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The Perception of Prosodically Ambiguous Intonation Patterns by L2 English Learners and the Effects of Instruction

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Abstract

Considering the contradictory research on explicit teaching of suprasegmentals, the present study aims to investigate the effects of explicit instruction of L2 English learners' perception of prosodically ambiguous intonation patterns, as well as the possible effects of reported musical familiarity on intonation acquisition. A control group and a treatment group of low-intermediate international English students were asked to judge the meaning of three types of sentence-final intonation patterns: declarative sentences, tag questions, and wh- questions. Overall, the group that received explicit instruction during the four-week treatment phase scored higher on the perception post-test than those who received no treatment, although the improvement was not found to be statistically significant. A small number of learners with self-reported musical familiarity in the experimental group did not significantly improve in their perception of intonation patterns compared to their peers.

For a second language learner, intonation, stress, feet, and syllable structure could be considered crucial components in phonological acquisition. Among these suprasegmental features, intonation is an under-researched aspect of L2 phonology. This scarcity of studies in the acquisition of L2 intonation (Ritchie & Bhatia, 2009, p. 255) can be attributed to the lack of agreement on a model for L1 acquisition of intonation in the generative literature (see Ladd 1996 for a discussion, cited in Ritchie and Bhatia, 2009). This challenge is also evident by the lack of attention to suprasegmentals in Flege's Speech Learning Model (Flege, 1995) and Best's Perceptual Assimilation Model (Best, 1995). In the following sections, a general overview of American English (AE) sentential intonation patterns is discussed. It is followed by a review of literature on the acquisition of L2 sentential intonation in addition to the studies on acquisition and musical ability.

LITERATURE REVIEW

L2 Acquisition of English Sentential Intonation Patterns

In English, meaning is not only expressed through lexical choices, but also through intonation, whether that be within thought groups, sentence-final intonation, or by paragraphs. Intonation can convey a wealth of information, from syntactic and informational material to attitudinal and emotional viewpoints of the speaker (Vassiere, 2004). It can be used to manage conversation topics, negotiate turn-taking, and show awareness of information, all of which may not be apparent by other linguistic means (Chun, 1988). As a logical consequence of rich and multidimensional meaning being conveyed through one linguistic feature, many cross-cultural misunderstandings can be attributed to misinterpretation of intonation features in English (Gumperz, 1982).

In English there are many types of intonation patterns, depending on the type of sentence. Under the broad category of 'questions,' there are different types of questions, each having its own intonation pattern. Vassiere (2004) lists several different types of intonation patterns for questions alone: yes-no questions, echo questions, calls for confirmation, alternative questions, rhetorical questions, disbelieving questions, and questions to oneself. Despite the fact that most questions are accompanied by rising intonation (and L2 learners of English are thus taught this), wh- questions are accompanied by falling intonation, which has been the subject of study in the past.

In a study by Zhang et al. (2010), perception of English intonation by L1 Chinese speakers was measured by dividing sentential intonation into three categories: declarative statements with intonation signifying continuation or termination, wh-questions and yes-no questions. As stated, wh-questions carry rising intonation, while yes/no questions and declarative statements are expressed through falling intonation. Subjects were to listen to a recording of an L1 English speaker saying statements including these intonation types, then mark whether each sentence contained rising or falling intonation. Students scored high on yes/no questions and declarative sentences, but their scores were equivalent to random guessing on wh- questions, showing they were unaware that wh-questions are accompanied by falling intonation. Results were the same for continuation statements; subjects were unaware of the rising intonation that accompanies these types of sentences. This study suggests that intonation in general is a feature of English that requires a student's attention, whether through explicit instruction or implicit learning. More specifically, this study also suggests that different types of intonation patterns are acquired before others.

Not only does an L2 English speaker have to perceive and learn the pitch contrasts between different types of statements, but he or she also has to learn the meaning tied to these contrasts. In his study of Nigerian L2 English speakers' perception and interpretation of English intonation, Raphael Atoye (2005) found that 85.7% of the 120 third-year English students studied could perceive the correct intonation changes in sentences, but only 25.7% could correctly identify the meaning conveyed through those changes, thereby suggesting that social meaning of intonation, rather than purely phonological features, be taught to non-native speakers of English.

One study by Pennington and Ellis (2000) looked at (a) native Cantonese speakers' perception of L2 prosodic cues in sentences with varying intonation patterns and (b) the success of these participants' memory recognition in identifying those prosodic meanings. They sought to discover whether Cantonese speakers made use of the L1 tonal patterns in interpreting and discriminating the intonation in L2 English sentences with varying prosodic cues. One of the purposes of the study was to see how participants' performed in remembering and identifying a previously seen or heard ambiguous sentential intonation patterns. They concluded that learners' exposure to prosodically ambiguous patterns of intonation through 'explicit focus' did not help them better perform in identifying those differences in intonation. However, it is notable that what they call

an 'explicit focus' in the study was not a type of instruction. Rather, it was a type of task, which guided the participants to pay more attention to some forms than others. That is why the article itself calls for more studies to be conducted in teaching intonation.

Another study, by Marcelino and Rocca (1998), looks at the effects of instruction on the production of intonation patterns by Brazilian learners of English. The participants in the study were assumed to be aware of English intonation patterns since had taken classes on English phonetics and phonology. Although the study claims to be looking into the 'teaching of intonation' as its title suggests, there is only one timed recording of the learners and with no pre-test. Once the participants recorded themselves imitating sentential intonation patterns, native speakers of English scored learners based on perception of native-likeness. Although the study was not an interventional study, they claimed their purpose was to point out the difference between Brazilian and English intonation patterns in order to improve pedagogical approaches.

The studies summarized underscore the importance of teaching intonation to non-native speakers not only for phonological competence but also for socio-pragmatic competence. Levis (1999) argues that current pedagogical materials on intonation lack communicative purpose and present an inadequate view of the functions of intonation. He further claims that current pedagogical materials and texts have overlooked more recent research. One way current materials rely on 'outdated and inaccurate descriptions of intonational forms and function' (p. 37) is in describing English intonation patterns. Current research supports a need for three patterns to describe pitch: rising, falling, and a half-fall or unfinished pattern. All three are needed to fully teach comprehensive intonation of conversation, especially for students to learn accurate response cues. Levis presents four principles for improving intonational teaching methodology. He encourages teachers to teach intonation in explicit context; this is the most effective way to example dialogic intonation assignment. Secondly, teachers should make learnable and generalizable statements about meaning. Levis offers guidelines for teaching emotional-attitudinal affects on intonational meaning (p. 57). Thirdly, teaching intonation should be in the context of a communicative purpose, not just the pattern. Otherwise, intonation is treated as subordinate to its communicative value. Lastly, it's important to teach intonation with realistic language. If the primary goal of classroom exercises is communicative proficiency, the unnatural language that has been included in textbooks in the past will no longer be applicable.

Musicality and Intonation

With the similarities between music and language spanning recognition of melody, contour processing, and perception of rhythm, tone, sight, sound and symbol it is no surprise that researchers have explored this connection (Stansell, 2005). Because language is a multi-modal construct, speakers rely not only on the lexicon but also body language and musical quality of the language—a heading under which suprasegmentals fit, to convey meaning (Stansell, 2005). It has been suggested, and supported by Patel and Daniele (2002), that the rhythm of a culture's language affects the rhythm of their music. When they compared the rhythms of English and French and classical music composed by speakers of each language, they saw significant differences in rhythmic patterns which mirrored those of the respective languages, suggesting that there are related constructs.

Based on their study of Finnish students' acquisition of certain English phonemes, Riia Milovanov et al. (2004) also suggest a link between music and language in the brain. The students with musical aptitude, those who attended a special music class at school, performed significantly better than those without musical aptitude on the pronunciation of English phonemes, by showing significantly less native language transfer.

A link has been shown not only between musicality and the acquisition of segmentals, but also of suprasegmentals, the topic of this study. In a study by Bidelman et al. (2011), native Chinese speakers and native English musicians performed better across all domains in pitch tracking (within the context of both music and language) than did English-speaking non-musicians. These results suggest that those who are musical and those who speak tonal languages, such as Chinese, are using the same part of the brain to process pitch.

Furthermore, in a study by Kolinsky et al. (2009) looking at L1 French speakers' perception of lexical stress, which does not exist in French, musicians were more able to identify stress contrasts than non-musicians. They conclude that these findings support the idea that difficult linguistic prosodic variations are more easily processed by those with musical training.

Though the link between language processing and musical training has been supported, there is a gap in the literature pertaining specifically to the acquisition of sentence-level intonation of those with musical training. In addition to researching the role explicit teaching has on L2 English speakers' acquisition of prosodically ambiguous intonation patterns, this

study also seeks to explore how musical training affects learners' acquisition of these patterns

RESEARCH QUESTIONS & HYPOTHESES

With regard to the acquisition of prosodically ambiguous intonation patterns in L2 English, the present study seeks to answer the following research questions:

1. Does explicit instruction on various intonation patterns of L2 English affect learner perception of various prosodically ambiguous intonation patterns of declarative sentences, wh-questions, and tag questions?
2. Are the learners' reported degree of musical familiarity and the overall success in their perception of L2 English sentence level intonation patterns related?

Aiming to answer these research questions, we make the following hypotheses. First, L2 English learners, over a course of four weeks, will improve on identifying the following prosodically ambiguous intonational patterns—declarative sentences, wh- questions, and tag questions. Low-intermediate L2 English learners will find it relatively easier to perceive the ambiguity in declarative sentences, more difficult to perceive the ambiguity in wh- questions, and most difficult to perceive the ambiguity in tag questions. Overall, the treatment group will outperform the control group in rating perceived meaning of the three patterns tested. Following instruction, it is expected there will be a positive correlation between learners' level of self-reported musical familiarity and their success in perceiving the three types of intonation patterns.

THE METHOD

Participants

Participants were enrolled in a level three, low-intermediate English as a second language (ESL) speaking and listening class at English Programs for Internationals at the University of South Carolina, Columbia. There were two groups involved in this study, an experimental group and a control group. The control group consisted of eleven participants, nine males and two females, from China, Saudi Arabia, Japan, Taiwan,

Equatorial Guinea, and Oman. They reportedly spoke Mandarin, Japanese, Spanish, and Arabic as their L1. The experimental group consisted of eleven participants, eight males and three females, from Saudi Arabia, Japan, Taiwan, Equatorial Guinea, and South Korea and the participants in the experimental group. This group reportedly spoke Arabic, Japanese, Chinese, Spanish, and Korean. After the post-test, three males from the experimental group were removed from the results because of insufficient data from either the pre- or post-test surveys, leaving the experimental group results calculated with eight participants.

Materials and Procedure

In this ESL institute, students are tested and placed by proficiency level in three types of classes: writing and grammar, reading and vocabulary, and speaking and listening. The proficiency testing is threefold: an oral interview with two teachers that examines grammar, fluency, and pronunciation; a writing test; and a computerized test, the Accuplacer. The oral placement, Accuplacer score, and class placement level was the guide for deciding level proficiency for our participants. After being placed by proficiency level, the students were then randomly selected for one of the teachers in the level.

For this study, we tested participants in two low-intermediate level classes, with eleven students in each. Participants were given a background questionnaire and a pre-test during the first full week of class for their nine-week term at the intensive language school. The experimental group was then taught sentence-final intonation, as well as other aspects of suprasegmental intonation during the four weeks. The control group was not taught sentence-final intonation during this four-week period. After four weeks, the post-test was administered to both groups.

The background questionnaire was administered to check and control for prolonged exposure to English speakers, other known languages, and attitude towards correct English pronunciation. It also included a section of questions relating to the subject's musical background, including any formal or self-training along with length of experience. They were given space at the bottom of the questionnaire to add any extra information about their relationship with music.

The pre-test was given to test for previous knowledge on the topic of sentence-final intonation and to measure growth in the experimental group. Their participation was anonymous and voluntary. The pre-test

and post-test were the same test given at different times. Learners were asked to listen to the sentence and choose the best option based on the meaning the intonation communicates in the sentence. Students both listened to and read the sentences. The written sentences did not include punctuation, to control for the influence orthography might have on the students' decisions.

Survey items. The test included an instructions page, which asked the participants to listen to each clip and respond to the question. Supporting the research by Chun (1988) and Atoye (2005), we constructed the intonational sentences based on a realistic context. The instructions page mentioned the context for our survey: "Kelly and Linda are having a party at their apartment tonight. They are preparing for their guests." The test sentences were each introduced with a few sentences of context to connect the overall theme for the survey story: Kelly and Linda's party. Each question had the option 'I don't know' if participants were uncertain of the answer. In total, it took most students between ten to fifteen minutes to complete the online perception test.

The twelve questions included in the test were one of three sentence types: i) declarative sentences, ii) wh-questions and iii) tag questions. Two declarative sentences were completed statements with falling intonation and two were unfinished statements with middle intonation. The test questions included two wh-questions with the normal pattern of falling intonation and two wh-questions with rising intonation, in sentences indicating a need for clarification. The last four sentences were tag questions, two with the normal pattern of rising intonation and two with falling intonation. The two native speakers used Audacity software (2008) to record the twelve sentences, and then embed them in the online survey. Below you can find samples of each category included in the survey:

Declarative sentences

Given Context:	Kelly talks to Tom. Kelly says
Recorded Text:	I would love for you to stay[1]
Possible answers:	Kelly wants Tom to stay longer.
	Kelly wants Tom to stay but she has to go to bed**.**
	I don't know.

[1] As mentioned earlier, there are no punctuation marks included in the perception test to avoid interference orthography might have on students' decisions.

Wh-questions	
Given Context:	Kelly and Linda are talking about their guests. Linda says
Recorded Text:	How many guests do we have
Possible answers:	Linda couldn't hear her and wants her to repeat. Linda wants to know how many guests there will be. I don't know.
Tag Questions	
Given Context:	Kelly and Linda are talking about the party. Linda says
Recorded Text:	It's going to be a fun party, isn't it
Possible answers:	Linda wants Kelly to agree with her. Linda is asking Kelly's opinion. I don't know.

For these test items, instead of asking students to explicitly mark rising, falling or mid intonation patterns; students' perception of intonation was measured based on the meaning associated with sentence final intonation.

Instructional Methods and Techniques

In order to determine the methodological principles adopted in the treatment phase, classroom teaching methods and techniques were analyzed through interviews with the expert teacher, Ann Janosik. Researchers observed her classes to better understand her teaching philosophy behind instruction. These classroom observations prior to the experiment also helped to identify her method for presenting content using the materials provided.

One important aspect revealed in the analyses is that the principles practiced in Ann Janosik's teaching overlap with the principles found in Task-Based Language Teaching (TBLT) (Ellis, 2003; Long 1985). Although the tasks were not always communicative and authentic in nature, the activities guided their learning process through task-based practices (Ellis, 2003, p. 261). These activities include but aren't limited to noticing activities, focused feedback, and focused tasks. Moreover, this teacher seemed to adopt 'inductive teaching' principles, defined as 'conscious induction as guided discovery' by Decoo (1996, p. 96). The adopted

methodological principles and techniques of the classroom teacher is summarized in the following Table (1) (Doughty and Long, 2003).

Table 1. Summary of Methods and Techniques Adopted

Methodological Principles (adapted from Doughty & Long, 2003)	Treatment in the Experimental Group
Principle 2: Promote learning by doing	Learners were encouraged to hear their own intonation patterns using kazoos.
Principle 3: Provide rich input	Learners were exposed to a variety of input inside the classroom through audio samples of the textbooks as well as native-speaker model
Principle 4: Elaborate input to make it comprehensible and meaningful	Learners are provided with necessary explanations and input to make the differences between two intonation patterns clear and comprehensible through the use of focused practice and feedback activities.
Principle 5: Promote collaborative and cooperative learning	Learners were encouraged to work in pairs to listen to each other as well as to complete the assigned tasks.
Principle 6: Focus on form	Learners were explicitly yet inductively explained the prosodic ambiguity of the intonation patterns they had been practicing to help them better comprehend those patterns

The treatment phase of the study identified with the principles and techniques explained above used activities adapted from the materials listed below in Table (2) in addition to the input the teacher provided the learners with based on her more than 10 years of experience in teaching ESL pronunciation.

Despite the fact that the teacher made use of different units and sections from these materials and accompanying audio materials, she expressed that most of the lexicon in those materials were above the level of the learners in level three and thus, needed to be simplified (Ann Janosik, personal communication, November 28, 2011). The difficulty level of the lexicon and the syntax in the texts is not surprising. There are relatively fewer textbooks that attempt to teach the kind of suprasegmental aspects in question, and the nature of sentence final intonation has with subtle differences in meaning. She supplemented the use of materials with the

use of kazoos to better explain and help learners to understand the notion of intonation and also to hear their own intonation performance.

Table 2. An overview of materials used in the treatment phase

Material	Page #	Purpose
1. *Clear Speech from the Start* (2000) by J. B. Gilbert	42-45	Introduce basics of intonation and prominence
2. *Pronunciation Plus* (1998) by M. Hewings and S. Goldstein	97-102 108-109	Teach falling and rising intonation in wh-questions and declarative sentences; predict intonation
3. *Well Said* (2007) By L. Grant	113-117	Teach wh-question with falling intonation as opposed to Yes-No questions; practice intonation
4. *Teaching pronunciation* (2010) *2nd edition* by Celce-Murcia et al.	255-261	Teach wh-questions and declarative sections with different intonation patterns by simplifying the materials
5. Kazoos		Teach intonation, practice intonation

Using these methods and techniques of instruction, learners in the experimental group received instruction on the subject matter at least 1.5 hours a week for four weeks during class time. In total, the learners received 5-6 hours of pedagogical intervention on intonation in general, as well as attention to sentence final intonation, the focus of our study. However, the prosodic ambiguity of 'tag-questions' was not explicitly taught in the class due to the fact that the learners were not ready to understand the subtleties in meaning (Ann Janosik, personal communication, November 28, 2011). However, these question types were still included in the analysis as we thought they could also show some improvement after receiving instruction on intonation in general. Students were not exposed to other summative evaluation of their performances other than informal evaluations made in class. The control group received no instruction on the aspects being investigated.

Data analysis

The results were collected using the surveygizmo.com reports feature and analyzed using SPSS version 14.0 software. The correlations between the

overall ratings and scores of learners who reported musical familiarity were also calculated for the control and experimental group. The data were categorized by sentence type to note any gains made by either group.

RESULTS AND DISCUSSION

Comparison of Overall Results

In order to answer the question of whether learners benefited from explicit instruction in identifying prosodically ambiguous sentential intonation patterns, pre- and post- instruction scores obtained from both treatment and control groups were compared. The results were analyzed based on the number of incorrect or correct answers. Preliminary results based on percentages of classroom averages suggest learners who received instruction improved their overall perception of prosodically ambiguous intonation patterns more than the learners in the control group. The comparison of test results for the experimental group show that overall perception of sentence final intonation increased by 7.29 per cent. The results were parallel with previous studies (Ellis, 2000; Hahn, 2002) that show pedagogical intervention in the teaching of intonation results in phonological gains for the learners.

As for the learners in the control group, they also improved in overall perception of sentential intonation patterns by 4.55 per cent. However, the percentage of overall gains in the control group results was 2.74 per cent less than the gains in the experimental group. This suggests that for those with explicit attention to intonation the gains were higher than those without attention to intonation. This also suggests that gains can be made without explicit teaching.

However, these initial results based on percentages were not found to be statistically significant ($p > .05$). Table 1 below summarizes the perception test results by students in the experimental and control groups for each question type.

Table 3. Descriptive statistics for the effects of teaching intonation patterns*

Groups		Experimental (n=8)		Control (n=11)	
Question Types	TIME	*M*	*SD*	*M*	*SD*
Wh-questions	Pre	1.57	.535	1.91	.302
	Post	1.86	.690	2.18	.405
Declarative	Pre	2.71	.756	2.09	.701
	Post	2.86	.900	2.55	.522
Tag questions	Pre	2.29	.488	2.36	.809
	Post	2.00	1.155	2.45	.934

*$p < .05$

As mentioned earlier, although the statistical analyses of the data do not show any significant improvement in the experimental group, the percentage-based calculations of the study corroborate with the fact that teaching intonation patterns to learners with low proficiency can be helpful in their understanding of L2 prosody. The smaller classroom size, and thus, lack of enough power, might have affected the statistical analyses, but when we have a closer look at the individual gains in the experimental group in general, they still seem to make gains.

The second research question asked if learners with a self-reported degree of musical familiarity outperformed their peers with no musicality background. The answer to the second question was found through a comparison of those specific participants' pre- and post-test results in the perception test. The results were analyzed based on percentage of overall progress made on the incorrect or correct answers by those with reported musical familiarity. Statistical analyses performed suggested that those two aspects were not correlated ($p > .05$). The following section demonstrates a breakdown of the scores based on the question types for a fine-tuned analysis and evaluation of the results.

Comparison of Three Different Sentence Types

In the test, three types of sentences were included with varying intonation patterns. Each sentence type was recorded using what was referred to as the default intonation pattern, and the exception intonation pattern, so that each sentence type had a total of four examples.

For wh-questions, it might be expected that the default intonation pattern of falling pitch would be the easiest to perceive. In fact, students consistently rated the default wh-questions correctly, for both the pre- and

post-test. This suggests that low-intermediate students were aware of wh-intonation patterns without explicit teaching. For the experimental group, they either somewhat improved the already high percentage of correct responses or maintained their correct responses. The perception of wh-questions with rising intonation, which are used for surprise or clarification, showed no consistent pattern for either the experimental or control groups. Overall, both groups improved between the pre- and the post-tests (Figure 1).

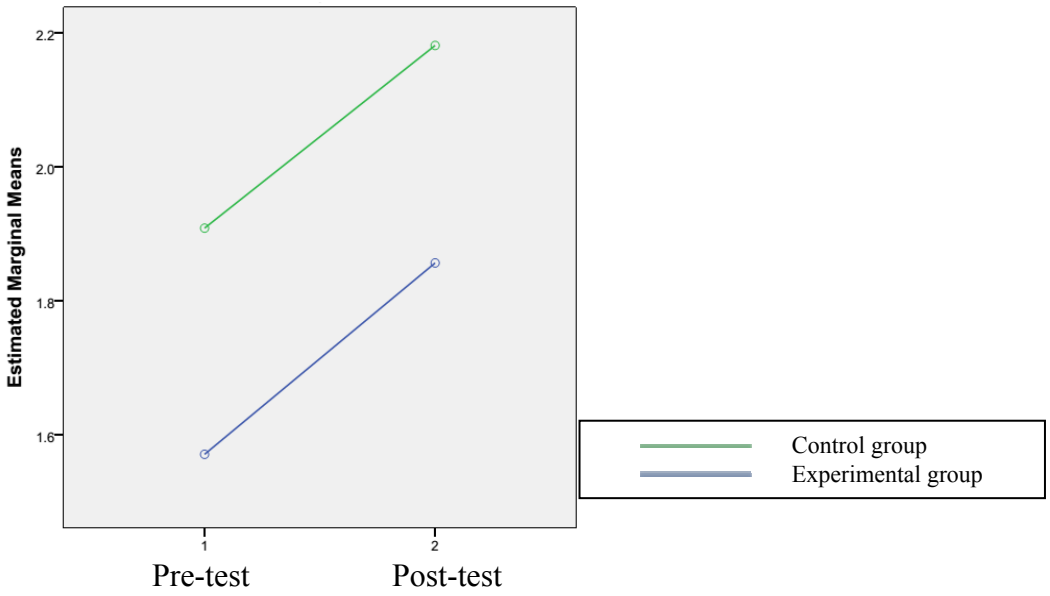

Figure 1. Wh-questions. Pre-and Post-test performance of experimental and control groups.

Because wh-questions are one of the common structures L2 English learners get exposed to, starting at the early stages of language learning experience, they are used most commonly to ask information questions of some sort with a falling intonation rather than asking for clarification or surprise with a rising intonation. This might have affected the learners' responses participating in this study.

In regards to the declarative sentences with falling tones, referred to as the default form in this study, learners in the experimental group either maintained their correct answers from the pre-test or improved significantly. A high percentage of learners in the control group also correctly answered these questions. This shows that low-intermediate level students were aware of the meaning correlated to the sentence type. There was no apparent pattern for the unfinished declarative sentence

types, possibly because this intonation pattern was new for the low-intermediate level learners.

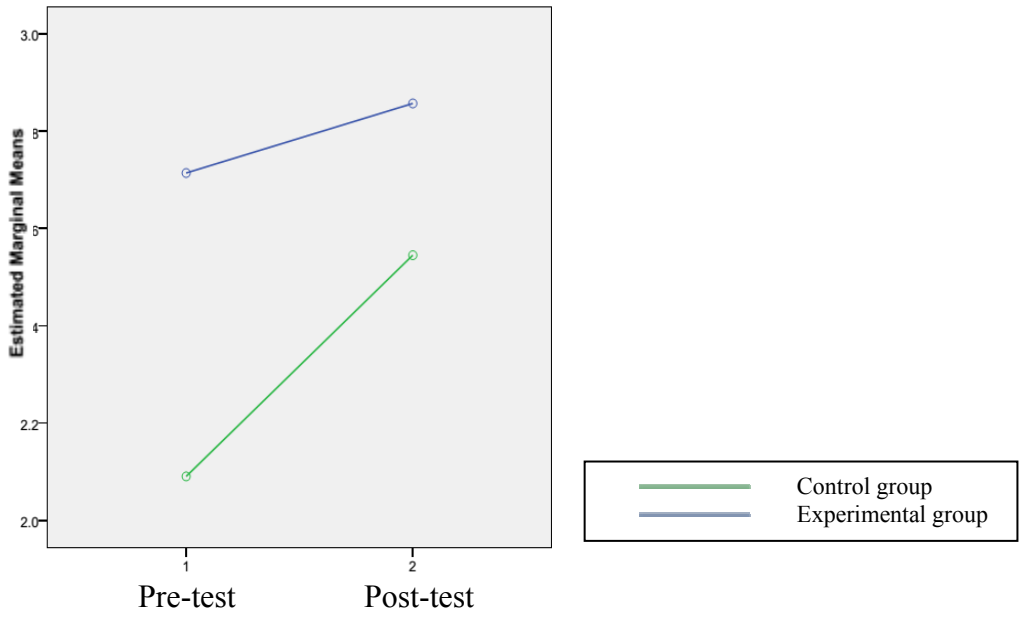

Figure 2. Declarative Sentences. Pre-and Post-test performance of experimental and control groups.

Tag questions, for which students received no explicit teaching, also showed varied results with no overall patterns. Both the experimental and control groups rated these questions more incorrectly overall compared to the two other sentence types. An observation can be made that tag questions may still be above the students' level of awareness at the low-intermediate level. No significant pattern of gains can be observed in this area.

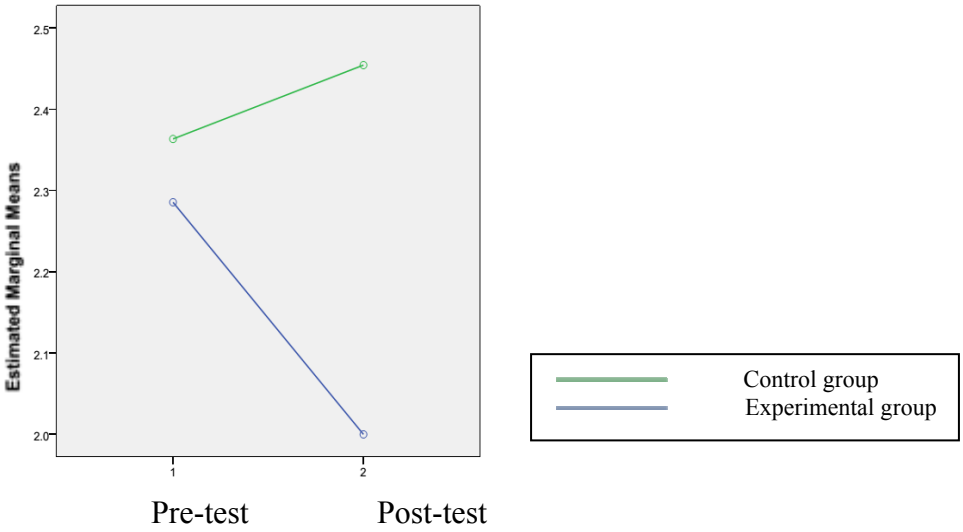

Figure 3. Tag questions. Pre-and Post-test performance of experimental control groups.

The inconsistent ratings for the 'exceptional' intonation type in each sentence category could be attributed to random guessing by students. It may be the case that to test for gains in sentential intonation patterns, there is a need for more than 12 sentence examples with a larger sample of students. The hypothesis that declarative sentence and wh- question intonation types as easier to perceive than tag question intonation can be confirmed based on these results.

Musical Familiarity Results

There were a total of four students in both the control group and the experimental group with self-reported musical familiarity, meaning they had at some point learned how to play an instrument, either through formal music lessons or self-training. By comparing the total percentage of correct answers on the pre- and post-test answers for the experimental group, it is evident that those with musical familiarity made no overall gains between the pre- and post-test scores, in both cases scoring 52.8% correct. The subjects with musical familiarity in the control group made overall gains of 6.25%, from scoring 50% correct on the pre-test to 56.25% correct on the post-test.

When the students with 10 years of musical training were pulled out from the rest of the data and checked for intonation gains, it was revealed that they performed similarly to the rest of the students with less or no musical training. The data sample in this study was not large enough to make conclusive statements concerning reported length of musical

training and improvement in intonation perception. It could be the case that due to the nature of our test, which did not ask students to recognize type of pitch, those with musical familiarity did not have opportunity to test and judge explicit pitch expertise related to musicality.

CONCLUSION

Overall, the difference in scores between the pre- and post-tests is higher for the experimental group (7.29% vs. 4.55% increase) meaning the group that received explicit instruction during the four-week treatment phase made more gains than those who received no treatment. However, the results were not found to be statistically significant ($p > .05$). There were no visible patterns or significant gains in one isolated sentence type, wh-, tag, or declarative. Despite overall improvement, learners with self-reported musical familiarity in the experimental group did not significantly improve in their perception of intonation patterns. These findings suggest that explicit attention to sentence-final intonation may not support acquisition for students with reported musical familiarity, though a further area of research could be separating L2 English speakers' perception of intonation pitch and the meaning attached to it for possibly different results.

Though there were steps taken to reduce or control confounding variables, there are certain limitations to consider in reviewing this data. It is possible that the English proficiency level of the subjects in this study, low-intermediate, was too low to begin teaching the intonation patterns addressed in this study. If this is the case, it may be that either they did not understand the patterns taught because they did not have the foundation for them yet, or that they started to doubt themselves, yielding wrong answers on the post-test on questions they had answered correctly on the pre-test.

Another confounding factor may be the vastly different backgrounds of the students. Their country of origin, differing experience with English, age, gender, or time in the U.S. could all be factors affecting intonation acquisition. This factor was an unavoidable confound since the nature of the ESL classes we observed were multilanguage classrooms. However, similar studies can be carried out in English as a Foreign Language (EFL) contexts to circumvent such problems.

It is possible that musical familiarity is beneficial to the second language learner only after prolonged experience to a form, or some time after the new form is introduced. Based on the study by Kolinsky et al.

(2009) showing otherwise, it is more likely that the students with musical familiarity could perceive the intonation contrasts more than those without musical experience, yet had not linked the meaning with the intonation pitch, and therefore answered the questions incorrectly. Within the group of students with self-reported musical familiarity, there was much variation in the amount and type of musical training. The time studying music ranged from three months to 10 years. Some students were self-taught, others had formal training, and the age at which that training took place varied from student to student. But according to the test-type administered, musicality was not a factor that aided students in making intonation gains. With a more significant number of participants, these factors can be examined more closely.

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