



The practical application of hand gestures as a means of improving English intonation

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Abstract

This paper reports on the results of a study that investigated the use of hand gestures as a learning strategy for the acquisition of English intonation by Catalan/Spanish native speakers. Thus, two research questions were explored: a. regarding the benefits this learning strategy could have on the recognition of intonation patterns; b. about the extent of improvement that hand gestures provide to the production of basic intonation patterns in English. To address these questions the subjects of the study had to read a set of sentences while they were recorded. Data from the recordings was analyzed through frequency values in the utterances' pitch contours. The sentences were affirmative, yes/no questions and information questions.

Additionally, the subjects of the study were divided in two groups, the control and the experimental ones. The experimental group used hand gestures to modulate intonation patterns. Results revealed that rising intonation was more used during the pre-test. Contrary to that, during the post-test students were able to recognize and use falling intonation as well. As a result, students' awareness of intonation patterns was developed and by using hand gestures they were able to produce rising and falling intonation more accurately.

Keywords: intonation, hand gestures, rising, falling, pronunciation.

1. Introduction

Spanish and Catalan native speakers use a narrower pitch range than English [1]. Moreover, Spanish and Catalan speakers express emphatic stress with extra length, which contrasts with the extra pitch variation in English. Notably, these differences in L1 and L2 intonation impact learners' intonation performance. In fact, students might transfer L1 intonation, which may affect their intelligibility and the development of their communicative competence.

In addition, in most EFL classes, pronunciation is covered just on the basis of

segmental features. Because of that, suprasegmental components such as intonation and stress are often neglected. What is more, sometimes pronunciation features are taken for granted and teachers tend to assume that providing high quality input is sufficient to acquire a native-like pronunciation. However, the input to which students are exposed in class is limited. It certainly helps them to understand English, but it is not enough to raise awareness of aspects like intonation [2]. Thus, the main objective of this research project is to raise students' awareness of intonation by using a specific tool, i.e., hand gestures [3]. The main hypothesis of the study is that the use of hand gestures should enhance students' awareness of the different intonation patterns. Therefore, by the end of the treatment, students should be able to recognize intonation as an important language component to support their oral production and not only vocabulary and grammar. A secondary hypothesis states that the explicit use of hand gestures will result in significant improvements in the production of basic intonation patterns.

Even though both aspects are undoubtedly relevant, people might be able to communicate ideas without an advanced vocabulary or grammar and still be understood. However, people can struggle when conveying a message if pronunciation is not accurate. Under those circumstances, this paper proposed a tool to enhance intonation awareness [3].

On one hand, [4] mention that in general the idea of intonation can be associated with a distinction between declarative and interrogative patterns, which correspond to a falling and rising intonation at the end of the sentence, respectively. On the other hand, [5] mentions that intonation goes beyond falling and raising in declaratives and interrogatives. The author states that, in daily and real interactions, speakers vary the intonation in a sentence according to the emphasis they want to portray. In this case, the variations in intonation are known as contrastive intonation. For the present paper, the general assumption argued by [4] will be the basis for the intonation patterns that will be studied, since using

these two types can make a speech meaningful and make it possible for speakers to communicate effectively.

In addition, Spanish and Catalan speakers tend to transfer L1 intonation patterns to avoid a “flat sound”. Their L1 has different pitch movements so students tend to use its intonation contours [6]. With that being said, it is clear that, in order to make English “more familiar”, learners might use their L1’s intonation and, as a result, they might be affecting intelligibility [7]. For this reason, teaching sounds of the language as well as suprasegmental features becomes important.

When it comes to hand gestures, [8] conducted a study that was intended to deal with fossilized pronunciation in adult English speakers. There he proposed an innovative pedagogy which involved teacher and student body movement. Students were taught to carry out kinesthetic monitoring as a major learning strategy. The main goal of this strategy was to focus on how a language “feels” rather than how it “sounds”. There were different techniques used such as beating and clapping to recognize stress as well as using downward and upward movements of the hand to create a visual representation of intonation patterns. Consequently, students comprehended and recognized how intonation is used.

To sum up, when and how our voice rises and falls may indicate different meanings. Therefore, it is clear that raising awareness of the recognition and use of appropriate and basic intonation patterns while providing a learning tool is a relevant subject of study.

2. Methodology

2.1. Design

In order to test the hypothesis, an experimental study was designed with two groups of subjects, one control and one experimental. The study consisted of three parts: a pre-test, a treatment and a post-test. The pre-test and post-test consisted of discrimination tasks. The groups were asked to read a set of sentences while they were being recorded. The recordings served as data in order to examine intonation production in terms of pitch values. Regarding the instruction, both groups were taught during ten hours about intonation and through reformulation of their sentences they kept practicing their performance. However, the experimental group was also taught to use hand gestures as an aid in modulating the intonation required for each type of sentences included in the design.

2.2. Treatment

First of all, it is important to mention that each group had one hour a week dedicated to speaking. So, each group worked separately and independently on the activities that will be explained below. The activities conducted were based on [6]; a communicative framework for pronunciation instruction and a sequence of tasks were applied. Both groups were explained about basic intonation patterns and students listened to six different recordings. The recordings showed incorrect and correct intonations for affirmative statements, yes/no questions and information questions. Then, students were asked to recognize the ones they perceived as correct and to explain their reasoning. Finally, students were encouraged to compare and contrast the intonation they used in Spanish/Catalan with the one required in English. These exercises aimed to raise awareness of the differences between basic intonation patterns. Given the fact that intonation is often neglected in the EFL classroom, the instructor provided a clear definition– *intonation is the melody of the sentences*. Consequently, raising and falling intonation was explained with the recordings that had been analyzed. Thus, an inductive approach for teaching intonation was used. In the following session, different pictures were shown to students. At the same time, hand gestures, modulated by the instructor, were introduced just to the experimental group. Moreover, throughout the ten hours dedicated to this treatment, students used the same strategy, writing down their ideas when describing pictures, while the experimental group used hand gestures as well. Thus, there was meaningful learning. Unfortunately, the last task type, communicative practice, was not applied due to the limited amount of time allowed for this study.

2.3. Data analysis

Once the data was gathered, the software PRAAT was used. Since the analysis was based on pitch, the most reliable way of getting a sense of it was by examining a narrowband spectrogram with a reduced visible range [9]. Therefore, for each sentence the word containing the focal stress was analyzed in terms of overall frequency in order to determine if there was a rising or falling intonation.

The first step was to identify the word containing the focal stress in the sentences that students read. This is usually the last content word in the sentence. Then, the syllables where the pitch varies were identified. After that, those syllables were narrowed in PRAAT in order to identify the frequency values used. Next, the values from the pretest and the post-test were tabulated in Excel. Finally, the values were

Figure 1 shows the visual representation of the sentence *Can you speak German?* On top of the figure the wave form of the sentence can be seen, while the bottom shows the corresponding spectrogram. The blue line shows the fundamental frequency. Since it is a yes/no question, the focal stress should be evidenced in the word *German*. In order to analyze the frequencies in the word, syllable 1 (black line) and syllable two (gray dots) were analyzed. The difference in the frequencies shown in both syllables contributed to identifying an increase or decrease in pitch. As a consequence, rising or falling intonations were determined.

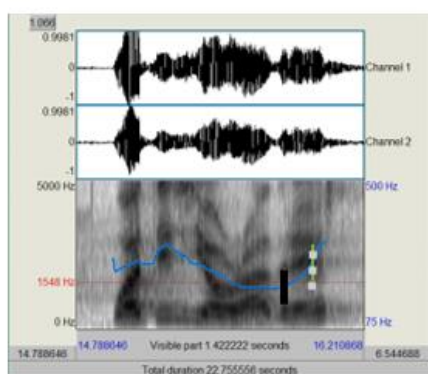


Figure 1: Rising intonation

Figure 2 shows the visual representation of the sentence *Sonia is arriving on Monday*. Again, at the top of the figure the wave form of the sentence can be seen, with the spectrogram underneath and the blue line showing the fundamental frequency. Since it is a positive statement, the focal stress should be evidenced in the word *Monday*. In order to analyze the frequencies in the word, syllable 1 (black line) and syllable two (gray dots) were analyzed. The difference in the frequencies shown in both syllables contributed to identify an increase or decrease in pitch.

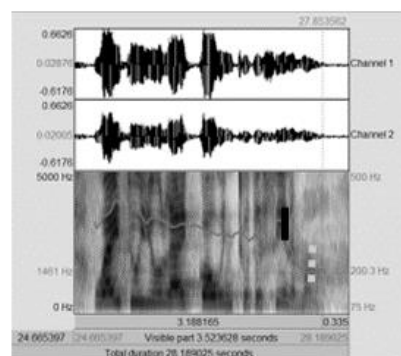


Figure 2: Falling intonation

2.4. Statistical analysis

For the statistical analysis, the results were treated using ANOVA to determine if there was a significant difference between the control and experimental group before and after the treatment. Once the data was gathered, each participant was analyzed by tabulating the results from the subtraction made from syllable one and two of the stressed word in the sentences included in the design. This operation was repeated for each sentence regarding the pre and post-tests.

Then, three different ANOVA tests were used. Each test was based on the type of sentence to which students were exposed to: affirmative sentences, yes/no questions and information questions. This analysis was done using the data analysis option in Excel, considering a two-way ANOVA with replication and keeping an alpha value (α) of .05.

3. Results

Table 1 shows the results for the ANOVA test based on the first group, affirmative sentences. They show that in terms of group ($F = 10.21, p < .05$) and time ($F = 11.64, p < .05$) there is a significant difference, which suggests that because of the treatment conducted, both groups performed the category differently during the pre and post-tests. It also shows a non-significant interaction, which represents that, regardless of the group factor, the time factor always has a similar effect, i.e., increasing the values.

Table 1: Affirmative sentences

Affirmative sentences						
Source of Variation	SS	df	MS	F	P-value	F crit
Group	20431.907	1	20431.907	10.205604	0.00238	4.0266314
Time	23302.24	1	23302.24	11.639316	0.001257	4.0266314
Interaction	56.668651	1	56.668651	0.0283056	0.867045	4.0266314
Within	104105.47	52	2002.0282			
Total	147896.28	55				

Table 2 shows the results for the ANOVA test based on the second group, yes/no questions. They show that in terms of group ($F = 1.42$, $p > .05$) there is no significant difference, while regarding time ($F = 15.24$, $p < .05$) there is a significant difference. These results suggest that both the control and the experimental group performed differently after the treatment than before. Besides, it shows a non-significant interaction, which might have to do with the fact that the groups' performance is not affected by the time.

Table 2: Yes/No questions

Yes / No questions						
Source of Variation	SS	df	MS	F	P-value	F crit
Group	2948.3353	1	2948.34	1.4176	0.2392121	4.0266314
Time	31698.431	1	31698.4	15.241	0.0002739	4.0266314
Interaction	29.049603	1	29.0496	0.014	0.9063785	4.0266314
Within	108152.96	52	2079.86			
Total	142828.78	55				

Table 3 reports the results for the ANOVA test based on the third group, information questions. They show a significant result for group ($F = 13.36$, $p < .05$), but not for time ($F = 1.95$, $p > .05$). Besides, the interaction ($F = 12.63$, $p < .05$) is also significant. This implies that both factors are correlated.

To illustrate this correlation, Figure 3 shows a visual representation of these results. It is important to notice that the change relies on the post-test from the experimental group. Thus, the change from a rising to a falling intonation could be attributed to the treatment in this group, hand gestures.

What is more, this group of sentences is the crucial one for this study, since it might be reflecting that hand gestures can be a reliable tool to improve falling intonation in information questions.

Table 3: Information questions

Wh- questions						
Source of Variation	SS	df	MS	F	P-value	F crit
Group	40160.72	1	40160.72	13.35686	0.0006	4.026631
Time	5876.669	1	5876.669	1.954494	0.168039	4.026631
Interaction	37977.43	1	37977.43	12.63074	0.000818	4.026631
Within	156350.9	52	3006.747			
Total	240365.7	55				

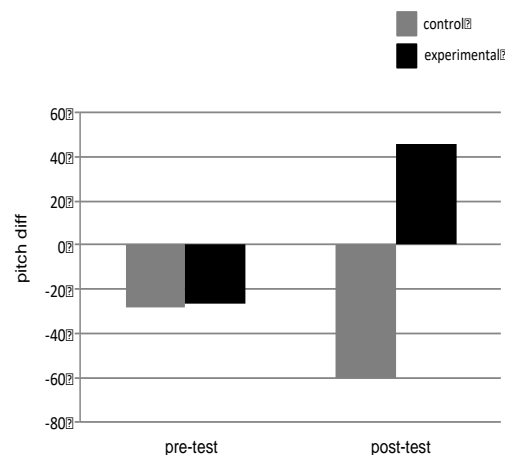


Figure 3: Interaction for information questions

4. Discussion

The first hypothesis for this study concerned the benefits of incorporating hand gestures when developing students' concrete awareness of raising and falling intonation. The analysis firstly revealed that, in all cases, including intonation in the EFL classroom fosters awareness of its importance and use. Indeed, there have been different research works in recent years which show that instruction on intonation contributes to the development of students' awareness of how English works in its spoken form [10]. Consequently, students might improve their communicative competence.

According to the Common European Framework of Reference for Languages, six competences are part of the linguistic competence. Within them, the phonological aspect deals with pronunciation and intonation. In the case of this study, students acknowledged the difference between a correct and an inaccurate intonation. As a result, they preferred the native model and they intended to use it in order to be easily understood when communicating in English. Moreover, they were conscious of the prestige associated with using accurate intonation patterns and its impact on their social use of the language. In that way, student's awareness of intonation patterns helped them understand more than just a linguistic level of English.

Likewise, in this research students were asked to compare and contrast intonation patterns in L1 and L2. Under those circumstances, students had their L1 as the basis for understanding such an abstract concept as intonation. This was a beneficial activity because it allowed the participants to identify how the language systems work [11]. As a result, there was less transferred intonation patterns during the post-test. Indeed, this analysis might help them enlarge their repertoires, which will definitely work as a tool for becoming independent learners and for

performing more effectively in future encounters with English speakers [12].

In addition, it may provide support for weak students. The analysis was an additional tool for recognizing basic intonation patterns in English. People use gestures all the time as a support to communicate meaning. Likewise, in this study hand gestures were expected to help learners to use the correct intonation pattern and, thus, to convey meaning accurately. Because of that, gestures can be seen as input, raising a range of questions regarding their role in the classroom, and their effects on comprehension, production and learning more generally [13]. For all these reasons, it could be confirmed that incorporating hand gestures benefits the development of students' concrete awareness of raising and falling intonation.

On the other hand, the second hypothesis was about the extent of improvement in the production of English basic intonation patterns based on hand gestures. When it comes to the benefits of hand gesture, as stated in the introduction, [9] proposed an innovative pedagogy which involved teacher and student body movement. This strategy helped students focus on how a language "feels" rather than how it "sounds". One of the strategies of that study was using downward and upward movements of the hand to create a visual representation of intonation patterns. In the light of that study, it could be claimed that an abstract concept becomes "visible" and clear for students. Besides, hand gestures become a practical, workable, trustworthy system to learn intonation [14]. Hence, students not only recognize that there are more factors besides vocabulary, grammar and the language skills, but also that intonation plays an important role in production. What is more, students started gaining control over their L2 pronunciation, which should lead them to be fluent speakers. However, hand gestures which model intonation do not play a role in daily conversation. As a result, at some point students should stop using this strategy as an aid [15]. It could be the case that students might do it themselves or the instructor might encourage them to stop using hand gestures. Then, the question will be whether they can use proper intonation patterns without using hand gestures or if they might shift back towards transferring L1 intonation patterns. Further research is needed to be able to settle this issue.

Equally important, by using hand gestures students will learn from the beginning that pronunciation is normal and necessary for intelligible and comprehensible communication. Teachers will also benefit from using this strategy, since they will learn and innovate more in terms of strategies to cope with intonation in the EFL classroom. As [16] argue,

pronunciation instruction should not be separated from the rest of language instruction and should be a constant and integral part of every lesson. [17] is in agreement with that statement. In fact, he mentions that there is plenty of evidence that includes the use of the body, especially of hands, as a language teaching strategy. As a consequence, language teachers could benefit from it while making rich use of gestures in their teaching, including gestures and other kinetic expressions in learning activities. On top of that, teachers could also share their experiences and encourage more teachers around the world to include strategies to cope with intonation. Under those circumstances, hypothesis number two was confirmed. Students using hand gestures are able to produce more accurate raising and falling intonation.

Last but not least, this research was in alignment with [6]'s communicative framework for pronunciation instruction. Supported by the results of this paper, it could be mentioned that those types of tasks are suitable when pursuing concrete awareness and analysis for long lasting results. However, it is important to note that the first type could have worked better with advanced students, since they have developed more metalinguistic language to describe and analyze tasks. Besides, there was no communicative practice due to the amount of time devoted for this study.

Together with the proposal stated above, it would be interesting to replicate the methodology of this study in order to focus equal attention on keeping a smooth and plain intonation before creating a rise or a fall. In that sense, it was observed that, even though the experimental group improved their production on rising and falling intonation, they tended to start a question with a rising intonation. This feature is transferred from their L1, in which this initial rise is an indicator of a question [18]. Therefore, by conducting a different study it could be determined if EFL students can also tackle that problem through the use of hand gestures.

5. References

- [1] Coe, N. 2011. *A teacher's guide to interference and other problems*, Cambridge, Cambridge University Press, 2011.
- [2] Dayan, L. 2015. A Critical Review of Krashen's Input Hypothesis: Three Major Arguments. *Journal of Education and Human Development*.
- [3] Muzammil, L. 2005. *The Effect of L1 Suprasegmental Features on L2 Learners' Speaking Performance*. Kanjuruhan University of Malang
- [4] Hirst, D, Di Cristo, A. 1998. *Intonation Systems. A survey of twenty languages*, United Kindom: Cambridge University Press.
- [5] Knowles, G. 1984. Variable strategies in intonation. *Intonation, accent and rythm. Studies in Discourse phonology*, Germany, Waltwer de Gruynter, 1984, p. 242.

- [6] Celce - Murcia, M. Brinton,D. Goodwin, J.1996. *Teaching pronunciation: a reference for teachers of English to speakers of other languages*, Cambridge: Cambridge University Press,
- [7] Gilakjani,A. Ahmadi, M. 2011.Why is Ponunciation So Difficult to learn?, *English Language Teaching*..
- [8] Acton, W. 1984. Changing Fossilized Pronunciation. *TESOL Quartely*.
- [9] Styler,W. 2017. Using Praat for Linguistic Research. Creative Commons.
- [10] Zhang,L.2004.Awareness-Raising in the TEFL Phonology Classroom: Student Voices and Sociocultural and Psychological Considerations. *International Journal of Applied Linguistics*.223 - 224..
- [11] Ammar,A. Lightbown,P, Spad,M. 2000.Awareness of L1/L2 differences: does it matter?. *Lanfuage awareness*,
- [12] Zhang,L.2000.A canon of wider choice. *English Today*, pp. 55-60,
- [13] Gullberg,M. 2006. Some reasons for studying gesture and second language acquisition (Hommage à Adam Kendon). *International Review of Applied Linguistics*, pp. 103 - 124,
- [14] Smotrova,T.2015.Making Pronunciation Visible: Gesture In Teaching Pronunciation, *TESOL Quartely*.
- [15] Hudson,N.2011. Teacher gesture in a post-secondary English as a second language classroom: A sociocultural approach. *UNLV University Libraries*, pp. 260 - 267,
- [16] Darcy,L. Ewert,D. Lidster, R. 2012. Bringing pronunciation instruction back into the classroom: an ESL teachers'pronunciation toolbox, Iowa. *Proceedings of the 3rd Pronunciation in Second Language Learning and Teaching Conference*,
- [17] Orton,J. 2007. Gesture: in modern language teaching and learning, *Australian Federation of Modern Language Teachers Associations*,
- [18] Bolinger, D. 1994. *Intonation and its parts*, California: Stanford University Press, 1994.