



An investigation into the recognition and production of pitch patterns of *If*-clauses by Turkish pre-service teachers of English

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Abstract

Teaching pitch patterns of English as part of one of the elements of intonation has considerably been undervalued in Turkish teacher education contexts despite its significance in communication (Roach, 2001; Scherer, 2003; Maastricht et al., 2016) hence less research was conducted on this subject (Wennerstrom, 2001; Pickering, 2002; Demirezen, 2014) especially in Turkish teacher education settings. This study therefore intended to explore the competency levels of Turkish pre-service teachers of English on the recognition and production of pitch phonemes of *If*-clauses. It further aimed to remediate any pitch-related problems of the participants through a variety of explicit drills utilizing Grammar/Intonation Model (Cauldwell & Hewings, 1996) and Audio-Articulation Model (Demirezen, 2003) in the light of Discourse Intonation Model (Brazil, 1997). Data were gathered through pre-test/post-test experimental design with the participation of 61 freshmen of the ELT department of a state university in the academic year of 2015/16. Descriptive and inferential analyses demonstrated that the majority of the participants were in need of remedial training. It was also discovered that the treatment was effective in ameliorating the participants' problems in terms of recognition. It was concluded in this study that Turkish pre-service teachers of English must be exposed to continuous remedial training in intonation, especially pitch patterns.

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Keywords: pitch patterns; teacher education; *If*-conditionals; Grammar/Intonation Model; Audio-Articulation Model.

1. Introduction

Suprasegmental features such as intonation and rhythm have attracted little attention in both Turkish (Arslan, 2013; Demirezen, 2009, 2014, 2015a, 2015b) and non-Turkish contexts (Harmer, 2001; Celce-Murcia, 2010; Murphy, 2014) on account of a number of reasons including the complexity of the subject (Wong, 1994; Mitrofanova, 2012), teachers' lack of interest (Wang & Munro, 2004; Derwing & Munro, 2005; Gilbert, 2008), and prosodic typology (Juns & Fletcher, 2014; Topal, 2017). However, teaching intonation – pitch patterns in particular – bears great significance in that they convey semantic information (Spaai & Hermes, 1992) and lead to communication breakdowns in their lack (Maastricht et al., 2016). As teachers of English represent efficient role-models for their students, they must possess a good knowledge of the subject with at least near-native-like accent which can be achieved through a

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good command of the intonation that includes primary stress, pitch, and juncture. Considering this fact, it must be emphasized that pitch patterns must be incorporated into the curricula of English language teacher education in Turkey in order to create increased learning and teaching opportunities and raise efficient and knowledgeable prospective teachers of English. In this regard, it is expected of Turkish pre-service teachers of English to be proficient and competent enough in identifying and employing the pitch patterns of English correctly. It must also be reminded here that enhancing the competency levels of Turkish teachers of English bears as great significance as the teaching of pitch patterns.

Pitch phonemes, as the second element of intonation along with stress and juncture, are defined as “the relative highness and lowness of the voice” (Celce-Murcia, 2010, p. 184). In other words, they depict the unique tones of speaker-generated utterances. The value of pitch patterns must be increased considering the fact that they may differentiate meanings and carry paralinguistic meanings (Demirezen, 1986; Peoples & Bailey, 2012). Furthermore, characteristics of people (Crystal, 1981) and their emotional state (Baenziger & Scherer, 2005) can be identified through pitch levels. Taking into consideration the salience of pitch patterns in meaning-making process in communication, the instruction of pitch patterns in English to both in-service and pre-service teachers of English becomes a goal to be achieved for sound communication management. Teaching the pitch patterns of *If*-clauses to Turkish teachers of English therefore is grave to distinguish between embedded questions and conditionals constructed using *If*-statements.

The present study, because of the reasons aforementioned, intended to explore the competency levels of Turkish pre-service teachers of English in relation to the recognition and production of the pitch patterns of *If*-clauses, an under-researched area, and any of their pitch-related errors in case of any. Aside from these, this study also aimed to raise the awareness of prospective Turkish teachers of English about teaching intonation and inform them of the accurate use of pitch patterns of *If*-clauses through a wide range of recognition and production drills designed by the medium of Audio-Articulation Model (Demirezen, 2003) and Grammar/Intonation Model (Cauldwell & Hewings, 1996) in the light of Discourse Intonation Model (Brazil, 1997).

1.1. Pitch and Pitch Phonemes in English

For Demirezen (1986, p. 116) pitch is “the frequency of vibrations of human voice heard in highness and lowness of tones during the act of speech.” Pitch is mainly dependent on the vibration rate of vocal cords (Cruttenden, 1986) and hence the pitch of the voice gets higher when more syllables are stressed. What makes pitch a salient component of intonation is the fact that it harbors some paralinguistic meanings inside (Peoples & Bailey, 2012). Depending on the level of the pitch, one can understand whether the person is angry, happy, or sad. Apart from this, pitch patterns change the meaning in communication. For instance, higher pitches may indicate exclamation or interrogation while lower pitches may display statements. That being stated, the pitch levels of in English are illustrated in the following table.

Table 1. The Pitch Levels of English

Level	Pitch Name
/1/	Low Pitch Phoneme
/2/	Normal (Mid) Pitch Phoneme
/3/	High Pitch Phoneme
/4/	Extra High Pitch Phoneme

To clarify the levels and their equivalents in Table 1, Demirezen (1986, p. 118) explained that normal pitch of the voice is displayed by /2/ as to the ups and downs of the voice. In other words, each statement starts with pitch level /2/. The word with a primary stress in a statement gets pitch level /3/ and then the

statement is finalized with pitch level /1/ as the voice goes down. It must be borne in mind that these pitch levels do not bear any meanings alone. Instead, they come together and form patterns through which phrases, clauses, and sentences are made. However, it must also be noted here that rises and falls in pitch cannot be ascribed to stress alone but intonation contours as well. Intonation contours can be defined as distinctive pitch patterns in an utterance through which statements, interrogatives, declaratives, etc. are formed. In Table 2 below, a number of revised intonation contours collected from several researchers (Demirezen, 1986; Celce-Murcia, 1996; Gut, 2009) are presented.

Table 2. The Intonation Contours in English

Intonation Contour	Area of Use
/2 3 1 ↓/ or /2 2 1 ↓/	Statements / Declarative sentences
/2 3 3 ↑/ or /2 2 3 ↑/	Commands / Wh-questions Yes-no questions as statements Yes-no questions as interrogatives
/2 3 2 →/	Certain phrases and clauses Initial grammatical unit Certain statements
/3 2 2 ↓/ or /2 2 3 ↑/ /2 2 3 ↑/	Mothers' special calls for children Stressed words, phrases, or clauses in series

When the focus of this study is considered, it can be stated that /2 3 2 →/ and /2 3 1 ↓/ pitch patterns will be used as these indicate the pitch patterns of *If*-clauses in English. To be more specific, it can be argued that *If*-conditional sentences often get /2 3 2 →/ - /2 3 1 ↓/ pitch patterns when the main clause is preceded by *If*-clause. However, there are some instances of /2 3 1 ↓/ pitch pattern, which can also be found in the corpus of this study. The difference between these two pitch patterns can be explained as follows. The first type, namely, /2 3 2 →/ - /2 3 1 ↓/ pitch pattern is utilized in *If*-conditional sentences which have two words with primary stress while the second type, /2 3 1 ↓/ is used in *If*-conditionals with one primarily stressed word. To clarify this, the following examples can be provided.

(i) If you work hard, you can achieve it.

^{/2}If you work ³**HÁRD**² →²you can ³**aCHÍEVE** it¹↓/

As can be observed in the example above, both dependent and independent clauses have one word with primary stress. It was mentioned earlier that each statement starts with pitch level /2/ and the word with primary stress in the statement gets pitch level /3/ and the statement is ended with pitch level /1/. However, in case of use of a comma, a sustained juncture must be utilized as it indicates an incomplete utterance or a short period of pause. For this reason, the pitch pattern in the example above would be /2 3 2 →/ - /2 3 1 ↓/. The following example denotes a special case in relation to the pitch patterns of *If*-clauses.

(ii) You can achieve it if you work hard.

^{/2}You can ³**aCHÍEVE** it if you work hard¹↓/

In the second example above, the sentence has one word with primary stress and therefore there would only be a /3/ pitch level in the statement. As the sentence starts with pitch level /2/ and is finalized with /1/ pitch level, the probable pitch pattern of the statement above would be /2 3 1 ↓/. When the dependent clause is preceded by the main clause, there are two cases. The first one was provided in the second example, which was a special case where the whole sentence has only one word with primary stress. However, there is another case of *If*-clause in which the sentence has /2 3 2 →/ - /2 3 1 ↓/ intonation contour. In this case, the sentence – as expected – has two words with primary stress.

1.2. Pitch Instruction and Its Significance

Pitch accents are very important in that they demonstrate listeners whether the speaker meant a statement, a question, or displayed amusement. Both grammatical and paralinguistic meanings can be achieved through the use of appropriate pitch patterns. With this in mind, it is plausible to assert that pitch phonemes bear great significance in conveying meaning and managing sound communication. Studies conducted on pitch and pitch phonemes revealed the significance of these suprasegmental features of the language. For instance, Celce-Murcia et al. (2010) expressed that learners would disfavor incorrect use of rhythm and word connection by native speakers. More specifically, learners might be regarded rude or abrupt when they produce intonation contours inaccurately. Similarly, Maastricht et al. (2016) discovered that communication between speakers is inhibited due to incorrect use of pitch accents. However, the significance of pitch patterns can best be understood from what Wells (2006) argued as follows:

By combining different pitch levels (=unchanging pitch heights) and contours (=sequences of levels, changing pitch shapes) we express a range of intonational meanings: breaking the utterance into chunks, perhaps distinguishing between clauses (such as statement vs. question), focusing on some parts of the utterance and not on others, indicating which part of our message is background information and which is foreground, signaling our attitude to what we are saying (p.5).

1.3. Methods of Teaching Pitch Phonemes

Both traditional and discourse-based approaches were adopted to teaching intonation, yet for the teaching of pitch phonemes or patterns, audiovisual methods would be much more effective in that learners would best benefit from the visual and auditory aids, seeing the sound wave of the utterance and its frequency along with the simultaneous accompaniment of audio of the utterance. It must also be reminded here that the teaching of pitch patterns must be contextualized in the light of Discourse Intonation Model (Brazil, 1997) which deals with the communicative function of intonation and connects it to a present description of discourse. With the advance of speech visualization technology, it was advised and favored by several scholars (Anderson-Hsieh, 1992; Levis & Pickering, 2004; Chun, 2013) that the teaching of intonation and pitch patterns be realized through this technology. Some online software and programs such as PRAAT (Boersma & Weenink, 2004), WASP (Huckvale, 2003), and VisiPitch (Kay Elemetrics Corporation, 2004) were found to be ineffective in that they provide users with the chance to examine pitch patterns at the sentence level not the discourse one. According to Anderson-Hsieh (1994), suprasegmentals can be taught most effectively through pitch extraction by use of appropriate equipment and intensification of speech signal and presentation of the information on the screen accompanied by immediate visual feedback. Therefore, it can be asserted that a multi-modal method that combines both auditory and visual aids and introduces them simultaneously in real time can be most beneficial to the teaching of pitch patterns.

1.4. Determinants of Pitch Instruction

The implementation of a technique, method, or an approach may not yield the expected results all the time due to various factors since theory and practice cannot complement each other. For this reason, the teaching of pitch patterns of *If*-clauses or any other grammatical features of English may not produce the desired effect due to some reasons. Concerning the teaching of pitch patterns, for instance, it can be argued that discouragement can be displayed by both learners and teachers due to its complex nature (Wong, 1994). In a similar vein, Mitrofanova (2012) claimed that intonation is similar to phonemes

which has not meaning of their own but are capable of playing a distinctive role. Another factor to be the predictor of incorrect use of pitch patterns can be cross-linguistic differences (Ladefoged, 1982; Bertran, 1999; Topal, 2017). In our case, differences between Turkish and English in terms of intonation, especially pitch phonemes, make it hard for prospective Turkish teachers of English to acquire the accurate pitch patterns. Teachers' lack of interest and competence can also affect the teaching of pitch phonemes as teachers experience pedagogical misdirection (Wang & Munro, 2004) or claim lack of time (Gilbert, 2008). Nevertheless, these determinants should not demotivate both pre-service and in-service teachers of English or deter them from acquiring or teaching this suprasegmental feature of English as part of professional identity and phonological competence, a sub-category of linguistic competence according to Common European of Framework (Council of Europe, 2001).

1.5. Earlier Work on Pitch Phonemes

Studies carried out on pitch phonemes and accents can be categorized into two as those conducted in Turkish and non-Turkish contexts. The research studies carried out in non-Turkish contexts revealed that visual pitch feedback was more effective than auditory-only feedback (De Bot, 1986), pitch are used to emphasize contrastive information (Wennerstrom, 1994) and paratone structure hints the listeners as to the informational structure (Pickering, 2004). Regarding the research conducted in the Turkish settings, there is a scarcity. In a study conducted by Demirezen (2014), it was found that participants failed to produce correct pitch patterns due to negative L1 transfer and thus must be encouraged to receive remedial training. As can be seen from the literature, there is an extensive gap in terms of studying the pitch accents or phonemes in relation to teaching. For this reason alone, this study was worth being conducted.

1.6. Research Questions

In connection with the discussion made so far, the following research questions were developed for this study.

1. Is the difference between the participants' pre-test and post-test scores in relation to the recognition and production of pitch patterns of *If*-clauses statistically significant?
2. What are the percentages of the participants in terms of producing /2 3 2 / - /2 3 1/ and /2 3 1/pitch patterns respectively?
3. What is the overall success rate of the participants in relation to the recognition and production of the pitch patterns of *If*-clauses?

2. Method

This section will provide some information about the background of the participants along with the research design, setting, instruments used in this study, treatment and procedures for data collection.

2.1. Research Design

A pre-test/post-test experimental design was administered in order to find answers to the research questions of this study. As this study intended to reveal the competency levels of the participants in terms of recognition and production of the pitch patterns of *If*-clauses, pre-test and post-test were conducted in written and oral forms. The written test aimed to evaluate the recognition levels of the participants while the oral one intended to assess their production levels in relation to the pitch patterns

of *If*-clauses. In both pre-test and post-test, the same tests were administered and both written and oral tests included the same sentences in the corpus. There were 12 *If*-conditional sentences of Type 1, 2, and 3 conditionals equally divided into 4 sentences in total for each conditional type. In two of the sentences of each conditional type, *If*-clause was in the middle while it is at the beginning in the other two. The participants were asked to choose the correct option in the written test which assessed their levels of recognition of the pitch patterns of *If*-clauses while they were asked to record their voices while reading aloud the sentences in the corpus in the post-test. The content of the corpus was designed in accordance with expert opinion and several criteria such as the quality of the sound and the length of the sentences. Obtaining the opinions of three experts in the field, the sentences were downloaded from Longman Dictionary of Contemporary English (2012) and Longman Dictionary of American English (2008) and several course books through Audacity program in 44100 Hertz. The sentences in the corpus of this study are illustrated along with speech waves below.

/If he resigns, it will be an admission of guilt. / (Pitch Phonemes) /232 →231/



Fig. 1. Type 1 Sentence 1

/If Julie doesn't get her act together, she'll never graduate. / (Pitch Phonemes) /232 →231/



Fig.2. Type 1 Sentence 2

/You'll be missing the boat if you don't buy these shares now. / (Pitch Phoneme) /231/

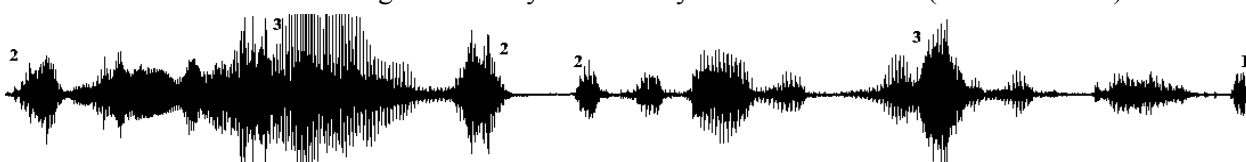


Fig. 3. Type 1 Sentence 3

/We won't get anything done if you two don't stop carrying on. / (Pitch Phonemes) /232 →231/



Fig. 4. Type 1 Sentence 4

/If my car had one, life would be so much easier. / (Pitch Phonemes) /232 →231/

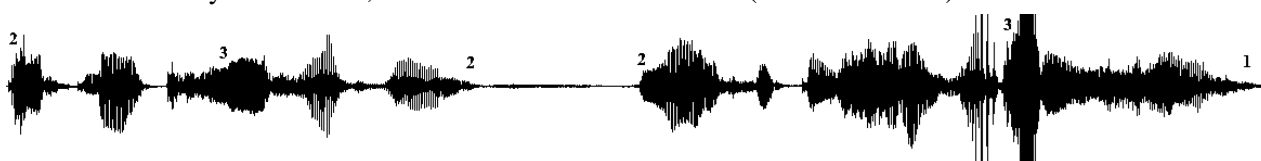


Fig.5. Type 2 Sentence 1

/If they needed a computer, they'd buy one. / (Pitch Phonemes) /232 →231/



Fig.6. Type 2 Sentence 2

/I'd get one tomorrow if I had enough money. / (Pitch Phoneme) /231/



Fig.7. Type 2 Sentence 3

/I'd travel more if my husband weren't afraid of flying. / (Pitch Phonemes) /232 →231/



Fig.8. Type 2 Sentence 4

/If I'd known it was you on the phone, I would have answered it. / (Pitch Phonemes) /232 →231/



Fig.9. Type 3 Sentence 1

/If you'd asked me out to dinner, I'd have said yes. / (Pitch Phonemes) /232 →231/

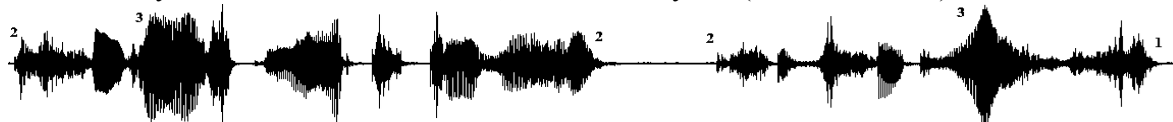


Fig.10. Type 3 Sentence 2

/I definitely would have remembered if you'd told me. / (Pitch Phoneme) /231/



Fig.11. Type 3 Sentence 3

/I wouldn't have felt so tired this morning if I'd gone to bed earlier. / (Pitch Phonemes) /232 →231/



Fig.12. Type 3 Sentence 4

2.2. Settings & Participants

The participants of this study were selected through convenience sampling technique as they were easy to recruit for this study (Dörnyei, 2007). As the population for this study was too large, it was considered that convenience sampling would be benefited most since the participants were easy to reach to the researcher. 61 Turkish freshmen studying at the ELT Departments of state university in Ankara participated in this study after their consent was obtained through voluntary participation form. Of the participants, 13 were male while 48 were female whose ages ranged from 18 to 21. In terms of their familiarity with the pitch patterns of *If*-clauses, the participants can be considered equal in that they all took the same courses titled ‘Listening and Articulation I/II’ in two education terms. They can also be considered equal in terms of education background because they all took the same proficiency exam before they started university. Bearing this in mind, the sample of this study can be considered homogenous.

2.3. Instrumentation

The main instrument of this study consists of 12 sentences collected from Longman Dictionary of Contemporary English (2012) and Longman Dictionary of American English (2008) alongside of several course books. The sentences were selected based on a number of criteria along with expert opinion. There were four sentences from each conditional type; that is, Type 1, 2 and 3. In two of the sentences *If*-clause was at the beginning while it is in the end in the other two. The collection of sentences from dictionaries and books were also favored by several other scholars (Kelly, 2001; Swan & Water, 2011; Wells, 2014). The sentences were computed into SPSS for internal consistency and inter-item reliability through to Kuder-Richardson 20 (KR-20) due to their dichotomous use in the oral test (Gliner et al., 2009) prior to the administration of the tests.

For the measurement of the written pre-test and post-test, Cronbach’s alpha formula was computed through SPSS. The correct answers given by the participants were labeled as 1 and their incorrect answers were labeled as 0. According to the computation, the score was 0.73 for the pre-test and 0.74 for the post-test. The measurement was found to be reliable in that the score was higher than 0.70 (Nunnally, 1978). The measurement of the oral pre-test and post-test was performed via KR-20 formula as the sentences were subject to dichotomous use. The participants’ correct answers were labeled as 1 and incorrect ones as 0. When the scores were computed into SPSS and KR-20 analysis was performed, the KR-20 coefficient was found to be 0.79 for the pre-test and 0.77 for the post-test. The measure was considered reliable since the coefficient score was higher than 0.75 (Tan, 2009). Hence, the reliability was maintained for the main instrument of this study.

2.4. Treatment

After the results of the pre-tests were obtained, it was observed that the participants were in need of remedial training and hence six-class-hour of training session was organized during which the participants were given brief general information about intonation and then were exposed to written and oral practice drills about the pitch patterns of *If*-clauses prepared in accordance with Grammar Intonation Model (Cauldwell & Hewings, 1996) and Audio-Articulation Model (Demirezen, 2003) in the light of Discourse Intonation Model (Brazil, 1997). The session was administered by way of PowerPoint presentation and it was given to the participants for further practice when the session was over. During this six-hour session, the participants had the chance to take part in the activities actively and they were taught the accurate pitch patterns of *If*-clauses through a variety of audiovisual materials all of which were believed to contribute to the increase in the recognition and production levels of the participants.

2.5. Procedure for Data Collection and Analysis

Data required for this study were obtained from written and oral pre-tests and post-tests. The participants were asked to choose the best pitch patterns for each question in the written pre-test while they were expected to record their voices during the articulation of the sentences in the corpus in a stress-free and sound-proof environment in the oral pre-test. The procedure was the same for the post-test along with the questions in both pre-tests and post-tests. Upon the end of procedure for data collection, the raw data were computed into SPSS and subject appropriate descriptive and inferential analyses.

The analysis of the data was performed in two steps. First, the answers of the participants in the written pre-test and post-test were computed into SPSS and then Paired-Samples T-test was administered in order to find out whether there was a statistically significant difference between the participants' pre-test and post-test scores. The evaluation of the oral pre-test and post-test was performed by three different raters. The raters' evaluation of the correct answers was labeled as 1 while the incorrect answers were labeled as 0. Since this was human evaluation, inter-rater reliability coefficient was computed through SPSS. The results of the analysis demonstrated that the inter-rater reliability coefficient was 0.93 for the pre-test and 0.84 for the second, which suggested that there is almost little variance among the evaluation of the raters. Following the computation of reliability analysis, the raw data were not ready to be subject to descriptive and inferential analyses to find answers to the research questions.

3. Results

RQ-1: Is the difference between the participants' pre-test and post-test scores in relation to the recognition and production of pitch patterns of If-clauses statistically significant?

The first research question is related to the recognition and production of the correct pitch patterns of *If*-clauses by the participants. Both written and oral pre-test and post-test scores were computed into SPSS for inferential analysis. Paired-Samples T-test was performed to see if the difference between the participants' pre-test and post-test scores was statistically significant. The results of the analysis were illustrated in the following table.

Table 3. Paired-Samples T-test Descriptive Statistics

		Paired Samples Statistics			
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE-REC	5.3115	61	3.65851	.46842
	POST-REC	9.4098	61	2.64813	.33906
Pair 2	PRE-PRO	5.8962	61	2.63491	.33737
	POST-PRO	6.7213	61	2.31275	.29612

As illustrated in Table 3, the mean scores of the participants' responses indicated that there has been great improvement in their recognition levels while the improvement in the production was little. In other words, it can be stated that the participants performed better in recognizing than producing the pitch patterns of *If*-clauses.

Table 4. Paired-Samples T-test Results

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	PRE-REC POST-REC	-4.09	3.3995	.4352	-4.9690	-5.2766	-9.41	60	.000
Pair 2	PRE-PRO POST-PRO	-.825	3.7881	.4850	-1.7953	-2.7723	-1.70	60	.094

The data in Table 4 demonstrated that the difference between the participants' pre-test and post-test scores in terms of recognition was statistically significant since the p value was less than .05 (.000<.05) while the same cannot be expressed for the production levels of the participants as the results were found to be insignificant. It can be argued here that the intervention (or the remedial session) was proven to be effective in terms of ameliorating the participants' pitch-related problems in relation to recognition but was insufficient for the production. When the time allocated for the remedial session was taken into consideration, it can be speculated that the improvement was substantial and can be much better if more time for remedial sessions can be allocated. More interpretations will be made in the discussion part.

RQ-2: What are the percentages of the participants in terms of producing /2 3 2/ - /2 3 1/ and /2 3 1/pitch patterns respectively?

As mentioned earlier, intonation contour is formed with the combination of primary stress, pitch and juncture phonemes. Statements in English start with the pitch level /2/, the word with primary stress gets pitch level /3/ and the sentence is finalized with pitch level /1/. In addition to this, depending on the punctuation marker – or pauses in the utterance – the sentence takes a sustained or terminal juncture phoneme displayed with a right /→/ or down /↓/ arrow respectively. The combination of these arrows and pitch levels form the basis of intonation contours. The second research question was formulated to reveal the intonation contour favored by the participants when the dependent clause precedes the main clause.

In the corpus of this study, 9 of the 12 sentences the intonation contour was /2 3 2/ → /2 3 1↓/ while in 3 of them it was /2 3 1↓/. When descriptive analysis was conducted, the results were as displayed in the following table.

Table 5. Participants' Scores for Intonation Contour

	N	/2 3 2/ → /2 3 1↓/		/2 3 1↓/	
		Correct	Incorrect	Correct	Incorrect
PRE-PRO	61	54.09%	45.91%	52.45%	47.55%
POST – PRO	61	77.59%	22.41%	78.13%	21.87%

When Table 5 is examined, it can be observed that more than 50% of the participants did produce both intonation contours correctly in the pre-test. However, the percentage went up to more than 75% in both types of intonation contour. Further analysis suggests that /2 3 1↓/ intonation contour was

performed more by the participants than /2 3 2 / → /2 3 1/. This finding suggests that the majority of the participants were inclined to produce /2 3 1/ pattern in *If*-conditional sentences.

RQ-3: What is the overall success rate of the participants in relation to the recognition and production of the pitch patterns of If-clauses?

The third research question was formulated to reveal the overall rate of performance of the participants in terms of recognition and production of the pitch patterns of *If*-clauses. The written and oral pre-test and post-test scores of the participants will be calculated and presented in the following table to respond to the last research question of this study.

Table 6. Overall Success Rate of the Participants

	Pre-test Recognition		Pre-test Production		Post-test Recognition		Post-test Production	
	Correct	Incorrect	Correct	Incorrect	Correct	Incorrect	Correct	Incorrect
Type 1	46.7%	53.3%	61.62%	38.38%	85.25%	14.75%	55.61%	44.39%
Type 2	43.85%	56.15%	46.85%	53.15%	85.63%	14.37%	60.8%	39.20%
Type 3	38.5%	61.5%	38.93%	61.07%	68.03%	31.97%	50.27%	49.73%
Total	43.01%	79.89%	49.13%	50.87%	79.63%	20.37%	55.56%	44.44%

Table 6 gives a very detailed description of the participants' pre-test and post-test scores in terms of recognition and production of the pitch patterns of *If*-clauses by conditional types. In relation to the recognition of the pitch patterns of *If*-clauses, the majority of the participants recognized the pitch patterns of *If*-conditional Type 1 while the least percentage belongs to *If*-conditional Type 3. Approximately 80% of the participants failed to recognize the pitch patterns of *If*-clauses in general. Regarding the production of the pitch patterns of *If*-clauses, approximately half of the participants failed to produce the correct pitch patterns of *If*-clauses while this proportion increased almost 6% in the post-test, indicating improvement on part of the participants' production. It must also be noted here that the participants enhanced their production of the pitch patterns of *If*-clauses in both Type 2 and Type 3, yet there was almost a 5% decrease in the correct production of pitch patterns of Type 1 sentences in the post test.

4. Discussion

As a result of the findings of both written and oral pre-test scores, it was revealed that the participants were in need of remedial training on the perception and production of pitch patterns of *If*-clauses. Upon this findings, they were subjected to a remedial training session on the target subject by virtue of several recognition and production drills prepared in the light of Grammar Intonation Model (Cauldwell & Hewings, 1996) and Audio-Articulation Model (Demirezen, 2003). Two weeks following the training session, the participants were given the same written and oral pre-test to evaluate their competence levels of recognizing and producing accurate pitch patterns of *If*-clauses.

All three research questions formulated in this study aimed to reveal the participants' overall success in the perception and production of pitch patterns of *If*-clauses. Pitch contours are significant in that they indicate the beginning and ending of an utterance. They also demonstrate whether it is a statement or a question. In our case, *If*-conditionals can be confused with embedded questions and therefore it is salient to use accurate intonation patterns to discriminate between these two grammatical structures. Without accurate employment of pitch patterns, it might be hard for both native and non-native speakers

of English to understand the intended message as different intonation contours convey different meanings.

It can thus be argued that prospective teachers of English should be trained in relation to the awareness of general intonation contours and production of these pitch contours as part of professional development and work ethics because it would otherwise be very humiliating if non-native teachers are not considered qualified to teach their students subjects of phonetics and phonology. Teacher candidates should therefore be trained well to be a proper representative or role-model of the language they will teach.

Table 7. Summary of Pre-test and Post-test Results for Pitch Patterns

	N	Pre-test Mean	SD	Post-test Mean	SD	p value	Pre-test Percentage	Post-test Percentage
REC	61	5.31/12	3.65	9.40/12	2.64	0.000	44.25%	78.33%
PRO	61	5.89/12	2.63	6.18/12	2.31	0.094	49.08%	51.50%

As illustrated in the table above, prospective teacher of English indicated improvement in terms of recognizing the pitch patterns of *If*-clauses; however, the production of the same subject was not statistically significant. The reason for this can be their lack of attention or insufficient number of training sessions. Nevertheless, it must be reminded here that this does not underestimate the significance of pitch phonemes since their lack might lead to meanings shifts in communication. Additionally, as prospective teachers of English, it is of great importance to possess a good command of the target subject in order to be able to teach it to their future students.

Considering the various pitch patterns in English, it can be suggested that non-native speakers of English, especially teachers must be offered training sessions where they could remediate their problems with pitch patterns through a number of recognition and production drills. Also, it is urgent that they must develop a metacognitive and meta-phonological awareness to be able to realize the differences between their mother tongue and target language in relation to pitch patterns since Brown (2014) asserted that the use of steady pitch with jumps from one syllable to the other may be influenced by one's first language. It can therefore be concluded that prospective teachers of English should be offered remedial training on not only pitch patterns but also other prosodic features where they are most likely to have problems in terms of recognition and production considering the fact that they should do this as part of professional development and ethics.

5. Conclusions

The significance of teaching the pitch patterns of *If*-clauses was deliberated and urged throughout this study and therefore aimed to evaluate the competence levels of prospective Turkish teachers of English in terms of perception and production of pitch patterns of *If*-clauses. The intervention, which included various perceptual and productive drills prepared via Grammar Intonation Model (Cauldwell & Hewings, 1996) and Audio-Articulation Model (Demirezen, 2003) in the light of Discourse Intonation Model (Brazil, 1997), proved to be effective in terms of remediating the participants' perceptual and productive problems with regard to pitch patterns of *If*-clauses. Bearing in mind the significance pitch patterns (Spaai & Hermes, 1992; Maastricht et al., 2016), this study also urged the instruction of pitch patterns of not only *If*-clauses but other grammatical structures as well.

When the overall results of the research questions were taken into account, it can be claimed that the participants did well in all types of *If*-conditionals in terms of perception and production of pitch patterns yet the production of pitch patterns was not statistically significant. Considering the insufficient number

of remedial sessions and several other factors that might have intervened, it can be suggested that prospective teachers of English must be offered more remedial training sessions through which they can ameliorate their perceptive and productive problems with pitch patterns. This study proved the efficacy of remedial training despite the minimum amount of training received by the participants. Therefore, it can be argued that they can be much better in terms of perceiving and producing the pitch patterns of both *If*-clauses and other grammatical forms accurately if they are offered more training sessions.

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İngilizce öğretmen adaylarında İngilizce şart tuncelerindeki ses yüksekliđi örüntülerinin teşhisi ve söylenmesinin incelenmesi

Öz

Tonlama unsurlarından biri olarak İngilizce ses yükseliđi örüntülerini öğretmek, iletişimdeki önemine rağmen, Türk öğretmen eğitimi bağlamında önemli ölçüde göz ardı edilmiştir (Roach, 2001; Scherer, 2003; Maastricht ve ark., 2016) ve dolayısıyla bu konuda özellikle Türk öğretmen eğitimi ortamlarında daha az araştırma yapılmıştır (Wennerstrom, 2001; Pickering, 2002; Demirezen, 2014). Bu nedenle bu çalışma, İngilizce öğretmen adaylarının şart tuncelerindeki ses yükseliđi örüntülerinin teşhisi ve söylenmesi konusundaki yeterlilik düzeylerini araştırmayı amaçlamaktadır. Ayrıca, Dilbilgisi Tonlama Modeli (Cauldwell & Hewings, 1996) ve İşitsel-Sesletim Modeli (Demirezen, 2003) kullanılarak, Söylem Tonlama Modeli (Brazil, 1997) ışığında, katılımcıların konu ile ilgili problemlerini düzeltmeyi amaçlamıştır. Veriler, 2015/16 akademik yılında bir devlet üniversitesi İngilizce Öğretmenliđi bölümündeki 61 birinci sınıf öğrencisinin katılımı ile ön test / son-test deneysel tasarımı ile toplanmıştır. Tanımlayıcı ve çıkarımsal analizler, katılımcıların çoğunun iyileştirici eğitime ihtiyaç duyduđunu göstermiştir. Ayrıca, müdahalenin, katılımcıların teşhis açısından sorunlarının iyileştirilmesinde etkili olduđu da keşfedilmiştir. Bu çalışmada, Türkçe öğretmen adaylarının, özellikle ses yüksekliđi örüntüleri konusunda olmak üzere, tonlamada sürekli iyileştirici eğitime maruz kalmaları gerektiđi sonucuna varılmıştır.

Anahtar sözcükler: ses yüksekliđi örüntüleri; öğretmen eğitimi; şart tunceleri; Dilbilgisi Tonlama Modeli; İşitsel Sesletim Modeli.

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