The effects of phonology and misprint location on Japanese proofreading

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The influences of phonology at the pitch accent level and misprint location in a sentence on Japanese proofreading were investigated. The participants silently read short Japanese sentences and detected misprints in them. We found that more misprint detection errors were made when the misprint was the same pitch-accent homophone as that of a word that would fit the sentence meaning, than when the misprint was a different pitch-accent homophone or a non-homophone. This result suggests that phonological information at the pitch-accent level is used in Japanese proofreading. The interaction of the phonology and the misprint location had an influence on misprint detection speed. This indicates that the contextual information of a sentence is essential for misprint detection, and the homophony and the location of the misprint influences the speed of context comprehension.

Key words: homophone, Kanji, phonology, proofreading, sentence processing

During proofreading, some misprints can be detected easily and others with difficulty. The characteristics of proofreading errors may contribute to a better understanding of the reading process.

Some research has revealed that phonological information of misprints is activated during silent proofreading (e.g. Morita & Tamaoka, 2002). However, previous proofreading studies have not taken account of pitch accent, which conveys important phonological information in the Japanese language. In this study, we investigated the influence of phonology at the pitch accent level on Japanese proofreading. We also investigated the effect of the location of a misprint in a sentence on Japanese proofreading. The location of the misprint could influence the speed of misprint detection because it could influence the speed of context comprehension, which is essential for misprint detection.

Method

Participants Eighteen Japanese undergraduate students participated in this experiment.

Stimuli Sixty short Japanese sentences (12–14 characters in length) were used as stimuli. Each sentence contained one misprint, which was a two-Kanji character noun. There were three conditions involving the homophony of the misprint: (a) a same pitch-accent homophone condition, in which the misprints were the same pitch-accent homophones as the correct words (sharing the same consonants, vowels, and pitch accents). For example, “研究者を公私/koushi/として迎えた。” (the letters in italics in// represent higher pitches, and those not in italics lower pitches. Correct word: “講師”/koushi/); (b) a different pitch-accent homophone condition, in which the misprints were homophonic with the correct words but a different pitch accent (e.g. “格子”/koushi/); and (c) a non-homophone condition, in which the misprints were not the homophone of the correct words (e.g. “美貌”/bibou/). There were also three conditions for the location of the misprints in each sentence: (a) a top condition, in which the misprint was the first word of the sentence; (b) a middle condition, in which the misprint was in the middle 1/3 of the sentence; and (c) a bottom condition, in which the misprint was in the last 1/3 of the sentence. Sixty correct sentences were added as fillers.

Procedure The experiment consisted of one block of 120 trials. The participants were required to decide whether or not the stimulus sentence con-
tained misprints by reading the sentence silently, and to respond by pressing a key as quickly as possible. To make sure that the participants comprehended the sentences which they read an easy comprehension test was added at the end of each trial.

**Results and Discussion**

Responses to trials in which errors were made in the sentence comprehension test (3.29% of the total trials) were excluded from the analysis.

**Error rates**  The mean error rates are shown in Figure 1(a). The analysis revealed that the main effect of homophony was significant, $F(2, 34)=5.72$, $p<.01$. Tukey’s HSD test revealed that more errors were made in detecting same pitch-accent homophone misprints than in detecting different pitch-accent or non-homophone misprints, both $ps<.05$. This result indicated that participants used phonological information at the pitch-accent level.

**Correct response latencies**  The mean correct response latencies are shown in Figure 1(b). The main effect of the misprint location was revealed as significant, $F(2, 34)=5.41$, $p<.01$, by the analysis. Tukey’s HSD test showed that the participants took more time to detect misprints when they were at the top of the sentences than when they were in the middle, $p<.01$. In addition, the interaction between homophony and the location was significant, $F(4, 68)=4.12$, $p<.005$. Tukey’s HSD test revealed that the misprint location effect was significant only in the different pitch-accent and the non-homophone conditions. In these two conditions the response latencies were longer when the misprints were at the top of a sentence than when the misprints were in the middle of a sentence, $p<.005$ and $p<.001$, respectively.

These results suggest that contextual information was used for misprint detection, and the location of the misprint had an influence on obtaining the contextual information. When a different pitch-accent or non-homophone misprint was at the top of a sentence, the phonology of the misprint interfered with the comprehension of the context, and misprint detection was delayed. On the other hand, when the misprint was in the middle of a sentence the preceding and following context was available and the misprint was detected rapidly. In addition, a misprint with the same pitch-accent homophone, which “sounded” correct, helped the participants to comprehend the “correct” sentence context regardless of the location of the misprint. Therefore a location effect was not observed in the same pitch-accent homophone condition.

This study revealed the use of phonology of pitch-accent level and contextual information in Japanese proofreading. The use of pitch accent information might contribute to efficient homophone discrimination in Japanese reading.

**References**