**Phonological processing of Japanese Kanji by Chinese second language learners: Evidence from consistency and frequency effects in word and nonword reading tasks**

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**Background: Pronunciation of Japanese Kanji Word**

- In Japanese Kanji words, the constituent characters have one exclusive or several completely different, alternative pronunciations according to the semantics of their intra context.

  - 教室 (教室): [教室 (教室)]
  - [教室 (教室)]
  - 教室 (教室): [教室 (教室)]
  - [教室 (教室)]

- The effects of consistency & frequency in reading: Words with higher frequency or consistency show better performance in reading speed and its accuracy.

- The gradated pattern of consistency (Fushimi et al., 1999, Fushimi et al., 2003, 2009): consistent < inconsistent-typical < inconsistent atypical word (reaction time/error rate)

**Purpose of the Present Study**

- The emergence of the two effects revealed a neurocomputational model of interaction between semantic memory and statistical property in phonological processing (Ijuin et al., 2012)
- In this research, we tested the two effects to examine whether the model can be applied to Chinese second language learners.

**Participants & Methods**

- Chinese undergraduate students, major in studies of Japanese language or literature from universities in the mainland of China.

  **Experiment 1: Comparisons of results between Japanese natives (Fushimi et al., 1996) and advanced learners.**

  **Experiment 2: Comparisons of results among advanced learners, intermediate learners and Japanese semantic dementia (SD) patients (Fushimi et al., 2003, 2009).**

**Design & Procedure**

- **Word Oral Reading Task**

  - Reaction Time (RT, among advanced learners only)
  - Error Rate (ER)
  - LARC Error in WRT

- **Nonword Oral Reading Task**

  - Reaction Time (RT, among advanced learners only)
  - Error Rate (ER)
  - LARC Error in WRT

**Results of Experiment 1**

- Comparisons with the results among Japanese natives

  **Japanese Proficiency**

  **Average Year/Month Reading Japanese**

  - **Experiment 1**
    - Advanced (N = 20)
    - 372.5 months
    - 2 year and 5 months
  - **Experiment 2**
    - Intermediate (N = 30)
    - 43 months
    - 5 year and 3 months

- The two effects were replicated in WRT. However, frequency effect was not so obvious in NWRT.

  - The clearer graded pattern in ER and LARC: Less support from semantic knowledge in LF and atypical band.

  - This feature was less significant among Japanese natives suggesting stronger interaction of semantic memory and statistical property.

**Results of Experiment 2**

- Data comparisons of results in ER of WRT

  - The effects of consistency and frequency were both replicated among intermediate learners.
  - Reading accuracy among intermediate learners was not as good as that of advanced learners.
  - The gradated pattern in consistency appeared stronger than that observed in advanced learners.
  - The similarities with the result in SD patients.
    1. Lack of the semantic knowledge of Japanese words (due to the language proficiency)
    2. Not in lack of word semantic knowledge but of its corresponding phonological knowledge.

**Discussions**

1. The Generalization of Potential Model in Naming Japanese Kanji (exp.1)

   - Parallel Distributed Processing Model, POP (Seidenberg & McClelland, 1989)
   - Primary System Hypothesis (PSH)
   - Language processing is assumed to be an emergent property of semantic and phonological/orthographic interaction between neural systems (Ueno, 2012)
   - The interaction of semantic memory and statistical property of phonological knowledge.

2. Characteristics of Chinese SL Learners (exp.2)

   1. The robustness and continuity in consistency effect were distinguished among Chinese SL learners, especially in low frequency items.
   2. This feature becomes more salient for learners with lower language proficiency. Reading performance of them was similar to that of Japanese SD patients, which indicates less support from semantic memory in their phonological processing.

3. The frequency effect appeared unstable compared with experiments among Japanese natives.

**References**

- Ueno, T. (2012). Phonological processing of Japanese Kanji Word. In Japanese Kanji words, the constituent characters have one exclusive or several completely different, alternative pronunciations according to the semantics of their intra context.