Available online at **globets.org/journal**
International Journal of Education, Technology and Science
2(3) (2022) 263–278

IJETS
International Journal of Education Technology and Science

AN ACOUSTIC ANALYSIS OF POTENTIALLY PROBLEMATIC LEXICAL STRESS PATTERNS FOR TURKISH EFL TEACHERS

Tunay Taş[a]*, Özlem Khan[b]

[a]*Yozgat Bozok University, Faculty of Education, Yozgat, 66900, Turkey*
[b]*Hacettepe University, Faculty of Education, Ankara, 06800, Turkey*

Received: 13.05.2022 Revised version received: 22.07.2022 Accepted: 24.07.2022

Abstract

Segmental and suprasegmental features of English pronunciation may pose certain challenges to users from different linguistic backgrounds. In this regard, this study aims to investigate the patterns of lexical stress placement that may cause problems to Turkish teachers of English. The voice recordings were collected from 11 participants through an elicitation instrument consisting of 45 isolated lexical items, which represent 9 typical stress patterns found in 2-syllable, 3-syllable, and 4-syllable words. The analysis was done via Praat in accordance with the acoustic correlates of the stress-accent found in English speech, and the participants' success rates were evaluated using a rubric. Findings have shown that the speakers tend to have difficulty in longer lexical items and in stress placements that are located towards word-final positions. It is accordingly argued that L2 users of English that come from a different prosodic background may need explicit instruction on concepts of stress-accent and rhythm. In this regard, the place of target language pronunciation in contemporary foreign language education is discussed in relation to focus-on-form instruction with a view to highlighting the importance of suprasegmental features in interpersonal meaning-making.

Keywords: lexical stress; acoustic analysis; pronunciation; L2 users; focus-on-form

*Corresponding author Tunay Taş. ORCID ID.: https://orcid.org/0000-0002-6346-9936
E-mails: tunay.tas@yobu.edu.tr, tunaytas@outlook.com

1. Introduction

A vital starting point for nearly all spoken languages is pronunciation. Accurate pronunciation makes it possible for language users to get their messages across effectively. It is key to one's communicative competence, as language users depend upon a sound system to encode and decode information in their speech. Features of pronunciation can be divided into two as segmentals and suprasegmentals. It is shown that speakers, on the basis of segmental and suprasegmental features pertaining to a specific sound system, form a perceptual template, for receptively making sense of incoming speech, and a motor template, for using a number of articulators in speech production (Pennington & Rogerson-Revell, 2019). This phonological system is shaped through various kinds of input, interaction, and practice and may greatly differ between one's L1 and L2. When, for example, the phonological system of an L2 differs from that of the learner's mother tongue, the existing acoustic space needs to be re-warped so that incoming speech can be perceived and correctly understood. Likewise, motor template needs to be re-adjusted according to such details as place and manner of articulation for intelligible pronunciation in an L2 sound system.

However, integrating a set of phonological features into one's multi-competence is not always void of difficulty. Differences in the processes of first and second language acquisition pose certain challenges to L2 users of English. Not every feature of the target language pronunciation could be learnt with ease. Turkish speakers of English, in this case, are not exempt from this phenomenon, since they too are prone to various phonological interferences (Thompson, 2001). One example given by Demirezen (2012a) is lexical stress, which may be an alien concept to many Turkish L2 users of English, causing a number of communication problems. One of the reasons underlying this predicament is that the stress-accent of English speech is a suprasegmental concept with which most Turkish L1 speakers are unfamiliar. In English phonology, syllables that receive stress-accent are made prominent through acoustic changes in duration, intensity, and pitch during speech production (Fox, 2000). Turkish L1 speakers, not being readily accustomed to this sort of phonological phenomena, are required to re-adjust their perceptual template and motor template according to the mentioned acoustic changes so that they can accurately use English lexical stress.

1.1. Place of pronunciation in language teaching

Lexical stress is one of the elusive areas in pronunciation teaching despite its significant impact on the comprehensibility of L2 speech (Trofimovich & Isaacs, 2012). As Pennington and Rogerson-Revell (2019) point out, cross-linguistic influence, learning processes, and various educational factors can be stated amongst factors that affect L2 pronunciation. Regarding the effects of formal education, research has indicated that foreign language learners can benefit from focus-on-form instruction to a considerable extent (Long, 2015), notably in pronunciation (Saito, 2015). Over the past decades, how pronunciation is viewed by

teachers and learners has been affected by varied conceptions about language teaching and learning. From a historical perspective, pronunciation was in a peripheral place in language classrooms up until the 1950s. However, with the advent of structuralism and behaviourism in the 1960s, the emphasis placed upon pronunciation increased at a great rate and accordingly shaped the sets of objectives in foreign language teaching. In the era of Audiolingualism, an analytic approach to pronunciation teaching was adopted, and features of the target language speech were given a central place in classrooms. Following the 1980s, the former views on pronunciation were sidelined as a result of the popularity of such emerging concepts as communicative competence and social interaction. This paved the way for a kind of language teaching methodology in which mutual comprehensibility is upheld, possibly at the expense of accuracy in segmentals and suprasegmentals. In the 1990s and 2000s, it arguably became evident that Communicative Language Teaching could benefit from a fair focus on language form in an action-oriented approach, in part leading to the development of Task-Based Instruction. The twenty-first century methodology, whilst still bearing some traces of the past, can be claimed to have brought about a growing emphasis on multi-competence (Cook, 2016), plurilingualism (Council of Europe, 2001), and the intelligibility principle (Levis, 2020). In short, the changing winds and shifting sands of language teaching methodology have positioned pronunciation at different places throughout the history, which is summarised in the following table:

Table 1.
Place of Pronunciation Instruction in Different Teaching Methods

	GTM	**DM**	**SLT/ALM**	**CLT**	**TBI**
Focus	Weak	Strong	Very strong	Moderate	Moderate
Target	Ø	Near nativelike	Nativelike	Mutual comprehensibility	Mutual comprehensibility
Approach	Ø	Intuitive	Analytic	Integrative	Integrative
Level of practice	Subsentential	Sentential	Subsentential and Sentential	Suprasentential	Any
Instruction	Coincidental	Incidental	Explicit	Implicit	Somewhat explicit

Note. GTM: Grammar Translation Method; DM: Direct Method: SLT: Situational Language Teaching; ALM: Audiolingualism; CLT: Communicative Language Teaching; TBI: Task-Based Instruction.

1.2. Lexical stress in Turkish and English

Lexical stress is a feature that exists in both Turkish and English, albeit in a slightly different form (Thompson, 2001). In terms of location, lexical stress systems manifested in Turkish and English can be classified as fixed-stress and free-stress, respectively (Revithiadou, 1999). Namely, Turkish is characterised with an edge-oriented quantity insensitive stress

system, in which stress is located in a relatively fixed position (i.e. usually on the final syllable), regardless of syllable weight or number of syllables included in a word. On the other hand, English speech can be claimed to have a free-stress system, in which stress can be located in somewhat varied positions in a word. According to Crystal (1996), a juxtaposition of the Germanic Stress Rule and the Romance Stress Rule determines the location of primary stress in English polysyllabic words. The aspect of mobility that a free-stress system brings may cause certain problems to L2 users of English who may have yet to develop a sense of interconnection between stress at the word level and the corresponding lexicon.

In addition to location, a typology of stress may as well distinguish acoustic correlates of accent manifested in a spoken language. Stress-accent languages, like English, are often associated with the concurrent utilisation of duration, intensity, and pitch (Fox, 2000). This group of languages are labelled stress-accent because a syllable can be made phonologically prominent through a combination of changes in these acoustic cues. As opposed to stress-accent languages, the sole use of pitch marks accent location in a pitch-accent language, such as Japanese. The extent to which stress-accent is utilised in Turkish speech is not the same as in English speech, arousing controversies amongst phonologists as to which group of languages Turkish belongs to. Some researchers believe that Turkish could be placed amongst pitch-accent languages, since the fundamental frequency is the greatest cue to the unit that is made phonologically prominent (Levi, 2005). It exceeds the scope of this paper to discuss whether Turkish is a stress-accent or pitch-accent language. Nonetheless, it should be noted that these two languages differ in terms of the types and extent of acoustic correlates they modulate in speech production, which may be problematic for Turkish L2 users of English.

1.3. Problem statement

Previous studies have shown that suprasegmental features of pronunciation are closely associated with the comprehensibility of L2 speech (e.g. Kang et al., 2010; Trofimovich & Isaacs, 2012). It is, hence, of pedagogical significance for language teachers to be competent in the use of suprasegmentals, such as intonation, rhythm, and stress-accent. It should be borne in mind that speakers coming from a different prosodic background may struggle perceiving and producing certain suprasegmental features inherent in L2 phonology. Therefore, research should focus on aspects and features of L2 pronunciation that could be identified as problematic so that they can be remedied in the course of foreign language education. In this regard, research done in the Turkish context shows that the stress-timed rhythm of English is likely to be difficult for Turkish L2 users of English to integrate fully into their multi-competence, in which cross-linguistic influence from L1 was found to persist even in English language teachers' speech (Taş, 2021). Similarly, studies on suprasegmentals, albeit limited in number, indicate that the mobility of lexical stress (Demirezen, 2012a) and some patterns of stress placement in polysyllabic words may cause problems to Turkish teachers and learners of English (Hişmanoğlu, 2012).

It is posited that the stress-accent of English should be one of the top priorities in foreign language teaching considering its essential role in spoken interaction (Demirezen, 2012b). The nucleus of lexical stress 'functions as the peak of information within the thought group' (Gilbert, 2008, p. 10) and is crucial to the speaker's idea development and speech rhythm in spoken discourse. Nonetheless, speaking skills and prosodic features of the target language pronunciation are observed to be largely ignored in Turkish foreign language classrooms (e.g. Arslan, 2013). This fact is further supported by self-reported needs of Turkish learners of English who acknowledge their need of help in L2 pronunciation (Çelik, 2000). The lack of focus on pronunciation teaching calls for a deeper consideration of suprasegmental difficulties faced by Turkish teachers and learners of English, including errors related to patterns of lexical stress placement in polysyllabic words. In this respect, previous research showed that the stress-accent of English poses intrinsic difficulties to Turkish L1 speakers, which affects their English L2 performance in multiple ways (Taş, 2021). Therefore, it is of great value to put a certain emphasis upon stress-accent and investigate which patterns of lexical stress placement cause the most difficulty for Turkish teachers of English. Identifying potentially problematic lexical stress patterns could provide a clearer view of the difficulties encountered by Turkish L2 users of English. This may, in turn, inform the education of prospective language teachers, in-service language teachers, and students in the Turkish context, as well as those in similar educational contexts affiliated with comparable phonological problems related to the teaching and learning of English.

1.4. Purpose of the study and research questions

The suprasegmental problems outlined in the previous section denote a need for further research into how the stress-accent of English is used by Turkish L2 users of English in speech production. This study aims to investigate the patterns of lexical stress placement in polysyllabic English words from an acoustic perspective. In doing so, the primary purpose is to identify stabilised lexical stress errors made by Turkish teachers of English and highlight the most problematic lexical stress patterns. A subsidiary purpose is to demonstrate how acoustic speech analysis could inform pronunciation instruction through the use of audio-visual cues achieved from various acoustic information. In accordance with these aims, the following research questions have been formulated:

RQ 1: What are the success rates of Turkish speakers of English in lexical stress placement in 2-syllable, 3-syllable, and 4-syllable words?

RQ 2: Which of the examined patterns of lexical stress placement are likely to cause the most difficulty to Turkish speakers of English?

2. Method

2.1. Setting and participants

This study was conducted in a noise-treated language laboratory located in Ankara, Turkey. Convenience-based sampling method was used to recruit participants who were readily accessible at the time of data collection. The participant group consisted of 11 adults (8 females and 3 males), all of whom are operationally defined as Turkish teachers of English. All the participants were volunteers between the ages of 22 and 32 (m=24.9, SD=3.7), holding a Bachelor's degree in the field of English Language Teaching (ELT). Each stated that they had previously taken at least one course related to phonetics and phonology of English during their BA studies. It is, hence, assumed that they have some metalinguistic awareness of lexical stress and how it is utilised in English speech. In addition to 11 Turkish L2 users of English, 2 native speakers of Standard North American English were recruited through the same convenience-based sampling method. Both native speakers were adults at the ages of 27 (female) and 30 (male), and they stated no prior knowledge in phonetics and phonology. The speech samples collected from 2 native speakers were not included in the main data set but used as an interpretive baseline for analysing 11 Turkish participants' stress placements.

2.2. Data collection instrument and procedure

A data collection instrument was developed by the researchers to elicit read speech samples in L2 English (see Appendix A). This instrument was used to elicit the participants' placement of the primary stress in polysyllabic words. It included a total of 9 stress patterns that are found in 2-syllable, 3-syllable, and 4-syllable words. There were 5 isolated lexical items per category, resulting in a total of 45 items. They were presented to the speakers in a pseudo-randomised order during the elicitation phase. The words included in this inventory were mostly chosen from academic vocabulary, and items that showed inconsistency across different dialects in terms of stress placement (e.g. /kənˈtrɒvəsi/ and /ˈkɑːntrəvɜːrsi/) were avoided to the extent possible. Initially, the data collection instrument was piloted with 2 native speakers of Standard North American English, in which a fairly high reliability rate in the placement of primary stress was achieved (a=.95). Later, it was administered to 11 Turkish L2 users of English individually.

The process of data collection was carried out through one-on-one meetings with the participants. It lasted about a time span of 4 weeks, in March 2021. All the speakers participated in the study signed an informed consent form prior to data collection. The one-on-one meetings were held in a noise-treated room in which the participants were asked to read out the isolated words listed in the instrument. Read speech samples were recorded via a digital voice recorder. The audio files were saved in .wav file format with settings set at 44.1 kHz sampling rate and 24-bit quantisation, and they were directly stored in the memory of the device, which later were transferred to a computer for analysis. In each meeting, the same

procedure was followed for elicitation and recording. First, the participants were allowed some time (about 30 seconds) to skim through the word list and familiarise themselves with the items included in the instrument, which was placed directly in front of them. Second, they were asked to read out the items listed in this instrument at a natural pace. In case of any hesitation, re-reading was allowed, and major disfluencies or hesitations were excluded from data analysis.

2.3. Analysis of the spoken data

Data analysis consisted of two phases. In the first phase, the speech samples collected from the speakers were analysed in terms their acoustic properties. In the second phase, descriptive statistics was used for evaluating the speakers' success rates across varying patterns of lexical stress placement. The whole data set included the recordings of 11 Turkish L2 users of English, as well as those of 2 native speakers, resulting in a total length of 19 minutes and 14 seconds in duration. The read speech samples were analysed via the Praat software. In doing so, acoustic properties of the speakers' recordings were examined through a number of audio-visual cues. The general assumption throughout this acoustic analysis was that a syllable that receives the primary stress in a polysyllabic word, according to three major acoustic correlates of stress-accent (i.e. intensity, duration, and frequency), should be louder, longer, and reach higher levels of pitch in a syntagmatic sense. Following this underlying assumption, the speech samples were analysed by the first researcher using the tools available in the Praat software, such as pitch contours, intensity plots, and temporal variability shown on the time axis. An example of this procedure is given below, showing a 3-syllable word with the primary stress on the first syllable.

Figure 1.

Intensity Cue and Duration Cue from Native Speaker Model (1) (27, Female), Plotted Against Sp1 (2) (23, Female) for the Word 'Narrative'

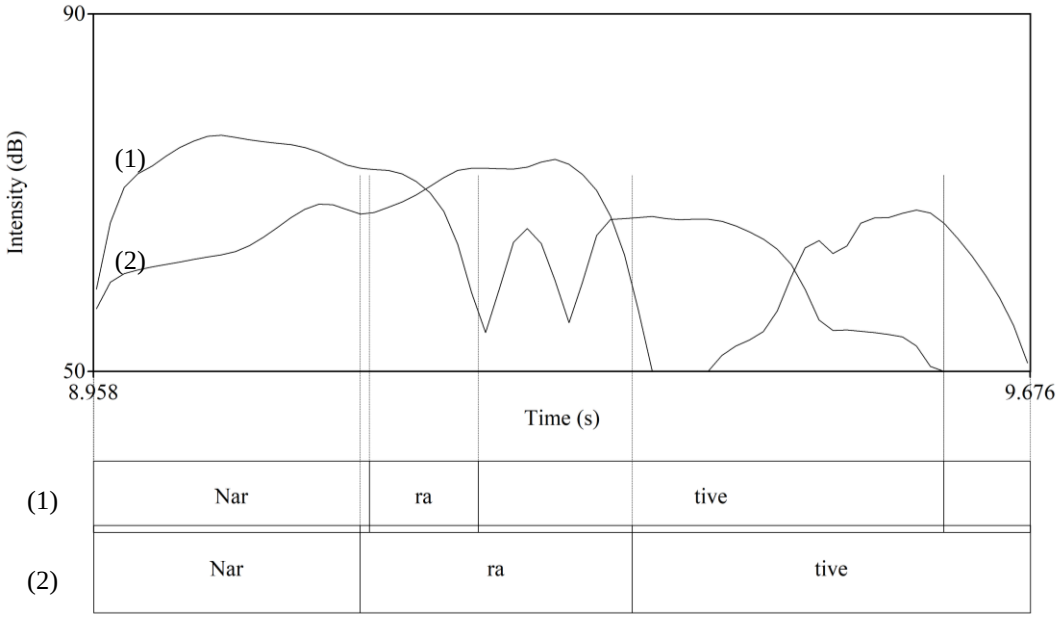

Figure 1 exemplifies how the speech samples were analysed using some of the audio-visual cues processed via Praat. In this figure, two intensity plots for the word narrative, using the voice recordings from a native speaker model (L1 English) and a participant (L2 English), were contrasted with one another. The first plot (1) belongs to the native speaker, and it demonstrates a region articulated with a greater amount of energy where the syllable 'nar' is located. On this plot, there is observed to be a significant drop in the intensity of the syllable 'ra' (i.e. vowel reduction) and a moderate amount of increase in articulatory effort in the last syllable 'tive'. The first plot (1) demonstrates how the word narrative is pronounced as /ˈnærətɪv/, with the primary stress being placed upon the first syllable. The second plot (2) belongs to one of the Turkish teachers of English. This participant's pronunciation, in contrast with the native speaker model, demonstrates a relative increase of articulatory energy in the second syllable 'ra' instead. Because the participant (2) makes a lexical stress error, the word happens to be pronounced as /neˈreɪtɪv/, which is likely to cause misunderstandings in communication. As a result of incorrect stress placement, it is shown that the time it takes to utter the word is slightly longer for the Turkish participant than it is for the native speaker. Also, the difference between transcription 1 and transcription 2 on the time axis indicates an apparent rhythmic deviation. The Turkish participant was observed to divide the word into syllables that are more or less equal in duration rather than distinguish accented and unaccented syllables in the regular foot structure.

In the second phase of data analysis, the collected speech samples were evaluated in terms of their accuracy on the basis of acoustic information obtained in the first phase that is described above. In order to evaluate the speakers' success rates in lexical stress placement, a holistic rubric was developed by the researchers (see Table 2). The criteria included in this rubric were stress placement, acoustic correlates of stress-accent, segmental interferences caused by stress errors, and an intuitive measurement of communicative value. Each word uttered by a participant was rated by the researchers according to this rubric, on a scale of 1 to 3 with 1 being incorrect and likely incomprehensible and 3 being distinguishable, intelligible, and comprehensible. The spoken data collected from 2 native speakers of Standard North American English were used as an interpretive baseline throughout this whole process. The means of success rates were calculated on the basis of scores that 11 Turkish teachers of English achieved in a specific category of expected lexical stress placement. Then, the values were converted into percentages in order to make a comparison between various stress patterns. Descriptive statistics was used to determine which of the examined stress patterns caused the most difficulty to the speakers (see Table 3).

Table 2.
Holistic Rubric for Evaluating Lexical Stress Placement

	Score		
Criteria	**1**	**2**	**3**
Stress Placement	Incorrect	Correct but hard to distinguish	Correct and distinguishable
Acoustic Correlates	Lacking or inadequate	Partially present	All present
Segmental Interference	Stress-originated phonemic errors	Negligible phonemic errors	No phonemic errors
Communication Breakdowns	Likely	Tolerable	Posing no threats
Overall	Incomprehensible	Mutually comprehensible	Intelligible and comprehensible

3. Results and discussion

The analysis of speech samples collected from 11 Turkish teachers of English revealed a general trend across their success rates in given lexical stress patterns. The results indicated that the higher the number of syllables in a word was, the lower overall success rates the speakers achieved. It was found that the category of 2-syllable words (77.0%) was the most successful one. The speakers' success rates in the categories of 3-syllable words (70.7%) and 4-syllable words (66.5%) demonstrated a gradual decrease. It was observed that the participants made comparatively more stress errors in longer words when compared with shorter ones. This result suggests that increasing the number of syllables in a polysyllabic word seems to pose certain problems to Turkish L2 users of English in the placement of primary stress on correct syllables. In this line, it is possible to state that these results could denote a tendency for Turkish L1 speakers to deviate from general rules of lexical stress when words get longer and more complicated. An important reason why longer polysyllabic words were relatively more difficult for the participants could be attributed to some typological differences between Turkish and English, since accent is known to contribute to speech rhythm at some basic level in English (Fox, 2000). The foot structure of English speech, typically consisting of one accented syllable and following unaccented syllables, could be troublesome for Turkish L2 users of English. Because Turkish is comparable to syllable-timed languages in terms of its more or less equal syllable timing in spoken language (Taş, 2021), the trochaic rhythm of English might arguably force Turkish L2 users of English to make more stress errors as the number of syllables in a word increases. In addition to the speakers' overall success rates in disyllabic, trisyllabic, and tetrasyllabic words, the following table presents the results of individual stress patterns in each category:

Table 3.
Success Rates of Turkish Speakers of English in Lexical Stress Placement (%)

Speakers	2 syllables			3 syllables				4 syllables				
	First (Oo)	**Final** (oO)	**Overall**	**First** (Ooo)	**Pen-ultimate** (oOo)	**Final** (ooO)	**Overall**	**First** (Oooo)	**Ante-penultimate** (oOoo)	**Pen-ultimate** (ooOo)	**Final** (oooO)	**Overall**
Sp1	66.7	80.0	73.3	80.0	66.7	60.0	68.9	86.7	73.3	46.7	46.7	63.3
Sp2	66.7	80.0	73.3	73.3	66.7	66.7	68.9	80.0	60.0	73.3	60.0	68.3
Sp3	66.7	86.7	76.7	66.7	46.7	60.0	57.8	73.3	60.0	46.7	53.3	58.3
Sp4	86.7	86.7	86.7	86.7	80.0	86.7	84.4	93.3	53.3	66.7	60.0	68.3
Sp5	73.3	80.0	76.7	80.0	66.7	73.3	73.3	80.0	73.3	46.7	40.0	60.0
Sp6	53.3	86.7	70.0	60.0	60.0	66.7	62.2	73.3	66.7	80.0	53.3	68.3
Sp7	86.7	80.0	83.3	73.3	80.0	66.7	73.3	80.0	80.0	73.3	73.3	76.7
Sp8	60.0	80.0	70.0	66.7	66.7	60.0	64.4	73.3	60.0	80.0	66.7	70.0
Sp9	73.3	66.7	70.0	73.3	80.0	60.0	71.1	93.3	66.7	66.7	53.3	70.0
Sp10	80.0	73.3	76.7	80.0	73.3	60.0	71.1	73.3	46.7	46.7	60.0	56.7
Sp11	93.3	86.7	90.0	86.7	93.3	66.7	82.2	93.3	80.0	60.0	53.3	71.7
Average	**73.3**	**80.6**	**77.0**	**75.2**	**70.9**	**66.1**	**70.7**	**81.8**	**65.5**	**62.4**	**56.4**	**66.5**

The results from individual stress patterns showed that the speakers achieved an average success rate of 73.3% in 2-syllable words with word-initial stress. With a moderate amount of increase, it was found to be 80.6% in 2-syllable words with word-final stress. The trend observed in this category stands in contrast to the one in 3-syllable words and 4-syllable words, in which the participants' accuracy in locating the primary stress tends to decrease as the placement shifts towards word-final positions. This contrast implies that disyllabic words could be relatively easier for Turkish speakers of English to locate the primary stress when it is to be placed upon the final syllable. In the category of 3-syllable words, the speakers achieved an average success rate of 75.2% for word-initial stress pattern. However, it was found to be 70.9% for penultimate stress pattern and 66.1% for word-final stress pattern, showing a consistent amount of decrease as the placement is moved towards word-final positions. The trend encountered in trisyllabic words is quite similar to the one in tetrasyllabic words. In the analysis of 4-syllable words, it was found that the speakers achieved an average success rate of 81.8% for word-initial stress pattern, which is the highest score amongst 9 stress patterns examined in the study. When the primary stress shifted away from word-initial position, there was observed to be a significant loss of accuracy in the category of 4-syllable words. The speakers' success rate was 65.5% for antepenultimate stress pattern, 62.4% for penultimate stress pattern, and 56.4% for word-final stress pattern. In general, the most problematic stress patterns were found to be the ones where the primary stress is placed upon final, penultimate, and antepenultimate syllables in tetrasyllabic words, respectively.

The results obtained in this study support the argument that the mobility of stress in English vocabulary could, indeed, be one of the sources of stress errors made by Turkish L2 users of English (Demirezen, 2012a), since there was found to be a considerable discrepancy between the speakers' success rates in word-initial, word-medial, and word-final stress placements. It may be tempting to argue that this phenomenon in part boils down to differences between stress systems employed in English speech and Turkish speech. Turkish L1 speakers, having entrenched an edge-oriented fixed stress system within their multi-competence, need to integrate the free stress system of English into their L2 speech. To many Turkish L1 speakers, stress-accent is an alien concept and could be difficult to master, since the acoustic correlates found in Turkish speech are somewhat different from those in English speech (see Levi, 2005). It should, however, be mentioned as a caveat that the manifestation of stress in speech production rests upon a whole phonological system, including such differences as in phonotactics of the corresponding languages, which may pose intrinsic difficulties for many L2 users coming from a different linguistic background.

The results in this study as to which of the stress patterns could potentially be problematic for Turkish L2 users of English (i.e. final, penultimate, and antepenultimate stress patterns) contradict some of the findings reported in previous studies (e.g. Hişmanoğlu, 2012). It was stated by Hişmanoğlu (2012) that the most common cases of stress errors faced by Turkish L2 users of English occur when the primary stress is placed upon ante-penultimate, penultimate, and word-final syllables, respectively. The pattern observed in the current study demonstrates an opposite trend when compared with the results of Hişmanoğlu (2012). The speakers' success rates tended to decrease as the placement of primary stress shifted towards word-final positions, which, for example, suggested that word-final stress pattern could be relatively more problematic than ante-penultimate stress pattern for Turkish L2 users of English (see Table 3). The mentioned contradiction between two different trends could possibly be attributed to methodological and instrumental differences between two studies and may need to be confirmed by further research. As for word-initial stress pattern, the current study shows that Turkish teachers English do not appear to have much difficulty placing the primary stress on word-initial syllables in polysyllabic words.

Another important finding is the overall success rate (i.e. 70.3%), which was calculated from the average of each speaker across all stress patterns. Naturally, this is a rough estimation considering the limited sample size of this study. It would, thus, be a feeble attempt to use such a value to determine a threshold for mutual intelligibility and comprehensibility as regards the use of lexical stress. The frequency and functional load of stress patterns considerably differ in daily communication. For example, word-initial stress in disyllabic words could occur more frequently than word-final stress in tetrasyllabic words. This could entail a high degree of intelligibility and comprehensibility despite low success rates observed in word-final positions due to given relative functional load. Nonetheless, it is obvious that 70.3% overall success rate is far from a perfect score. It is feasible to suggest that expecting a sort of native-like L2 performance even from highly proficient Turkish teachers of English

seems to be a far-fetched goal, at least with respect to some suprasegmental features of pronunciation. The highlighted situation points to the conflict between the Intelligibility Principle and the Nativeness Principle in pronunciation teaching (Levis, 2020). If, for example, an overall success rate around 70% is deemed enough for communicative purposes, then it is conceivable to 'argue for the superiority of the Intelligibility Principle in regard to where pronunciation fits within the wider field of language teaching' (Levis, 2020, p. 310). Of course, setting a threshold for intelligibility and/or comprehensibility is a complex process and may vary from context to context, depending upon its consequent merits weighed against contextual constraints and general viability. On the other hand, it is also possible to argue in favour of a higher success rate if the ultimate goal is aligned with the Nativeness Principle.

Arguably, all the participants involved in this study were intelligible and comprehensible enough for one to assume that they can easily be understood by their students or interlocutors from the same linguistic background. However, it should be taken into consideration that interpersonal meaning-making calls for a wide range of pronunciation competence in the target language. The L2 user may have to interact with different language user groups, including those who speak it as a maternal or foreign language. Considering the discrepancy between certain stress patterns (see Table 3), it is of great importance to draw pedagogical implications related to the place of pronunciation teaching in foreign language education. In this study, the data analysis was based on the speech samples that belong to Turkish teachers of English. For this reason, the types of stress errors observed could more or less be claimed to be stabilised errors or even some indications of fossilisation. In this respect, it can be assumed that explicit pronunciation instruction with a strong focus on suprasegmental features could prove useful eliminating a large body of stress errors, further improving one's L2 pronunciation competence. The English stress system is governed by certain rules (i.e. the Germanic Stress Rule and the Romance Stress Rule) that determine where the primary stress should be located in a polysyllabic word (Crystal, 1996). A fair emphasis on the teaching of these rules and other suprasegmental features through focus-on-form instruction could amend some of the problems Turkish L2 users of English experience in lexical stress placement, which were identified as word-final, penultimate, and antepenultimate stress patterns.

The general discrepancy between L1 performance and L2 performance, as well as differences between two sound systems, affects L2 users' pronunciation competence. Turkish teachers of English may thus require some instruction on suprasegmental features of English to be able to incorporate unfamiliar concepts into their multi-competence, such as stress-accent. This would be likely to increase their intelligibility and comprehensibility when teaching and interacting with different language user groups. On this matter, lexical stress is posited to be an important factor affecting the speaker's comprehensibility in L2 speech (Trofimovich & Isaacs, 2012). Given their place in the prosodic structure (see Gilbert, 2008), the teaching of stress and speech rhythm should be considered an important part of the development of communicative competence. Although there are ambivalent views towards form-focused instruction in contemporary foreign language education, the results presented in

this study show that there could be a room for improvement in L2 users' pronunciation even if they are perceived to be highly proficient speakers. It was revealed that even proficient speakers, Turkish teachers of English in this case, may display stabilised pronunciation errors if they fail to notice salient features of L2 speech. In this line, one may argue in favour of form-focused instruction within the framework of an action-oriented approach. It is because language learning, notably the acquisition of L2 pronunciation, is an incremental process in which communicative language ability is intertwined with both (phonological) accuracy and (phonological) fluency (Ellis, 2015).

The purpose of form-focused pronunciation instruction is to make L2 users notice salient target language features to which they might otherwise not pay enough attention. As Pennington and Rogerson-Revell (2019) review, in addition to traditional approaches with a segmental orientation, contemporary 'research gives some support to a focus on prosody, particularly for comprehensibility with L1 listeners' (p. 188). Considering differing success rates across lexical stress patterns examined in the current study, a focus-on-prosody approach to pronunciation teaching is likely to improve the overall intelligibility and comprehensibility of Turkish teachers of English. Technology-mediated pronunciation teaching, despite being in its infancy, could be used for enhancing teaching and learning experiences of such L2 user groups. It could offer the affordances of interacting with different language user groups in a multimodal environment, nearly instant feedback from automatic speech recognition systems as well as visualised feedback that can display various acoustic information, individual practice with virtual conversational partners that can imitate or respond back to the speaker, and so on.

4. Conclusion and recommendations

The primary aim of this study was to investigate and identify common lexical stress patterns that are problematic for Turkish L2 users English. Read speech samples, collected from 11 highly proficient Turkish teachers of English, were analysed according to the acoustic properties of stress-accent. The evaluation of the speakers' success rates across 9 stress patterns has yielded that Turkish L2 users of English tend to have problems when the primary stress is placed upon the final, penultimate, and antepenultimate syllables, respectively. Moreover, it has been revealed that longer polysyllabic words caused the participants to make relatively more stress errors. These findings suggest that the stress-accent of English speech could be a challenging concept for Turkish L1 speakers. In this regard, it is reasonable to argue that one of the reasons underlying such stress errors that Turkish L2 users of English often make partly depends upon the typological distance between these two languages. Turkish speech differs from English speech as to the ways in which a syllable is made phonologically prominent, possibly forcing the L2 user to make stress errors due to cross-linguistic influence and other factors affecting performance in speech production.

In conclusion, correct pronunciation is posited to be an essential component of communicative competence, but it is observed that some suprasegmental features of English may pose certain challenges to L2 users coming from different linguistic backgrounds. This study has to some extent shown that Turkish teachers English may have persistent difficulties with several stress patterns. This is a situation that needs to be addressed in the education of prospective teachers and other means of developing L2 pronunciation competence, for which form-focused and technology-mediated instruction could prove useful with a specific focus on English prosody. However, it should be noted that this study was performed with a small participant group and only included isolated speech samples. Further research may be needed to confirm the results presented here and may also look into the placement of lexical stress in connected speech.

Declaration of Conflicting Interests and Ethics

The authors declare no conflict of interest.

References

Arslan, R. Ş. (2013). An investigation of prospective English language teachers' spoken communication skills: A case study from Turkey. *Hacettepe University Journal of Education, 28*(1), 27–40.

Çelik, M. (2000). Self-reported needs of EFL students in terms of linguistic skills. *Hacettepe University Journal of Education, 19*, 50–57.

Cook, V. J. (2016). Premises of multi-competence. In V. J. Cook & L. Wei (Eds.), *The Cambridge handbook of linguistic multi-competence* (pp. 1–25). Cambridge University Press.

Council of Europe. (2001). *Common European framework of reference for languages: Learning, teaching, assessment*. Cambridge University Press.

Crystal, D. (1996). The past, present, and future of English rhythm. *Speak Out, 18*, 8–13.

Demirezen, M. (2012a). Word stress and vocabulary item relations in teacher training. *Hacettepe University Journal of Education, S1*, 112–123.

Demirezen, M. (2012b). Demonstration of problems of lexical stress on the pronunciation Turkish English teachers and teacher trainees by computer. *Procedia – Social and Behavioral Sciences, 46*, 3011–3016. https://doi.org/10.1016/j.sbspro.2012.05.606

Ellis, R. (2015). The importance of focus on form in communicative language teaching. *Eurasian Journal of Applied Linguistics, 1*(2), 1–12. https://doi.org/10.32601/ejal.460611

Fox, A. (2000). *Prosodic features and prosodic structure: The phonology of suprasegmentals*. Oxford University Press.

Gilbert, J. B. (2008). *Teaching pronunciation: Using the prosody pyramid*. Cambridge University Press.

Hişmanoğlu, M. (2012). Teaching word stress to Turkish EFL (English as a foreign language) learners through internet-based video lessons. *US-China Education Review A*, (1), 26–40. https://doi.org/10.17265/2161-623X/2014.01A.004

Kang, O., Rubin, D., & Pickering, L. (2010). Suprasegmental measures of accentedness and judgments of language learner proficiency in oral English. *The Modern Language Journal, 94*(4), 554–566. https://doi.org/10.1111/j.1540-4781.2010.01091.x

Levi, S. V. (2005). Acoustic correlates of lexical accent in Turkish. *Journal of the International Phonetic Association, 35*(1), 73–97. https://doi.org/10.1017/S0025100305001921

Levis, J. (2020). Revisiting the intelligibility and nativeness principles. *Journal of Second Language Pronunciation, 6*(3), 310–328. https://doi.org/10.1075/jslp.20050.lev

Long, M. (2015). *Second language acquisition and task-based language teaching*. Wiley Blackwell.

Pennington, M. C., & Rogerson-Revell, P. (2019*). English pronunciation teaching and research: Contemporary perspectives*. Palgrave Macmillan.

Revithiadou, A. (1999). *Headmost accent wins: Head dominance and ideal prosodic form in lexical accent systems*. LOT Dissertation Series. https://doi.org/doi:10.7282/T3MS3RJ1

Saito, K. (2015). The role of age of acquisition in late second language oral proficiency attainment. *Studies in Second Language Acquisition, 37*(4), 713–743. https://doi.org/10.1017/S0272263115000248

Taş, T. (2021). Influence of the linguistic multi-competence on Turkish EFL teachers' pronunciation of stress-timed rhythm in English [Unpublished master's thesis]. Hacettepe University.

Thompson, I. (2001). Turkish speakers. In M. Swan & B. Smith (Eds.), *Learner English* (2nd ed.) (pp. 214–226). Cambridge University Press.

Trofimovich, P., & Isaacs, T. (2012). Disentangling accent from comprehensibility. *Bilingualism: Language and Cognition, 15*(4), 905–916. https://doi.org/10.1017/S1366728912000168

Appendix A. Elicitation instrument

Below is the data collection instrument that was used for eliciting read speech samples from the participants.

Number of syllables	Stress placement			
	1st syllable	2nd syllable	3rd syllable	4th syllable
2 syllables	Foreign Vary Option Sequence Nearly	Persist Inspect Conclude Diverse Resource		
3 syllables	Narrative Maintenance Summarise Allocate Contrary	Contextual Determine Interpret Explicit Achievement	Expertise Undermine Furthermore Interact Relocate	
4 syllables	Definitely Competency Dedicated Dominating Negatively	Majority Alternative Facilitate Parameters Distinctively	Transformation Analytic Conversation Evolution Intervening	Interviewee Unpicturesque Mid-afternoon Nevertheless Entrepreneur