

# *A Description of Japanese Sound System*

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**Abstract:** This paper explores various aspects of the Japanese sound system, including dialect divisions, languages in daily contact with Japanese, consonants, vowels, and pitch. It examines the historical records of dialects in Japan, highlighting the formation and characteristics of major dialects such as the Tokyo, Kansai, Hokkaido, and Kyushu dialects. The paper also discusses the influence of loanwords on the Japanese language, emphasizing the increasing presence of loanwords in daily communication. Furthermore, it analyzes the consonant and vowel phonemes in Japanese, paying attention to their variations and pronunciation differences, including the shape of the lips during vowel pronunciation and the pronunciation of special phonemes in Japanese, as well as the influence of the position of the tongue on the pronunciation of Japanese vowels. Lastly, the paper delves into the importance of pitch in Japanese, both phonetically and phonologically, and its role in word formation, meaning, and sentence-level intonation. By exploring these aspects, this paper provides a comprehensive understanding of the Japanese sound system and its significance in the language.

**Keywords:** dialect, consonant, vowel, pitch

## **1. Introduction**

The Japanese language is known for its unique sound system, which includes distinct consonant and vowel sounds, as well as various dialect divisions and pitch patterns. These elements contribute to the rich and diverse linguistic landscape of Japan. In this paper, we will explore the different aspects of the Japanese sound system, including the formation of dialects, the influence of loanwords on the language, and the pronunciation of consonants and vowels. Additionally, we will examine the role of pitch in Japanese, both at the phonetic and phonological levels. By understanding these aspects, we can gain a deeper appreciation for the intricacies of the Japanese language and its impact on communication and culture in Japan. Furthermore, we will discuss the languages that are in daily contact with Japanese, highlighting the extensive absorption of loanwords and the importance of mastering these loanwords for effective communication. Overall, this paper aims to provide a comprehensive overview of the sound system of Japanese and its significance in the Japanese language and culture.

## **2. Dialect Divisions**

The earliest records of dialects can be found in the 8th century Nara period's "Manyoshu" collection, which provides detailed descriptions of the Eastern and Horengu dialects, dating back over a

thousand years. This serves as strong evidence of the existence of dialects in Japan at that time. The main reasons for the formation of dialects can be roughly divided into two points: firstly, new languages that originated in the capital (or cultural centers of certain regions) continuously spread to surrounding areas. Sometimes, a situation may occur where a new language becomes less used in the capital, or even disappears completely, but is widely adopted and established in other regions [1].

Some of the major Japanese dialects will be described below. Firstly, there is the Tokyo dialect, also known as Standard Japanese. This is the most commonly spoken dialect in Japan, as Tokyo is the capital and largest city of Japan. The Tokyo dialect is characterized by clear pronunciation, faster speech, and standard vocabulary and grammar. Most Japanese people can understand and use the Tokyo dialect because of its widespread use in media and education. Next is the Kansai dialect, which is mainly found in the Kansai region of Japan, including the cities of Osaka, Kyoto and Kobe. The Kansai dialect is characterized by slower pronunciation, higher intonation, and sometimes inflections such as "やん" or "でえ" at the end of words. The vocabulary and grammar of the Kansai dialect also differ from standard Japanese, for example, the use of "ほんま" instead of "本当に"(真的). The Hokkaido dialect is the northernmost dialect in Japan and is mainly spoken in the Hokkaido region. Hokkaido dialect is characterized by heavier pronunciation, slower speech, and the addition of inflections such as "さ" or "っちゃ" at the end of words. The vocabulary and grammar of the Hokkaido dialect also differ from standard Japanese, for example, "ばい" is used instead of "です" (yes). The Kyushu dialect is the southernmost dialect in Japan and is mainly spoken in the Kyushu region. The Kyushu dialect is characterized by thicker pronunciation, faster speech, and sometimes the addition of inflections such as "けん" or "ぐらい" at the end of words. The vocabulary and grammar of the Kyushu dialect is also different from standard Japanese, for example, "しも" is used instead of "下さい"(please). In addition to the above dialects, there are many other dialects in Japan, such as the Tohoku and Shikoku dialects. Each dialect has its own unique characteristics and charms, which make the Japanese language and culture more rich and diverse.

### 3. Languages in Daily Contact with Japanese

Japanese vocabulary can be roughly divided into three categories: native words, Chinese words, and loanwords. Native words are inherent vocabulary in Japanese, Chinese words are words that were directly or indirectly imported from China in ancient times, including words created by the Japanese using Chinese characters, and they are mainly written in Chinese characters. Loanwords are mainly words that have been imported from Europe since modern times and are generally written in katakana [2].

Due to the extensive absorption of loanwords, Japanese has gradually evolved from a language composed of hiragana and kanji to a mixed language consisting of kanji, hiragana, and katakana. The percentage of loanwords in Japanese national language dictionaries was only 1.4% in the 1889 "Genkai," but it increased to 7.8% in the 1972 "Shin Meikai Kokugo Jiten." In the late 1990s, it accounted for around 10% in general dictionaries. The "Modern Knowledge of Contemporary Language," which reflects the changes of the times, has been published annually, and the total vocabulary of loanwords reached 83,000 in 1992, with about 90% coming from English [3]. With the acceleration of Japan's internationalization process, there are more and more loanwords in the Japanese language, and the language life of Japanese people cannot be separated from loanwords. Today, loanwords have become an essential tool in the lives of Japanese people. According to surveys, loanwords account for an average of 40%-50% in daily Japanese language usage, and ordinary people need to master at least 2,000 loanwords to adapt to daily communication needs [4].

The presence of loanwords in Japanese can be attributed to multiple factors. Firstly, the language and writing system of Japanese are conducive to the absorption of foreign languages. Japanese is an agglutinative language, where the grammatical relationships in a sentence are mainly expressed by attaching particles and auxiliary verbs to other words. This characteristic of Japanese is also advantageous for absorbing foreign languages. Most foreign words are nouns, but by adding "suru" after them, they can be turned into verbs, such as "sain suru" meaning "to sign". Adding "na" after them can turn them into adjectival verbs, such as "riaru na engi" meaning "realistic performance" [5].

Secondly, various social factors in Japan have accelerated the absorption of foreign languages. The rapid increase in foreign languages is a result of absorbing new achievements from Western countries and a national psychology of worshipping the West. After the defeat in World War II, Japan had no choice but to develop and revitalize its economy in order to compete with the West. The introduction of foreign languages became one of the foundations and prerequisites for its economic development in order to catch up with the leading cultural and technological advancements of Western countries. In addition, worshipping the strong is a criterion for the Japanese people's behavior and self-esteem. From February 1972 to January 1976, a public opinion survey was conducted on the attitudes towards foreign languages among Tokyo and Osaka citizens. 80% of the respondents answered that they liked or tolerated the use of foreign languages because they believed that foreign languages were elegant and fashionable ways of expression, indicating their willingness to be "international individuals" [6]. In this cultural context, it is not surprising that foreign languages have become a trend.

#### 4. Sound System of Japanese - Consonants

The Japanese consonant system consists of a relatively small number of sounds compared to some other languages. There are five basic consonant sounds: /p/, /t/, /k/, /s/, and /m/. These sounds are pronounced with a clear and crisp articulation. However, there are variations in pronunciation depending on the region or dialect. For instance, the /r/ sound is often pronounced as a flap or a lateral approximant in some dialects. It is important to note these variations in order to accurately pronounce Japanese words [7].

The recent article "The phonology of Japanese /r/: A panchronic account" published by Laurence Labrune in the Journal of East Asian Linguistics argues for the unique status of the consonant /r/ in Japanese.[1]The /r/ hypothesis by Labrune, abbreviated Hr, integrates and advances earlier work in both generative phonology and Japanese traditional linguistics. It includes a variety of assertions, including: It is asserted that the consonant /r/ was originally epenthetic and that it is (a) an unmarked consonant, (b) devoid of any phonological feature definition at the underlying level [8].

In consonants, the pronunciation of special phonemes in Japanese is also a very important part. The geminate consonant [っ] is a special syllable in Japanese, which is usually marked with a small kana [っ]. Although it is not pronounced, it occupies one beat in terms of time. Generally speaking, except for loanwords, geminate consonants only appear before consonants [k], [s], [t], [p], for example: にほん (Japan), びっくり (surprised), さか (soccer), and so on. The key to pronouncing geminate consonants accurately is to stop the vocal cords and airflow at the same time when encountering this sound, and after a beat, let the airflow break through the obstruction of the articulatory organs and produce the sound of the following syllable after the vocal cords vibrate. Since geminate consonants do not exist in modern Chinese, Chinese students can only master the pronunciation of geminate consonants through repeated practice in order to speak Japanese with rhythm and fluency [7].

The nasal sound [ん], like geminate consonants, is also a type of syllable and occupies one beat in terms of length. The nasal sound belongs to nasal sounds, and when pronounced, the tongue blocks the back of the soft palate, forming a blockage through which airflow is emitted through the nasal cavity. Due to the influence of other sounds that follow it, it usually produces four types of sounds: [N], [m], [n], and [ɾ]. First, when the nasal sound [ん] appears alone or at the end of a word, or before a vowel, a semivowel, or a fricative [s], [z], [h], it is pronounced as [N]. For example: にんしん (determination). Second, when the nasal sound [ん] appears before bilabial sounds [b], [p], [m], it is pronounced as [m]. For example: かんぺき (perfect). Third, when the nasal sound [ん] appears before [k], [g], [ɾ], it is pronounced as [ɾ]. For example: しんがく (university). Fourth, in all other cases, it is pronounced as [n]. For example: こんらん (confusion). In Chinese, the pronunciation duration of [ai] and [a] is the same, but in Japanese, the pronunciation duration of [ai] is exactly twice that of [a]. Moreover, in Japanese, different pronunciation durations can change the meaning of words [9].

## 5. Sound System of Japanese - Vowels

"In phonetics, vowels are sounds produced without obstruction from the vocal organs, generated by the vibration of the vocal cords. Japanese phonetics consist of 5 vowel phonemes, namely [a], [i], [u], [e], and [o]. Compared to Chinese and English, Japanese has a relatively small number of vowel sounds, which makes it easier to master their pronunciation.

The vowel [a] is pronounced with an open mouth and the tongue in a natural position, with the tip of the tongue in the middle of the lower teeth, producing sound through the vibrating vocal cords. It is important to note that [a] is the most open vowel in Japanese phonetics. The vowel [i] is pronounced with slightly open but not tense lips, the tongue against the lower teeth, and the tongue surface close to the hard palate, producing sound through the vibrating vocal cords. The pronunciation of [i] is often sharp and thin, but the airflow should be unobstructed. The vowel [u] is pronounced with slightly open and flat lips, the tip of the tongue retracted, touching the lower teeth. The tongue position is slightly higher and slightly forward, producing sound through the vibrating vocal cords. The sound produced by [u] is not very strong, and all the articulatory organs should remain relaxed. The vowel [e] is pronounced with an open mouth, moderate size, between [a] and [i], with the tip of the tongue and tongue surface slightly lowered, producing sound through the vibrating vocal cords. The pronunciation of [e] requires tension in the articulatory organs. The vowel [o] is pronounced with the mouth shape between [a] and [u], the lips slightly spread to the sides, forming a slight round shape, while the tongue position is semi-high, producing sound through the vibrating vocal cords.

In addition, there are semi-vowels, which are sounds with weaker airflow, less friction, and intermediate between vowels and consonants. Japanese phonetics include two semi-vowels, namely [w] and [y]. Semi-vowels in Japanese are usually of short duration, and when pronounced, the airflow passes through the oral cavity, creating a weak frictional obstruction to produce sound. The semi-vowel [w] is pronounced with slightly spread lips, and the articulatory organs should not be too tense. The sound produced should be short and light. The semi-vowel [y] is similar to the pronunciation of the vowel [i], but when producing this sound, there is a slight friction."

The shape of the lips during vowel pronunciation is an important aspect that changes the resonance cavity and forms the vowel timbre. The lip shape of vowels in Japanese and Chinese can be either rounded or unrounded, depending on the vowel. For example, the lip shape of [a] is unrounded in both Japanese and Chinese. The lip shape of [i] is unrounded in both languages, but Chinese has two different lip shapes for this vowel. The unrounded lip shape corresponds to [i], while the rounded lip shape corresponds to [y]. [i] is an extended vowel, with the lips spread

sideways and slightly flattened, while [y] is the most rounded, with the lips forming a small hole when pronounced. It is worth noting that [y] appears in Japanese as a semi-vowel. The lip shape of [e] is unrounded in both Japanese and Chinese, while the lip shape of [o] is rounded in both languages. Although the tongue position and the contact between the back of the tongue and the soft palate are almost the same for [e] and [o], the only difference lies in their lip shapes. The lip shape of [e] is in its natural state and is unrounded, while the lip shape of [o] forms a circular shape and is rounded. The vowel [u] in Japanese is different from [u] in Chinese. The international phonetic symbol for [u] in Japanese is [u], and the lip shape is unrounded. On the other hand, the international phonetic symbol for [u] in Chinese is [u], and the lip shape is rounded. When pronouncing [u] in Japanese, the lip shape is relatively relaxed, and the degree of rounding is often insufficient. In contrast, when pronouncing [u] in Chinese, the lips are tense and pushed forward. Among the five Chinese vowels mentioned above, [a] and [i] are unrounded vowels, while [o] and [u] are rounded vowels. Among the five vowels in Japanese, all except [o] are unrounded vowels [10].

The pronunciation of Japanese vowels is mainly influenced by the position of the tongue. All five Japanese vowels are monophthongs, and most of them are non-rounded vowels. In contrast, in Chinese Pinyin, there is a distinction between monophthongs and diphthongs, such as the monophthong [a] and the diphthong [ai]. After comparing the pronunciation positions of these two languages, it can be seen that the Japanese vowels [e] and [o] are similar to the Chinese vowels [ai] and [ao], but they are actually completely different. This is because the pronunciation position of the Japanese vowels [e] does not change, while the Chinese diphthong [ai] is produced by sliding from the vowel [a] to the vowel [i]. At the same time, the pronunciation of Japanese vowels is more tense than that of Chinese vowels, and the degree of lip opening is smaller. For example, the pronunciation position of the Japanese vowel [a] is very similar to the Chinese vowel [a], but when pronouncing the Japanese vowel [a], the tongue position should be higher and the mouth shape should be smaller than the Chinese [a]. Similarly, the pronunciation position of the Japanese vowel [u] is similar to the Chinese vowel [u], but the pronunciation methods are clearly different. In terms of lip shape, the former is a spread lip sound, with the lips flattened to the sides, while the latter is a rounded lip sound, with the lips protruding forward.

## 6. Pitch

Pitch is an important aspect of language that plays a significant role in communication. Japanese is a pitch-accent language, which means that the pitch pattern of a word can change its meaning. In Japanese, pitch accent refers to the way in which the pitch of a word rises or falls. It is important to note that pitch accent is different from stress accent, which is found in languages like English. In English, stress accent refers to the emphasis placed on certain syllables in a word. However, in Japanese, pitch accent refers to the pitch pattern of a word as a whole.

From a linguistic perspective, the study of pitch in Japanese involves analyzing both its phonetic and phonological aspects. Phonetically, pitch is analyzed in terms of its frequency, intensity, and duration. Phonologically, pitch is analyzed in terms of its role in word formation and meaning.

Phonetically, pitch in Japanese is characterized by its frequency, which refers to the number of cycles per second. This frequency is measured in hertz (Hz). Japanese has a pitch accent system, where certain syllables in words are pronounced with a higher or lower pitch. The pitch patterns can vary across different dialects and regions in Japan. Intensity, on the other hand, refers to the loudness or strength of the pitch. It is measured in decibels (dB). Duration refers to the length of time a pitch is held. These phonetic aspects of pitch are important in understanding the acoustic properties of Japanese speech.

Phonologically, pitch plays a crucial role in word formation and meaning in Japanese. Japanese is a tonal language, meaning that pitch differences can distinguish between different words or word forms. For example, the word "hashi" can mean both "bridge" and "chopsticks" depending on the pitch pattern used. This phenomenon is known as pitch accent. The pitch accent system in Japanese is characterized by the presence of high and low pitch patterns on different syllables within a word. The placement of the pitch accent can vary across different words and can affect the meaning of the word.

Furthermore, pitch also plays a role in sentence-level intonation in Japanese. The pitch contour of a sentence can convey information about the speaker's attitude, emotion, or emphasis. For example, a rising pitch at the end of a sentence can indicate a question, while a falling pitch can indicate a statement. The study of pitch in Japanese at the phonological level involves analyzing these intonation- patterns and their communicative functions.

## 7. Conclusions

The study of dialect divisions, languages in daily contact with Japanese, and the sound system of Japanese, including consonants, vowels, and pitch, provides valuable insights into the linguistic diversity and complexity of the Japanese language. The existence of dialects in Japan can be traced back over a thousand years, highlighting the regional variations in pronunciation, vocabulary, and grammar. Additionally, the extensive absorption of loanwords has transformed Japanese into a mixed language, with loanwords accounting for a significant percentage of daily language usage. The sound system of Japanese, characterized by a relatively small number of consonant and vowel sounds, as well as the presence of geminate consonants and nasal sounds, poses challenges for learners but also adds richness and nuance to the language. Furthermore, the pitch accent system in Japanese plays a crucial role in word formation and meaning, as well as sentence-level intonation. Overall, the study of these aspects of the Japanese language enhances our understanding of its linguistic structure and cultural significance.

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