern, there are some exceptions: some T1 checked syllables have long vowels, and some T3 checked syllables have short vowels. This shows that the matching between vowel length and tone is changing. Wong [1] observed the same phenomenon and attempted to explain it from a diachronic view of sound change and the daily usage of the exceptional words. However, no scholars have examined the phenomenon acoustically. This paper aims to explain the phenomenon and discuss its implication by examining the phonetic realization of the exceptions by focusing on the more common exception of "long vowel + T1".

A list of exceptions was identified and minimal pairs were created with other legitimate syllables. Table 1 provides an example (type B) where the long vowel [a] is matched with T1, which is an exception. In addition to the exceptions, syllables of types A, C, and D were included in the recording materials for comparison. All target syllables formed multisyllabic words or phrases to provide the context. Speakers were asked to read aloud the multisyllabic words or phrases, and then the target syllables. 33 native Hong Kong Cantonese speakers (16 males; 17 females) ranging from their twenties to sixties were recruited for the production task.

No significant difference was found in F0 between type A (mean = 185 Hz) and type B (mean = 186 Hz) syllables. However, regarding vowel duration, it was observed that a type B syllable (mean = 141 ms, e.g. [pak$^{55}$]) was shorter than a type C one (mean = 161 ms, e.g. [pak$^{33}$]). Although the difference in duration between type B and type C syllables could be attributed to their respective lexical tones (as T1 is typically shorter than T3, which may cause type B (T1) to be shorter than type C (T3)), it is notable that younger speakers tended to produce type B syllables with a vowel duration closer to type C than older speakers did. In other words, the younger speakers had longer vowel durations for type B syllables compared to older speakers. This suggests that even though type B syllables exceptionally have long vowels, older speakers still tended to shorten the vowel duration as a measure of compensation to preserve the matching between vowel length and tone.

The above results indicate that a phonological change is underway, wherein the matching between vowel length and tone is weakening. It is also noteworthy that some type A syllables (e.g. [hɐk$^{55}$], 'black') can have their vowel prolonged to become a type B syllable (e.g. [hak$^{55}$], 'black'), without affecting the word meaning or usage. This trend is more prevalent among younger speakers. These findings suggest that the vowel length contrast in Hong Kong Cantonese checked syllables is being neutralized. However, the vowel length contrast remains stable in other linguistic environments (e.g. [sam$^{55}$] 'three' and [sɐm$^{55}$] 'heart' still present an obvious and stable contrast before the -m coda). While vowel length does not contrast in most Chinese dialects, the checked syllables may hint the starting point of vowel length neutralization in Cantonese.

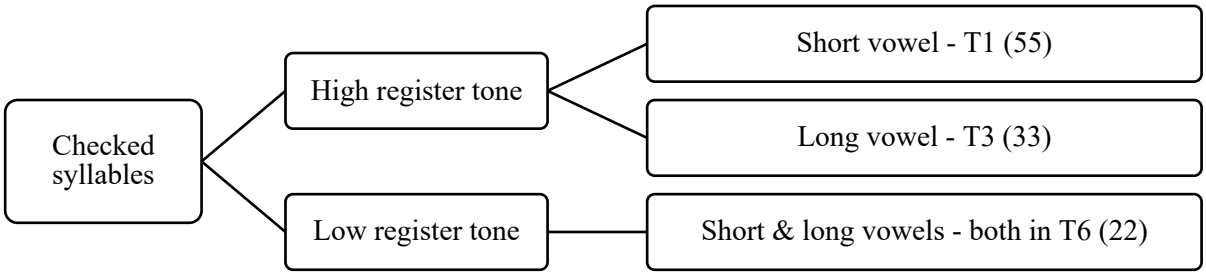


**Fig.1** The matching between vowel length and tone of Cantonese checked syllables

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|---|---|---|---|
| **Type A** | [pɐk$^{55}$] | Legitimate (high register tone + short vowel + T1) | 'north' |
| **Type B** | [pak$^{55}$] | Exception (high register tone + **long vowel** + T1) | 'pop' |
| **Type C** | [pak$^{33}$] | Legitimate (high register tone + long vowel + T3) | 'uncle' |
| **Type D** | [pak$^{22}$] | Legitimate (low register tone + long vowel + T6) | 'white' |

**Table 1** Syllables that form minimal pairs with [pak$^{55}$]

References

[1] Wong, T. S. (2010). The Phonological Rule between Tone D1b and Vowel Length in Cantonese Revisited. In Yì Xíanghuī & Líu Cūnhàn (eds.), *Proceedings of the 14th International Conference on Yue Dialects*. Guilin, China: Journal of Guilin Normal College.