An Error Analysis of the Perception Based on Accent in Japanese

A Arianingsih, M F K Musyaafa

Japanese Department, Faculty of Humanities, Universitas Komputer Indonesia
Bandung, Indonesia

Email: anisa@email.unikom.ac.id , faiz.63821019@mahasiswa.unikom,ac.id

Abstract. Japanese has many words that have similar syllables but different meanings. However, for non-native speakers, these differences in meaning are quite difficult to spot as they can only be distinguished by tone also refers to accent. This study aims to analyze the misperception of accents in words with the same syllable. The data collected in this study were conducted through a perception test. These words were categorized based on the error types of the specified syllables. This study's respondents are 20 students of the 3rd and 5th semester Japanese Department of Universitas Komputer Indonesia in the 2022/2023 academic year. The results showed that accent perception errors in respondents mostly occurred in Odaka accent patterns and many words with accents of 4 mora. Perception errors occur because students are unfamiliar with the vocabulary and accent patterns. This is related to the length of student learning.

Keywords: error analysis, perception, accent, Japanese

1. Introduction

The Japanese language has a complex grammar system that can be difficult for foreigners to understand. One of the most important aspects of this language is using an accent. According to Sessler et al., "the Japanese word order is SOV-non-SOV". This differs from the English word order (i.e., SVO) [1]. Therefore, to speak correctly in spoken Japanese, one must have perfect knowledge of the Japanese language. If you make any errors while speaking Japanese, the people listening to you will misunderstand, which will then cause miscommunication. As a result, the errors you make significantly affect your interactions with others and the overall impression you give to others about your proficiency in the Japanese language. The accent is the height of the air pressure on each word as a differentiator, a rule determined by the people's customs in a region. Intonation is the fluctuation of pitch, the intensity or emphasis of a tone, or the shortness or length of a tone, so especially in Japanese with the same syllable, this makes the difference in meaning.

An accent is a particular pronunciation of a word or phrase. In other words, it is how an individual pronounces words. In general, accents can be classified into native and non-native. A speaker with a native accent generally pronounces words using the phonetic rules that are specific to the native language of that individual. On the other hand, a speaker with a non-native accent typically uses unfamiliar phonetic rules in pronouncing words [2].

Different accents affect the way people perceive and understand each other. People respond to sounds and tones differently depending on their language or background. When discussing Japanese

PROCEEDING BOOK
The 6th International Conference on Business, Economics, Social
Sciences, and Humanities 2023
E-ISSN: 2830-0637

623

intonation, one must first understand the language itself. Japanese is an agglutinative language that employs a mora-timing system, meaning words are pronounced about one another in groupings known as syllables. Each syllable is composed of a vowel and one or more consonants. The syllable structure in Japanese is indicated by an accent mark placed above the vowel or consonant that is considered "heavy" in the syllable. This accent mark, called the pitch accent, indicates to the speaker when to pause or take a breath. In essence, the pitch accent gives the listener information on the length of each syllable in a Japanese word. This is important since the spoken word is the language's backbone and drives the sentence's syntax [3].

The lexical pitch accent system

To mark narrow focus in a communicative function for directing the listener's attention to the information the speaker believes is especially important. For those languages which employ fundamental frequency (F0) as a cue to mark focus, a natural question arises as to whether there is a conflict or competition between focus and other communicative functions (e.g., lexical tone/accent), which are also expressed mainly by F0. F0 is an acoustic dimension involved in cuing multiple communicative functions for languages that use F0 to mark lexical prosody (e.g., tone or lexical pitch accent) and focus. For example, the role of lexical prosody in focus perception has been reported for a tone language like Mandarin. But again, Japanese is not a tonal language. Rather than being a tonal language, Japanese is considered a 'pitch-accent language.' Rather than having various tones for a single vowel sound like in Mandarin, Japanese uses high and low pitch to show the difference between accented and unaccented syllables.

For example, the word hashi. In Japanese, hashi can mean 'chopsticks' （箸） or 'bridge' (橋) or even 'edge' (端), depending on where you place stress on the syllables. The word hashi is made up of two Japanese syllables: HA (は) and SHI （し）, HAshi (high pitch to low pitch) means 'chopsticks', haSHI (low pitch to high pitch) means 'bridge' or 'edge.' The Initial Lowering Rule in Tokyo Japanese states that the first mora of a word always begins with a low pitch unless the word has its accent location on the first mora. Another generalization of the Tokyo Japanese accent is that both the accented mora and the mora preceding it perceive a high pitch. The mora following the accented mora is realized with a low pitch [5].

In Japanese, a word can be either lexically accented or unaccented. For an accented word, the pitch accent could fall on any syllable. The lexical pitch accent in Japanese, or its lack of lexical contrasts. Acoustically, it bears a high falling F0 pattern. For example, in ha'shi 'chopsticks,' the pitch accent falls on the first syllable and shows a high-low pattern; in contrast, hashi 'edge,''which is unaccented, is phonologically assigned and an L H pitch pattern. Unlike lexical tones, of which all members are deemed equal in prominence within a language, an accented mora in Japanese stands out among unaccented ones. Acoustically, the pitch accent differs from unaccented words with a higher F0 peak followed by a steep fall. Japanese uses pitch to indicate which part of the syllable is accented, which can convey clearly what the word means, especially in the case of a homophone. Mastering tones is vital to understanding and being understood, whereas, in a pitch-accent language like Japanese, you can be understood without correctly using the pitch. While using a pitch accent correctly will make you sound more native when speaking Japanese, most people will know what you mean based on context, even without the correct pitch.

Also, the duration of each sound that makes up a word (known as a 'mora') is the same, and only the pitch varies. As a result of this rhythmic consistency, it is sometimes inaccurately claimed that Japanese does not have accents, but this is not true - the pitch does vary within words and sentences. Your Japanese will only sound natural if you accurately reproduce this when speaking. In some cases, multiple words use the same sounds, but with different pitches, you may need help understanding that our pitch needs to be corrected. Therefore, four-mora words are categorized into five (4+1) accentual patterns. An example of each of these patterns is provided below.

PROCEEDING BOOK
The 6th International Conference on Business, Economics, Social
Sciences, and Humanities 2023
E-ISSN: 2830-0637

624

1. 平板 - heiban, this accent pattern generally means 'accentless' (LHHH(H)), flat intonation. In any 平板 word with more than one mora, the first mora is pronounced with a slightly lower pitch, and then all remaining mora is pronounced with a high pitch. Any particle following the word is also pronounced high.

2. 頭高-atamadaka, in this accent pattern, the first mora is high, and all subsequent moras are pronounced with a low pitch (HLLL). The drop in pitch is larger than the small rise in pitch. Any particle following the word is also pronounced with a low pitch.

3. 中高 – nakadaka, the characteristic of this accent pattern is the pitch drops from high to low somewhere within the word. The first mora is low, and any particle following the word is also pronounced with a low pitch (LHLL/LHHL). All 中高 words have at least three moras.

4. 尾高 – odaka, in this accent pattern, the first mora is low (unless the word only has a single mora), then goes high to the end of the word. Any particle following the word has a low pitch.

According to Sugito, it is not necessary to make an L-H distinction clearly to be perceived correctly as long as H is not lower than L. Kindaichi's advocacy seems rational since several previous acoustic studies investigating Japanese pitch accents reported findings supporting his idea. These acoustic studies analyzed the phonetic data more objectively by measuring the fundamental frequency (F0). Sugito showed that the acoustic cue to differentiate accentual patterns is the abrupt pitch fall in words [6].

Homonyms

This is the case with homonyms (douonigigo). In Japanese, a homonym is one of two or more words that are identical in writing and/or pronunciation but differ in meaning (if there is a difference in accent on a word with the same sound, it will result in a different meaning of the word. There are many homonyms in the Japanese language due to the syllabic nature of the language and its writing system which makes words look the same but have different pronunciations and meanings. When we talk about meaning, there are two types: lexical meaning and grammatical meaning.jishoteki-imi (辞書的意味) or lexical meaning is the meaning of the word according to its reference as a result of sensory perception and its separated from its grammatical elements, or it can also be called the original meaning of a word [7]. In this case, we focus on the lexical meaning because Japanese are called pitch-accent or tonal accent languages, and tone can convey lexical meaning, which is discussed in this study. Perception errors are the meaning of a word and explain the relationship between accents and homonyms accent.

Table 1 below shows that languages differ considerably in the degree of homophony, with the highest and the lowest differing by order of ratio. The homophone ratio is correlated qualitatively with phonological resources based on the World Atlas of Language Structures Online data.

Table 1. Homophone Ratio from the World Atlas of Language Structures Online [8]

	Total Sequences	Homophonous Sequences	Homophone Ratio
Japanese	35047	3875	11.06%
Mandarin	37070	2175	5.87%
English	61778	2022	3.27%
Spanish	42356	1238	2.92%
German	305733	5720	1.87%
Arabic	49105	693	1.41%

Given that there exist significant differences in homophony ratios across languages, we investigate the processing consequences of these differences. Theoretically, homophony is not a cost-free way of encoding meaning, as it violates conventional one-to-one mappings between

PROCEEDING BOOK
The 6th International Conference on Business, Economics, Social
Sciences, and Humanities 2023
E-ISSN: 2830-0637

625

phonological forms and meanings and could thus easily give rise to ambiguity and confusion. Empirically, it has been shown that children find it difficult to learn a second meaning assigned to a phonological form that has already been assigned a meaning. When English words are presented in their orthographic forms without any context, adults respond to homophones more slowly than they respond to mono-meaning words in both lexical decision tasks; on the exact effect of homophones on word processing has much experience with processing homophones in daily communication, and, on the other hand, have to resolve the ambiguity caused by homophones efficiently to make sure that the communications can go on smoothly [9].

Based on the table, Japanese languages are ranked higher languages with higher homophone ratios. This suggests a possible account for the reported homophone advantage in processing, namely, that since there are high proportions of homophones in these languages, native speakers will, on the one hand, have much experience with processing homophones in daily communication. Unfortunately, that case didn't work for non-native speakers. They must efficiently avoid the ambiguity caused by homophones and ensure that communications can go on smoothly. For this reason, the relationship between accents and homonyms in Japanese is very continuous; only with the accent or lexical pitch accent the difference in meaning be recognized.

Previous studies found that an abrupt pitch fall was the primary cue for perceiving an accent. When a sentence consists of lexically unaccented words, a gradual pitch fall is observed in the whole portion after its initial rise, this phenomenon is not unique to Japanese but is observed in most other languages. This phenomenon does not have linguistic meaning and is not ordinarily perceived [10].

Studies from Sugiyama recorded six minimal pairs of disyllabic words that contrast between the initial and final accents. When peak amplitude and mean amplitude between the first and second syllables were calculated, no consistent difference was found between the two types of words. Since it was not necessary to be made production studies on whether secondary cues to pitch accents exist in Japanese. [11]. Recent research by Muradás-Taylor described a trilingual speaker of English and the Nigerian languages Nupe and Hausa who produced a highly accurate and stable Japanese pitch accent, despite not having lived in Japan or received explicit instruction on Japanese pitch accent. It is likely that Nupe and Hausa, which are both tonal, helped acquire a Japanese pitch accent. Individual differences in short-term phonological memory can explain that variation in accuracy in perception However, the Japanese pitch accent lies in encoding pitch accent in long-term memory that more experienced learners can imitate closer to the standard Japanese accent [12].

Previous studies showed that although the surface pitch patterns observed in the two languages' dialects are highly similar, there are clear differences in the interaction between pitch and morphology. All of them have prosodic systems in which words may have only a single prominent mora or syllable, after which the pitch drops abruptly to a significantly lower pitch. Prominent mora or syllable thus can be analyzed as carrying an accent. Regardless of whether to treat 'pitch accent' as a separate category distinct from stress accent and tone, Tokyo Japanese dialect from stress languages like English in that it has a class of unaccented words, and from full-fledged tone languages in that surface pitch patterns are predictable once we know the location of the accent [13]. This study aims to describe student's difficulties in perceiving Japanese accents based on the type of accent and the number of moras in each word.

2. Method

This study used a descriptive qualitative method. Respondents are 20 students from the 3rd and 5th semester of the Japanese Department Universitas Komputer Indonesia in the 2021/2022 academic year. Two phases of practice sessions preceded the actual trials. The purpose of the first phase of practice sessions was to get the result from the minimal pairs or homonyms of words that only can be differed by the accent pattern, and the purpose of the second phase was to examine the ability to analyze the pattern from lexical accent in all 4 accents in Japanese.

The data used in this research are homonyms words and several accent patterns in Japanese, categorized by the number of mora used. The test words were five minimal pairs of final-accented

PROCEEDING BOOK
The 6th International Conference on Business, Economics, Social
Sciences, and Humanities 2023
E-ISSN: 2830-0637

626

and unaccented words with the same phoneme sequence within a pair. Phonologically, final accented words and unaccented words both have the pitch pattern accent of high-low and differ. The most notable difference between the two types of words would appear in the following particle, when there is one. The particle has a low pitch following an accented word and a high pitch following an unaccented word. However, we use a method that only uses words without particles to test the subject more deeply in their perception of the difference in meaning caused by the difference in accent patterns.

The technique was to give a question sheet to the subject with two different types of questions, multiple choice and essay. In multiple choice questions, using questions a and b, where both words are homonyms in Japanese, we tell the subject to listen to the audio, then say to the subject to answer which word is correct based on the accent pattern listened to. In essay questions, we divide based on two forms, mora and accent pattern, there are 10 questions in which questions 1 to 4 are words with the number of 2 mora, then in numbers 5 to 7 are words with the number of 3 mora, and then in numbers 8 to 10 are words with the number of 4 mora.

3. Results and Discussion

From the data results, we can explain the subject's perception ability of accent patterns and mora in Japanese. Considering whether the accent pattern is very influential on the number of confusion of the subject when answering the question, or the role of mora is what gives more pressure to the subject when they meet words with a large number of mora, or these two aspects are interconnected with words with many mora and the complexity of Japanese accent patterns if tested through listening tests to answer questions according to the appropriate meaning rules. These two aspects are interconnected with words with many mora and the complexity of Japanese accent patterns if tested through an auditory test to answer questions according to the meaning.

We divide the results of this data into two subjects, the first subject with the code Data A is the result of the data we obtained from the subject from 3rd semester students and the second subject with the code Data B is the data we obtained from the subject from the 5th semester students. The problem of misperception is often found in Japanese language learners at the beginner level. Still, this problem is not only related to misperception but a condition where the learner needs to be sufficiently learning vocabulary, especially vocabulary in the form of sounds which, if practiced, can help distinguish the difference in an accent with the correct meaning perceptually. The table below shows student answers in the perception of accent on minimal pair words or homonyms. Table 2 and 3 show the perception test of minimal pairs with accent patterns as differentiate, and the accent patterns will affect the accuracy in identifying some homonyms words.

Table 2. The result of 3rd semester students of Homonym's Question Type (Data A)

Words	Accuracy (%) Correct	Accuracy (%) Wrong	
飴	50%	50%	HOMONYM'S QUESTION TYPE
橋	80%	20%	
味	70%	30%	
伝記	40%	60%	
いつか	50%	50%	
帰る	70%	30%	
熱い	40%	60%	
兄弟	80%	20%	
居間	40%	60%	
花	40%	60%	
赤	60%	40%	
髪	30%	70%	

PROCEEDING BOOK
The 6th International Conference on Business, Economics, Social
Sciences, and Humanities 2023
E-ISSN: 2830-0637

627

肩	70%	30%
重い	60%	40%
買う	70%	30%
Average	57%	43%

From table 2 above, it can be seen that most of the respondents were correct in their perception of the words 橋 (hashi) and 兄弟 (kyoudai) as much as 80%, then next on the words 味 (aji), 帰 (kaeru), 肩 (kata), and 買う as much as 70%. These words are more familiar to their ears than the minimal pair. It's different with data B, who is 5th semester students. The results from 5th semester students about homonyms words can be seen in table 3 below.

Table 3. The result of 5th semester students of Homonym's Question Type (Data B)

Words	Accuracy (%)		
	Correct	Wrong	
飴	70%	30%	
橋	90%	10%	
味	90%	10%	
伝記	60%	40%	
いつか	80%	20%	
帰る	70%	30%	HOMONYM'S QUESTION TYPE
熱い	100%	-	
兄弟	90%	10%	
居間	70%	30%	
花	60%	40%	
赤	100%	-	
髪	80%	20%	
肩	70%	30%	
重い	70%	30%	
買う	60%	40%	
Average	77%	23%	

Table 3 shows that accurate results are found in the word 熱い (atsui) and the word 赤 (aka). It can be seen that these two words often come out in their learning. 熱い (atsui), which means hot, is an adjective that can be paired with nouns. This is why many Subjects in data B can perceive the word correctly. Likewise, the word 赤 aka, which means red, has a 100% accurate percentage, not denying that Subject from data A often hears and uses this word which is commonly used in Japanese as 赤ちゃん (akachan), which means baby. In looking at the effect of these homophone words, it is clear that verbs have a fairly low percentage. This problem can be attributed to the many similarities, and the pitch accent pattern on verbs is quite difficult, whether or not listeners are familiar with the words. Therefore, when some words tend to have better intelligibility than others within the same condition.

From this analysis of homonym words, many subjects lost their perceptual focus when they met words that had the heiban accent pattern 平板 (heiban) with the LHH pattern. Many words were inaccurate as the word 買う (kau), 飴 (ame), 伝記 (denki), and 花 (hana). The heiban accent pattern is difficult to identify without a connecting word or particle after the word is formed. In the sense that the heiban itself is a flat board, this accent pattern is considered to be unaccented. Thus, many A subjects lose the focus of their perception, the first mora is pronounced with a slightly lower pitch,

PROCEEDING BOOK
The 6th International Conference on Business, Economics, Social
Sciences, and Humanities 2023
E-ISSN: 2830-0637

628

and then all remaining moras are pronounced with a higher pitch. Any particle following the word is also pronounced high. That's why the lexical pitch accent can also affect focus perception.

Next is the result of student answers in the accent perception on essay questions. Table 4 and 5, which test pitch accent patterns with mora comparison and gives results with a higher number, will affect the accuracy in identifying accent patterns.

Table 4. The result of 3rd semester in pitch accent patterns based on mora (Data A)

Accent Comb		Accuracy (%)		
Mora	Words	Correct	Wrong	
2 moras	国	50%	50%	PITCH ACCENT PATTERNS
	川	70%	30%	
	味	50%	50%	
	僕	80%	20%	
3 moras	食べる	50%	50%	
	世界	30%	70%	
	高い	40%	60%	
4 moras	毎日	20%	80%	
	大学	10%	90%	
	学生	20%	80%	
Average		42%	58%	

Table 5. The result of 5th semester students in pitch accent patterns based on mora (Data B)

Accent Comb		Accuracy (%)		
Mora	Words	Correct	Wrong	
2 moras	国	60%	40%	PITCH ACCENT PATTERNS
	川	50%	50%	
	鍵	60%	40%	
	僕	100%	-	
3 moras	食べる	50%	50%	
	世界	40%	60%	
	高い	50%	50%	
4 moras	毎日	40%	60%	
	大学	20%	80%	
	学生	30%	70%	
Average		50%	50%	

Based on tables 4 and 5 above, it can be concluded that in both data A and data B, the most errors were in words with 4 morals, while the respondents succeeded in perceiving accents in words with 2 morals. For example, in the word 僕 (boku). Previous studies that analyzed natural speech consistently found that intensity was greater for accented syllables than unaccented syllables [11]. However, it was not certain if the difference was large or consistent enough to serve as a reliable cue to pitch an accent. In the present study, if intensity difference was greater for final-accented words than unaccented words, as previous studies had shown.

PROCEEDING BOOK
The 6th International Conference on Business, Economics, Social
Sciences, and Humanities 2023
E-ISSN: 2830-0637

629

Tables 6 and 7 show the results of pitch accent patterns based on position.

Table 6. The result of 3rd semester students in pitch accent patterns based on position (Data A)

Accent Comb		Accuracy (%)		
Accent Pattern	Words	Accurate	Wrong	
Heiban 平板	国	60%	40%	
	川	50%	50%	
	鍵	60%	40%	
Atama daka 頭高	僕	100%	-	PITCH ACCENT PATTERNS
	世界	40%	60%	
	毎日	40%	60%	
Naka daka 中高	食べる	50%	50%	
	高い	50%	50%	
Odaka 尾高	大学	20%	80%	
	学生	30%	70%	
Average		50%	50%	

Table 7. The result of 5th semester students in pitch accent patterns based on position (Data B)

Accent comb		Accuracy (%)		
Accent Pattern	Words	Accurate	Wrong	
Heiban 平板	国	50%	50%	
	川	70%	30%	
	鍵	50%	50%	
Atama daka 頭高	僕	80%	20%	PITCH ACCENT PATTERNS
	世界	30%	70%	
	毎日	20%	80%	
Naka daka 中高	食べる	50%	50%	
	高い	40%	60%	
Odaka 尾高	大学	10%	90%	
	学生	20%	80%	
Average		42%	58%	

From tables 6 and 7 above, it can be concluded that for both semester 3 and 5 students, the most mistakes were in the accent with the odaka accent pattern, such as in words　だいがく (daigaku)

PROCEEDING BOOK
The 6th International Conference on Business, Economics, Social
Sciences, and Humanities 2023
E-ISSN: 2830-0637

630

and がくせい (gakusei). This is because the position of the odaka is an accent with a flat pattern, or accents on the last mora, called tail accents.

In accent-bearing words, these patterns are lexically specified, meaning that the H* tone is linked to a single mora, followed by a steep pitch (L tone) fall on the next mora or syllable. There is also a large class of unaccented words in Japanese that do not contain an F0 fall [14]. If respondents are affected by the intensity of accent patterns that are diverse and quite difficult to distinguish between the 4 accent patterns that exist in Japanese, we look for correlations that occur in the field when conducting this experiment. It can be concluded that there is a correlation between words with accent patterns that can be distinguished according to the rules because respondents have often heard these words from native speakers or from many anime they watch or many Japanese songs they hear that happen to have the word we are testing. Although the results provide convincing evidence for perceiving homophone processing differences, we note that the findings in this study are limited to the processing of isolated words without the context provided or without the use of particles. Furthermore, in the previous study, there are languages in which different types of phonation are utilized. Certain tones occur with a creaky voice or breathy voice to enhance the percept of those tones [15].

Since many respondents do not widely understand such lexical prosody, this study aimed to assess whether there is an acoustic correlation in the perceptual outcomes on lexical tone accents and many word homonyms in Japanese. In summary, the results obtained in this study support some of the results found in past studies. We should also realize that such experience almost exclusively occurs in the processing of homophones embedded in rich or broad contexts; how such experience can be used in word processing remains unpredictable. Therefore, adding linguistic context may alter the findings regarding homophone processing and what relationships may exist between lexical meaning and accent patterns.

4. Conclusion

Accent perception errors in respondents mostly occurred in Odaka accent patterns and many words with accents of 4 mora. Perception errors occur because students are unfamiliar with the vocabulary and accent patterns. This is related to the length of student learning. The more words you learn, the more you can distinguish accents, especially accents in vocabulary that has minimal pairs. This study only examines the accent on a word, while the perception of accent patterns in sentences needs further investigation.

References
[1] Bernier, A. 2021. "An Introduction to The Japanese Language" Babbel, babbel.com/en/magazine/guide-to-Japanese-language
[2] Atagi, E., & Bent, T. 2017. Nonnative accent discrimination with words and sentences. *Phonetica*, *74*(3), 173-191.
[3] Starr, R. L., & Shih, S. S. 2017. The syllable as a prosodic unit in Japanese lexical strata: Evidence from text-setting. *Glossa: a journal of general linguistics*, *2*(1).
[4] Lee, A., Chiu, F., & Xu, Y. 2022. Focus perception in Japanese: Effects of lexical accent and focus location. *PLoS One*, *17*(9), e0274176.
[5] Britton, J. 2016. *The Syntax and Phonology of Aoyagi plus Rendaku Compounds*. Doctoral dissertation, University of York Language and Linguistic Science.
[6] Sugito, M. 1972. Ososagari-koo: dootai-sokutei ni yoru nihongo akusento no kenkyuu (Delayed pitch fall: an acoustic study). *Shoin Joshi Daigaku Ronshuu*, *10*, 201-229.
[7] Sutedi, D. 2004. Dasar-Dasar Linguistik Bahasa Jepang, Bandung: Humaniora.
[8] Lu, Y., & Morgan, J. L. 2020. Homophone auditory processing in cross-linguistic perspective. *Proceedings of the Linguistic Society of America*, *5*(1), 529-542.
[9] Lee, A., Chiu, F., & Xu, Y. 2022. Focus perception in Japanese: Effects of lexical accent and focus location. *PLoS One*, *17*(9), e0274176.

PROCEEDING BOOK
The 6th International Conference on Business, Economics, Social
Sciences, and Humanities 2023
E-ISSN: 2830-0637

631

[10] Hirano-Cook, E. 2011. *Japanese pitch accent acquisition by learners of Japanese: Effects of training on Japanese accent instruction, perception, and production* (Doctoral dissertation, University of Kansas).

[11] Sugiyama, Y. 2017. Perception of Japanese pitch accent without F0. *Phonetica*, *74*(2), 107-123.

[12] Muradás-Taylor, B. 2022. Accuracy and Stability in English Speakers' Production of Japanese Pitch Accent. *Language and Speech*, *65*(2), 377-403.

[13] Poppe, C. 2023. Pitch Accent and Morphology in Japanese and Korean Dialects: Toward a Typology. *NINJAL Research Papers 24*, 1–44.

[14] Ito, J., & Mester, A. 2016. Unaccentedness in japanese. *Linguistic Inquiry*, *47*(3), 471-526.

[15] Brunelle, M., & Kirby, J. 2016. Tone and phonation in Southeast Asian languages. *Language and Linguistics Compass*, *10*(4), 191-207.

PROCEEDING BOOK
The 6th International Conference on Business, Economics, Social
Sciences, and Humanities 2023
E-ISSN: 2830-0637

632