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L1 Swedish prominent syllable perception in Japanese words

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Abstract

This thesis investigates the perception of prominent syllables in Japanese words by native Swedish speakers. The study explores factors such as word type, pitch placement, and sentence structure that influence L1 Swedish speakers' accuracy in identifying the prominent syllable in Japanese words. The study also highlights the influence of linguistic context and individual variation on the perception of prominent syllables, and attempts to shed light on the complex interplay between native language phonological systems and the perception of foreign language prosody, in this instance, between Swedish and Japanese. The results implicate a varying degree of success among L1 Swedish speakers' ability to identify syllable prominence in Japanese words, with pitch- and word placement drastically determining the accuracy of said identification.

Keywords: Japanese, Swedish, prosodic transfer, cross-linguistic transfer, positive transfer, interference, pitch-accent, phonology, intonation

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CONVENTIONS

This thesis uses the modified Hepburn system to transcribe the Japanese sentences/words in this thesis, which will also be italicized. Long vowels are indicated by macrons. Exceptions to this are words such as names of people or cities which use English spellings. Furthermore, the diacritic symbol // is used to represent this phonetic implementation of pitch accent in this thesis.

Chapter I: Introduction

1.1 Aim of the Study

The influence of cross-linguistic transfer, specifically the transfer of linguistic patterns from one's native language (L1) to a second language (L2), has been a topic of considerable debate and investigation within applied linguistics, second language acquisition research, and language teaching (Ellis, 1994; Odlin, 1989). Despite numerous studies conducted over the past four decades, there remains a notable level of uncertainty and confusion regarding the manifestation and extent of L1 influence on L2 learners' use of the target language. This research aims to address this gap by exploring cross-linguistic prosodic transfer and the perceptual ability of Swedish L1 speakers in identifying prominent syllables in Japanese words.

It is widely believed that L1 transfer can facilitate L2 acquisition when similar linguistic elements exist in both the L1 and L2 (positive transfer), while it can also hinder L2 learning when differences between the two languages arise (negative transfer/interference). As such, speakers of a certain language group can have a beneficial pre-disposition toward

certain languages as L2 learners. However, comparing findings across studies poses challenges due to significant variations in factors such as L2 learners' proficiency levels, sample sizes, theoretical frameworks, and research methodologies. Some studies lack control groups of native speakers of the target language or fail to include control data in the learners' L1. Moreover, the majority of research focuses on L2 English acquisition, which raises the possibility that observed errors may be attributed to idiosyncrasies of the English prosodic system rather than general cross-linguistic transfer patterns (Raiser & Hiligsmann, 2007). In the context of L2 acquisition, non-native speakers face the challenge of acquiring the ability to assign and phonetically produce pitch accents accurately. Additionally, they must learn the appropriate phonological types of accents to convey specific meanings in different contexts. Despite the importance of prosody in language learning, the acquisition of pitch accent in L2s has received limited attention in previous research, and the existing findings are often inconclusive or contradictory (Raiser & Hiligsmann, 2007).

This study aims to contribute to the understanding of cross-linguistic prosodic transfer by examining the ability of Swedish L1 speakers, with no prior knowledge of Japanese, to identify prominent syllable (more accurately; mora) in Japanese words. In Japanese, prominence, also known as accent, refers to the perceptually salient syllable that receives the highest pitch accent within a word. The prominent syllable plays a crucial role in conveying meaning and differentiating between words that would otherwise be homophonous. By focusing on the similarities between Swedish and Japanese as pitch-accent languages, characterized by a two-pitch system (high and low), this research explores whether Swedish L1 speakers can leverage their inherent sensitivity to pitch accent cues to perceive and identify the prominent syllables in Japanese.

The findings of this study have implications for our understanding of cross-linguistic perception, the role of L1 transfer in L2 acquisition as well as inherent pre-disposition, and by focusing on the shared phonetic characteristics of Swedish and Japanese, this study aims to contribute to our understanding of L2 acquisition processes, lingual pre-disposition, and the interplay between L1 and L2 perception in the context of pitch-accent languages.

1.2 Research Questions

- 1) To what extent are L1 Swedish speakers able to audibly identify the prominent syllable in Japanese words?*
- 2) Does sentence structure affect the accuracy of perception?*
- 3) Does location of prominent syllable affect the accuracy of perception?*
- 4) How may L1 Swedish speakers benefit from their Swedish phonological system when perceiving Japanese words? Alternatively, how may they be hindered by it?*

Chapter II: Background

2.1 Swedish Phonology

Swedish, a pitch-accent language belonging to the Nordic group of Germanic languages along with Danish, Norwegian, Icelandic, and Faroese, exhibits distinctive phonological features that contribute to its unique prosody. Unlike intonation in terms of high or low tones, Swedish intonation primarily involves rising or falling pitch patterns (Gårding, 1989). In Swedish, stress and tonal accent both instantiate culminativity, the notion that every lexical word has at most one syllable which is marked for the highest degree of metrical prominence, at different levels of the prosodic structure, with clear similarities to the dominance system of Japanese, where there is a distinction between accented and unaccented

stems, and where prefixes and (in particular) suffixes influence stress/accent placement (Riad, 2012). Beside stress, Swedish also features tonal accent types known as accent 1, or acute (*ánden* 'the duck'), and accent 2, or grave (*ànden* 'the spirit')—also referred to as bisyllabic accent, however this study focuses on pitch/accent placement rather than accent types.

Another characteristic of Swedish phonology is the complementary nature of length. Stress, an integral part of Swedish phonology, is primarily indicated by greater relative length, with stressed syllables in Swedish consistently containing long speech sounds (aside from predictable variations like inherent durational differences and utterance-final lengthening), where a long vowel is followed by a short consonant, and a short vowel is followed by a long consonant (Bruce, 1977). Empirical evidence, along with anecdotal accounts, demonstrates that stress is crucial for intelligibility, and can distinguish between different lexical meanings of words that share the same segmental structure. Stress is therefore considered a core feature, and there is a clear division between stressed and unstressed syllables. Each root and certain affixes of a lexical unit, including compounds and lexicalized phrases, have one syllable that carries phonetic prominence (stress) which may or may not be pronounced in a given utterance (Bruce, 1977).

For instance, on the word level, distinctive stress can differentiate words like "*Jápan*" and "*japán*", "*kánon*" and "*kanón*". Similarly, on the phrase level, stress placement distinguishes between "*hälsa på någon*" (to greet someone) and "*hälsa på någon*" (to visit someone) (Thóren, 2014). Stressed syllables are invariably heavy due to a prosodic condition known as Stress-to-Weight (or Prokosch's law). This condition ensures that stressed syllables are bimoraic, which can be achieved either by a long vowel or a combination of a short vowel followed by a long consonant (Riad, 2014). Segmental quantity in Swedish is

complementary, meaning either the vowel or the consonant in the stressed syllable must be long, but not both simultaneously. This complementary segmental quantity means that the weight of stressed syllables is controlled by prosodic requirements (Riad 2014).

The immediate phonological factors influencing Swedish intonation are the word-level accents and accentual and tonal features at the phrase and sentence levels. These features are further conditioned by syntax and pragmatics (Thóren, 2014). Similar to other Germanic languages, accent in Swedish is employed to express semantic weight and demarcation. Root morphemes, which carry the main information, are typically accented, while affixes are not. The accented syllable of the first root morpheme is primary and marks the beginning of a construction, such as in "svensk-ar-na" (the Swedes). Reduced accent occurs in compounds and derivatives, where the accented syllable belongs to the last lexical morpheme, and the remaining syllables have lower levels, as in "smör-gås-bordet" (the smorgasbord) (Thóren, 2014).

While most Swedish words are accented on the first syllable, there is a significant number of polysyllabic words that are accented on non-initial syllables. French loanwords, particularly of recent origin, tend to be oxytones (Thóren, 2014). Accent location distinguishes only a few word pairs.

2.2 Japanese Phonology

Japanese is a linguistically diverse language with various regional dialects across the 48 prefectures of Japan, with the lingua franca of Japan (*Kyotsugo*) being principally based in the Tokyo area. These dialects differ in terms of pitch and accent, as well as varying in verb and adjective morphology, particle usage, and vocabulary (Shibatani, 2009), however in this study, only Tokyo-Japanese will be discussed. Four pitch accent systems observed in

Japanese: "*Heiban*" (flat accent), "*Atamadaka*" (high initial accent), "*Nakadaka*" (high medial accent), and "*Odaka*" (high final accent). Pitch accent in Japanese refers to an abrupt fall in fundamental frequency (F0), indicating tonal patterns within words which, like in Swedish, differentiate and determine word meaning. For example, *ame* (飴) meaning candy, while *áme* (雨) means rain, *obasan* (LHHH) meaning aunt/madam, while *obāsan* (LHLLL) means grandmother/old lady. Japanese lexical contrasts based on pitch accent are distinguished by the presence or absence of pitch accent and its location. Accented words feature a high tone followed by a low tone, resulting in an abrupt H-L fall in F0, while unaccented words lack such a fall. Unlike many tonal languages, Japanese utilizes only two levels of tonal heights, namely high and low, without intermediate levels like mid-tones, a restriction, as discussed, known as culminativity (Kawahara 2016), which can also be observed in Swedish.

The syllabic and phonotactic structures of Japanese are distinct from other languages, including its geographically close neighbours, Chinese and Korean. Japanese also primarily consists of open syllables, except for syllabic nasal consonants, whereas languages like English allow for a wider range of syllable types, including closed syllables and consonant clusters (Avery & Ehrlich, 1992). Due to these inherent differences, Japanese learners commonly encounter difficulties when producing closed syllables and consonant clusters in such languages (Kita Yoko, 2019).

Prominence, in Japanese, is determined by a combination of prosodic and syntactic factors. Speakers use prosodic parameters like frequency, intensity, and duration, as well as contrastive prosodic categories such as specific pitch accent types, to highlight certain parts of an utterance (Mizuguchi & Tateishi, 2020). Non-prosodic factors also play a role, but it remains unclear which linguistic variables most significantly impact prominence. According to the findings of Shinobu Mizuguchi and Koichi Tateishi's research on prominence in

Japanese (2020), Japanese uses acoustic cues of length, F0, and intensity to mark prominence. However, their research suggests that boundaries are marked more prominently than the prominence itself, with Japanese often rephrasing constituents and placing the rephrased elements at the intonational phrase IP (intonational phrase)-initial position, where the pitch is highest within the IP due to the downstepping pitch contour (downstep: the phenomenon that an H-L pitch accent induces a lowering of F0 contour of the following material. Downstep gauges the degree of relative pitch range expansion and influences focus perception), and that Japanese acoustic focal cues are not strong enough to highlight prominence by themselves (Mizuguchi & Tateishi, 2020).

Japanese phonology also features various types of affixes with distinct accentual behaviors. Given the culminativity restriction, when two accented morphemes are concatenated, one accent must be deleted, typically resulting in a recessive suffix losing its accent if the root is accented (Kawahara 2016). This reflects a tendency in natural languages to preserve more information from roots than affixes. Proper names in Japanese often exhibit a default accent location on the antepenultimate (the third syllable of a word counting from the end) mora, although the accentual behavior can vary depending on the word's origin. For example, names derived from adjectives are generally accented, whereas those derived from verbs are unaccented (Kawahara 2016).

Additionally, Japanese phonology avoids placing stress on epenthetic vowels, especially in loanwords with a light syllable followed by a heavy syllable (LH). Accent falls on the initial syllable if the first vowel is not epenthetic, but this placement is avoided if the initial vowel is epenthetic (Kawahara 2016). High vowel devoicing also interacts with accentuation. Vowels between two voiceless consonants or those that are word-final and preceded by a voiceless consonant tend to devoice, leading to a tendency to avoid placing

accent on devoiced vowels. However, young speakers often place accents on devoiced vowels without shifting the accent, indicating a generational shift in pronunciation habits (Kawahara 2016).

2.3 Previous Research

Yasuko Nagano Madsen's research on the prosodic characteristics of Swedish learners of Japanese serves as a valuable reference for the present study. Swedish L2 prosody is characterized by a preference for upward pitch movement, including a preference for F0 rise over F0 fall, upstep over downstep, and a lack of sharp F0 falls in their production (Nagano-Madsen, 2015a). Additionally, Swedish learners encounter difficulties in perceiving the distinction between F0 rise and F0 fall. Nagano-Madsen (2015b) discusses a frequently used phrasing strategy employed by Swedish learners when reading Japanese text, which involves the use of 'upstep' instead of the more common downstep in grouping words into prosodic phrases.

Another area in which Swedish learners encounter challenges is in acquiring F0 features related to information and discourse structure (Nagano-Madsen, 2015a). Japanese follows a topic-comment structure, where the topic is presented first with the topic particle "wa," followed by new information. Notably, Swedish learners tend to exhibit an opposite F0 relation, with the topic phrase carrying a higher F0 than the focused phrase. The distinction between pitch accents appears relatively early in the acquisition process, possibly due to the lexical pitch accent distinction present in Swedish, albeit with different phonetic realizations compared to Japanese. However, despite this lexical pitch accent distinction in Swedish, most Swedish students are unaware of it. Furthermore, pitch accent distinction in Japanese is not typically taught in Japanese courses, in contrast to the inclusion of tones in Chinese language

instruction from the beginning. While studies on interlanguage mostly focus on grammar, limited research exists on L2 intonation acquisition. The patterns observed by Yasuko Nagano Madsen may potentially be relevant to this study.

Yasuko Nagano Madsen's research specifically analyses the prosodic organization of L2 Japanese produced by L1 Swedish speakers at the beginner level. The study involved ten native Swedish university students, five males and five females between the ages of 18 and 20, with similar regional and family backgrounds. None of the participants had previous experience studying in Japan or received specific training in reading the given Japanese text. The recorded speech, consisting of the story of Momotaro (Peach Boy), was analysed using prosodic phrasing criteria proposed for Tokyo Japanese.

Notably, none of the beginner-level students in the study demonstrated the distinction between the two types of lexical pitch accent in Japanese. This finding aligns with a previous study by Nagano-Madsen, which indicated that the distinction typically emerges between the intermediate and advanced levels for most Swedish learners. Although both Swedish and Japanese have lexical pitch accent distinctions, this distinction does not appear before the intermediate level in Swedish learners. While studies have examined whether Swedes can produce proper intonation in the early stages of learning, the question of whether they can perceive it remains unanswered, serving as a key focus of the present study.

Also worth noting, is the research conducted by Hadding-Koch and Abramson (1964) which aimed to determine whether vowel duration or spectral attributes played a more prominent role in perceptually distinguishing vowel quantities in Swedish. The study concluded that while vowel duration served as a primary perceptual cue for Swedish vowel quantity, the contribution of vowel spectra could not be disregarded (Hadding-Koch K. and Abramson A. 1964). These findings align with the research conducted on the Japanese

language, indicating a similar pattern regarding the role of vowel duration and spectra in distinguishing vowel quantity. This suggests that there is a complex yet systematic relationship between these factors, reminiscent of the findings in the Swedish language.

The relevance of Nagano Madsen's research and Hadding-Koch and Abramson's study lies in the interplay between prosodic features (such as pitch, duration, and quality) and their perception by L1 Swedish speakers. Swedish learners' tendency to rely on vowel duration and spectral quality might influence their perception of Japanese pitch accents. Additionally, the findings from Nagano Madsen's study suggest that Swedish learners need to adjust their prosodic strategies (e.g., from upstep to downstep) to match Japanese patterns. This adaptation also involves tuning their perception to the pitch movements that characterize Japanese prominence.

Chapter III: The Project

3.1 Methodology

The study utilized an online questionnaire format, ensuring flexibility and convenience for participants. Prior to the test, 21 participants of ages 19-63, with no prior knowledge of Japanese, were provided with an introductory tutorial to familiarize themselves with the purpose of the study and the basic Swedish pitch accent system as to eliminate potential confusion and ensure accuracy. While all participants remained anonymous, some were acquaintances of mine, either asked by me or a family member to take the survey, while others were complete strangers found on the internet, who found the questionnaire through social forums I'd shared it on. The sole requirement was that they had to speak Swedish as their mother tongue. The assessment began with participants identifying the prominent

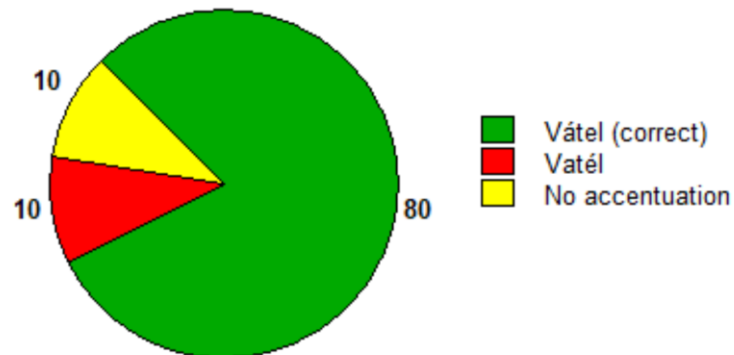
syllable in a set of fabricated Swedish neologisms (*Vatel* and *Barålen*, type 1 accent pronunciation on both) before transitioning to the main test phase involving Japanese stimuli (*Tsubare*, *Koreku*, *Zakemi*, and *Hokosa*). The Swedish neologisms were recorded by me, a native Swedish speaker from Hälsingland with no audible dialect, while the Japanese neologisms were recorded by two native Japanese speakers with Tokyo dialect, one male, and one female. The stimulus words were fabricated with the intent to replicate words of respective language, while also being constructed in such a way so that there'd be a mix of consonants and vowels, a varied range of stimuli for the listeners.

The order of the questions and the answer options were randomized to mitigate potential bias. Each participant responded to 32 questions, excluding the Swedish examples, and each one, following the exact same format as the introductory exercises, consisted of four multiple-choice answers, presenting all possible pitch accent locations for the given word, along with an option indicating "no accentuation." Each question consisted of a sentence containing the stimulus word, underlined, accompanied by an audio recording of the sentence, which participants could replay as needed. The test encompassed sentences read by both male and female voices, ensuring a diverse range of auditory stimuli. Additionally, participants were asked to provide information regarding their regional origin within Sweden, as intonation serves as a significant dialect marker in Scandinavian dialects (Gårding, 1989). Supplementary information, such as age and gender, was also collected to explore potential correlations.

3.2 Results: Raw Data

Figure 1

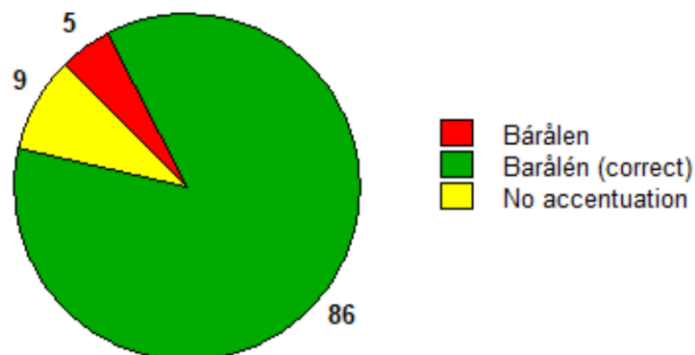
Vatel example answers (%)



Sentence: “Jag såg en *Vatel* idag”

Figure 2

Barålen example answers (%)



Sentence: “*Barålen* lossnade”

As shown in figures 1 and 2, more than 80% of the participants could successfully identify Swedish pitch placement, while approximately 20% could not. This indicates a good, but not perfect, understanding of Swedish pitch placement, which is to be considered when evaluating the final results regarding the Japanese stimulus words. Since 100% could not be

achieved in either word, 80-86% will act as the basis for maximum prominence perception when it comes to the Japanese words.

Table 1

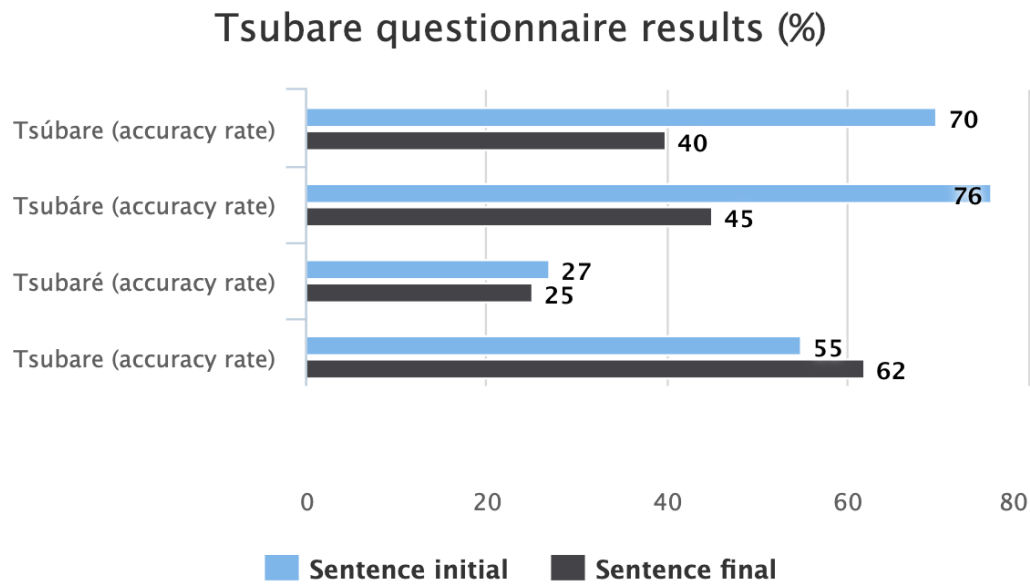


Table 2

Koreku questionnaire results (%)

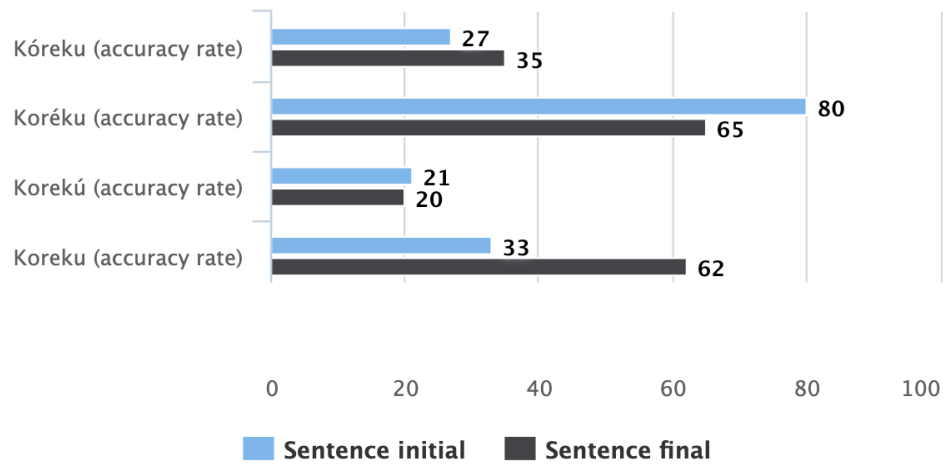


Table 3

Zakemi questionnaire results (%)

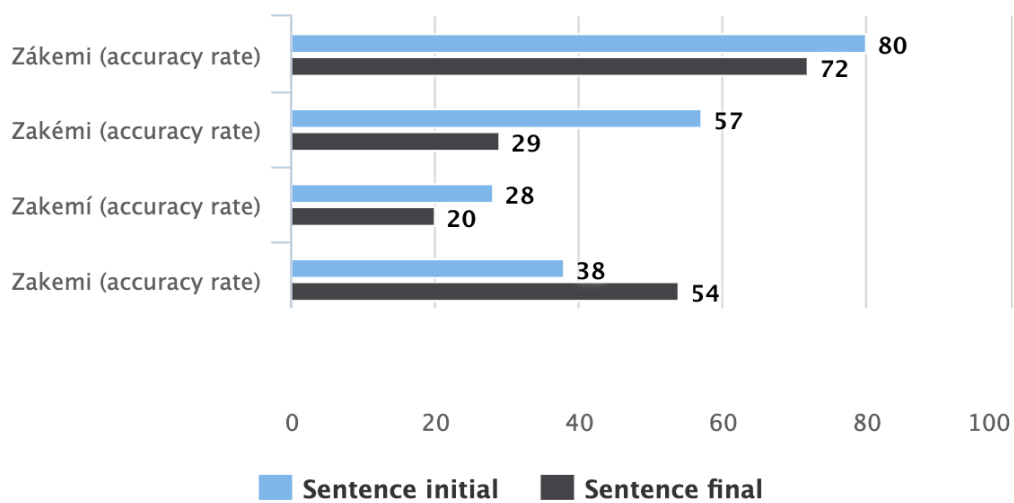
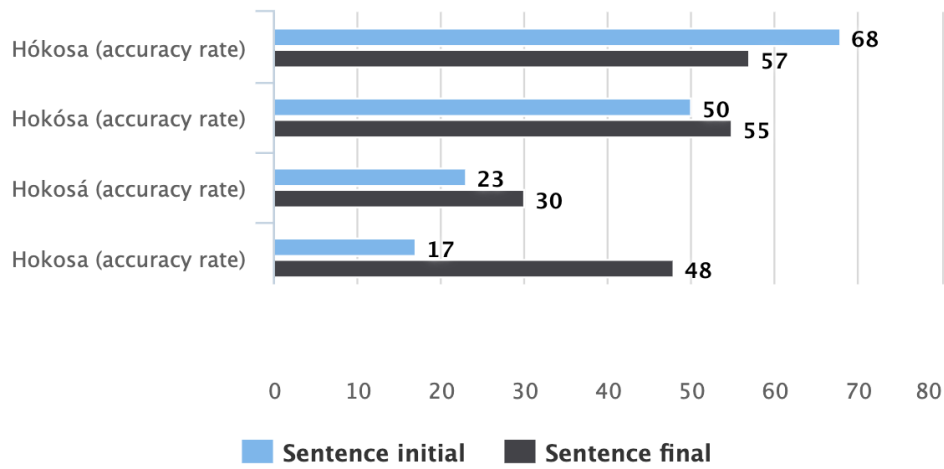


Table 4

Hokosa questionnaire results (%)



3.3 Results: Compilation and Analysis

Table 5: Summary

I = (Sentence) Initial

F= (Sentence) Final

	Success rate (%):	Success rate (%):	Success rate (%):	Success rate (%):
Stimulus	Tsubare	Koreku	Zakemi	Hokosa
words:				
Initial (first)	I 70	I 27	I 80	I 68
mora pitch	F 40	F 35	F 72	F 57
Medial	I 76	I 80	I 57	I 50
(second)	F 45	F 65	F 29	F 55
mora pitch				

Final (third)	I 27	I 21	I 28	I 23
mora pitch	F 25	F 20	F 20	F 30
Toneless	I 55	I 33	I 38	I 17
	F 62	F 62	F 54	F 48

1. Initial mora pitch (Tsúbare, Kóreku, Zákemi, Hókosa):

– Sentence-Initial: Average correct = $(70\% + 27\% + 80\% + 68\%) / 4 =$

61.25%

– Sentence-Final: Average correct = $(40\% + 35\% + 72\% + 57\%) / 4 =$ **51%**

2. Medial mora pitch (Tsubáre, Koréku, Zakémi, Hokósa):

– Sentence-Initial: Average correct = $(76\% + 80\% + 57\% + 50\%) / 4 =$

65.75%

– Sentence-Final: Average correct = $(45\% + 65\% + 29\% + 55\%) / 4 =$ **48.5%**

3. Final mora pitch (Tsubaré, Korekú, Zakemí, Hokosá):

– Sentence-Initial: Average correct = $(27\% + 21\% + 28\% + 23\%) / 4 =$

24.75%

– Sentence-Final: Average correct = $(25\% + 20\% + 20\% + 30\%) / 4 =$ **23.75%**

4. Toneless (Tsubare, Koreku, Zakemi, Hokosa):

– Sentence-Initial: Average correct = $(55\% + 33\% + 38\% + 17\%) / 4 =$

35.75%

– Sentence-Final: Average correct = $(62\% + 62\% + 54\% + 48\%) / 4 =$ **56.5%**

Table 6: Sentence Initial versus Sentence Final Success Increase/Decrease rates

Word	Initial Mora Pitch	Medial Mora Pitch	Final Mora Pitch	Toneless
Tsubare	-30%	-31%	-2%	+7%
Koreku	+8%	-15%	-1%	+29%
Zakemi	-8%	-28%	-8%	+16%
Hokosa	-11%	+5%	+7%	+31%

Table 7: Identification of *Tsubare* in Sentence Initial Position

Pitch placement	Correct responses (%)	Inclination toward incorrect alternatives (%)	Incorrect responses (%)
Tsúbare	70	Tsubáre: 10 Tsubaré: 10 Toneless: 10	30
Tsubáre	76	Tsúbare: 14 Tsubaré: 5 Toneless: 5	24
Tsubaré	27	Tsúbare: 9 Tsubáre: 55 Toneless: 9	73
Tsubare	55	Tsúbare: 14 Tsubáre: 28 Tsubaré: 3	45

Table 8: Identification of *Tsubare* in Sentence Final Position

Pitch placement	Correct responses (%)	Inclination toward incorrect alternatives (%)	Incorrect responses (%)
Tsúbare	40	Tsúbare: 15 Tsubaré: 10 Toneless: 35	60
Tsubáre	45	Tsúbare: 7 Tsubaré: 17 Toneless: 31	55
Tsubaré	25	Tsúbare: 14 Tsubáre: 21 Toneless: 40	75
Tsubare	62	Tsúbare: 5 Tsubáre: 33 Tsubaré: 0	38

Focusing on sentence initial *Tsúbare* first (Table 7), the majority of participants were able to accurately identify the correct syllable pitch, almost reaching the same accuracy of the participants' general identification rate with the Swedish neologisms (70% versus 80%). The incorrect guesses were evenly spread out (10% on all other options), suggesting no correlation of inclination toward a specific word type. (Sentence initial) *Tsubáre*'s results were about the same, with a slightly stronger inclination among subjects toward option

Tsúbare compared to the rest, however the success rate was also higher (76% versus 70%). (Sentence initial) Final accented *Tsubaré*, on the other hand, received a significantly lower success rate of a mere 27%, less than half of what the (incorrect) medial-pitch alternative *Tsubáre* received. It can be observed that, while not as drastically shown as in *Tsubaré*'s results, there is a tendency among the L1 Swedish participants to, if not identifying the pitch correctly, misidentify pitch accents as falling earlier than they actually do. Initial pitch (*Tsúbare*) for medial pitch (*Tsubáre*), medial pitch for final pitch (*Tsubaré*), and as for words which have no preceding accent location (*Tsúbare* and *Tsubare*), the guesses are more evened out (due to *Tsubare*'s shaky success rate, I personally assume the “inclinations” are mostly fabricated guesses).

Now, moving on to the sentence final results (Table 8), the most apparent difference is the general strong inclination toward the toneless alternative. On top of that, sentence final *Tsubare* is the only word class exceeding 50% and maintaining a relatively high success rate compared to the other word classes, whose success rates decreased overall (initial pitch *Tsúbare* and medial pitch *Tsubáre* drastically so). Here, the aforementioned inclination toward wrongfully perceiving word pitch as one pitch “early” no longer applies, nor are *Tsubare*'s results as varied (as in, incorrect alternative distribution). Interestingly, inclination toward final pitch (*Tsubaré*) increased as well in word final sentences, second to that of toneless.

Table 9: Identification of *Koreku* in Sentence Initial Position

Pitch placement	Correct responses (%)	Inclination toward incorrect alternatives (%)	Incorrect responses (%)
Kóreku	27	Koréku: 17 Korekú: 2 Koreku: 0	73
Koréku	80	Kóreku: 0 Korekú: 3 Toneless: 17	20
Korekú	21	Kóreku: 14 Koréku: 41 Toneless: 24	79
Koreku	33	Kóreku: 25 Koréku: 42 Korekú: 0	67

Table 10: Identification of *Koreku* in Sentence Final Position

Pitch placement	Correct responses (%)	Inclination toward incorrect alternatives (%)	Incorrect responses (%)
Kóreku	35	Koréku: 65 Korekú: 0	65

		Toneless: 0	
Koréku	65	Kóreku: 10 Korekú: 10 Toneless: 15	35
Korekú	20	Kóreku: 4 Koréku: 44 Toneless: 32	80
Koreku	62	Kóreku: 5 Koréku: 14 Korekú: 19	38

Focusing on the sentence initial position for *Kóreku* first, the identification success rate among participants was notably low at 27%. This is a sharp contrast to the higher accuracy observed for Swedish neologisms and previously observed sentence initial *Tsúbare*. The incorrect guesses for *Kóreku* were distributed primarily toward *Koréku*, which, interestingly, applies for all pitch locations of the word *Koreku* (sentence initial position). Participants exhibited a strong tendency to misperceive the word pitch as medial, no matter the placement. Next, examining sentence initial *Koréku*, the high correct identification rate of 80% aligns with the previously observed word's (76% versus 80%). Participants clearly found this pitch pattern easier to identify, suggesting a potential familiarity with or ease of recognising the medial pitch accent. Here, a large majority of the incorrect guesses (17% out of 20%) were placed on the toneless alternative. For sentence initial *Korekú*, the correct identification rate drops sharply again to 21%, once more realigning with the results of the other stimulus words. Lastly, sentence initial *Koreku* had a correct identification rate of 33%,

which, while low, is higher than *Korekú*. This suggests that participants were occasionally able to correctly identify the toneless variant, but not as consistently as the medial pitch accent. Here too, as previously mentioned, participants expressed a bias toward medial pitch.

Moving on to the sentence final position, the identification rates for *Kóreku* improve slightly to 35%, though still substantially low compared to the medial pitch variant. This slight improvement suggests that participants find it marginally easier to identify initial pitch accents of this particular word in sentence final positions, though the success rate remains quite low. The incorrect alternative, *Koréku*, attracted all incorrect responses (65% out of 65%). For sentence final *Koréku*, the correct identification rate dropped to 65% from 80% in the initial position, but it remained the highest among the variants. This indicates a relative ease in recognizing medial pitch accents, even in sentence final positions, reinforcing the participants' stronger ability to identify medial pitch accent. The incorrect alternatives were relatively spread out, suggesting no particular inclination toward a certain misperception.

Sentence final *Korekú* had a consistent low correct identification rate of 20%, similar to the initial position. This persistently low rate highlights the difficulty participants faced in identifying the final pitch accent, often misperceiving it as either medial or toneless.

Finally, sentence final *Koreku* saw a marked improvement in correct identification rates, reaching 62%. This is a significant increase compared to the initial position, suggesting that participants found it easier to identify the toneless variant in sentence final positions.

Table 11: Identification of *Zakemi* in Sentence Initial Position

Pitch placement	Correct responses (%)	Inclination toward incorrect alternatives (%)	Incorrect responses (%)
Zákemi	80	Zakémi: 0 Zakemí: 9,5 Toneless: 9,5	20
Zakémi	57	Zákemi: 32 Zakemí: 7 Toneless: 4	43
Zakemí	28	Zákemi: 34 Zakémi: 28 Toneless: 10	72
Zakemi	38	Zákemi: 31 Zakémi: 31 Zakemí: 0	62

Table 12: Identification of *Zakemi* in Sentence Final Position

Pitch placement	Correct responses (%)	Inclination toward incorrect alternatives (%)	Incorrect responses (%)
Zákemi	72	Zakémi: 16 Zakemí: 8	28

		Toneless: 4	
Zakémi	29	Zákemi: 38 Zakemí: 24 Toneless: 9	71
Zakemí	20	Zákemi: 30 Zakémi: 35 Toneless: 15	80
Zakemi	54	Zákemi: 8 Zakémi: 24 Zakemí: 12	46

Focusing on sentence initial *Zákemi* first, participants showed a high accuracy rate in identifying the correct pronunciation of *Zákemi* at 80%, which aligns perfectly with the high accuracy observed in the identification of Swedish neologisms. This suggests a very strong understanding of first-syllable pitch accent placement in word initial sentence structure. For *Zakémi*, the correct identification rate drops to 57%. This still represents a majority but shows a noticeable decline compared to *Zákemi*. Here, participants predominantly misidentified *Zakémi* as *Zákemi* (32%), highlighting the tendency shown in *Tsubare* (and to a degree, *Koreku*) to shift the perceived pitch accent earlier in the word. Final pitch *Zakemí* follows the trend of noticeably low accuracy rate for that word type, and toneless *Zakemi* similarly so, with no significant bias toward a certain pitch location in either word.

As for the sentence final position results, the trend of the accuracy rates dropping overall continues, with the exception of toneless *Zakemi*, whose accuracy rose from 38% to 54%. It can once again be observed that the participants seemingly find it easier to recognize

toneless pronunciation at the end of a sentence, and that the confusion patterns were relatively consistent across positions, with frequent mix-ups between *Zákemi* and *Zakémi*, and between *Zakémi* and *Zakemí*. This consistency indicates that certain pitch distinctions are universally challenging regardless of sentence position.

Table 13: Identification of *Hokosa* in Sentence Initial Position

Pitch placement	Correct responses (%)	Inclination toward incorrect alternatives (%)	Incorrect responses (%)
Hókosa	68	Hókosa: 19 Hokosá: 5 Toneless: 8	32
Hokósa	50	Hókosa: 40 Hokosá: 5 Toneless: 5	50
Hokosá	23	Hókosa: 39 Hokósa: 23 Toneless: 15	77
Hokosa	17	Hókosa: 17 Hokósa: 53 Hokosá: 0	83

Table 14: Identification of *Hokosa* in Sentence Final Position

Pitch placement	Correct responses (%)	Inclination toward incorrect alternatives (%)	Incorrect responses (%)
Hókosa	57	Hokósa: 22 Hokosá: 7 Toneless: 14	43
Hokósa	55	Hókosa: 17 Hokosá: 11 Toneless: 17	45
Hokosá	30	Hókosa: 20 Hokósa: 0 Toneless: 50	70
Hokosa	48	Hókosa: 40 Hokósa: 4 Hokosá: 8	52

Looking at sentence initial position first, the pronunciation *Hókosa* had a correct identification rate of 68%, indicating moderately high accuracy, however it was frequently confused with *Hokósa* (19%), suggesting that participants find it challenging to distinguish the high pitch on the first syllable from a high pitch on the second syllable in the initial position for this word. For *Hokósa*, the correct identification rate was 50%. While this is relatively high, there was significant confusion with *Hókosa* (40%), reinforcing the difficulty participants have in differentiating between these two pitch accents at the beginning of a

sentence The pronunciation *Hokosá* had a lower correct identification rate of 23%, with a substantial number of participants mistaking it for *Hókosa* (39%) and *Hokósa* (23%). This, too, aligns with the pattern shown in the other stimulus words, that pattern being L1 Swedish speakers' difficulty with identifying final pitch, as well as mistaking medial pitch for initial pitch. *Hokosá*'s results especially align with those of *Zakemís*'s in terms of participant inclination toward initial- and medial pitch (39% and 23% vs 34 and 28%). The toneless version, *Hokosa*, saw the lowest correct identification rate at 17%, the lowest out of all stimulus words, with the majority of participants confusing it with "Hokósa" (53%). This further confirms that toneless pronunciation is especially difficult to identify correctly when it starts a sentence.

In the sentence final position, the accuracy and confusion patterns shifted. The correct identification rate for *Hókosa* decreased to 57%, indicating that while still relatively high, participants found it slightly harder to recognize this pronunciation at the end of a sentence. Similarly, *Hokósa*'s identification rate dropped as well, though not drastically, showing that participants' ability to identify this pronunciation did not significantly change based on sentence position. Like in the sentence initial position, participants still strongly gravitated towards the initial pitch alternative, with the difference now being that the toneless alternative shared the same inclination rate (17%), a trend that can be observed in the previous stimulus words discussed (the fact that the toneless option gains popularity in sentence final positions). The correct identification rate for *Hokosá* was slightly higher than in the initial position. Here, too, initial pitch and toneless alternatives were the most common, with toneless taking up 50% of the participants' guesses. The toneless pronunciation *Hokosa* had a higher correct identification rate in the final position at 48%, compared to the initial position, and yet again, participants often chose *Hókosa* (40%). Overall, regardless of word position in the sentence,

the initial pitch alternative consistently gained a lot of attention, which cannot be said about any of the other stimulus words.

3.4 Discussion

As can be seen in table 5, participants demonstrated a significantly higher accuracy in identifying the prominent syllable in sentence initial word phrases. This suggests that L1 Swedish speakers are more proficient in perceiving pitch placement when the Japanese stimulus word appears at the beginning of a sentence. However, an interesting contrast was observed with toneless words, where participants found them easier to recognize in sentence final phrases instead. This change is particularly evident in the stimulus word *Koreku*, where participants' overall accuracy increased from 17% to 48%, a notable 31% difference. Participants also exhibited relatively high precision in locating first- and second-syllable accented words (particularly first) in sentence initial positions. The reason for this, could be due to the tendency for prominence or emphasis in the Swedish language to be placed on the initial syllable of a word or phrase. In fact, the majority of Swedish words are accented on the first syllable (Gårding, 1989). This linguistic convention may have influenced the participants' expectations and attentional focus on the initial syllable when perceiving Japanese words in sentence initial positions. They may have relied on their native prosodic expectations, which prioritize the initial syllable, to guide their perception in the study, hence resulting in negative transfer. In this respect, L1 Swedish speakers may in fact benefit from the Swedish phonology system in regards to initial-syllabic accented Japanese words, while the opposite applies for non-first-syllable accented words (interference).

An exception to this trend was observed with the word *Koreku* again, which had an accuracy rate of 27%, significantly lower than the other words' accuracies of 70%, 80%, and

68% (first syllable pitch). The answers were, however, rarely ever unanimous, suggesting a lack of confidence in the participants' answers, and a certain amount of guessing may therefore have been at play. Despite the seemingly random answer choices however, certain patterns can still be discerned. For instance, when participants misperceived first syllable accented words, they often mistakenly perceived them as second syllable accented words instead. Additionally, third syllable accented words, identified as the most challenging for L1 Swedish speakers, were frequently mistaken for either toneless or second syllable accented words. However, considering how much difficulty the participants had with this word class, it's possible that it's a complete coincidence, and that the guesses simply aligned in such a way.

Interestingly, the stimulus word *Hokosa* had a lower overall recognition rate compared to other neologisms. One possible explanation for this discrepancy is that the word utilizes the same vowel (O) twice, potentially making it more challenging to differentiate the pitch. This observation aligns with the participants' struggle to accurately identify the initial syllable pitch in *Koreku*, which also uses the /o/ vowel. While /u/ and /i/ are lexically defined as the only devoiced vowels in the Japanese phonological inventory, /o/ has been documented to experience devoicing as well, which may very well have been the case in this study, resulting in confusion among the participants when encountering this.

3.5 Conclusion

“To what extent are L1 Swedish speakers able to audibly identify the prominent syllable in Japanese words?” In conclusion, the study results suggest that L1 Swedish speakers display varying levels of accuracy in identifying the prominent syllable in Japanese words, influenced by factors such as pitch placement, word placement, and (potentially) the vowels

used and their order. While some pronunciations are more easily recognized at the beginning of a sentence, others (such as final-accented words) pose persistent challenges, indicating that sentence position significantly influences how pitch accents are perceived and identified, as well as on which syllable (mora) the pitch falls on. Which answers research question 2; “Does sentence structure affect the accuracy of perception?” Sentence structure, in terms of word initial and word final placement, greatly affects the accuracy of perception. As mentioned, participants exhibited significantly higher accuracy in locating the prominent syllable in sentence initial phrases, as depicted in table 5, accuracies which align with their results in the test phase using Swedish example words, where a success rate of approximately 80% was achieved. However, this pattern does not hold true for toneless words, which were easier to recognize in sentence final phrases. As for research question 3; “Does location of prominent syllable affect the accuracy of perception?”, participants generally showed a higher accuracy in locating the prominent syllable when accent was placed on the initial or medial syllable (mora), potentially due to the prominence of the initial syllable in the Swedish language. This relates to research question 4; “How may L1 Swedish speakers benefit from their Swedish phonological system when perceiving Japanese words? Alternatively, how may they be hindered by it?”, as it suggests a positive transfer from the Swedish phonological system to the perception of initial-syllabic accented Japanese words. However, for final-syllable accented words, as well as toneless ones, negative transfer or interference is more likely to occur. This also explains why the toneless Japanese words were significantly more challenging for the participants to accurately label, since the Swedish prosodic system doesn’t have accentless (toneless) words. The preceding linguistic context may also play a role in facilitating the perception of the prominent syllable. In sentence initial phrases, there is no preceding context that could potentially interfere with the perception of

pitch accent. This lack of interference allows participants to focus more directly on the target word and its pitch placement. It is however important to note that the L1 Swedish speakers in this study demonstrated considerable variability in their results, ranging from 8 to 23 correct responses out of 38, indicating that the perception of prominent syllables is highly individual-dependent. Additionally, no correlation between dialect (nor gender or age) was found, which will be discussed further in “Limitations and Further Research”. Hopefully these findings contribute to our understanding of cross-linguistic perceptual processes and underscore the complex interplay between native language phonological systems and the perception of foreign language prosody.

3.6 Limitations and Further Research

The study has several limitations that should be considered. One significant limitation is the lack of participation by native Japanese speakers. Including native Japanese speakers in the test could provide a benchmark for the accuracy and perception of pitch accents. Native Japanese speakers' responses could serve as a control group, helping to identify whether the difficulties observed among L1 Swedish speakers are due to inherent challenges in distinguishing these pitch patterns or are specific to non-native listeners. This comparison could shed light on the nuances of L1 Swedish prominent syllable perception in Japanese words and provide a clearer understanding of the phonetic challenges faced by Swedish speakers.

Another avenue for further research involves including a second language group, such as native English speakers. Conducting a similar test with L1 English speakers and comparing their results with those of L1 Swedish speakers could offer insights into how different language backgrounds influence the perception of Japanese pitch accents. This

comparative analysis could reveal whether the challenges in pitch accent perception are unique to Swedish speakers or are more broadly applicable to speakers of other non-tonal languages. Such comparisons could contribute to a broader understanding of second language acquisition and the impact of native language phonetic structures on the perception of foreign phonological features.

Then, there's the fact that the participant sample size was smaller than desired and expected, which may have affected the generalizability of the findings. Increasing the number of participants would provide a more comprehensive representation of L1 Swedish speakers and potentially yield more accurate results. Secondly, the length of the questionnaire, which took approximately 20-30 minutes to complete, may have caused participant fatigue or reduced motivation towards the end of the experiment. As cognitive resources and attention may have diminished over time, participants' accuracy in identifying the prominent syllable in later sections of the questionnaire could have been impacted. Future research should consider shorter and more engaging experimental designs to maintain participants' focus and attentiveness.

Moreover, I was planning to incorporate the role of dialect in this experiment, however due to an insufficiently varied pool of participants, this was impossible to achieve, especially with the time restraint in mind as well as poor time management from my part. To obtain a more comprehensive understanding of whether dialect influences the perception of prominent syllables in Japanese among L1 Swedish speakers, future research should aim to recruit participants from a broader geographical scale, encompassing various dialects and regional variations.

Finally, incorporating qualitative data, such as participant feedback on their thought processes and difficulties during the test, could provide deeper insights into the cognitive

mechanisms underlying pitch accent perception. Understanding the subjective experiences of participants could help to identify specific areas of confusion and inform strategies for improving pitch accent training for language learners.

Overall, addressing these limitations and conducting further research would enhance our understanding of the factors influencing the perception of prominent syllables in cross-linguistic contexts and contribute to the field of second language prosody acquisition.

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Appendix:

Questionnaire instructions:

Detta test går ut på att hitta den framträdande stavelsen i olika japanska ord. Målet är att testa hur väl svenskar (utan någon tidigare japanska kunskap) kan uppfatta fonetiska skillnader i japanska ord. Som ni vet kan vissa ord i svenskan, till exempel *armén* och *armen*, skiljas genom användning av apostrof över vokalen, men ord som *banan* (bestämd form av bana) och *banan* (frukt) har ingen sådan skriftlig åtskillnad, utan endast genom uttal. Detta test kommer att fokusera på tonaccentens placering i ordet.

Till exempel:

(´ = ordaccent)

Jápan - Land

Japán - Japansk invånare

Kánon - Fastställd norm (ex inom litteratur)

Kanón - Krutvapen

I dessa exempel är de framträdande stavelserna de kluster i ordet som innehåller ordaccenten (´). I *jápan* är JA den framträdande stavelsen, i *japán* är det PAN, och så vidare.

I detta test används endast japanska ord med (högst) **EN** accentuerad stavelse, ej två eller mer. De japanska orden ni kommer att få höra kan även vara **utan** accentuering, så att säga platt. I sådana fall, väljer ni alternativet "INGEN ACCENTUERING".

Nu när ni vet grunderna för japansk och svensk ord accent, får ni göra ett litet test. Innan det riktiga testet med japanska ord, så att säga. Nedanför står det två meningar på svenska, och två ljudinspelningar som läser upp dessa meningar. Meningarna innehåller högst sällsynta svenska ord (ett i varje mening, understruket) vars betoning är okänd för er. Genom att lyssna på inspelningarna skall ni sedan välja av alternativen presenterade vilken av stavelserna i det understrukna ordet som är accentuerat- det vill säga den framträdande stavelsen.

När ni klickar på länken "Ljudfil" kommer ett nytt fönster öppnas, där ni måste trycka på "spela" knappen för att inspelningen ska starta. **Detta test passar därför bäst att göras på en dator!**

(soundfile) "Jag såg en vatel idag"

(soundfile) "Barålen lossnade."

Nu när introduktionen är avklarad, går vi över till japanska ord.

Kom ihåg: Dessa ord kan möjligtvis vara utan någon accentuering alls. Lika som i de svenska exemplen, kommer dessa ord användas i meningar, men endast det understrukna ordet är det ni skall fokusera på. Lyssna noga efter ordaccent, och välj ut vilken del av ordet vars stavelse är framträdande (accentuerad), men lyssna även noga om ingen stavelse är det. Ni får lyssna om på ljudfilen hur många gånger ni vill. Lycka till!

All stimulus sentences (not showing pitch location):

Tsubare ga arimasu.

Koreku ga arimasu.

Zakemi ga arimasu.

Hokosa ga arimasu.

Tsubare ga suki desu.

Koreku ga suki desu.

Zakemi ga suki desu.

Hokosa ga suki desu.

Tonari no tsubare ga arimasu.

Tonari no koreku ga arimasu.

Tonari no zakemi ga arimasu.

Tonari no hokosa ga arimasu.

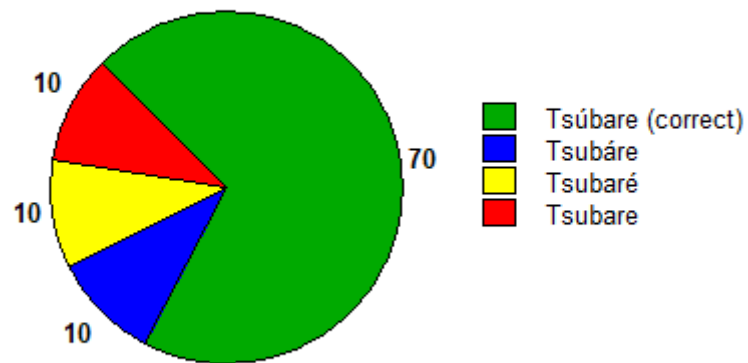
Mizu to tsubare ga arimasu.

Mizu to koreku ga arimasu.

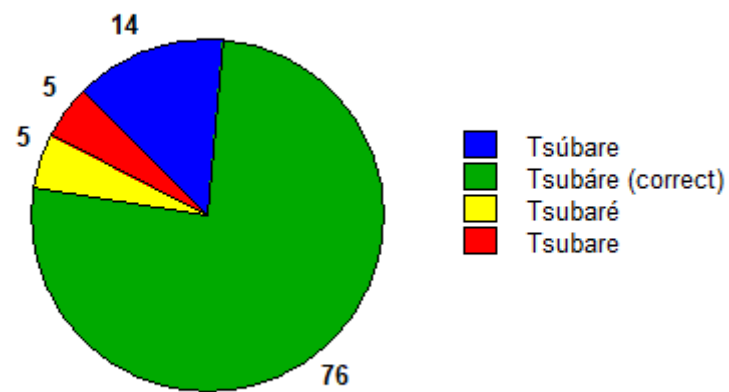
Mizu to zakemi ga arimasu.

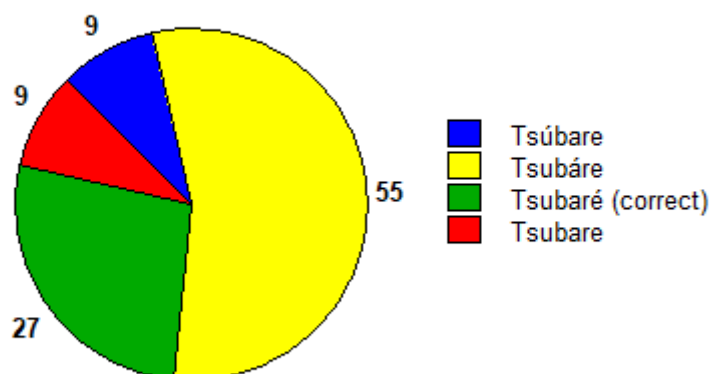
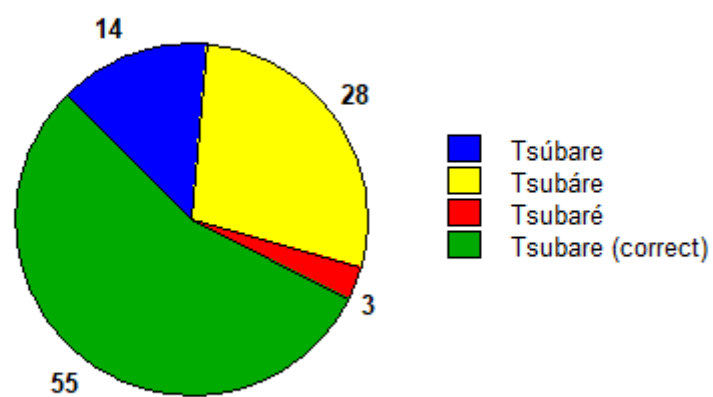
Mizu to hokosa ga arimasu.

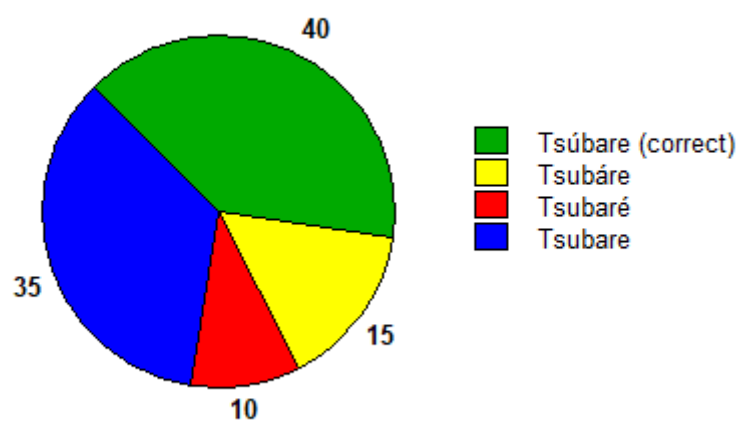
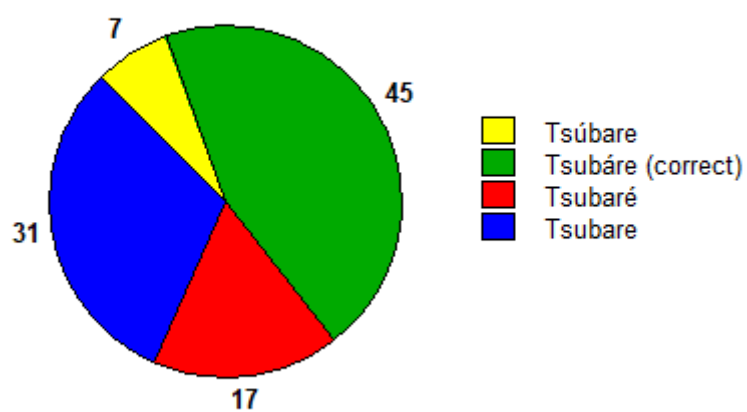
Sentence initial Tsúbare answers (%)

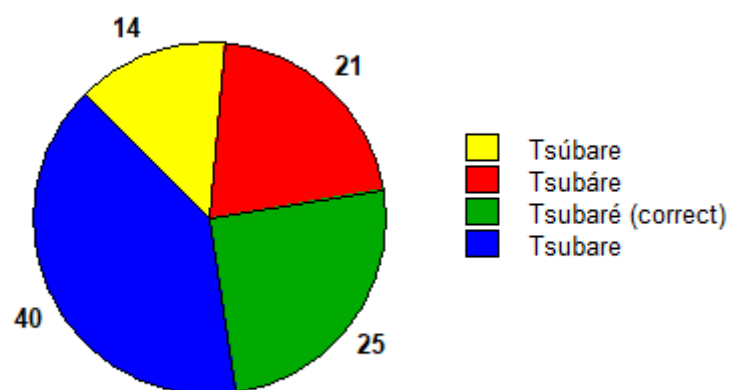
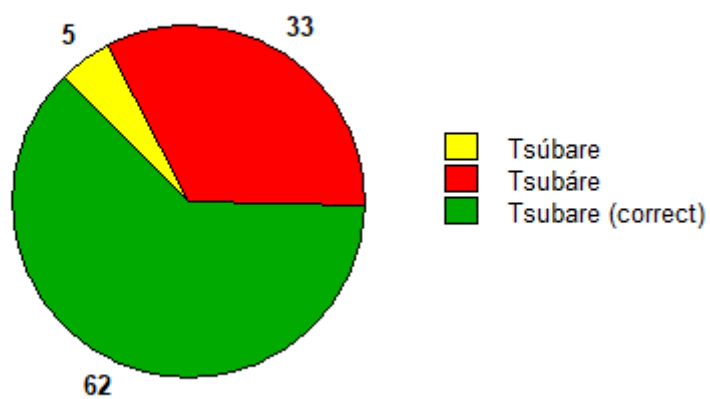


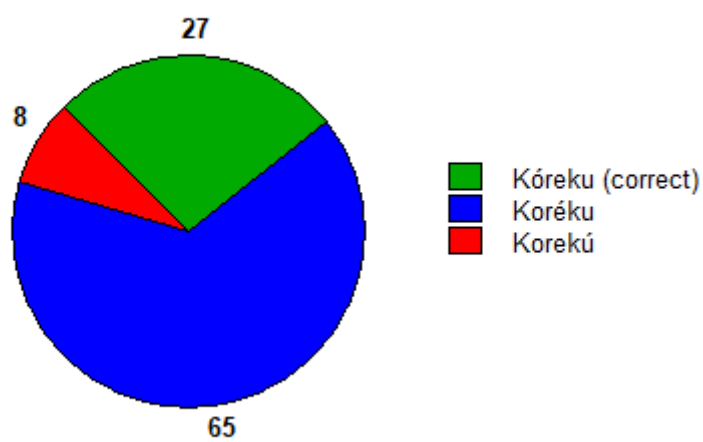
Sentence initial Tsubáre answers (%)

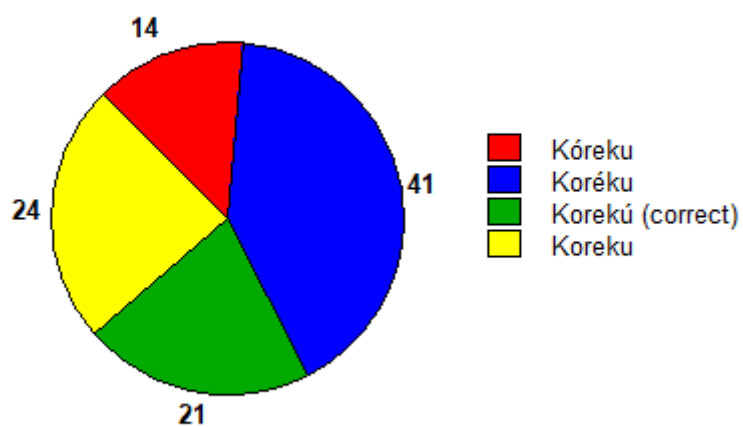
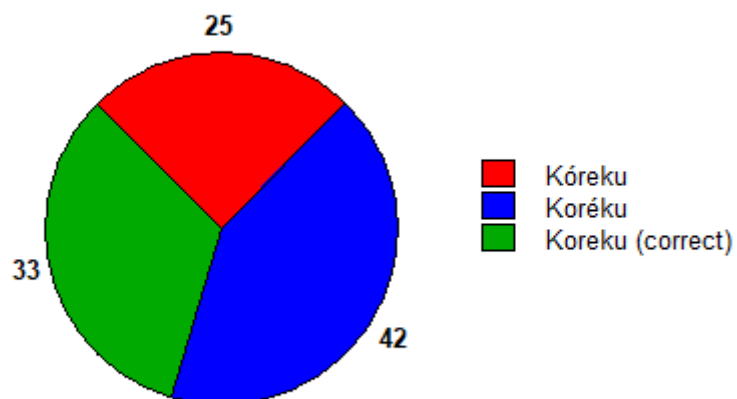


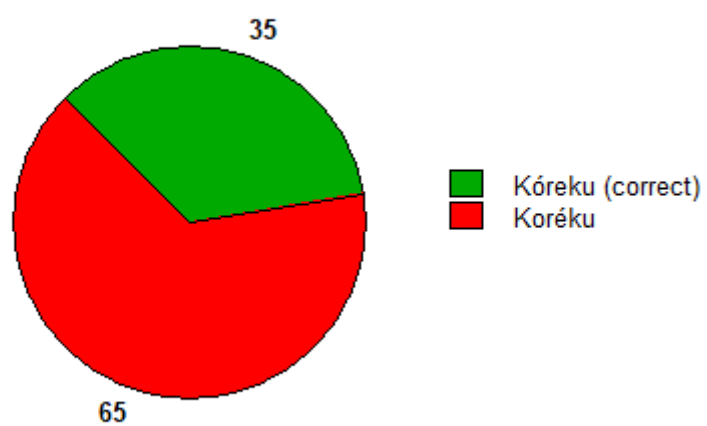
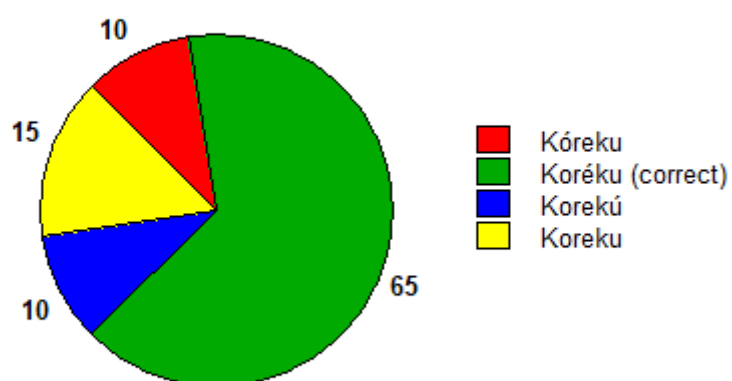
Sentence initial Tsubaré answers (%)**Sentence initial Tsubare answers (%)**

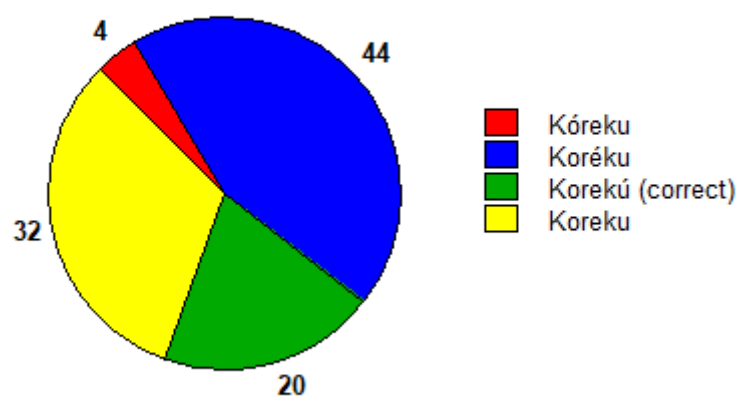
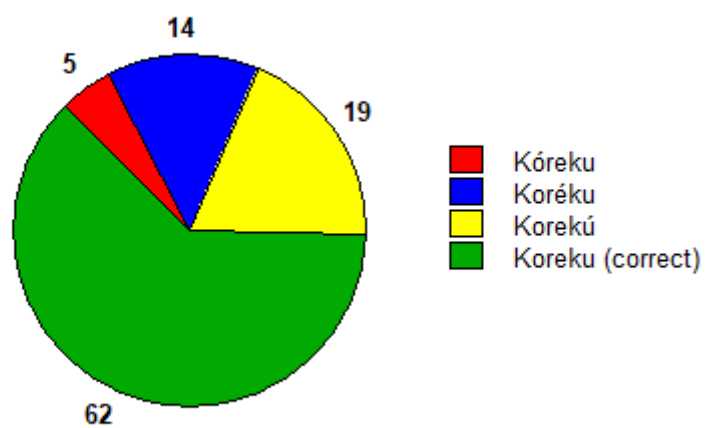
Sentence final Tsúbare answers (%)**Sentence final Tsubáre answers (%)**

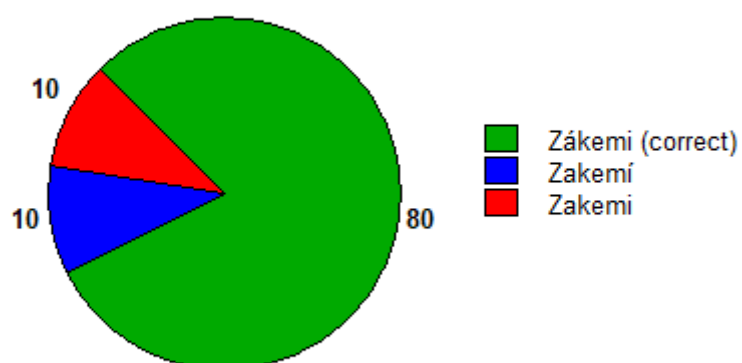
Sentence final Tsubaré answers (%)**Sentence final Tsubare answers (%)**

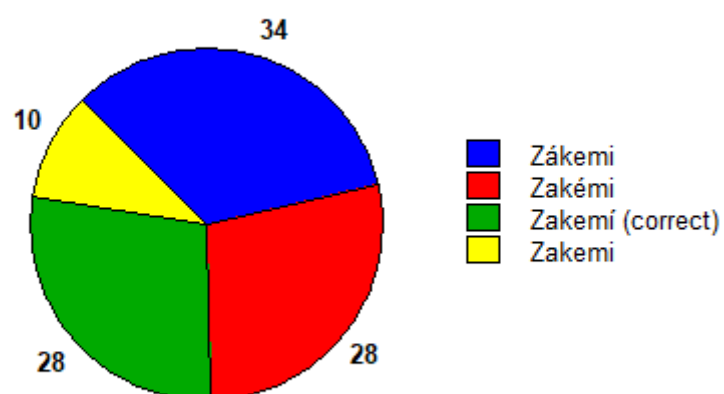
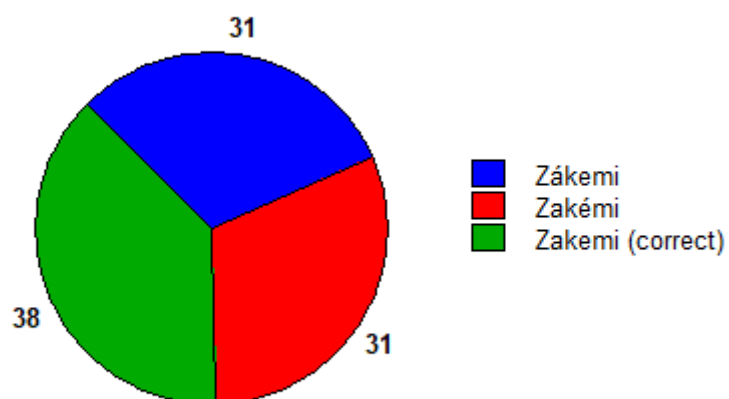
Sentence initial Kóreku answers (%)**Sentence initial Koréku answers (%)**

Sentence initial Korekú answers (%)**Sentence initial Koreku answers (%)**

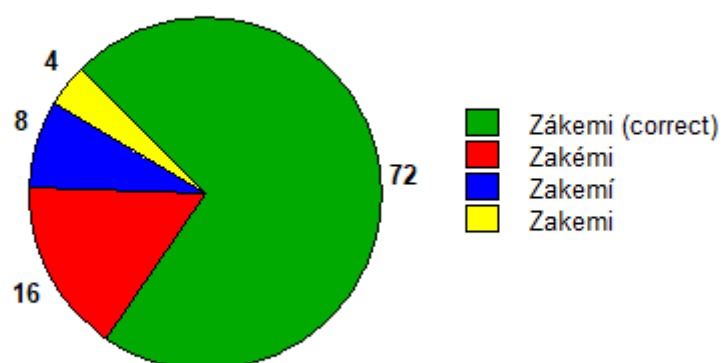
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Sentence final Korekú answers (%)**Sentence final Koreku answers (%)**

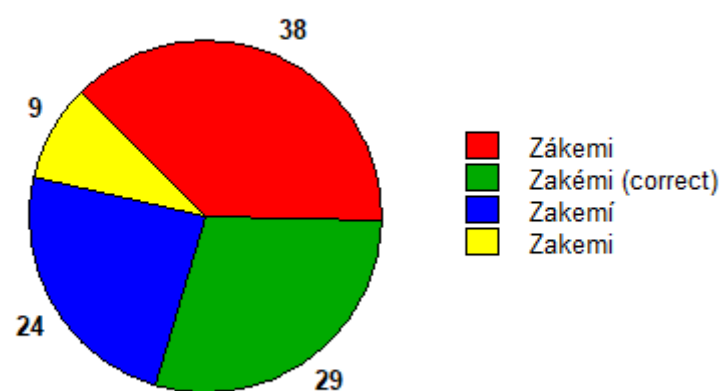
Sentence initial Zákemi answers (%)**Sentence initial Zakémi answers (%)**

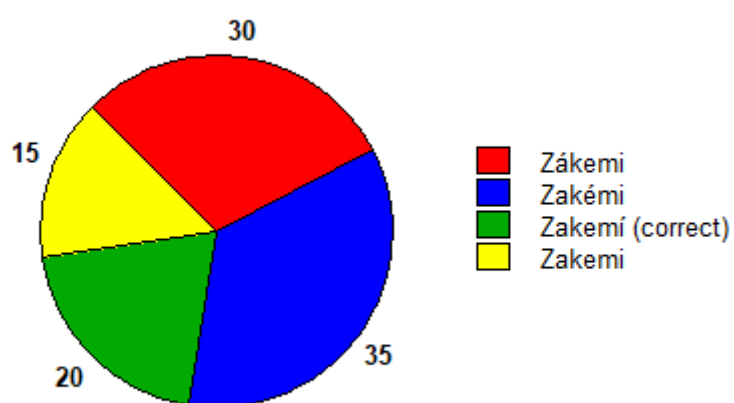
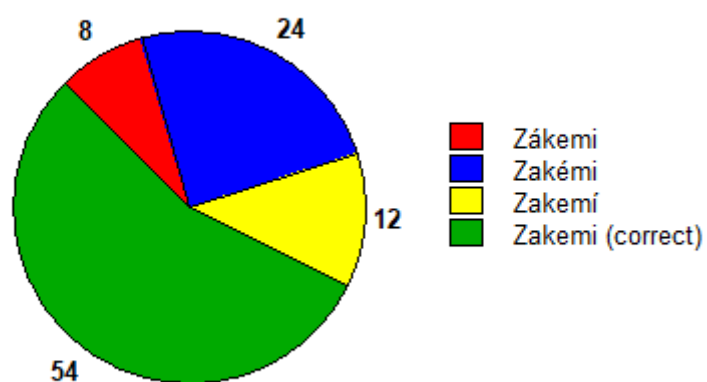
Sentence initial Zakemí answers (%)**Sentence initial Zakemí answers (%)**

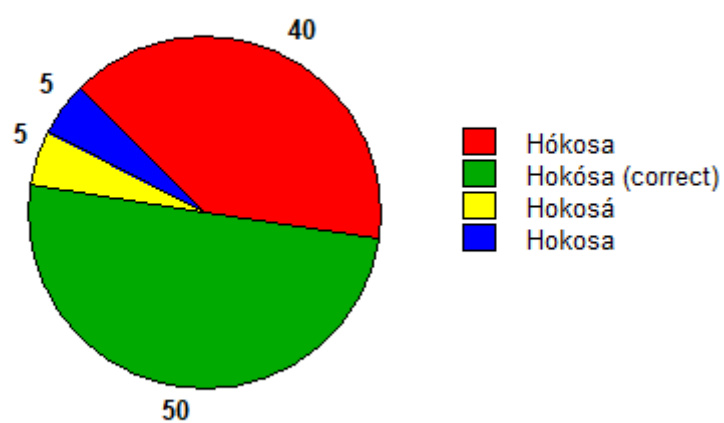
Sentence final Zákemi answers (%)

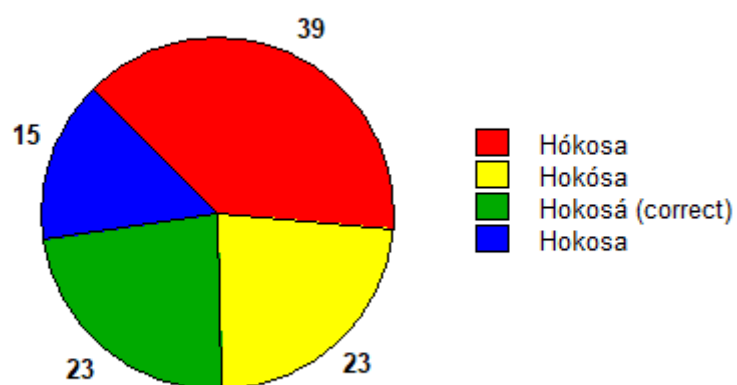
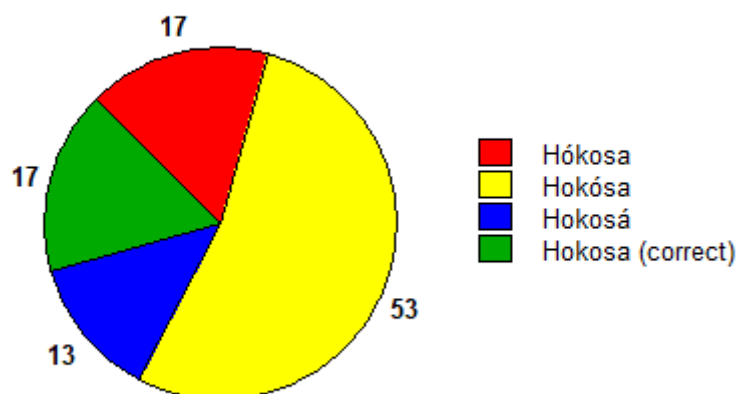


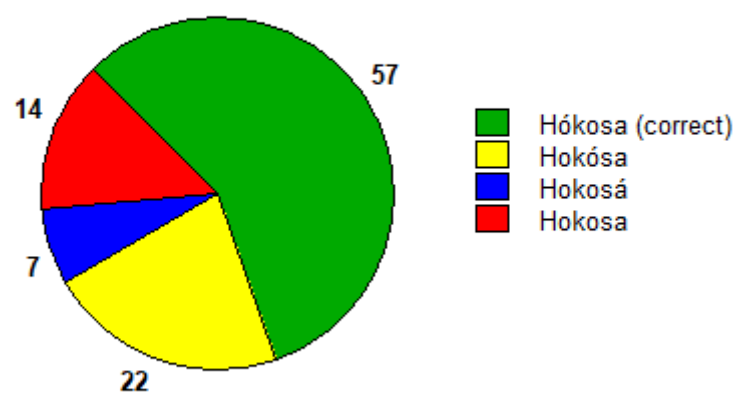
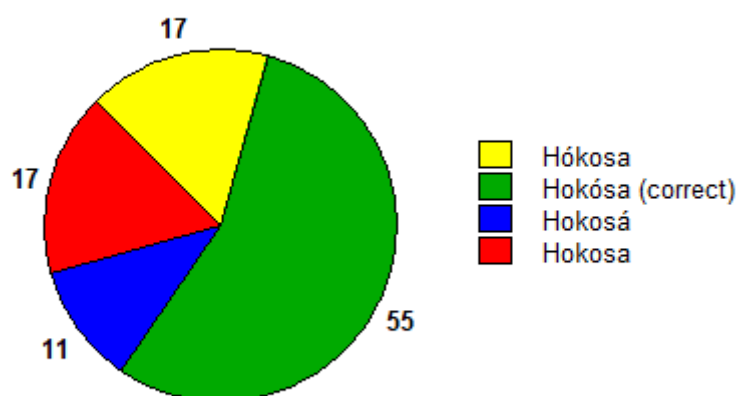
Sentence final Zakémi answers (%)

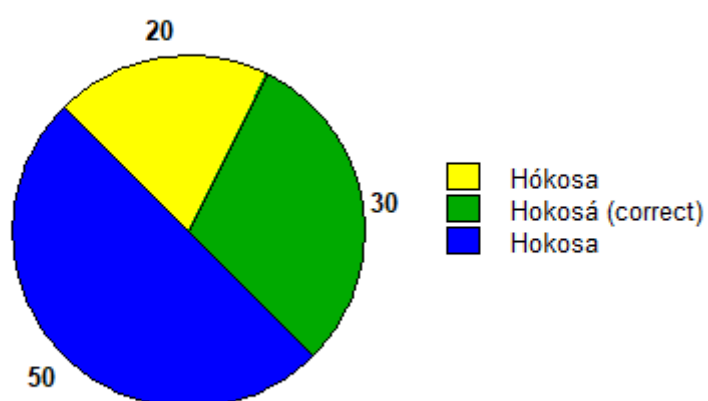


Sentence final Zakemí answers (%)**Sentence final Zakemí answers (%)**

Sentence initial Hókosa answers (%)**Sentence initial Hokósa answers (%)**

Sentence initial Hokosá answers (%)**Sentence initial Hokosa answers (%)**

Sentence final Hókosa answers (%)**Sentence final Hokósa answers (%)**

Sentence final Hokosá answers (%)**Sentence final Hokosa answers (%)**