Intonation Patterns of Korean Second Language Learners of English

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Abstract

Intonation is an important property when analyzing speech and is one of those properties of speech by which it is easy to distinguish bilinguals from monolinguals. Taking into account the different stress patterns of various languages, we chose to study Korean and English, since Korean is a syllable-timed language and English is a stress-timed language. Significant research has been done on similar research questions by Ulrike Gut, who studied intonation acquisition of German-English bilingual children, and Danica MacDonald, who studied Koreans' acquisition of English question intonation. Our goal was to answer broader questions about bilingualism, and how it affects the acquisition of intonation. Via Skype, we recorded our participants reading a pre-written English paragraph and plotted the pitch and intensity of three different phrases (a declaration, a question, and an exclamation) using the speech analysis software Praat. Our results generally showed that the intonation patterns of a speaker's first language affect those of their second language, but overall our study was inconclusive since the COVID-19 pandemic did not lend itself well to gathering all the data we might have needed to come to more confident conclusions.

1 Introduction and Background

Intonation is an important property when analyzing speech because it can convey both powerful and subtle variations in a speaker's intentions and meanings; former British Prime Minister Margaret Thatcher was even advised on how to use intonation to appear more authoritative (Gussenhoven 2002: 6). It also proves to be challenging for many learners of English, especially when their first or dominant language has contrastive intonation, like Mandarin. In addition, transfer occurs when a bilingual's native language has different non-contrastive intonation patterns from English. Although it does not determine grammaticality, intonation is one of those properties of speech by which it is easy to distinguish bilinguals from monolinguals. For this reason, intonation has become the subject of a myriad of articles and books and has become a topic of interest for those who study bilingualism.

In 1999, Ulrike Gut studied the acquisition of intonation by German-English bilingual children. For example, Gut studied the productions of Laura, a German-English bilingual with L2 English and limited English input (Gut 2000: 62). He found that this participant's phonetic use of English pitch accents at age 4;3 were "highly variable and [did] not show any systematic tendencies" (Gut 2000: 134). Another child, a simultaneous bilingual, seemed to have "separate systems for his two languages" (Gut 2000: 145). Several of Gut's other participants yielded inconclusive results (Gut 2000: 127). He concluded that pitch was acquired fairly early for most children, but intonational phrasing was not (Gut 2000: 164). Furthermore, there was some evidence of cross-linguistic variation in the production of pitch accents (Gut 2000: 166). Gut also wrote that there was a "lamentable" (Gut 2000: 2) lack of research on sentence-level intonation, which is an important aspect of language acquisition, especially when it carries nuances of meaning in the spoken language (Gut 2000: 4).

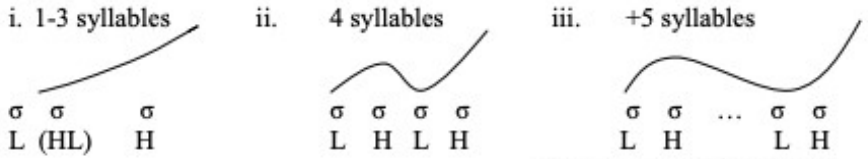
Danica MacDonald from the University of Calgary also picks up on the shortage of research on L2 acquisition of prosody, specifically intonation. She studied Koreans' acquisition of English question intonations and found that the L1 (Korean) intonation patterns of her participants affected their productions in L2, although there seems to be "improvement with greater exposure" (MacDonald 2011: 14). Additionally, her more advanced learners were able to apply the correct intonation patterns in English (MacDonald 2011: 14). Her subjects were all adults between age 20 and 30 and ranged from beginner to advanced (MacDonald 2011: 8).

MacDonald was only studying the bilinguals' question formations, comparing intonation patterns of wh- questions with yes/no questions. We wished to consider a wider range of sentences and see if this would affect results. In this project, we seek to determine whether adult Korean-English bilinguals who are dominant in Korean would exhibit crosslinguistic influence of intonation patterns in their English productions. We hypothesize that transfer will occur, and that our bilingual participants will produce discernible differences as compared with a native English speaker. Because this linguistic property can vary considerably between dialects, we will focus on the standard Canadian "Montreal" English.

2 Linguistic Property

Gut defines intonation with three primary linguistic functions: "nucleus placement, nuclear tone, [and] intonational phrasing"(Gut 2000: 3). The nucleus is defined as the central part of the syllable, and its placement varies cross-linguistically. Thus, intonation is dependent on how the listed aspects of the nucleus vary. Tone refers to the pitch movement on a stressed syllable, mainly in the nucleus (Gut 2000: 4). Tone can be simple or complex within one nucleus (i.e. they can rise and/or fall and/or remain level) (Gut 2000: 5). Pitch accents, or voicing, can be analyzed on a scale from High to Low (Gut 2000: 9). Combined is an analysis of tone with respect to loudness, length, pitch, and pauses (Gut 2000: 13) within phrases and sentences. In English, intonation can be used to mark focus (Gut 2000: 11) or questions (Gut 2000: 12). It also carries semantic meaning, as described in Gussenhoven's article "Intonation and Interpretation: Phonetics and Phonology". As an example, Gussenhoven provides a graph of perceived friendliness as a function of pitch, comparing Dutch and English; emotions can be communicated through intonation (Gussenhoven 2002: 6). Furthermore, proverbs can often require certain intonation patterns to carry more than just a literal meaning (Gussenhoven 2002: 6).

According to MacDonald, a key difference between English and Korean intonation systems is that Korean intonation only marks Accentual and Intonational Phrases, whereas English also shows Pitch Accents and Phonological Phrases (MacDonald 2011: 4). An accentual phrase is a prosodic unit which is immediately higher than a word, and it is defined by its intonational markers. An intonational phrase is a section of speech which has its own intonation pattern, and a phonological phrase is what syntax classifies as "XP"s, such as noun phrases, adjectival phrases, or verb phrases. Pitch accent is the one syllable in a word or morpheme which is more prominent than the others. In the Seoul dialect, the typical tonal pattern of the accentual phrase is Low-High-Low-High, based on the syllables (characters in the written language) in the phrase (MacDonald 2011: 3). Unlike in English, the tones can also differ based on word length in order to fit the LHLH pattern used for an Accentual Phrase, unless the initial syllable is aspirated. Macdonald includes on page 3 of her article the following graphs from Jun and Oh's article:



Source: Jun & Oh 1996: 40

Jun and Oh also provide a useful model comparing English and Korean intonation (Jun, Oh 2000: 1).

Furthermore, in terms of phonological stress, Korean is a syllable-timed language, which means that every syllable takes up about the same amount of time, and the actual length of time depends on the prosody. On the other hand, English is a stress-timed language which means that syllables may last different amounts of time, but there is a decently constant amount of time between consecutive stressed syllables. Korean intonation rises and falls abruptly based on syllables, so it sounds almost like a staircase, and English appears to rise and fall more fluidly

like waves. So, Korean-English sequential bilinguals might "apply" Korean intonation patterns to English syllables.

3 Method

Our first Korean-English participant from Seoul, *M*, is a 21-year-old woman who was educated in a traditional Korean school until Grade 4, when she attended a Korean international school until Grade 9. After that, she attended a typical Korean high school. She learned English starting in Grade 1 from a private English institute where she learned the alphabet and the basics of the language. She has been living in Canada since December 2019. Our second Korean-English participant, *W* (*M*'s brother), is a 31-year-old man who was first educated in Germany (from ages 5-8), and then went to a traditional Korean school from ages 8-20. He attended his first year of university in Korea and then spent one year in the military. After this, he came to Montreal, where he has been living for the last 7 years. He learned English from the Korean curriculum starting at age 10, but only started using English at age 24 upon arrival in Canada. Our third participant, S, is a 21-year-old woman from Montreal who is a French-English bilingual. A native English speaker, she was educated at a French immersion elementary school, learning French starting in Grade 1. She then attended an English high school, CEGEP, and university, and uses English almost exclusively at home and at work. Although *S* is not an English monolingual, she is dominant in English. Her English is perhaps better representative of the speech of Montreal anglophones than an English monolingual's would be, considering that most of them are French-English bilinguals.

To collect the data, we called our participants via Skype and recorded their responses. In order to test their intonation patterns, we gave them a passage of text to read, which contained varied phrases, including direct and indirect questions, as well as exclamatory and declarative sentences. For example, "I can understand why people make jewellery out of these beautiful things they find on the shore" serves as a test for how the participants would interpret an indirect question. By reading a paragraph out loud which they had neither seen nor heard before, the participants were required to apply the intonation pattern which was most natural to them to the provided sentences. Thus, the exercise tested their intonation patterns while reading English. The recordings were then inputted into speech analysis software, so that we could compare the data between participants.

4 Results

Following are graphs constructed using the sound editing software Praat, which show a couple components of intonation that are quantifiable: pitch and intensity (or loudness).

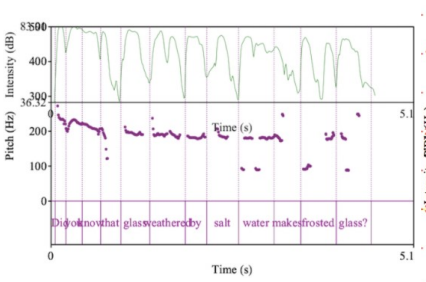


Figure 1: *S* Question

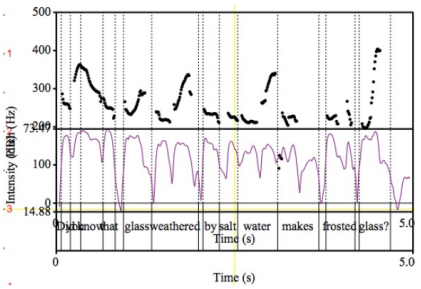


Figure 2: *M* Question

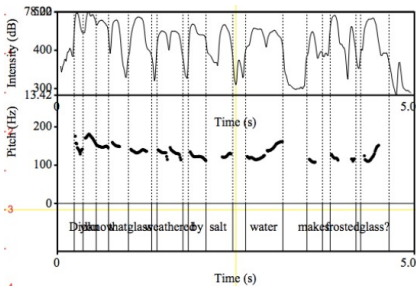


Figure 3: *W* Question

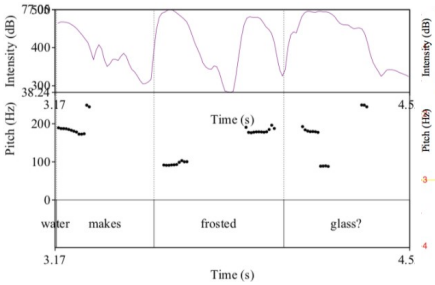


Figure 4: *S* Question Magnified

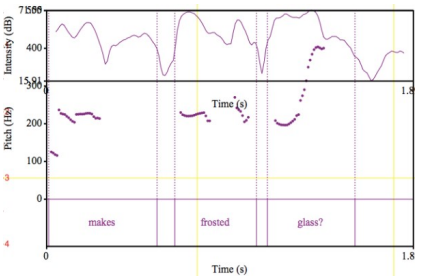


Figure 5: *M* Question Magnified

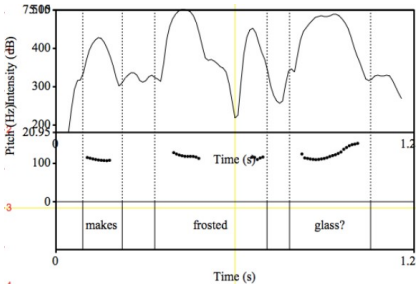


Figure 6: *W* Question Magnified

Figures 1 to 3 depict the question "Did you know that glass weathered by salt water makes frosted glass?" from our test paragraph. For native English speaker S, it shows the pitch mapped in purple and the intensity in green. Korean-English bilingual *M'* s questions are displayed along with the intensity (plotted in a purple solid line) and pitch (plotted as black and purple dotted lines here) of the production, and *W's* is all in black. The same question was analyzed for all three participants for comparison purposes. Figures 4 to 6 are zoomed-in versions of the end of the question, showing this phenomenon. By observing this version, we can also see the intensity, or loudness, more clearly than in Figure 1. In this question, we can see that the English native-speaker's pitch is higher at the beginning of the question at around 250 Hz and then lowers to around 200 Hz for mostly the rest of the question. However, the pitch jumps back up at the end to about 275 Hz, which demonstrates the characteristic intonation of questions in English. The intensity seems to display a negative correlation with respect to the pitch, which is typical; as the pitch rises to indicate a question, the loudness lowers. For the bilinguals, we can also see another factor of intonation at work here: pauses. Pauses indicate natural breaks between words in an utterance, but sometimes they also show hesitation. As we can see in Figure 2, there is a noticeable pause after the word "that" in our sample question. Also, the pitch raises at non-target-like moments throughout this utterance, for example during the words "weathered" and "water". As we can see in Figure 5, her pitch raises drastically, while the loudness of the utterance lowers as a result. When comparing this to *S'* s productions above, the intensity and pitch present similarly, but one difference is that our English native speaker's intensity dropped a bit later than our Korean/English bilingual's; *M'* s loudness dropped at about halfway through the word "glass?", as we can see in Figure 5 above. As we can see in Figure 3, an interesting thing to note about *W's* question production is the rising pitch not only at the end of the question, but also during the word "water".

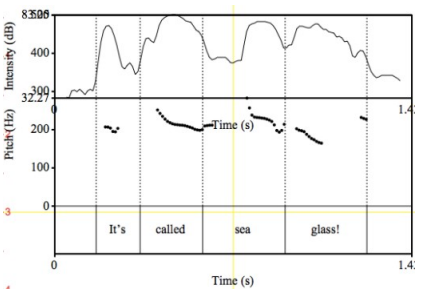


Figure 7: *S* Exclamatory

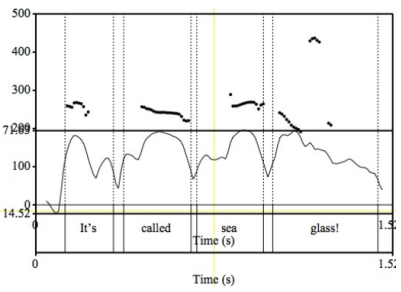


Figure 8: *M* Exclamatory

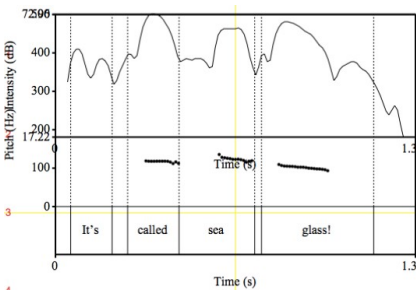


Figure 9: *W* Exclamatory

Figures 7 to 9 present the same intensity (plotted with a solid black line) and pitch (plotted with dotted lines) analysis as above, but this time it was done on an exclamation: "It's called sea glass!" For S, in Figure 7, the intensity remains at around 80 dB when the speaker produces a word and drops when there is a silence. It does not show any drastic differences between the question and the exclamation. As in the question, this speaker's pitch is higher at the end of the production, but we can also see that it is consistently higher throughout the exclamation than in the question. Figure 8 above shows that *M'* s pitch remains relatively low (around 250 Hz) throughout the exclamation and raises significantly (up to ≈450 Hz) at the very end of the utterance. This is very similar to *S'*s production, but *M'* s pitch level jumped more noticeably during the very last word in the production. The intensity also remains consistent throughout the exclamation (similarly to *S'*s exclamation intensity in Figure 7), but in comparing the graphs, I noticed that *M'* s intensity dropped more sharply. Otherwise, the data appear to be very similar. *W's* exclamation shown in Figure 9, when compared with the other two speakers, does not contain the raised pitch at the end, but rather presents more like a statement.

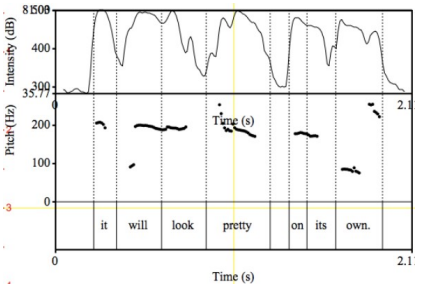


Figure 10: *S* Declarative Statement

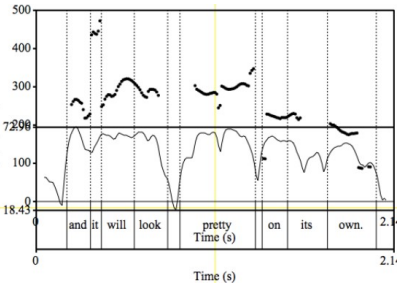


Figure 11: *M* Declarative Statement

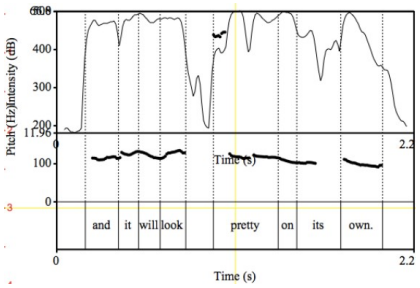


Figure 12: *W* Declarative Statement

Our last example, shown in Figures 10 to 12 takes the form of a statement from the Sample paragraph: "...it will look pretty on its own." As we can see in Figure 10, when compared with the question and the exclamation, the intensity at the end of the native speaker's statement remains consistent with the rest of her production; it does not drop significantly. Also, the pitch in this statement is much lower at the end of the production than it was in either the question or the exclamation and demonstrates the falling intonation characteristic of statements in English. For *M'* s productions shown in Figure 10, there was also a noticeable drop in pitch at the end of the statement, which again is the norm for English statements (Gussenhoven 2002: 1). And finally, as we can see from Figure 11, *W* pauses before saying the word "pretty", but otherwise his

production is similar to *S'*s. It is interesting to note that *M* also had this pause before the word "pretty", but *S* did not.

5 Discussion and Conclusions

Our results suggest that the bilingual speakers were slightly less confident when compared with the native English speaker. This could explain the pauses and apparent hesitancy in their productions; perhaps the phonology or syntax of those parts of the sentences were more difficult to them, such as subordinate clauses. Their occasional non target-like uses of pitch and intensity in their speech, such as with the word "water" may be instances of L1 intonation affecting L2 intonation, and that they are imposing Korean Low-High-Low-High Accentual Phrasing on the English sentence. Transfer of this property of their L1 might explain *M'* s tendency, especially in the questions, to raise pitch more often than *S* did. It is difficult to tell, however, as the bilinguals' productions do not consistently follow the L1 pattern, or even differ from the L2 patterns in the same ways. *M* also seems to exaggerate intonation in some places (see Figure 2), as compared with the native speaker of English. In contrast to this, *W* seems to tone down the intonation, most easily seen in the exclamatory statement shown in Figure 9. Both cases could either be the result of a lack of confidence or simply stylistic preferences. *S'*s productions seemed to be in a sort of median between the two. That said, the overall results between participants were mostly consistent, especially in the question examined. Both of our bilingual participants would be considered to be advanced L2 learners, and this might explain how similar the results were. Our results are also consistent with MacDonald's findings, as the productions of her advanced English learners were mostly target-like. However, whether from hesitancy or transfer, the bilinguals' speeches seem at some points to be distinguishable from a native English speaker, which again demonstrates how intonation is difficult to master even for advanced learners like *M* and *W* and can result in hesitancy and lack of confidence.

Studying intonation patterns on a comparative basis is difficult for several reasons. Firstly, besides the obvious geographical factors, English intonation varies from individual to individual based on their habits and general speech patterns. Furthermore, intonation is also interpretive because it imposes its own semantic interpretation on the text; when people are tasked with reading a written text, they must interpret whatever semantic information exists which is conveyed through intonation. This can lead to several different intonation patterns being considered correct, even if they were different from that of a native English speaker. It is also difficult to elicit speech patterns which would be natural to the participants, because they were not the writers of the text. In addition, the participants have no emotional connection to the words, which Gussenhoven's studies revealed to be conveyed partially through intonation. Ideally, more productions and more participants would be included in this study so that comparisons could surpass individual and semantic differences. However, given the current situation, finding more participants was not feasible. Thankfully, the way that we interpreted our data with the Pratt software lent itself well to collecting an audio file virtually, apart from internet connection issues. Even still, due to the constraints on the scope of the study, our results are inconclusive and further research should be conducted to gain a better understanding of L2 acquisition of intonation for Korean-English bilinguals.

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Appendix

Full Test Paragraph:
Did you know that glass weathered by salt water makes frosted glass? It's called "sea glass"! The pieces usually look like smooth, brightly-coloured rocks and might even have letters or decorations on them. Have you seen it on the beach by our house? I walked down there yesterday to see if I could find some, and I did! Look at how it sparkles in the light. You can see how many different colours I found: purple, blue, green, and even black! I can understand why people make jewellery out of these beautiful things they find on the shore, and why others purchase their creations, even at such steep prices. To be fair, it takes a lot of work to make such masterpieces! The artists have to drill holes in the hardened glass and twist wires to create chains for the glass to hang from, so it is a very labour-intensive process. But I'll just put the sea glass that I found into a glass jar, and it will look pretty on its own.