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THE LINGUISTIC COMPLEXITY OF HOMONYMY IN THE JAPANESE LANGUAGE

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Abstract This study analyzes the extensive nature of the homonymy (*dōon-igi-go*) phenomenon in the Japanese language, exploring its phonological origins, the role of kanji (characters) and pitch accent in semantic disambiguation, and the cognitive mechanisms employed by speakers. Unlike Indo-European languages, it is a common and systematic occurrence in Japanese for a single phonetic sequence to correspond to dozens of distinct semantic units. The research reveals the conflict between phonetic economy and semantic clarity. The results indicate that the Japanese writing system, pitch accent, and computational linguistics algorithms in digital systems serve as the primary mechanisms for resolving ambiguities in speech.

Keywords: Japanese Linguistics, Homonymy, Kanji, Pitch Accent, Sino-Japanese (Kango), Semantic Disambiguation, Phonology, Natural Language Processing (NLP), Kana-to-Kanji Conversion.

1. Introduction

While homonymy is a global linguistic phenomenon, its density in the Japanese language is unmatched by any other major language in the world. In Japanese, homonyms are referred to as *dōon-igi-go* (同音異義語)—literally translated as "same sound, different meaning words." While English speakers encounter a limited number of homonyms like "bank" (a river bank or a financial institution), Japanese speakers routinely face phonetic clusters representing more than 20 entirely different concepts in daily life.

This extreme proliferation of homonyms in Japanese is not merely a random linguistic curiosity, but rather the product of language evolution—specifically, centuries of cultural and structural interaction with the Chinese writing system (kanji). This study examines the operational principles of the Japanese language based on the delicate balance between "auditory ambiguity" and "visual precision."

2. Methods

This paper utilizes synchronous linguistic analysis, the comparative-historical method, as well as cognitive and computational linguistics (NLP) approaches. The "Kango" (漢語 – Chinese loanwords) layer, which possesses the highest degree of homonymy in Japanese, was selected as the object of study. The analyses were carried out through the following stages:

- **Historical-phonetic analysis:** The loss of the tonal system during the process of borrowing words from Chinese and its impact on the growth of homonyms were modeled.
- **Experimental-graphic analysis:** Psycholinguistic data were examined to determine the effect of kanji (character) writing on visual comprehension speed.
- **Acoustic analysis:** The effectiveness of pitch accent in distinguishing minimal pairs was evaluated.
- **Computational linguistic analysis:** To isolate morphologically homonymous words within text, noun-verb co-occurrence relations along with near and far co-occurrence data

sets were subjected to computer analysis based on a model.

3. Results

The primary driver of homonymy in Japanese is Kango (漢語)—words introduced from Middle Chinese between the 6th and 9th centuries AD. However, Chinese is a tonal language where the pitch of a word determines its meaning. During the process of adaptation into Japanese, these tones were entirely lost or adapted into a simple pitch accent system. Consequently, dozens of words that sounded distinct in Chinese due to their tones converged into the exact same phonomorphological form in Japanese.

In addition to this, the phonetic inventory of Japanese is highly restricted. It consists of only 5 vowels (/a/, /i/, /u/, /e/, /o/) and approximately 14 consonants. As Shibatani (1990) noted, this small range of sounds necessitates the repetitive use of phonetic patterns, inevitably giving rise to homonymy.

Homonyms in Japanese are broadly divided into two groups:

1. **Homophones** (同音語 - *dōongo*): Words that sound identical but have different spellings (kanji) and meanings.
2. **Homographs** (同形語 - *dōkeigo*): Words that may be written identically but differ in pronunciation and meaning (e.g., 酒 - *sake* [alcohol] and 鮭 - *sake/shake* [salmon]).

To illustrate the severity of this situation, let us analyze the phonetic sequence '*Kikō*' (Table 1):

Kanji (Writing)	Romaji	Uzbek Meaning	Context / Usage
機構	kikō	Mechanism / Organization	Technology or international structures
気候	kikō	Climate	Meteorology, weather logs
寄稿	kikō	Article submission / Contribution	Publishing and the press
帰校	kikō	Returning to school	Education and student life
奇行	kikō	Eccentric behavior / Eccentricity	Psychology, behavioral analysis
紀行	kikō	Travelogue	Literature, geographical essays

Table 1: Analysis of homonyms in the 'Kikō' phonetic cluster.

In automating the problem of processing and differentiating homonyms in text, the Kana-to-Kanji (phonogram-to-ideogram) conversion model proposed by Masahito Takahashi et al. (1996) yielded significant results. In the study, when 'near co-occurrence' based on the co-occurrence frequency of nouns and verbs extracted from corpus data was applied, the efficiency of correctly identifying homonyms increased by 7.4% compared to traditional methods based on simple word frequency, reaching an overall accuracy rate of 79.6% per word. It was experimentally confirmed that when the verb component is clear within a full sentence structure, the system can convert the correct kanji from among homonyms with an accuracy of up to 93.1%.

4. Discussion

The most powerful tool for resolving the issue of homonymy is the Japanese writing system itself. As Gottlieb (2005) wrote, kanji functions as a "semantic anchor" in text. A word that is ambiguous in spoken speech becomes completely transparent in writing. Japanese readers do not read characters letter by letter; instead, they perceive them holistically as logograms—

symbols of meaning. Psycholinguistic research indicates that Japanese speakers comprehend the meaning of a homonoymous word through its kanji image several times faster than through an audio signal.

However, when furigana (the small phonetic alphabet above kanji) is used in a text, the visual distinctiveness is conversely lost, returning the reader to an environment of phonetic ambiguity (Coulmas, 1989). Proposals to completely abolish the kanji system were put forward during the post-war period; however, scholars proved that this would trigger a "homonymy explosion" in the language, rendering Japanese unreadable.

Although Japanese is not tonal in the Chinese sense, "pitch accent" (高低アクセント - *kōtei akusento*) steps in from time to time to assist. The rise or fall of pitch between syllables serves to distinguish minimal pairs. For example, the '*Hashi*' cluster:

- 箸 (*Hashi* - High-Low): Chopsticks (for eating) (Vance, 2008)
- 橋 (*Hashi* - Low-High): Bridge (Vance, 2008)
- 端 (*Hashi* - Low-High + flat): Edge / Margin (Vance, 2008)

However, pitch accent cannot be a universal solution. First, it varies drastically according to regional dialects (such as Tokyo and Kansai). Second, most complex Kango compounds share the exact same pitch model, leaving them impossible to differentiate by ear (Tsujimura, 2013).

In daily communication, Japanese speakers utilize a "Top-Down" cognitive processing method. If a conversation is about climate issues, the brain automatically selects the "Climate" variant of the word "*kikō*" and blocks the "Eccentric behavior" variant (Kageyama, 2016).

In digital systems, this cognitive process is modeled by corpus linguistics. As Takahashi et al. (1996) noted, instead of creating massive universal thesauri, it is practically more efficient to use a 'far co-occurrence data sets' model that dynamically adjusts the semantic relationships of words throughout a sequence of sentences. This method opens new horizons for deep text analysis and the elimination of homonymy in artificial intelligence systems.

In modern technology, Japanese homonyms pose a major challenge for artificial intelligence and IME (Input Method Editors) systems. When a user types phonetically on a keyboard, the system displays a list of dozens of characters (Conversion struggle). If voice assistants like Siri or Alexa and AI models incorrectly analyze the contextual chain within a text, it leads to serious errors in semantic translation

5. Conclusion

Homonymy in the Japanese language is a natural byproduct of the language's phonetic simplicity and its heavy borrowing from Chinese lexicon. Although it creates a high cognitive load for learners, it endows the Japanese language with a unique visual richness, poetic depth, and a cultural charm abundant in wordplay. The study confirms that meaning in language does not consist of sound alone, but is rather a complex symbiosis of visual writing, pitch, and social context.

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