



Research Article

The Interlanguage Speech Intelligibility Benefit for Turkish Speakers of  
English

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**ABSTRACT**

This study is aimed at investigating the Interlanguage Speech Intelligibility Benefit (ISIB) via native English and Turkish listeners' transcriptions of Turkish talkers' words with pronunciation errors in English. Speech samples collected from talkers with a Turkish L1 background (N=16) were presented to 33 L1 English and 33 L1 Turkish listeners via an instrument to be filled with the transcriptions of erroneous target words. Results supported matched ISIB for listeners as Turkish talkers were more intelligible to Turkish listeners in a considerably higher number of target words. Similarly, a higher number of target words were more intelligible to Turkish listeners with statistically significant differences. Most of these words had been labelled erroneous due to L1 transfer caused by orthographic interference, mispronunciations of English sounds that do not exist in Turkish, and loanwords found in similar forms in Turkish. Turkish listeners appeared to rely on such cues in Turkish talkers' speech.

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**Statement of Publication Ethics**

This study was conducted in accordance with scientific publication ethics. The research procedures and data collection tool were ethically approved by Iowa State University Institutional Review Board with the document dated 07/11/2017 and numbered 17-558.

**Authors' Contribution Rate**

This is a single-authored paper.

**Conflict of Interest**

The author does not report any conflict of interest.

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## Introduction

Nonnative speakers (NNSs) speak in a second language (L2) with non-standard speech features that are generally associated with a foreign accent. According to Major (2013), “a foreign accent is a pronunciation deviating from what a native speaker (NS) expects another NS to sound like” (p. 1). Nonnative linguistic forms, in this regard, highlight the existence of an in-between system known as *interlanguage* that contains aspects from the speakers’ L1s and L2s (Yule, 2010). These nonnative speech features are due to the transfer of L1 elements to L2, which is also known as negative transfer or interference (Major, 2001). Gass and Selinker (2008) underline that this very own structure of L2 learners is not a deficit system, yet a language filled with random errors composed of various elements of the native language and the target language. Therefore, an interlanguage is made up of phonetic and phonological features that come out as the product of the interaction between a talker’s L1 and L2. As Munro (2008) also indicates, one can easily recognize someone from a different speech community with the help of the speech of the talkers even without any phonetic training.

NSs and NNSs interact with one another in various communicative settings. Therefore, NNSs’ success in oral communication can be measured by their intelligibility in L2. In terms of research endeavors regarding intelligibility, most of the studies concern nonnative and native interactions where NNSs take on the role of the *talkers* and NSs the *listeners* (Levis, 2018). However, the intelligibility of speech between NNSs (nonnative talkers, NNTs<sup>1</sup>, from here onwards) and nonnative listeners (NNLs) is still open for further investigations. Such enquiries are generally handled within the more specific area of investigations referred to as *the interlanguage speech intelligibility benefit* (ISIB).

Despite an increasing interest in ISIB research, there is still a clear research gap in the field and additional studies are needed to provide further insights into the nature of the ISIB. There is also a critical scarcity regarding the ISIB research with L2 talkers and listeners with a Turkish L1 background. Aimed at contributing to filling this gap, this study explored the intelligibility of Turkish talkers for native English listeners and listeners with a shared Turkish L1 background. To this end, the research design was built around the small-scale speech database, the data collection instrument, and partly the research data of the larger doctoral research of Uzun (2019) which originally investigated the salient pronunciation errors of Turkish talkers in English depending on expert listeners’ judgments, and the relative importance of these errors on the talkers’ intelligibility. This study was later published as a research article (Uzun, 2022).

## Literature review

Intelligibility, a common goal for most L2 learners today, was defined by Munro and Derwing (1995) as “the extent to which an utterance is actually understood” (p. 291). A foreign accent is a factor whose potential influence over intelligibility was studied via

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<sup>1</sup> Participants who provide speech samples in ISIB research are generally named as *talkers* so that they are not confused with more general speaker profiles (i.e., native and nonnative speakers). To this end, the term *talker* was preferred over *speaker* in this study as well to keep the discussions in line with the existing ISIB literature while the word *speaker* was used in the initial discussions regarding foreign accent.

empirical studies which generally found that foreign accent was not necessarily an impediment for intelligibility (e.g., Munro & Derwing, 1995; Derwing & Munro, 1997; 1999). The question of whether having a shared L1 brings an advantage for intelligibility in nonnative interactions attracted researchers' interests. Bent and Bradlow (2003) proposed ISIB to describe this advantage and defined it as "the benefit afforded by a shared interlanguage between a nonnative talker and listener" (p. 1600). The researchers also proposed matched and mismatched ISIB, which differ in terms of>NNLs' L1 backgrounds. Matched ISIB refers to the equal or greater intelligibility of an>NNL for another>NNL from the same L1 background while mismatched ISIB involves the equal or greater intelligibility of>NNLs from different L1 backgrounds (Bent & Bradlow, 2003). Stibbard and Lee (2006) held a different view from Bent and Bradlow (2003) concerning what benefit entails as they only considered instances of higher intelligibility an advantage, excluding equal intelligibility. Adopting this perspective in their study, Hayes-Harb et al. (2008) proposed two other types of ISIB, ISIB for listeners (ISIB-L) and ISIB for talkers (ISIB-T). They defined ISIB-L as the cases where nonnative speech is more intelligible to>NNLs than to>NLs while ISIB-T occurs when nonnative speech is more intelligible to>NNLs than a speech by native talkers (NTs).

Numerous studies have found evidence in favor of the ISIB for talkers and listeners for different L1 backgrounds. For instance, Xie and Fowler (2013) investigated the intelligibility of native and Mandarin-accented speech in English for native Mandarin and native English listeners and found evidence for ISIB-L for Mandarin listeners. The study provided limited support for ISIB-T as it was only Mandarin-speaking Chinese listeners who identified Mandarin accented Chinese speech more accurately. In Bent and Bradlow's (2003) study, high proficiency (HP) nonnative talkers' (NNT) speech was equally intelligible to listeners from the same L1 background compared to a native English talker's speech. As also discussed above, Bent and Bradlow (2003) considered this sort of an equal intelligibility situation as a benefit while several other researchers did not follow this perspective, but instead looked for a considerable difference between>NNLs and>NLs (Algethami et al., 2011; Hayes-Harb et al., 2008; Stibbard & Lee, 2006).

Several other studies analyzed specific phonological phenomena in terms of ISIB. For example, Hayes-Harb et al. (2008) examined the intelligibility of native and Mandarin-accented English speech for native English and native Mandarin listeners with a particular focus on word-final voicing contrasts. The study found evidence for ISIB-L where the low proficiency (LP) Mandarin listeners identified LP Mandarin talkers' words more accurately. In another study, Song (2011) investigated the intelligibility of Korean talkers' English lexical stress for Korean and native English listeners. According to the results of the study, there was evidence for ISIB for HP Korean listeners as they were highly accurate in judging stress patterns. In an attempt to examine Chinese-accented English liquids for Chinese, Korean, Japanese, and native English listeners, Lee and Xue (2013) found evidence for matched ISIB-L for final /l/, initial /r/, and final /r/. The results of the study also supported mismatched ISIB-L for LP talkers. Along with these studies, some others also provided empirical evidence in favor of>NNLs' advantage over>NLs' in

understanding other NNTs' speech (Chu & Taft, 2010; Hansen Edwards et al., 2019; Li & Mok, 2015; Podlipský et al., 2016; Shu et al., 2016; van Wijngaarden, 2002).

On the other hand, various studies found either limited support or no support at all for ISIB. Stibbard and Lee (2006) reported evidence against mismatched ISIB indicating that NNLs with a different L1 background than the talkers found it difficult to understand LP NNLs. The researchers found limited support for matched ISIB between NNLs and NNTs with the same L1 background. Similarly, Munro et al. (2006) reported weak evidence in favor of a speech intelligibility benefit in that familiarity or speaking with a particular accent did not result in significantly improved intelligibility. In this study, only Japanese listeners had a slight advantage when they heard Japanese-accented English while Cantonese listeners did not appear to have such an advantage. In another study, Algethami et al., 2011 examined the ISIB with Saudi talkers and native Australian English and native Saudi listeners. According to the findings, NNLs received higher intelligibility scores than NLs; however, the differences were rather small without statistical significance. Similarly, in several other studies, NNTs were found to be more intelligible to NNLs with a shared L1, yet the NNLs did not outperform NLs (Han et al., 2011; Hansen Edwards et al., 2018; Jułkowska & Cebrian, 2015; Lee et al., 2005). Despite these research efforts in various contexts, there is a clear research gap in terms of ISIB studies conducted with Turkish talkers and listeners.

Based on the above-mentioned discussions, this study aimed to answer the following research questions:

1. Do the Turkish talkers' pronunciation errors influence their intelligibility to Turkish and native English listeners differently? Is there an ISIB for matched L1 Turkish listeners?
2. What linguistic features do Turkish listeners rely on in understanding the talkers of English with a Turkish L1 background?

## Methodology

### Research design and publication ethics

The data collection procedures were carried out in Turkey and the United States. English speech samples collected from Turkish talkers in Turkey were presented to different listener groups at different times. In the first step, expert listeners (N=3) listened to the recordings and detected pronunciation errors in them via think aloud. This step was followed by the native listener sessions in which native English listeners in the United States completed an intelligibility task comprised of items with salient pronunciation errors as detected by expert listeners. These three phases were conducted as part of Uzun (2019).

In this follow up study, the same intelligibility task was presented to a group of listeners with a Turkish L1 background. The intelligibility scores of each target word were compared between native and nonnative listener groups with an aim to explore whether either listener group outperformed the other in understanding Turkish talkers' erroneous words. Table 1 presents an overview of the research procedures and tasks utilized in the collection of speech samples and the listening sessions. This study draws on the findings of

native and nonnative listener sessions, which are highlighted on the table below. It is important to underline at this point that the analyses are handled comparatively in this particular study different from Uzun (2019). Participant profiles, tasks, and other details about data collection procedures will be presented in greater detail in the following subsections.

**Table 1.** An Overview of the Research Procedures

Research Phase	Participant Profiles	N	Tasks	Source
Collecting Speech Samples	Turkish talkers (N=16); English native talkers as distractors (N=4)	20	Read aloud and picture description	Uzun (2019)
Expert Listener Sessions	Expert listeners	3	Error detection via read aloud	Uzun (2019)
Native Listener Sessions	American English native listeners	33	Transcription	Uzun (2019)
Nonnative Listener Sessions	Turkish listeners	33	Transcription	The ISIB Research

The author does not report any competing interests for this study. Listening procedures and the instrument were ethically approved by Iowa State University Institutional Review Board (IRB) with the ID 17-558. All participants attended the study on a voluntary basis and gave their informed consents.

## Context

This study was conducted in the United States and Turkey with different talker and listener groups. The following sections provide related contextual details.

## Participants

### *Talkers*

Talkers were Turkish students (N=16) (see Tables 1 and 2) enrolled in the English Language Teaching (ELT) programs of two state universities in Turkey. They had an average age of 21 (SD= .63). 13 talkers (81.25%) were female and three were male (18.75%). The talkers did not have any previous experience of living abroad. They did not report any speech disorders. All the talkers were native speakers of Turkish and learned English as a foreign language in Turkey. ELT students in Turkey have a long history with English as they receive extensive English classes starting from their high school years. Upon graduation, they are officially certified as English teachers who are eligible to apply for teaching positions at state and private schools. They also receive 100% English-medium instruction in their programs. In addition to Turkish talkers of English, two American and two British English NTs were also recruited as distractors to provide speech samples representing the two most common native speech models of English. Three NTs were female and one of them was male. Their average age was 32 (SD= 2.16). American talkers were Fulbright English teaching assistants when they participated in the study, and

British talkers were government officers in Turkey. Demographics of the talkers are presented in Table 2:

**Table 2.** Talkers

Talkers	N	Gender	Average Age
Turkish Talkers	16	13 Female, 3 Male	21
Distractors (Native Talkers*)	4	3 Female, 1 Male	32

\* Two talkers with American English and the other two with British English L1 background

Talkers were asked to respond to read aloud and picture description tasks. The read-aloud tasks were paragraph-length, 45-50-word short passages selected from Language Leader B2-C1 coursebook (Cotton, Falvey, & Kent, 2008). The coursebook was selected randomly and B2-C1 level was considered suitable for preservice English teachers enrolled in ELT programs. The passages were on different topics such as immigration, the internet, and globalization which were considered potentially interesting for talkers. Read aloud as a task type was used to control the length of speech samples produced by each talker. Picture description tasks, on the other hand, allowed for a less-controlled speech on a variety of topics like shopping, travel, and volunteering. The pictures used were collected through Google search and printed in color on thick paper before the piloting phase. The task cards were piloted with three native English teachers and a group of 10 university students in a teacher training program. Minor revisions were made on some tasks and application procedures based on pilot phase participants' feedback.

Talker sessions were conducted in quiet rooms in related universities and each session was conducted one-on-one. Talkers were asked to fill out consent and demographic forms first and they were screened in terms of eligibility to participate before the session was initiated. If found eligible, they were given the necessary instructions both orally and using the instruction cards. Once the procedures were over, talkers were asked to pick a topic for each task type, prepare, and respond to it when ready. Their responses were recorded with a Sony IC Recorder ICD-SX850. This procedure was repeated with distractors as well. As a result, a small database comprised of a total of 40 recordings was brought together.

### *Listeners*

In this study, data were collected from two listener groups, American English NLs (N=33) and nonnative Turkish listeners (N=33) (see Table 3). American English NLs were all naive listeners. In other words, none of them had received phonetics, phonology, pronunciation, or linguistics classes, or had any language teaching experience at the time of data collection. 20 listeners (60.6%) were female and 13 of them (39.4 %) were male, and the average age was 21 (SD= 2.51). These listeners had varying degrees of educational backgrounds as 26 of them (78.7%) were undergraduate students, one was a Ph.D. student, and another was holding a Ph.D. They had no previous experience of living or studying in Turkey or learning Turkish.

Turkish listeners were first-year students at the English language and literature, and American culture and literature programs of a state university in Turkey. They were all

proficient English users as students enrolled in language-related programs at higher education have a relatively longer background in English language studies than most learners of English. They get accepted to these programs based on their scores in a nationwide language examination and receive a 100% English-medium instruction in their programs. As for additional demographics, 23 Turkish listeners were female, and 10 were male with an average age of 18.3 (SD= .97). They did not have any professional teaching experience. They never lived or studied abroad. None of the listeners, Turkish or native English, reported any hearing impairment. A brief overview of the two listener groups is provided in Table 3:

**Table 3.** Listeners

Listeners	N	Gender	Average Age
American Native Listeners	33	20 Female, 13 Male	21
Nonnative Turkish Listeners	33	23 Female, 10 Male	18.3

## Data collection and analysis

### *Data collection*

#### *The intelligibility task*

The intelligibility task is a 71-item instrument (See Appendix) comprised of a total of 87 erroneous target words that belonged to Turkish talkers and six others (two in the words section and four in longer utterances) sampled from the speech samples of native British and American talkers who were recruited as distractors. This instrument was developed as part of Uzun's (2019) larger doctoral research in which target erroneous words were detected by at least two expert listeners out of three via think-aloud. All the items that belonged to Turkish talkers contained at least one target word with an agreed pronunciation error.

The items in the instrument were fill-in-the-blanks type and the erroneous words were left blank for listeners to transcribe on paper. In the selection process of erroneous words to be placed into the instrument, representativeness of detected error types as well as the overall size of the instrument, were taken into consideration for a reliable implementation. The instrument was piloted with a native English listener and three upper-intermediate level Turkish listeners. Their task completion times were recorded, and their feedback was requested. No matter what their L1 backgrounds were, the participants completed the task in 30-35 minutes and found the level of the recordings suitable for them without reporting any issues in understanding or completing the tasks.

#### *Listening Sessions*

Slightly different procedures were followed in listening sessions. Sessions with native English listeners were conducted face to face at a state university in the United States. They were held in quiet rooms on a personal computer using Sony MDR-P180 model headsets. All the sessions were done on paper and monitored by the researcher. Turkish listeners did their session all at once at a computer lab located in the listeners' university campus in Turkey. They accessed the audio recordings on personal computers

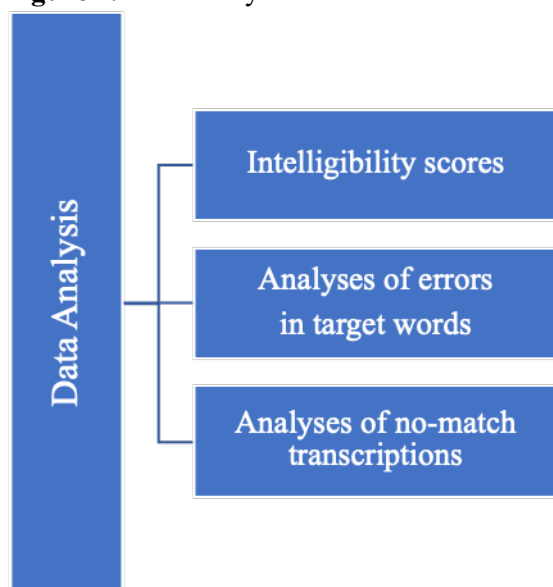
using Creative HS-350 headsets and completed the task on paper. All the computers, headsets, and recordings were checked by the researcher before the session in case of technical issues. This listening session in the computer lab was also monitored by the researcher.

Listeners in all sessions were reached via personal contacts and their eligibility was screened via the items placed in the demographic forms. They were first requested to fill out consent and demographic forms and additional instructions were given orally to avoid possible confusions. They were then asked to start listening with two training items to practice the activity and check the equipment. Listeners were allowed to listen to each recording up to two times. No technical issues occurred, and all the listeners in both sessions completed the task in 30 to 40 minutes.

### *Data Analysis*

Data were analyzed in three subsequent steps which involved the comparisons of Turkish and native English listeners' intelligibility scores, analyses into the error types in the target words and the analyses of no-match transcriptions of the two listener groups (see Figure 1):

**Figure 1.** Data Analysis Procedure



The first analysis was conducted via descriptive (percentages) and inferential statistics (chi-square tests). Intelligibility scores, in other words, the rates of listeners' 'match' transcriptions with the talkers' intended words, were calculated via percentages for each target word. Then, chi-square tests were employed to explore the statistical significance of the differences in the intelligibility scores between the two listener groups.

Secondly, target words that were significantly more intelligible to Turkish and native English listeners were listed separately and possible linguistic factors contributing to the intelligibility of Turkish talkers were explored. To this end, expert listeners' error descriptions (i.e., vowel, consonant, and word stress errors) reported in Uzun's (2019)



work were utilized to reach certain patterns. This analysis also revealed what specific linguistic features Turkish listeners relied on in understanding Turkish talkers' speech.

Finally, no-match transcriptions of the two listener groups were analyzed comparatively to gain a deeper understanding into the nature of differences in how NNLs and NLs perceive Turkish talkers' erroneous target words comparatively. Such transcriptions were first listed for each target word separately, and the numbers of no-match alternatives proposed were counted and compared between the listener groups. Then, the alternatives produced for each word were examined in further detail to investigate if there is further evidence for an ISIB for Turkish listeners.

## Results

Overall, the results indicated that Turkish talkers' erroneous words influenced their intelligibility to native English and Turkish listeners differently. Also, Turkish talkers were generally more intelligible to Turkish talkers, which demonstrated evidence for a matched ISIB-L.

### *Comparisons of the Intelligibility Scores*

Turkish listeners were able to figure out Turkish talkers' words more successfully despite their pronunciation errors. This result provided supporting evidence for a matched ISIB-L for Turkish listeners. It was found that Turkish listeners' intelligibility scores were higher in 44 target words (50.6%) out of a total of 87 that belonged to Turkish talkers. On the other hand, native English listeners' intelligibility scores were higher in 18 target words only (20.7%). The two listener groups received equal intelligibility scores in 25 target words (28.7) (see Table 4):

**Table 4.** Distribution of Higher Intelligibility Target Words across Listener Groups

Listener Group	Number of Words	%
Turkish	44	50.6
Native English	18	20.7
Equally Intelligible	25	28.7
Total	87	100

Despite this initial finding, further analyses were needed to investigate whether differences were statistically significant. According to the results of the chi-square tests conducted on each target word, differences in intelligibility scores were found statistically significant in favor of either listener group in a total of 34 target words. 25 words (%73.5) were significantly more intelligible to Turkish listeners while only 9 (%26.5) were significantly more intelligible to native English listeners ( $p < 0.05$ ) including one word that belonged to a NT distractor (see Table 5).

**Table 5.** Distribution of Higher Intelligibility Target Words with a Significant Difference

Listener Group	Number of Words	%
Turkish	25	73.5
Native English	9	26.5
Total	34	100

This result demonstrates that Turkish listeners were considerably more intelligible to Turkish listeners despite their pronunciation errors.

*Pronunciation errors in target words significantly more intelligible to Turkish listeners*

The results indicate that target words that were significantly more intelligible to Turkish listeners mostly contained segmental errors. Out of 25 target words, 12 of them had been labelled erroneous due to mispronounced vowels which were followed by six words with consonant errors, three words with word stress errors, and four multiple-error words (three words being in *vowel + vowel* and one *consonant + vowel* pattern). Target words with segmental errors were mainly motivated by different sources of L1 influence which were orthographic interference, mispronunciations of English sounds that do not exist in Turkish, and loanwords. It can be assumed that Turkish listeners intuitively used these cues in making sense of Turkish talkers' speech.

*The role of orthographic interference*

Orthography was one of the leading factors in Turkish talkers' pronunciation errors. Out of a total of 25 target words that were significantly more intelligible to Turkish listeners, at least nine of them were erroneous due to orthographic interference. Naturally, this influence was clear in words with segmental errors, particularly vowel errors. Vowel errors in the words 'war' (/wɔr/ - [wɑr]) and 'focus' (/ˈfoukəs/ - /ˈfokəs/) are examples of orthographic interference and Turkish listeners outperformed native English listeners in these mispronounced words. The only consonant error of this sort was seen in the word 'laughing' where the talker pronounced the /f/ sound in the second syllable as [k]. It can be assumed that the talker was under the influence of the <g> grapheme which would be pronounced in Standard Turkish as [g] and it is a close alternative to [k] in terms of both manner and place of articulation. Also, missing consonants in words like 'persuading' (/w/ not pronounced in the second syllable) and 'queue' (/j/ not pronounced) were likely due to orthography as well and Turkish listeners compensated for these sounds more successfully. As an example for multiple error target words, a talker pronounced the word 'download' as /danlod/ instead of /ˈdaʊn,ləʊd/ with two diphthong errors. However, Turkish listeners did better in figuring out the word possibly making use of the first vowels in diphthongs as clues.

*Mispronunciations of English sounds that do not exist in Turkish*

Target words with mispronounced English sounds which do not exist in Turkish were better understood by Turkish listeners in general. Two of the Turkish talkers' pronunciation errors in the words section stemmed from /w/ which is a non-existent sound in Turkish. In one of these target words, Turkish listeners seemed to decode the word more successfully than native English listeners despite the mispronounced [w] in the initial syllable of the word 'woman'. In the longer utterances section, Turkish talkers tended to approximate sounds in the words 'sheeps', 'achievements', 'hat', 'caps', and 'this is' to different consonant and vowels that are used in standard Turkish. The tense vowel /i/ was pronounced lax as [ɪ] in 'sheeps' and the second syllable of 'achievements'. Similarly, for 'hat' and 'caps', the non-existent vowel /æ/ in standard Turkish was pronounced as an [ɛ] by Turkish talkers. The consonant /ð/ is also non-existent in Turkish and it was approximated to [z]. Yet, all these erroneous target words were more intelligible to Turkish listeners with a statistically significant difference.

### *Loanwords*

The third evidence of L1 influence comes from loanwords that are used in similar forms in the two languages. The word ‘balance’ is a loanword in Turkish which is spelled as ‘balans’ and pronounced as [balans]. The English word ‘balance’ was pronounced by a Turkish talker the same way as its Turkish equivalent, which facilitated the understanding for Turkish listeners. This example relates to orthography as well because <a> grapheme is pronounced as [a] in standard Turkish. A similar example is ‘contrast’ which contained two vowel errors, yet more Turkish listeners transcribed it correctly with a statistically significant difference. This word is spelled as ‘kontrast’ and pronounced as [k<sup>h</sup>ɔntrast] by the Turkish talker, the same way as its Turkish equivalent. ‘cinema’ was a multiple error word with a vowel and a word stress error. Beyond that, the word is spelled as ‘sinema’ and pronounced as [sɪ'nema] in Turkish as a loanword. This word was unintelligible to all the native English listeners while 24 Turkish listeners transcribed it correctly.

### *Suprasegmental errors and intelligibility*

The findings indicate that Turkish listeners make up for the segmental errors of Turkish talkers more effectively than native English listeners. In terms of suprasegmentals, three target words with word stress errors were more intelligible to Turkish listeners with statistically significant differences. In all these words, stress was incorrectly shifted to a syllable on the right. It is also worth noting that no word with a word stress error was more intelligible to native English listeners.

### *Errors in target words significantly more intelligible to native English listeners*

Even though the findings provided evidence for a matched ISIB-L for Turkish listeners, a total of eight words were more intelligible to native English listeners with statistically significant differences. One of these words was found in the words section, and the remaining seven were identified in longer utterances. The target words that were significantly more intelligible to native English listeners did not reveal a clear pattern making it hard to offer sound explanations. All the target words in this category contained segmental errors only, and more specifically, there were slightly more consonant errors. Besides this, the target word ‘doctorates’ that belonged to an American native distractor was significantly more intelligible to native English listeners.

### *Interpreting no-match transcriptions*

The third analysis was into the no-match transcriptions which demonstrated that native English listeners offered a considerably higher number of options when they could not find the talkers’ intended words. Native English talkers proposed more options in 47 target words (75.8%) out of a total of 62 in which the intelligibility scores were not equal between the listener groups. Turkish listeners offered more words in only 15 target words (24.2%) in their no-match transcriptions. To illustrate, the word ‘support’ in the words section was transcribed as ‘sport’ (19 times), ‘part’ and ‘sparked’ (three times each), ‘porch’ (twice), ‘parked’, ‘sprout’, ‘spared’ and ‘start’ (once each) by native English listeners. Turkish listeners, on the other hand, transcribed the word only as ‘sport’ as a no-

match transcription alternative. Two examples from item 29 lend additional evidence for the same argument:

Item 29. It also leads to the ***destruction*** of *natural resources*

Target words in this utterance were ‘destruction’ and ‘resources’, and the italicized parts were left blank for listeners to transcribe (the word ‘natural’ was not a target word but still included in the blank in order not to give the listeners an additional clue). The word ‘destruction’ was pronounced as [dɪ'strækʃən], which led to transcriptions by native English listeners as ‘distraction’ (17 times), ‘deflection’, ‘extraction’, and ‘fraction’ (once each). The only alternative for Turkish listeners, on the other hand, was ‘distraction’ (18 times). ‘Resources’ was pronounced as [rɪ'sɔrdʒəz] instead of /rɪ'sɔrsɪz/ and this error resulted in no-match transcriptions for native English listeners as follows: ‘soldiers’ and ‘surges’ (3 times each), ‘charges’ (twice), ‘orders’, ‘searches’, and ‘research’ (once each). Again, the no-match word alternatives were far more varied compared to Turkish listeners who only transcribed the word as ‘sources’ (9 times) and ‘researches’ (once). This word also underlines the role of a shared L1 orthography between Turkish talkers and listeners because the <c> grapheme is pronounced as [dʒ] in Turkish. It appears that Turkish listeners did not consider words that specifically contained a [dʒ] sound in their transcriptions while native English listeners did.

A final example of this could be the word ‘migrate’ which was pronounced as [ˈmɪɡreɪt] by a Turkish talker instead of /ˈmaɪɡreɪt/. This word was transcribed correctly by 11 native English and 22 Turkish listeners. Despite this difference, an interesting finding was the variety of alternatives in native English listeners’ no-match transcriptions. The alternative words provided were ‘integrate’ (5 times), ‘negate’, ‘negrate’ (three times each), ‘emigrate’, ‘degrade’, ‘immigrate’, ‘neglect’ and ‘make great’ (twice each) most of which contained an [ɪ] sound in the initial syllable. It might be assumed that more Turkish listeners were able to figure that out this word probably because they were not confused upon hearing an [ɪ] sound corresponding to the <i> grapheme.

### Discussion

This study investigated matched ISIB-L by drawing on the intelligibility scores of Turkish talkers’ erroneous target words to native English listeners and Turkish listeners comparatively. The most important result was that Turkish listeners seemed to benefit from a shared L1 in understanding other Turkish talkers’ spoken productions despite the pronunciation errors involved, which was consistent with studies that found evidence in favor of an ISIB-L for HP listeners (Li & Mok, 2015; Song, 2011; Xie & Fowler, 2013). It should also be underlined that this result was not in line with several other studies that related such an advantage to other factors like speech properties (Jułkowska & Cebrian, 2015; Munro et al., 2006), exposure to accented speech (Li & Mok, 2015), or others which indicated that such an advantage has limited significance (Algethami et al., 2011; Bent & Bradlow, 2003; Stibbard & Lee, 2006). In this study, target words which were more intelligible to Turkish listeners with a statistical significance pointed to L1-related factors which were orthographic interference, mispronunciations of English sounds that do not exist in Turkish, and loanwords pronounced in similar ways as their Turkish equivalents.

Turkish talkers tended to make several pronunciation errors due to differences in orthography between English and Turkish (Uzun, 2019). Due to its highly transparent orthography, Turkish employs a high degree of sound-letter correspondence which interferes with English pronunciation (Bayraktaroğlu, 2008). Turkish talkers seemed to have difficulty with English vowels, which possibly relates to the more indirect nature of sound-spelling correspondence and orthography in English, in Levis and Barriuso's (2012) terms. Yet, this turned into an advantage when the listeners and talkers shared the same L1 as seen in this study. The findings also suggested that target words with word stress errors were significantly more intelligible to Turkish listeners. According to Field (2005) and Richards (2016), stress errors shifted incorrectly to a syllable on the right in a word have a more detrimental effect on intelligibility; however, Turkish listeners were not affected by the misplacement of word stress by Turkish talkers, which could likely be due to the syllable-timed nature of Turkish.

The analyses into the no-match transcriptions of Turkish and native English listeners showed that native English listeners offered considerably higher numbers of words in their no-match transcriptions, and many of them were higher-level lexical items. The alternatives seen in Turkish listeners' no-match transcriptions were rather limited, but their intelligibility scores were higher in more cases. Native English listeners' more comprehensive L1 lexical knowledge might likely have played a role in approximating mispronounced words to different possible alternatives; however, not surprisingly, native English listeners did not make use of such large vocabulary knowledge. Some of the words proposed by native English listeners might have even been unknown to some Turkish listeners. This finding provides a more indirect support for the ISIB. Due to the shared L1 phonological background with the talkers, Turkish listeners might have intuitively narrowed down the possibilities that could be an option for a target word more easily. This was much harder for native English listeners since they could not limit the possible options based on possible phonological clues like a shared L1 or familiarity with the accent. This finding also highlights the complex nature of intelligibility which, as Levis (2020) also put, cannot simply be restricted to pronunciation, but also relates to the lexicon, grammar, and other linguistic and non-linguistic aspects of language.

### Conclusion

The present study investigated the matched ISIB-L for Turkish listeners in experimental settings. The results showed that a shared L1 might facilitate communication between L2 speakers despite talkers' pronunciation errors. However, NNTs' pronunciation errors might naturally impair their intelligibility in their interactions with NTs or NNTs with different L1 backgrounds to varying degrees as well. An implication of this study is the necessity for an increased focus on intelligibility in language teaching settings. One way of achieving this could be to pay attention to the common pronunciation errors of L2 talkers or learners stemming from L1 interference. Errors that commonly lead to unintelligibility issues might be handled in classes more carefully. As Levis (2018) also puts, an intelligibility-based instruction should recognize learners as individuals or members of a group with certain difficulties in common that need to be addressed. To this

end, further empirical studies are of critical importance with understudied groups with certain L1 backgrounds, such as Turkish, to have a better understanding of learners' difficulties and needs.

As for limitations, Turkish talkers and listeners were all considered HP based on the programs they were enrolled in, and LP talkers or listeners were not included in the research. Besides this, no specific linguistic feature was analyzed in terms of its possible role for the ISIB. Further studies could reexamine the roles of vowels, consonants, word stress, or other phonological aspects to provide insights into the ISIB with more controlled stimulus and experimental research designs. Another limitation was related to the type of the ISIB that was explored in this study which was matched ISIB-L. With experimental research designs and the participation of Turkish talkers and listeners, further studies can analyze other proposed versions of the ISIB as well.

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## Appendix

### THE INTELLIGIBILITY TEST WITH ANSWERS

In this test, you will be presented a total of 71 recordings. Listen to the recordings in the given order and fill in the blanks with one or more words. You can listen to each recording twice.

The task has two sections: 'Words' and 'Longer Utterances'. Read the instructions carefully and ask the researcher if you have any questions. Do the examples at the beginning of each part before moving on to the actual test. Please write your name and surname before starting the session. Your identifying information will be kept secret and not shared with third parties.

Name and Surname: .....

#### SECTION A: WORDS

Write the words you hear in each item. Start with the examples first.

Example 1: ....*teenagers*....

Example 2: .....*street*.....

You may start if you are ready.



1. *produced*
2. *three*
3. *support*
4. *opportunities* (NS)
5. *evolution*
6. *woman*
7. *are*
8. *conditions*
9. *cinema*
10. *traditional*
11. *bazaar* (NS)
12. *persuading*

### SECTION B: LONGER UTTERANCES

Fill in the blanks with the word(s) you hear (one or more words for each blank). Start with the examples first.

Example 3: They are ....*professional*.... people at the top of their chosen career.

Example 4: The e-book has many other ....*advantages*....

You may start if you are ready.

13. *Between individuals* in the same sports
14. The magic *ingredient* was electronic paper
15. After using them for any *length* of time
16. There is a lot of *inequality* involved in globalization
17. And we see some *sheeps* walking alongside the people
18. There is so much *poverty* in the world
19. *Peer pressure* can lead people to do *things*
20. *Polar ice* has been shrinking
21. The man and woman are having dinner in a *restaurant* (NS)
22. Sports *stars* are *worth* the money they earn
23. The other is a *white hat* and a *black bag*
24. Like any well-known actor or *pop star*
25. Display technology used for *computer screens*
26. I *think* they are *refugees*
27. And there are some *passengers* in *queue*, in line
28. Sports stars do not *save lives*
29. It also leads to the *destruction* of *natural resources*
30. People who are low on confidence and *unsure* of themselves
31. *download* everything they need to their *e-book*
32. Volunteers pick up the garbage and *this is* the charity organization
33. It has become very common, *especially* in America (NS)
34. This couple *focus on* just one ... one kind of a television
35. The child achieves *above-average* results at school
36. There is a *girl* who is *talking* on the phone
37. *Amount* of money earned by top *sportsmen* and *women*
38. The most *common* form of *social influence*
39. Or really *contribute* much to the *society*
40. It means a *faster rate* of development

41. *On balance*, it can be said that
42. And students *cheating* with his friend
43. And which will change lives *the most*
44. They have to *migrate* their *countries*
45. Electronics *companies* had been working on the e-book
46. And also their *caps* and uniforms are purple
47. Environmentalists have not achieved any *significant results*
48. And there are *check-in* tables
49. Globalisation also *connects* people by means of communication. (NS)
50. *In contrast*, some people argue
51. There is a *classroom atmosphere*
52. And maybe they have a *war* in their country
53. She is talking and *laughing* ... in the mobile phone
54. It is *obvious* that there are differences
55. As *well* as text, the e-book can *display* pictures and diagrams.
56. Probably getting their masters, maybe their *doctorates* (NS)
57. Globalization *benefits* the rich nations, who *control prices*
58. *Companies* that will be *supplying* medical and scientific e-book files
59. A US invention that is *completely* different
60. More *likely* to seek their *peers' approval*
61. They go to somewhere, *maybe Europe* or somewhere else
62. *Nearly 75 thousand square kilometers*
63. Teacher *deals with* another things
64. *It is wrong* to pay sports stars
65. They found the perfect combination of *materials* and *technology*
66. Many people with *poor eyesight* will be able to read
67. In *recent* years
68. To enhance people's *lives* by their *achievements*
69. Usually *defined* as the tendency to think
70. Often *feature* in lists of world's richest people
71. The *professor* gives the diploma to the student