

The Influence of OCP-Place on Word Truncation: A study of Modern Japanese Abbreviation of Compound Loanword Nouns with Long Vowels*

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1 Introduction

The Obligatory Contour Principle (OCP, hereafter) is a phenomenon in which repetition of the same or similar linguistic character is avoided. When such a situation occurs, one of the components changes into a different linguistic component (Goldsmith, 1976; Leben, 1973; McCarthy, 1986). Originally, the OCP was proposed for tonal features (Leben, 1973). Then,

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the OCP was extended to non-tonal features, that is, features at the segmental level (McCarthy, 1986).

There are many recent works on phonological phenomena in Japanese reflecting the OCP's effect. Lyman's Law in *rendaku* (Itô and Mester, 1986; Vance, 1980; see also Vance and Irwin, 2016) and gemination devoicing in loanwords (Nishimura, 2006; see also Kawahara, 2011) are two representative examples. In this paper, the process of compound word truncation is described as another phonological phenomenon governed by the OCP. A word formation experiment was conducted to show the influence of OCP on word truncation.

The organization of this paper is as follows.¹ Section 2 introduces previous studies about the OCP effect on word truncation in Japanese. Section 3 describes the forced-choice test that was conducted to reveal the OCP effect in compound word truncation. The aim of this test was to obtain evidence to support the claim that a part of the word formation process in Japanese can be explained by the OCP. Section 4 reports the experiment's results and discusses the findings. Section 5 closes this paper, concluding and making suggestions for future works.

2 The OCP Effect in Word Truncation

In Japanese, loanwords are often truncated to form new words (Itô, 1990; Kubozono and Ogawa, 2005; Labrune, 2002). Many complex words tend to be abbreviated as quadrimoraic patterns by clipping the initial two morae from each component of the base word (e.g. *dejitaru* + *kamera* → *dejikame* 'digital camera'). However, in the case of a first component with a long vowel, it is possible to retain the long vowel as in (1a) or to suppress it as in (1b).

- (1) The patterns of complex abbreviated words with long vowels in the first component
- a. *shaapu* + *penshiru* → *shaapen* **shapupen* 'mechanical pencil'
 - b. *paasonaru* + *konpyuutaa* → *pasokon* **paakon* 'personal computer'

In the first type (e.g. *shaapen* in (1a)), the initial long vowel tends to be maintained (Maintaining Type, hereafter) whereas the second type (e.g. *pasokon* in (1b)) does not maintain the long vowel and replaces it with the next independent mora (Replacement Type, hereafter). In the first type (e.g. *shaapen* in (1a)), the initial long vowel tends to be maintained, especially when the same consonant is repeated at the morpheme boundary of an ab-

¹A '+' mark in this paper indicates a word break.

breviated word. Hence, the Replacement Type (e.g. **shapupen* in (1a)) tends to be avoided due to the influence of the OCP.

The majority of previous studies have tried to explain the abbreviation process through theoretical analysis (Kuwamoto, 1998; see also Nasu, 2005). However, a quantitative analysis of the linguistic facts is needed to confirm the analysis.

Moon (2016) also investigated the abbreviation patterns of loanword compounds in Japanese, focusing especially on the influence of the OCP. This previous study tried to make a quantitative analysis through database and experiment. The result of the database analysis showed that the sequence of similar consonant (C) or mora (CV) tend to avoid the Replacement Type. Also, the tendency toward avoidance is stronger in the case of similar mora (CV) than in the case of similar consonants (C). However, in the database,² there are real words that have high lexical dependency. These kinds of words with high lexical dependency in the database can lead to uncertain analysis results.

To solve this problem, Moon (2016) also conducted a word formation test using the software Praat (version 5.4.0, Windows) with seventy-two Japanese younger speakers. The participants were randomly shown nonce compound words in which the first component contained a long vowel, and they were asked to choose one that felt more natural between two possible abbreviation patterns (e.g. *jiipu* ‘jeep’ (real word) + *pareedo* ‘parade’ (real word) → *jiipare* or *jipupare*). Results of this test showed that Replacement Type is avoided when same consonant (C) or mora (CV) occurs at the morpheme boundary. (2) presents the condition (sequence of identical consonants or identical mora at the morpheme boundary) and the test word used (Replacement Type).

(2)	Replacement Type	Condition
a. shiikensaa + konsaato	shikekon	same consonant (C)
b. aakaibaa + kanbaseeshon	akakan	same mora (CV)

(2a) and (2b) both are examples of the test word to which the participants responded that the Replacement Type was less natural than the Maintaining Type. But comparing the number of participants that chose the Replacement Type in (2a) and (2b), it was clear that the number is higher for (2a). A chi-square test of independence was performed to examine the relation between

²For example, compound words with ‘mail’ in the first member tend to be abbreviated as Replacement Type rather than Maintaining Type (e.g. *meruado*, **meeado* ‘mail address’).

the number of responses in the Replacement Type and the condition (C or CV). The relation between these variables was significant ($\chi^2(1) = 48.65, p < .001$).

This previous study implicates that a sequence of the same mora (CV) or same consonant (C) at the morpheme boundary of an abbreviation word is likely to be avoided in Replacement Type. In the current study, we will focus on the sequence of the consonant (C) at the morpheme boundary related to this previous study.

3 Forced-choice Test

3.1 Purpose and Stimuli

To reveal what consonant sequences lead to avoidance of Replacement Type, we conducted a forced-choice test, focusing especially on the difference between labial, coronal, and dorsal places of articulation. As shown in Table 1, the current experiment prepared sixteen conditions that included the combination [\pm voice], and each condition has twenty-four items. Each target consonant was located in the second and third mora of the Replacement types. Table 1 presents the sequence of consonants at the morpheme boundary and the test word used (Replacement Type).

Labial	Coronal		Dorsal
pp: ripipan	tt: matetori	ss: pasesuto	kk: makukon
bb: habiban	dd: modedori	zz: kizuzemi	gg: rigequra
pb: supebisu	td: kotadomi	sz: kosuzero	kg: tekeqara
bp: tebiparo	dt: medetora	zs: kazasuro	gk: tagekura

Table 1. Sequence of consonants at the morpheme boundary of the Replacement Type

3.2 Procedures and Participants

Japanese native speakers were shown compound loanword nouns with long vowels and were asked to choose between Maintaining Type and Replacement Type. An example of the test words used in the experiment is shown on Table 2.

N1 + N2		Maintaining Type	Replacement Type
Nonce word	riipino + panfuretto	① riipan	② ripipan
katakana	リーピノ + パンフレット	① リーパン	② リピパン

Table 2. Example of the forced-choice test

The participants were shown novel compounds in which the N1 contains a long vowel and were asked to choose between two possible abbreviation patterns (e.g. *riipino* (nonce word) + *panfuretto* ‘pamphlet’ (real word) → *riipan* or *ripipan*). The nonce word (compound loanword nouns) and abbreviation patterns were represented in a Japanese orthography, *katakana*, which is the writing system usually used to write loanwords in Japanese. Figure 1 presents a screenshot of the forced-choice test and the question ‘Which of the two examples would you use? There is no correct answer, so I would appreciate it if you could respond as intuitively as possible’.

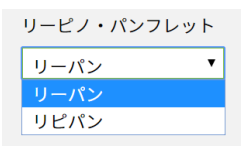
Question	Screenshot
あなたなら、2つの例のうちどちらを使いたいと思いますか？正解はありませんので、例を見て直感で答えていただければ幸いです。	

Figure 1. Screenshot of the forced-choice test and the question

Participants were asked to choose the one which of two possible abbreviation patterns would feel more natural based on native speaker intuition by using a pull down menu (seen in screenshot of Figure 1).

Each participant saw sixty items containing twenty-four test words and thirty-six fillers. These sixty items were rearranged by using the RAND function in Excel, and the arrangement was different for each participant. This forced-choice test was conducted with 160 Japanese native speakers online using Lancers.³ The participants’ age range was twenty to thirty years old.⁴

³Crowdsourcing site (<http://www.lancers.jp>).

⁴Moon (2017) pointed out that there is a generation gap: middle-aged and older speakers show a preference for quadrimoraic abbreviated forms, whereas younger speakers show a preference for trimoraic abbreviated forms in the abbreviation pattern formation process. In order to avoid influence of the generation gap, the subject’s age was limited to younger speakers in this study.

3.3 Results

The following figure summarizes the results of this experiment. The vertical axis indicates the percentage of responses for either the Maintaining Type at the bottom or the Replacement Type from the top. The experiment revealed that a sequence of labial consonants leads to a strong avoidance of the Replacement Type.

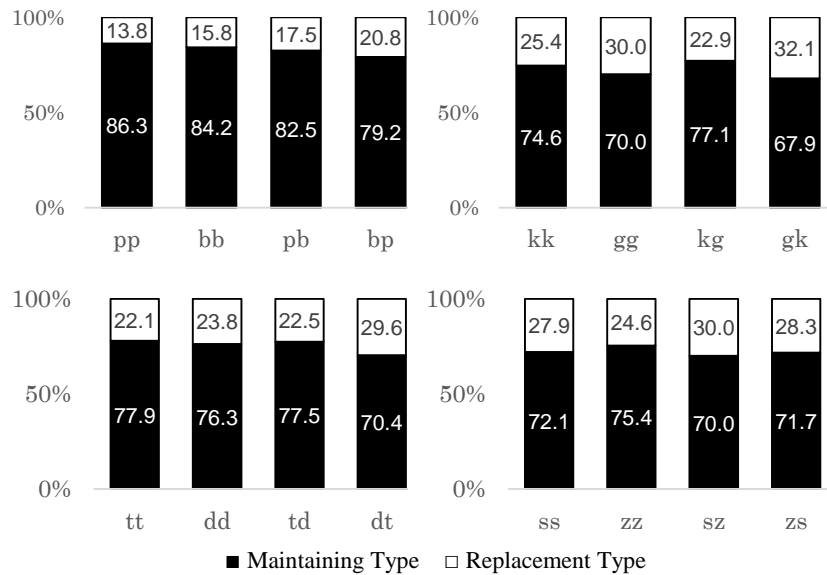


Figure 2. Results of the forced-choice test

The results revealed that sequential labials were avoided more often than sequential dorsal and coronal gestures (see Figure 2). A chi-square test of independence was performed to examine the relation between abbreviation patterns and places of articulation. The relation between these variables was significant ($\chi^2(1) = 35.79, p < .01$).

4 Discussion

This analysis reveals that the process of word truncation in Japanese is related to the OCP-Place effect, and labials were more likely to be avoided in Replacement Type than the dorsals and coronals. Japanese rendaku is another case in which the OCP-labial effect can be observed.

Rendaku is a morphophonological phenomenon in which the initial voiceless consonant of the second member of compounds becomes a voiced

In addition, the result of the current experiment suggests that the OCP effect can take place not only within a morpheme as in (4) but also at the morpheme boundary as in (5).

- (4) a. Avoidance sequential voicing (Yamato Japanese)
 fuda ‘tag’ buta ‘pig’ ***buda**
- b. Geminate devoicing (Japanese Loanword)
- i. **deddo** ~ detto ‘dead’
- ii. **teddo**, *tetto ‘Ted’
- (5) **riipino** + **panfuretto** → ripipan

(4a) represents the avoidance of two voiced obstruents in onset position in Yamato Japanese (Itô and Mester, 1986; see also Suzuki, 1998). Previous studies pointed out that the Yamato Japanese may contain at most one voiced obstruent. Thus, as seen in (4a), the word *fuda* (meaning tag) exists and so does *buta* (meaning pig), but *buda* does not because it contains two voiced obstruents (highlighted by the bold in (4a)).

Another example of OCP effect taking place within morpheme is the geminate devoicing in Japanese loanwords (4b). Geminate consonants in Japanese loanwords represent both devoiced and voiced geminates. Nishimura (2006) pointed out that voiced obstruent can be geminated and sometimes devoiced, as seen in (4bi). Voiced geminates show devoicing when the word contains another voiced obstruent elsewhere (highlighted by the bold in (4bi)). On the other hand, devoicing is not permitted, as seen in (4bii), because it contains at most one voiced obstruent in one stem (highlighted by the bold in (4bii)).

As seen in (4), both avoidance strategies in Yamato Japanese and geminate devoicing in Japanese loanwords are triggered by the OCP effect on the [+voice] feature within a morpheme (Itô and Mester, 1986, i.e. Lyman’s Law). However, the OCP effect in Japanese is not limited to the morpheme level, and it can be observed on the process of the word truncation as seen in (5). This result reveals that the OCP effect can take place not only within a morpheme but also at the morpheme boundary (highlighted by the bold in (5)).

5 Conclusion and Future Works

This study discussed identity avoidance in abbreviation forms of compound loanword nouns, especially focusing on the OCP-Place effect. To reveal what consonant sequences lead to avoidance of Replacement Type, we conducted an experiment focusing on the difference in place of articulation.

The results are as follows. 1) Sequential labials were avoided more often than sequential dorsal and coronal gestures; 2) The more similar the sequential consonants are, the more likely it is avoided in the output forms; 3) The OCP effect can take place not only within a morpheme but also in the morpheme boundary.

In future works, further investigation on the possibility that OCP-labial effect can be generalized in other phonological phenomenon is required.

The current study raises a further question. Why are labial sequences more likely to be avoided than dorsals and coronals? What is the phonological motivation? One possibility is that the OCP effect and the duration of the sequence of consonants at the morpheme boundary are related. It is also possible that sequences labials, especially a sequence of the consonant ‘p’, is merely uncommon in Japanese lexicon. In addition, these experiment’s results (as seen in Figure 2) raise the question of why fricatives influenced OCP effect less than stops.

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