Japanese Vowel Deletion Occurs in Words in Citation Form

Alexander Kilpatrick\(^1\), Rikke Bundgaard-Nielsen\(^2\) and Brett Baker\(^2\)

\(^1\)The University of Melbourne, \(^2\)The MARCS Institute for Brain, Behaviour and Development and \(^3\)Western Sydney University

Abstract

Japanese vowels have allophonic reduced variants, including shortened, devoiced and deleted instances. This kind of linguistic behaviour is commonly associated with rapid or casual speech. However, we demonstrate that vowel deletion also occurs in Japanese words in citation form. We propose that deletion is more likely to occur in high-frequency lexical items, specifically in three regularly occurring suffixes.

Introduction

Cross-linguistically, segmental reduction is associated with fast speech. In Japanese, however, vowel reduction—shortening, devoicing, and occurs regularly for high vowels, /i/ and /u/, even at a normal speaking rate (Fujimoto, 2015). Japanese vowel devoicing, and deletion behaviours are generally regarded as features of a single phonological process referred to as ‘vowel devoicing’ by scholars of Japanese.

Twelve native Japanese speakers (10 female; 2 male) living in Melbourne, Australia:

- Seven were expatriates, who had lived in Australia for five or more years (Age 27-42 y)
- Five were international students who had lived in Australia for less than a year and were studying English as a Foreign Language at University (Age 18-20 y)

Participants

Participants read from a pseudo-randomised list of 30 words in Hiragana script.

Recordings were conducted in quiet rooms in Melbourne, using a zoom H4n recording device with a sampling depth of 24kb/sec and a sample rate of 44 kHz.

Analysis

Elicitations were categorised (voiced, devoiced, deleted) on the basis of visual inspection of spectrograms in the following way:

Voiced vowels are characterised by voicing bars—which are indicative of vocal fold vibration—and formant resonance in spectrograms. Unvoiced vowels do not yield voicing bars but otherwise appear vowel-like. Deleted vowels simply do not appear to be articulated. There is no transition within the preceding fricative and no increase in intensity.

Two examples of devoiced and deleted allophones respectively. In figure 2 (moku), we observe an unvoiced word-final vowel (the release after the stop appears vowel-like in terms of F2 frequency but lacks voicing bars which are indicative of vocal fold vibration). Figure 3 (masu) on the other hand shows a deleted vowel.

Deletions only occur after fricatives and exhibit little evidence of vowel-like behaviour.

Results

<table>
<thead>
<tr>
<th>% Words</th>
<th>Environment</th>
<th>Deletion</th>
<th>Devoicing</th>
</tr>
</thead>
<tbody>
<tr>
<td>shiteru</td>
<td>95%</td>
<td>89%</td>
<td>5%</td>
</tr>
<tr>
<td>tabemashita</td>
<td>92%</td>
<td>92%</td>
<td>0%</td>
</tr>
<tr>
<td>ushiita</td>
<td>83%</td>
<td>83%</td>
<td>0%</td>
</tr>
<tr>
<td>shin</td>
<td>67%</td>
<td>67%</td>
<td>0%</td>
</tr>
<tr>
<td>shide</td>
<td>83%</td>
<td>83%</td>
<td>0%</td>
</tr>
<tr>
<td>masu</td>
<td>17%</td>
<td>17%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 1. Deletion and devoicing results. Words are presented in Hepburn Romanisation and environment indicates the environment of the vowel being monitored.

The results show that vowel devoicing and vowel deletion are frequently occurring phenomena even in words in citation form, in Japanese.

Devoicing and deletion are apparent to be used at similar rates across a wide age-range: We found no significant difference between expatriate participants and international students: all produced reduced vowels at a similar rate.

Discussion

An item-based analysis revealed differences in the rate of deletion in the tested suffix environments: /し/ /te/ underwent deletion most frequently (M = 88\%), followed by /し/ /ta/ (M = 81\%) and finally /ま/ /su/ (M = 78\%). We suggest these differences may reflect differences in frequency of occurrence of these suffixes: In a balanced corpus of contemporary written Japanese (NINJAL, 2009), /し/ /te/ occurred most frequently, followed by /し/ /ta/ and lastly /ま/ /su/, indicating that high-frequency items are more likely to exhibit vowel deletion.

Bibliography


Ethical approval for this research granted by the Humanities and Applied Sciences Human Ethics Sub-Committee. Ethics ID: 1544315