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PERCEPTION OF PROSODIC SPEECH FEATURES: FINAL INTONATION AND WORD STRESS FOR EFL LEARNERS **

ABSTRACT

The acquisition of intelligible pronunciation in a second language (L2) hinges on successfully managing the perception and production of speech features. In this regard, prosodic speech features, particularly intonation and word stress are of critical importance. This study investigates the diagnostic perception test results of the learners of English as a Foreign Language (EFL) (N=125) in Turkish higher education context, analyzing their scores on intonation and word stress sections. The results reveal that participants performed better on identifying final intonation patterns compared to word stress items while both areas demonstrated certain challenges. Scores were lower for items with final falling intonation, particularly evident in interrogative wh- / how questions, suggesting complexities in processing this feature. Additionally, word stress accuracy decreased with increasing syllable count. No significant correlation was observed between intonation and word stress scores. These findings highlight the importance of recognizing intonation and word stress as distinct yet interconnected aspects of pronunciation, calling for effective instructional approaches to address these key components of L2 sound system.

Keywords: prosody, intonation, word stress, diagnostic assessment, English as a foreign language

BÜRÜNSEL KONUŞMA ÖĞELERİNİN ALGILANMASI: YABANCI DİL OLARAK İNGİLİZCE ÖĞRENENLER İÇİN SÖZCE SONU EZGİ VE SÖZCÜK VURGUSU

ÖZET

İkinci dilde (D2) anlaşılabilir bir sesletimin edinilmesi konuşma öğelerine yönelik algı ve üretim süreçlerinin başarılı biçimde yönetilmesini gerekli kılmaktadır. Bu noktada, bürünsel öğelerin, özel olarak da ezgi ve sözcük vurgusu büyük bir öneme sahiptir. Bu çalışma, Türkiye yükseköğretim bağlamında yabancı dil olarak İngilizce öğrenenlerin (N=125) tanılayıcı dinleme algısı testindeki yanıtları üzerinden ezgi ve sözcük vurgusu sonuçlarını incelemektedir. Ulaşılan bulgular, katılımcıların sözce sonu ezgi görünümlerini tanılamada, sözcük vurgusu maddelerine oranla daha başarılı olduklarını ancak her iki alanda da belirli zorluklar yaşadıkları göstermektedir. Sonuçlar, özellikle wh- / how sorularında belirginleşen alçalan ezgi görünümlerinde elde edilen puanların görece daha düşük olduğunu göstermekte ve ezginin işlenmesindeki karmaşık görüntüyü ortaya koymaktadır. Ek olarak, sözcük vurgusu doğruluğunun, seslem sayısı arttıkça azaldığı belirlenmiştir. Ezgi ve sözcük vurgusu puanları arasında anlamlı bir bağıntıya ise ulaşılamamıştır. Sonuçlar, ezgi ve sözcük vurgusunun ayrı ancak bağlantılı boyutlar olduklarını, D2 ses dizgesinin bu önemli bileşenlerinin sağlıklı biçimde ele alınabilmeleri için etkili öğretim yaklaşımlarına gereksinim bulunduğunu göstermektedir.

Anahtar kelimeler: bürün, ezgi, sözcük vurgusu, tanılayıcı değerlendirme, yabancı dil olarak İngilizce

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Introduction

Understanding the nature of spoken language and becoming functional users in an L2 involves work on diverse speech features for learners. To address this need, it is essential to place emphasis on pronunciation in L2 teaching and learning contexts. Pronunciation involves the perception and production of speech sounds and their role in meaning-making (Dalton & Seidlhofer, 2014). It is important to note that mispronunciations of individual sounds in speech, also known as *segmentals* or *consonants* and *vowels*, can result in communication breakdowns since they may be perceived as different phonemes or not recognized correctly at all within the target language context (Levis, 2018). However, pronunciation encompasses not only segmentals but *suprasegmental* or *prosodic* features of language as well.

Trask (2007) defines prosody as *"variations in pitch, loudness, rhythm, and tempo (rate of speaking)"* (p. 234). Aside from this largely phonological definition, the core components of prosody extend to word stress, rhythm, intonation, and sentence stress for L2 English teaching professionals (Murphy, 2017). Gilbert (2008) stresses the necessity of incorporating prosodic aspects into pronunciation teaching, noting the enhanced progress of learners who receive instruction on English prosody and their improved ability to recognize and interpret rhythmic and melodic cues. Furthermore, Levis and Grant (2011) emphasize the importance of addressing prosodic features in instruction, as they are more directly pertinent to speaking skills compared to individual segments, given their influence extends beyond single words to entire utterances. Empirical evidence supports the effectiveness of teaching prosodic speech features, resulting in enhanced comprehensibility, which refers to *"perceived degree of difficulty experienced by the listener in understanding speech"* (Munro & Derwing, 2015, p. 14). For instance, Gordon and Darcy (2016) reported in their study that the group receiving instruction in prosodic speech features was found to be more comprehensible, in other words, easier to understand by listeners. Similar findings were reported in Derwing et al.'s (1998) research, where improvements in comprehensibility and fluency were noted following instruction on prosodic speech features.

Word stress and intonation are two important prosodic features of L2 speech. According to Ladefoged and Johnson (2015), word stress is attributed to entire syllables rather than individual vowels or consonants, where stressed syllables are uttered with increased energy and prominence compared to unstressed ones. In other words, stressed syllables are pronounced longer, louder, and higher in pitch (the relative lowness or highness of the speaker's voice) (Celce-Murcia et al., 2017; Cutler, 2015; Derwing & Munro, 2015). In addition, vowels retaining their full and inherent sound quality are labelled as strong or full vowels, occurring typically in stressed syllables, except for /ə/, identified as a weak vowel and often found in weak syllables (Skandera & Burleigh, 2005). Goodwin (2013) emphasizes that stress placement in English is also influenced by suffixation, with the primary stress often shifting to the syllable immediately preceding suffixes (e.g., -ic, as in *eLECtric*; -ity, as in *elecTRICity*) (p. 3). More specifically, several studies highlighted the importance of stress placement (e.g., Field, 2005; Hahn, 2004; Lewis & Deterding, 2018; Murphy, 2004; Uzun, 2022) and intonation (e.g., Holub, 2010; Sereno et al., 2015) for intelligible and/or comprehensible speech in different contexts.

Languages exhibit variations in stress patterns. For instance, English, Spanish, and Dutch are free-stress languages (Chun & Levis, 2020) and demonstrate changing patterns in stress placement. Specifically in English, vowels found in unstressed syllables are usually reduced (a

phonological phenomenon also known as *vowel reduction*) and tend to have a *'muffled'* quality like that of /ə/ (Katamba, 1996, p. 221), which also affects stress patterns. In English, shifts in stress placement convey different meanings within certain words (e.g., import as a noun versus import as a verb), whereas in French, stress consistently falls on the final syllable except in the cases of emphasis or contrast (Roach, 1992, p. 103). Similarly, languages like French are fixed-stress languages and the syllable stressed in words is the same (other examples include *Finnish* - first syllable, or *Polish*-penultimate syllable) (Cutler, 2015; Levis, 2018).

On the other hand, intonation is typically associated with *"variations in the pitch of the speaking voice"* (Brazil, 1997, p.1). Variation in pitch conveys diverse information, including personal characteristics like gender and age and nonlinguistic cues about the speaker's emotional state such as calmness, anger, happiness, or sadness (Ladefoged & Johnson, 2015). Overall, intonation can carry attitudinal, pragmatic, grammatical, and discoursal meanings (Levis & Wichmann, 2015). Regarding American English (AE) and British English (BE), the two varieties share a single system of intonation overall, mostly in frequencies and pragmatic choices rather than configurations like presence vs. absence of features (Bolinger, 1998). According to Grant (2016), the intonation in English typically falls at the end of statements providing information or expressing certainty (as in *I lost my wallet.* ↘) as well as *wh*- questions that request information (as in *What's your dog's name?* ↘) (pp. 95-96). In polar *yes/no questions*, on the other hand, final intonation rises in the end (as in *Is it supposed to rain?* ↗) (p. 97). Derwing and Munro (2015) similarly stress that intonation plays a linguistic role, with pitch potentially increasing towards the conclusion of a statement to indicate an interrogative intention (as in *You're leaving now?* ↗) (p. 59).

Despite the commonly held belief that pronunciation will be acquired naturally and requires no dedicated teaching, effective instruction in this area can lead to positive outcomes (Levis, 2022). Therefore, careful planning and consideration of all relevant variables are essential for successful implementation. An initial phase in developing effective pronunciation instruction involves conducting a needs analysis, also commonly referred to as *a diagnostic assessment*. This type of evaluation aids educators in identifying precise strengths and weaknesses in learners' pronunciation abilities (Knoch, 2017). As Celce-Murcia (2017) outlines, diagnostic assessments serve dual purposes: *screening*, which assesses learners' capabilities for specific tasks, and *placement*, which determines suitable levels based on proficiency. Pronunciation instructors should address both segmental and prosodic challenges, including non-target aspects, to meet learners' needs (Brinton, 2023); therefore, diagnostic assessment is an initial step in pronunciation instruction as well as recognizing the specific needs of learners.

Moreover, effective curriculum integration requires comprehensive efforts, and diagnostic assessment naturally forms a vital component of such procedures, too. In their proposal for integrating pronunciation into a curriculum, McGregor and Reed (2018) advocate for implementing a needs assessment as a crucial step, encompassing the planning process, encouraging learners' self-evaluation to heighten awareness of individual needs, and prioritizing specific speech features for instructional focus. In the context of Turkish higher education, a diagnostic assessment tool was used to gain insights into learners' pronunciation needs. This assessment addressed the following research questions regarding the prosodic speech features:

1. How do EFL students perform in a diagnostic perception test assessing final intonation patterns and word stress?

2. To what extent do individual scores on a test of final intonation perception correlate with scores on a word stress perception test?

Method

Data Collection

Data were collected using a diagnostic assessment test for pronunciation, accompanied by audio recordings (Baker, 2006) at the beginning of a classroom intervention. The test aimed to assess learners' perceptions of sound discrimination (i.e., *same* or *different* word pairs for minimal pair distinctions; 51 items), final intonation patterns (*rise* or *fall*; 10 items), and word stress placement (5 items). This study analyzed learners' perceptions of prosodic speech features; therefore, learners' scores for final intonation patterns and word stress placement were used for analyses. In Section II of the diagnostic test, final intonation items contained utterances of different lengths and types (i.e., *affirmative*, *interrogative*, and *question tags*). Learners were expected to listen to each item and mark the final intonation pattern as either a *rise* or a *fall*. As for word stress items, five sets with five words in each were presented, and learners were instructed to identify the word with a stress pattern differing from the others. For example, in a set of five disyllabic words (i.e., words having two syllables), four of them had the first syllable stressed while one had the second syllable stressed. The learners' task was to listen to the set of words and identify one word with a different stress pattern.

The test was conducted by pen and paper in participants' researcher classes equipped with high-quality speakers under the researcher's supervision. Participants were initially asked to complete consent and demographic forms, after which answer sheets were distributed. The researcher provided necessary instructions before each section, and test items were presented in the order provided by the resource. Test sections were administered following the completion of the outlined procedures.

This study received ethical approval from Ankara Yıldırım Beyazıt University Ethics Committee with a decision date of March 15, 2023, and approval number 03-37.

Participants

Participants (N=125) were B1 level students enrolled in the one-year mandatory preparatory English program at a state university in Türkiye. The participants were all native speakers of Turkish and EFL learners. They were expected to fulfill the requirements of the preparatory program and commence their academic studies in various faculties, including law, engineering, medicine, economics, and social sciences. Table 1 illustrates the demographic distribution of participants by gender and age group:

Gender	**N**	**Age Group**	**N**
Female	79	**17-25**	117
Male	46	**26-35**	8
			Total: 125

Table 1. Gender and age group

According to the data, female students constituted the majority, and most fell within the 17-25 age range.

Data Analysis

Using Jamovi (2022), a statistical analysis software, participants' test scores were analyzed. The analyses included descriptive statistics (mean scores, percentages, and standard deviation). Additionally, possible correlations between intonation and word stress test scores were examined using Pearson's r correlation using the same software.

Findings and Results

Prosodic Error Characteristics

Descriptive analyses of final intonation and word stress scores indicate that participants attained higher scores in final intonation items (see Table 2). The participants' overall mean score for final intonation items was 6,22 out of 10 items, and 2,58 out of five for word stress items.

	Final Intonation Items (N=10)	**Word Stress Items (N=5)**
Mean Scores (N=125)	6,22	2,58

Table 2. Mean scores for test sections

A closer examination of the mean scores in each test section reveals more detailed findings. Out of the ten items in the intonation section, the test contained a total of five interrogatives (yes/no and wh-/how question types), three affirmative utterances, and two tag questions. Regarding the final intonation patterns, five utterances ended with a rise, and five with a fall intonation pattern. Table 3 presents a detailed outline of the intonation patterns of the items and descriptive findings obtained:

Item Number	**Utterance Type**	**Intonation Pattern**	**Number of Correct Answers (N=125)**	**Percentage %**
1	Interrogative (Yes/No)	Rise	92	73,6
2	Affirmative	Fall	65	53
3	Interrogative (Wh-/ How)	Fall	63	50,4
4	Interrogative (Yes / No)	Rise	84	67,2
5	Interrogative (Yes / No)	Rise	82	65,6
6	Tag Question	Rise	106	84,8
7	Interrogative (Wh-/How)	Fall	68	54,4
8	Tag Question	Fall	85	68
9	Affirmative	Rise	78	62,4
10	Affirmative	Fall	54	43,2

*Std. dev.: 2,04223

Table 3. Final intonation scores

Test scores indicate that participants achieved higher numbers of correct answers in items ending with a rising intonation, ranging between %65.6 and %84.8. Four of the five items with the lowest scores ended with a falling intonation (items 2, 3, 7, and 10). The success rates for these items ranged as low as 43.2%, with the highest rate of correct answers for a falling intonation item

achieved in item number 9, reaching 62.4%. The remaining four items of the top five all contained a rising final intonation. Participants seemed to have greater difficulty with wh- / how question items that typically end with a falling intonation, while scores went higher with interrogative polar (yes/no) questions that ended with a rising intonation. Item 2 was *"Yes."* and the falling intonation at the end of this short utterance was not clearly heard by almost half of the participants. This result implies that short utterances might be harder for learners to decode, especially if they end with a falling intonation. These results suggest an overall perceptual challenge in differentiating between final fall and rise intonation patterns, with a notably increased difficulty observed in identifying falling intonation.

Despite the limited number of items in the word stress section, the general trend is that success rates tend to drop as the numbers of syllables increase. As seen in Table 4, disyllabic words received higher percentage results ranging between %52,8 and %65,6, while the success rates of the remaining two items (one tri- and one tetrasyllabic) fall under %50.

Item Number	Odd Word out in the Series	Number of Syllables	Stressed Syllable	Number of Correct Answers (N=125)	Percentage %
1	mis**take**	2	2	66	52,8
2	**Eng**lish	2	1	82	65,6
3	a**way**	2	2	77	61,6
4	lemon**ade**	3	3	58	46,4
5	conver**sa**tion	4	3	39	31,2

*Std. dev.: 1,19315

Table 4. Word stress scores

The trisyllabic word (i.e., a word with three syllables) *lemonade* with its third syllable stressed was successfully differentiated among others by %46,4 of the participants. The success rate drops even lower with tetrasyllabic word (i.e., a word with four syllables) *conversation* which has the primary stress on its third syllable. Only %31,2 of the participants successfully marked it out among the remaining four with the same pattern of stress placement.

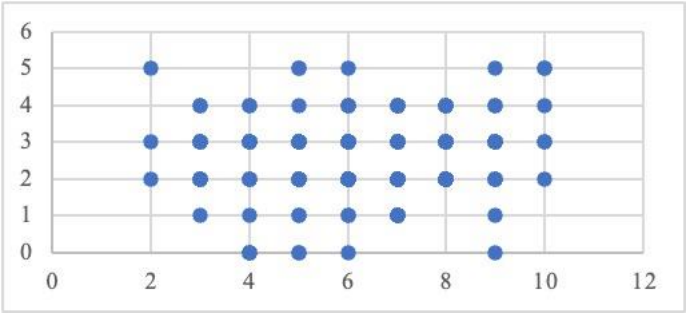
Correlation between Intonation and Word Stress Test Scores

Based on the second research question, possible correlations between participants' word stress and intonation scores were also examined via Pearson's r correlation (see Table 5). The obtained *p*-value of 0.18 indicates that there is no statistically significant relationship between the final intonation and word stress scores of participants, despite the presence of a positive correlation between these variables ($p > 0.05$).

		Intonation Scores
Word Stress Scores	Pearson's r	0.121
	df	123
	p-value	*0.180*

Table 5. Pearson correlation coefficient

To visualize these results, a scatter plot was generated to further examine the correlation between intonation and word stress scores (see Figure 1). The distribution of dots between the x and y axes offers further evidence of a positive yet weak linear relationship between intonation and word stress results.



*x-axis: final intonation results (0-10); y-axis: word stress results (0-5)

Figure 1. Scatter plot of final intonation and word stress scores

The scatter plot reveals a central density of dots with a minor additional density in the top right corner. These findings, as presented in Table 5 and Figure 1, suggest that while there may be a positive correlation between the two prosodic speech features in question, intonation and word stress, the relationship is not particularly strong. In other words, while there is variability in both intonation and word stress scores, they do not consistently increase or decrease together across all observations.

Conclusion

This study investigated EFL learners' performance on a diagnostic listening perception test, focusing on their final intonation and word stress test scores. The results suggest that EFL learners performed slightly better on intonation, achieving higher scores compared to word stress items; yet participants still seemed to experience certain degrees of difficulties in the perception of both features. Final intonation scores were lower for items featuring falling intonation, with interrogative wh- / how questions posing particular difficulty for participants. At this point, one possible reason for this observed challenge is the participants' preexisting knowledge or anticipation that interrogative wh- / how would consistently conclude with a rising intonation, similar to yes / no questions. This observation may indicate a potential influence from participants' first language (L1). In Turkish, the L1 of all the participants in this study, a typical final intonation pattern for yes / no questions is a fall while a slight rise is expected at the end of wh- / how questions with the question words (e.g., how, when, where) becoming prominent (Özsoy, 2004). This is different from English final intonation patterns, which might be misleading the Turkish L1 listeners. Gussenhoven and Chen (2000) suggest that listeners' interpretation of intonation is influenced by their language background as well as by more universal, non-linguistic factors. It is important to note that intonation serves not only to differentiate linguistic elements like statements and questions but also holds significant importance in discourse-level interactions, managing turn-taking and conveying speakers' intentions (Chun & Levis, 2020). Atoye (2005) observed that even when speakers are familiar with intonation concepts and can accurately detect intonation variations, they may still struggle to interpret the intended meanings. In this regard, as Newton and Nation (2021) also argue, fostering conscious awareness of how linguistic features are produced, alongside perceptual training aimed at distinguishing these features in input, lays essential groundwork for effective production practice. The ability to perceive various intonation patterns and understand their implications emerges as a key aspect for both learners and educators to address, from the very first awareness raising activities to the actual production of the target speech features.

Regarding word stress, participants' test scores tended to decrease as the number of syllables increased, with the lowest scores observed in trisyllabic and tetrasyllabic words. This result is in line with other studies which also note the difficulties experienced in identifying multisyllabic words. In Alzi'abi's (2023) work, for instance, it was reported that while participants performed well in identifying stress compared to production tasks, they still encountered difficulties, particularly with tri- and tetrasyllabic words. Similarly, Ali Al-Thalab et al. (2018) found that listeners demonstrated decreased performance in trisyllabic words compared to disyllabic ones, aligning with the observation of heightened identification difficulties as the number of syllables increased. In a separate study, Liu (2017) examined Chinese EFL learners' tendencies of stress assignment and found disyllabic and trisyllabic words as areas where improper assignments took place.

Drawing from the study's findings, tailored recommendations will be offered to address the needs of learners encountering similar challenges with intonation and word stress. According to Murphy (2004), awareness raising about word-stress patterns, alongside providing lexical information embedded within words, is essential to enhance L2 speech intelligibility. Therefore, teachers should incorporate focused practice on word stress, particularly in multisyllabic words where learners tend to struggle, emphasizing patterns and rules governing stress placement. To this end, dedicated activities focused on multisyllabic and irregular stress patterns, incorporating minimal pair drills and stress marking, can serve this purpose and also help enhance word stress accuracy in learners. To be more specific, learners should be taught the main distinctions between sounds and letters in English, followed by hands-on activities on syllable counting. This foundation sets the ground for effectively realizing the syllable structure in English and placing stress onto the correct syllables on multisyllabic words. These activities can be enhanced with visual, auditory, and kinesthetic stimuli, prompting learners to identify stressed syllables in multisyllabic words using colors, sounds, or physical movements. Field (2005) suggests integrating word stress recognition into language teaching activities to help learners segment continuous English speech effectively, an essential skill for listening comprehension requiring consistent practice. Another technique for addressing word stress in instruction is proposed by Carreão (2023). In his work, Carreão suggests integrating short poems such as *tankas* and *haikus* into classroom activities, enabling syllable counting, and encouraging learners to self-assess their pronunciation through creative activities. In another study, Hişmanoğlu (2012) found that internet-based video lessons proved to be more effective than regular pronunciation teaching in learners' understanding of primary stress in English.

As for intonation, the focus of instruction should be to highlight the communicative use and value of it as final intonation has this capability in English, especially in interaction (Levis, 1999; Muller Levis & Levis, 2016). Uzun and Celik Uzun (2022) recommend dramatization as a beneficial tool for effectively addressing final intonation patterns in English. According to the researchers, teachers can benefit from the collaborative nature, creativity, learner-centeredness, and adaptability of a step-by-step introduction of final intonation patterns through a drama technique called *Glottodrama*. Muller Levis and Levis (2016) suggest *bridging activities* for presenting and practicing final intonation patterns. The authors underline that bridging activities aim to keep the balance between controlled and communicative practice, providing learners with the opportunity to focus on pronunciation while also dealing with additional linguistic elements such as meaning and task demands. For instance, they suggest transforming traditional, complete

dialogues into short sentence dialogues to illustrate the potential for syntactically incomplete utterances and facilitate the observation of intonation's contribution to speech (e.g., Full form: *Are you leaving?* – Short form: *You leaving?*).

While this study provides insights into the relationship between intonation and word stress among EFL learners, certain limitations should be acknowledged. First, the sample size of 125 participants may not fully represent the diversity of EFL learners, and thus, the generalizability of the findings may be limited. Additionally, the use of a single diagnostic test to assess intonation and word stress perception and the limited number of test items may not capture the full range of learners' abilities in these areas. Future research could address the limitations of this study by employing larger and more diverse samples of EFL learners, including participants from different proficiency levels and language backgrounds. The complexity of phonological processing highlighted in this study suggests the need for further research on the interaction between intonation and word stress in language learning. Additionally, employing multiple measures to assess prosodic features beyond intonation and word stress, such as rhythm and speech rate, would provide a more comprehensive understanding of learners' perceptions of prosodic speech features.

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Ethical Statement/Etik Beyan: Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur. Bu çalışma Ankara Yıldırım Beyazıt Üniversitesi Etik Kurulu'ndan 15 Mart 2023 karar tarihi ve 03-37 onay numarası ile etik onay almıştır. / It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited. This study received ethical approval from Ankara Yıldırım Beyazıt University Ethics Committee with a decision date of March 15, 2023, and approval number 03-37.

Çatışma beyanı/Declaration of Conflict: Çalışmada kişi ya da kurumlar arası çıkar çatışmasının olmadığı beyan olunur. / It is declared that there is no conflict of interest between individuals or institutions in the study.

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