



Prosodic phrasing unique to the acquisition of L2 intonation -an analysis of L2 Japanese intonation by L1 Swedish learners-

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Abstract

This paper examines the prosodic organization of L2 Japanese produced by L1 Swedish at the beginner level. Japanese and Swedish have been well studied for their prosodic structures and some well-defined prosodic phrases have been proposed. However, these existing prosodic phrases are found to be inadequate in analyzing L2 intonation seen as interlanguage. Instead, it consists of some unique phrasing showing the characteristics of interlanguage, i.e. a language that has its own system and it changes continuously during the acquisition process. Studies on interlanguage are mostly on grammar and not much is known about the acquisition of L2 intonation. The results reveal that the beginner level L2 intonation is characterized by many pauses that are inserted at every grammatical phrase boundary. Such a phrasing is unique as interlanguage and presumably universal in the less fluent speech at the beginner level. While a typical prosodic phrasing in Japanese uses downstep to group APs to iPs, a typical phrasing in L2 Japanese produced by L1 Swedish uses upstep and some other patterns instead. They are considered to be L1 prosodic transfer.

Index Terms: L2 acquisition, intonation, interlanguage, prosodic phrasing, pause, Japanese, Swedish

1. Introduction

Studies of second-language (L2) acquisition are many but they are mostly for grammatical features and not for speech features. As for the speech features, there seems to be a significant difference between the acquisition of segmentals and prosody. For segmentals such as vowels and consonants, the learner typically starts with a similar segment in his mother tongue (L1) and the sound in question gradually becomes closer to that in the target language. As for the acquisition of L2 intonation, it appears to take a different process from that of segmentals. Acquisition of L2 prosody usually involves a 'reset phrase' where F0 activity is extremely limited presumably because learners concentrate more on grammar and lexicon or simply because of lack of fluency [1]. Although there has been a significant achievement in the study of L2 acquisition in the past few decades, acquisition of L2 intonation is still an understudied area of research. This study examines the acquisition process of L2 Japanese intonation produced by L1 Swedish learners at the beginner level with focus on prosodic phrasing. Since both Japanese and Swedish are well studied for their prosodic structure, it allows us to proceed further to examine the nature of interlanguage that is said to be both universal and language specific. How does a prosodic phrasing start at the beginner level and when and how does L1 transfer occur?

2. Theory and framework

Much of today's research on L2 acquisition adopts the concept of interlanguage postulated by Selinker as basic principle of discipline [2]. Interlanguage is a linguistic system that is different from both the learner's L1 and L2. The present study also takes this approach by examining how learners' intonation structure as interlanguage develops during the course of acquisition. As for the more specific theory and methodology, the present study adapts the AM theory as conceptual background and method [3] [4]. In addition, some phonological, syntactic, and discourse parameters as well as their phonetic realizations that have been used for the study of Japanese intonation are integrated. Some of such parameters are also mentioned in a recently proposed Intonation Learning Theory (LILt) [5].

2.1. The hierarchy of prosodic phrasing

For describing the intonation structure of Japanese, three levels of phrasing are marked by F0. The three types of phrases are the accentual phrase (AP), the intermediate phrase (iP), and the utterance (U) [3]. An accentual phrase is the lowest level phrasal unit containing at most one accent. Accentual phrases are then grouped together prosodically into units at the next higher level of phrasing called intermediate phrase. An intermediate phrase contains one or more accentual phrases and its boundary is usually marked by a pause. Within the intermediate phrase, accentual phrases are organized in such a way to gradual lowering in pitch level (downstep) in Tokyo Japanese. The third level phrasing unit called utterance is marked by an initial %L boundary tone and can be marked by a L% H% boundary tone for question. The utterance is also assumed to be the domain for declination. In more recent study, the intermediate phrase and utterance are merged to one unit called intonation phrase [4]. In the present study, we adopt the original three-way levels as it is found to be more useful in describing L2 intonation.

The above mentioned phonological units and their phonetic realizations shown in Table 1 below are, however, only partially found in the intonation produced by L2 learners. In particular, at the early stage of acquisition such as the target of the present study, these hierarchical units are rarely present.

3. Method and analysis

Ten native Swedish university students learning L2 Japanese have recorded the story of *Momotaro* (=Peach Boy) at the end of the first year.. They are five males and five females at the age between 18 and 20, who have the same regional and family background. None of them have studied in Japan previously and they did not have any specific training in

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reading the given text. The story of *Momotaro* contains six sentences with well-balanced syntactic and discourse considerations, and it has been widely used in the analysis of Japanese dialects previously [6]. The recorded speech was monitored on the PRAAT screen and F0 analysis was conducted according to the prosodic phrasing criteria proposed for Tokyo Japanese [3]. Table 1 gives the summary of those criteria and their phonetic realization with two additional parameters Focus and Pause. However, the phonetic realizations for each parameter are meant for native Japanese intonation and not for L2 intonation. As such, the phonetic realization criteria were used somewhat flexible. As for the native Japanese utterance, the recording of a professional speaker was used from a speech database for comparison [6].

Table 1. Analysis parameters

Phonological parameters	Phonetic realization
(1a) Pitch-accent distinction	(1b) Presence vs. absence of sharp F0 fall,
(2a) accentual phrase (AP)	(2b) Initial F0 rise
(3a) intermediate phrase (iP)	(3b) downstep, disjuncture
(4a) utterance (U)	(4b) domain of declination, L% as final lowering
(5a) Focus	(5b) F0 expansion and compression
(6a) Pause	(6b) acoustic/perceptual

4. Results

4.1. Pauses and prosodic phrasing

The eminent features of L2 Japanese intonation at the beginner level are the frequent pauses and the long duration of utterances. Figure 1 contrasts the waveforms for the L1 speaker (below), who is a professional speaker, and a typical L2 Japanese waveforms produced by a L1 Swedish speaker (above). In the L1 speaker's waveform, the utterance is divided into six groups of sentences by a regular insertion of long pauses. Within a sentence, a shorter pause is inserted between clause boundaries. In contrast, the waveform of a L2 learner shows no such clear grouping to reflex the number of sentences. Pauses are inserted frequently, often after each word and phrase, and no systematic variations are found in the duration of pauses to reflect a hierarchical unit. A visual examination of the waveforms can be an initial evaluation criterion for L2 intonation, if the waveform shows a regular grouping with pauses; it is likely that even F0 is structured to a certain extent.

The utterance duration is yet another criterion in evaluating the fluency of L2 speech. As for the present material of reading a short story, it varied from 4893ms to 5917ms (median 5415ms) for the ten students while the native Japanese speaker's utterance was 3895ms.

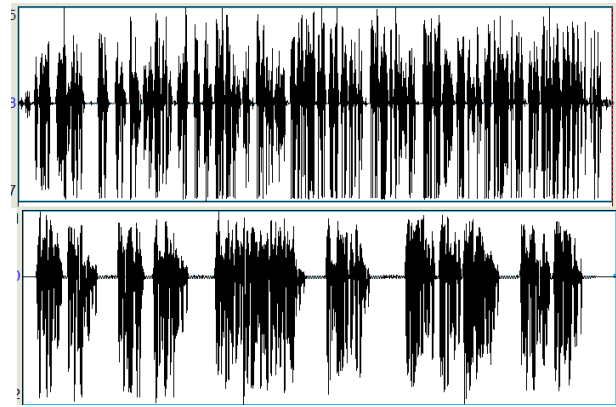


Figure 1: Waveforms by a L2 learner at the beginner level (above) and L1 speaker (below) for reading a short story with six sentences.

Having noted the difference in pauses and total duration, it should be pointed out there is a close correlation between the number of pauses and prosodic phrasing. Figure 2 shows the total number of APs, iPs, and pauses. The number of pauses varied from five for L1 speaker to as many as 38 for L2 speaker no. 2. For all, the L1 Japanese speaker (J in the graph) has the least number of APs, iPs, and pauses whereas the speaker 4 has the largest number of APs, iPs, and pauses. Pauses and iPs have a particularly well correlated. This is because L2 speakers have a tendency to produce the utterance phrase by inserting a pause, and such a phrase tends to consist an iP of its own. When the number of iP and pauses are less, the utterance sounds more fluent.

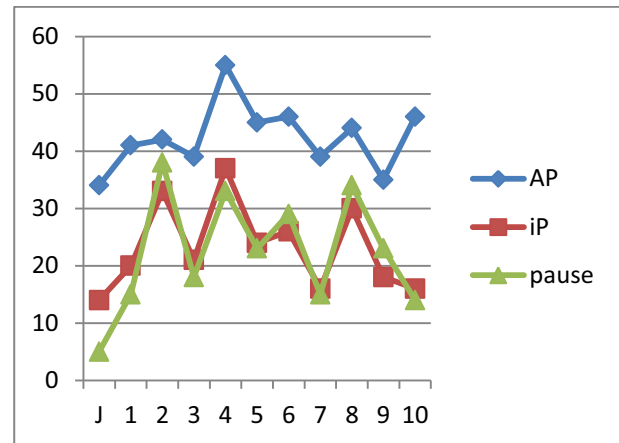


Figure 2: Total number of APs, iPs, and pauses in a read text with six sentences. Horizontal scale shows the speakers (J=Japanese, 1 to 10=L2 learners). Vertical scale shows the total number of tokens.

4.2. Pitch accent distinction

None of the ten students at the beginner level showed the distinction between two types of lexical pitch accent in Japanese. In our previous study on the acquisition of L2 Japanese intonation by L1 Swedish learners at intermediate and advanced levels, the distinction was reported to start somewhere between intermediate and advanced level for most students [1]. Since none of the beginner level students showed

the lexical pitch accent distinction, it confirms the result of our earlier study. Although both Swedish and Japanese distinguish two types of lexical pitch accents, the distinction do not appear before the intermediate level.

4.3. The Accentual Phrase (AP)

The accentual phrase (AP) is a phrasal unit containing at most one accent and the F0 shape is based on one of the accent types shown in Figure 2. However, the accentual phrase produced in L2 Japanese at the beginner level is usually not identical to any of the F0 types, be that Swedish or Japanese. It is conjectured there is no prosodic transfer regarding the F0 shape of AP at the beginner level. Instead, various shapes of L2 accentual phrases are found in the learner's speech. In Figure 3, typical L2 accentual phrases produced by L1 Swedish are demonstrated, in this example there is no hierarchical organization of APs to iPs. Some students have produced more flat F0 shapes for their APs.

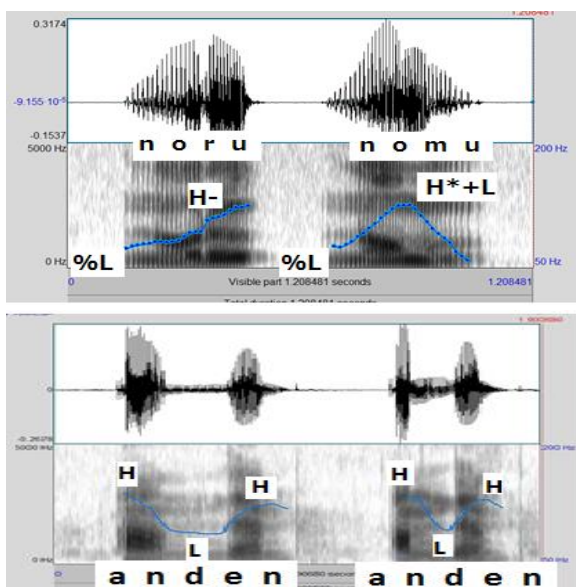


Figure 3: The two types of lexical pitch accents in Japanese (above) and Swedish (below)

4.4. The Intermediate Phrase (iP)

4.4.1. Pause with or without a phrase final H tone

A frequently used phrasing strategy in the L2 Japanese intonation was to mark a phrase by H%. This can happen in L1 Japanese as well for some speakers but the difference is it is usually accompanied by a downstep in L1 Japanese.

In Figure 4 above, L1 intonation (above) and L2 intonation (below) are shown for the sentence 'The old man went to the mountain to fetch twigs while the old woman went to the river to do washing'. In L1 Japanese intonation, there are six APs that are grouped to two iPs by downstep. In L2 intonation, phrases having the same F0 shape and nearly the same peak value are produced with pauses between them, and some are accompanied by a phrase final H tone (H%). There are seven APs in all and they are grouped to six iPs mostly by the use of phrase final H% tones. This is an example of intonation where most APs are identical to iPs simultaneously. The first AP is slightly higher in the F0 value while the last AP is lower in the

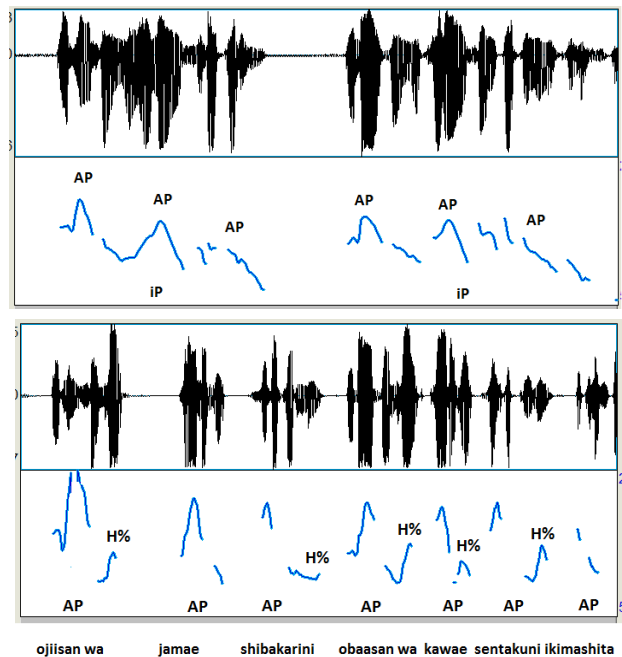


Figure 4: Sound wave and F0 for the L1 (above) and L2 speaker A (below) for the Japanese sentence 'Ojiisanwa jamae shibakarini, obaasanwa kawae sentakuni ikimashita (= The old man went to the mountain to fetch twigs while the old woman went to the river to do washing). Both are male speakers.

F0 value to mark the utterance as next higher level utterance (U). In many other cases, however, APs are iPs without any phrase final tones. An intonation produced with a pause after each phrase without downstep is a typical intonation pattern at the beginner level. In an utterance like this, there is no obvious prosodic transfer from Swedish. No obvious final lengthening was found for APs/iPs for this type of utterance.

4.4.2. Upstep and final compression

A typical prosodic structure for L2 Japanese at beginner level shown in Figure 4 above has little prosodic phrasing above the AP level. Since such patterns are found neither in Japanese nor in Swedish, it should be regarded as totally unique prosodic organization at the early stage of interlanguage. At the same time, few students have shown more advanced grouping strategies that are typical for the intermediate level reported earlier [1]. In Figure 5 below, two types of prosodic phrasings (iPs) that are regularly found in the Swedish learner's speech but not in the native Japanese speech are shown. It is exactly the same sentence shown in Figure 4.

The first type of prosodic phrasing is an upstep in which APs become successively higher in pitch. This is shown in the first half of Figure 5. Note this is exactly opposite of downstep shown in Figure 4 (above) for the native Japanese utterance. The second type of phrasing is what is shown in the latter part of Figure 5 in which the second AP has an F0 expansion followed by greatly compressed F0 towards the end of the utterance. The expansion and compression of F0 are typical for focus manifestation in Japanese. However, in L2 Japanese produced by L1 Swedish, the compression part is long and it often carries semantically important information. These types

of prosodic phrasing are not native to Japanese, at least for Tokyo Japanese but are found in Swedish, it can be interpreted that L1 prosodic transfer regarding phrasing occurs for some students already at the end of the beginner level.

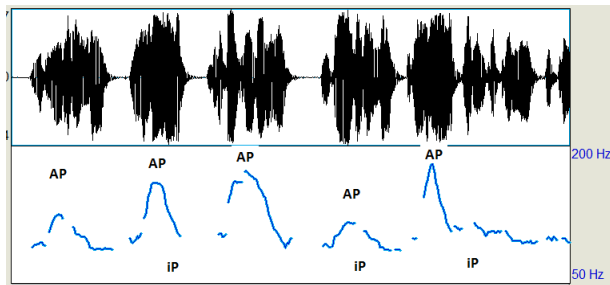


Figure 5: Sound wave and F0 for the L2 speaker B for the same sentence as in Figure 3. A male speaker.

4.4.3. Downstep

While downstep is a typical prosodic phrasing strategy in Japanese, its use in L2 Japanese intonation at the beginner level was limited. When does a prosodic phrasing by using downstep occur in L2 Japanese produced by L1 Swedish at the beginner level? Two occasions where downstep was found even among the beginner students were such phrases like ‘an old man and woman’ and ‘a big peach’, i.e. the first phrase is joined by ‘and’ and the second is an adjective phrase. In our previous study on the acquisition of L2 Japanese grammar, it is reported that such combinations are easily acquired by Swedish learners since the word order is exactly the same as in Japanese [7]. Even in prosody, these types of phrases have similar structure in both languages. In a longer subordinate clause, however, the grammatical structure becomes different between Swedish and Japanese and consequently, even the acquisition becomes difficult. In Japanese, all the modifier precedes the noun and there is a strong tendency that an entire subordinate clause is produced as one iP with downstep [8]. Since the acquisition of grammar and prosody was found to be related, it would be interesting to examine in the future how such grammatical clauses are produced prosodically both in Japanese and Swedish.

5. Discussion and conclusion

In this paper, the prosodic organization of L2 Japanese produced by L1 Swedish at the beginner level is analyzed. It has shown that a typical read speech at this level has many pauses and total duration of the utterance is much longer than that by L1 speaker. It seems L2 read speech has many pauses and even the use of respiratory muscles differ when a speaker read a text in his first language or in the second language [9]. Pauses are inserted after every grammatical phrase and this unit often functions both as AP and iP, i.e. they are identical. This early phase of prosodic phrasing is unique as interlanguage since such patterns are not found in Swedish or in Japanese. While a typical prosodic phrasing in read speech in Japanese uses a downstep to group APs to iP, the use of downstep was limited in L2 Japanese speech. Instead, upstep and F0 expansion followed compression were regularly observed in some slightly more advanced speakers’ speech. They are conjectured as L1 prosodic transfer from Swedish

regarding the prosodic phrasing. None of the learners have acquired the distinction between the two types of lexical pitch accents that forms the base of AP in Japanese. Pitch accent distinction occurs somewhat later. Together with the results of the L2 Japanese intonation produced by L1 Swedish at intermediate and early advance level that are reported earlier [1], somewhat more clearer qualitative model regarding the acquisition of L2 Japanese intonation has been obtained.

6. References

- [1] Y. Nagano-Madsen, “Acquisition of L2 Japanese intonation - data from Swedish learners (in Japanese),” In *Japanese Speech Communication 2*, pp.1-27. Tokyo: Hitsuji Shobou, 2014.
- [2] L. Selinker, “Interlanguage.” *IRAL* 10, pp. 209-231, 1972.
- [3] J. Pierrehumbert and M. E. Beckman, *Japanese tone structure*. Cambridge, MA: MIT Press, 1988.
- [4] J. J.Venditti, “The J_ToBi Model of Japanese Intonation,” in Sun-Ah J. (ed.) *Prosodic Typology: The Phonology of Intonation and Phrasing*:32, Oxford Scholarship Online, 2005.
- [5] I. Mennen, “Beyond segments: towards a L2 intonation learning theory (LILT),” in E. Delais-Roussarie, M. AVANZI, and S. HERMENT (eds.) *Prosody and Language in Contact: L2 acquisition, attrition, languages in multilingual situations*. London: Springer Verlag, 2015.
- [6] M. Sugito, “An overview of studies on Japanese prosody,” In *The Study of Sounds 23*, pp. 227–271. 1994
- [7] Y.Nagano-Madsen, Y. Okamoto-Gustafsson, and Y. Shimizu, “Acquisition of L2 Japanese by Swedish learners - The effect of a study stay in Japan on grammar and speech-(in Japanese),” *Journal of International Student Education no.8*, pp.77-102. Kochi: Kochi University, 2014.
- [8] Y. Nagano-Madsen, “Manifestation of downstep and intonation in Japanese: comparison of the Tokyo and Kochi dialects,” *Proceedings from FONETIK 2012*, pp. 5-8, 2012.
- [9] T. Isei-Jakkola and Y. Nagano-Madsen, “Respiratory muscle control during text reading, a comparison between L1 and L2 with Swedish and Japanese subjects,” in preparation.