The use of intonational cues marking new information in non-native speech

Judit Nagy
University of Szeged, Hungary

Recent research on the use of English in L2 and English as an International Language contexts reflects a shift from the nativeness principle towards focus on intelligibility and establishing which aspects of non-native pronunciation promote intelligibility and communicative success (Levis, 2005). Discourse competence and discourse intonation have been foregrounded as core components of communicative competence (Chun, 2002). The present study focuses on the use of intonation in marking information structure and the realization of such prominence through nuclear pitch accent by native and non-native speakers. 10 conversations among 10 native and 10 non-native speakers from the Wildcat Corpus of Native- and Foreign-Accented English (Van Engen et al., 2010) were analyzed in order to map differences between native and non-native speakers in the use of f0 and intensity to mark new information. The data suggest that native speakers use f0 as the main cue, whereas non-native speakers do not rely exclusively on f0 but exploit the joint effect of an increased f0 and intensity.

Key words: non-native English, intonation, information structure, acoustic cue, spontaneous speech

1. Introduction

Research on non-native speech has provided ample support on differences in both speech production and perception. Non-native prosodic features such as intonational patterns, stress placement and prominence have been extensively studied (Bradlow & Bfent, 2003; Bradlow & Pisoni, 1999; Chun, 2002; Derwing & Munro, 2008; Trouvain J. & Gut, 2007; Wang, Hirschberg, & Hill, 1990; Wennerstrom, 1994) alongside with the perception and intelligibility of non-native speech (Bamgbose, 1998; Berns, 2008; Levis, 2005; Nelson, 2008; Pickering, 2006; Rajadurai, 2007; Smith & Nelson, 1985). Native speakers have been found to rely extensively on prosodic cues in speech perception, for example Akker and Cutler (2003) maintained that prominence enables faster detection (Akker & Cutler, 2003). Unfortunately, cross-linguistic differences may lead to difficulties in perception or comprehension. According to Cutler (2009) non-native word recognition can be hindered in cases when non-native listeners use their native speech processing strategies for prosodic cue identification (Cutler, 2009, pp. 3524–5). Non-native English may display lower f0 values compared to native English (Wennerstrom, 1994, pp. 415-6) and different lexical stress patterns (Nagy, 2009). Moreover, non-native speakers have been found to use intonational patterns differently compared to native speakers. Ramirez Verdugo (2005) provided empirical evidence to the claim that non-native speakers did not use the same intonational range and variety of contours and as a result did not express the same communicative functions and signal pragmatic meanings as accurately as native speakers did (Ramírez Verdugo, 2005). However, Computer Assisted Pronunciation Training (CAPT) has been reported to be

an effective tool in raising metalinguistic awareness regarding suprasegmental features (Chun, 1998; Hardison, 2004; Nagy, 2014b).

According to Levis (2005) deviations from native norms in non-native speech have been approached along two key conceptualizations as either learner errors which need to be corrected by pronunciation instruction or one of the evident results of the changing status of English as an International Language. Levis (2005) proposed two underlying principles governing research on non-native speech production and perception. The *nativeness principle* reflects the dominant status of the native speaker and posits native-like pronunciation as a goal for language learners. In this approach deviations from an ideal and homogeneous native norm are undesirable and considered errors. The *intelligibility principle*, on the other hand, focuses on communicative success. Features of language use which promote communicative success are emphasized in the process of learning, while deviations from the target language norm are deemed acceptable on the condition that they do not hinder successful communication (Levis, 2005, pp. 370-1).

The transition from the dominance of the nativeness principle towards focus on intelligibility is parallel with changes in ESL and EFL teaching and the extension of the notion of discourse competence. The originally proposed model consisting of grammatical, strategic and sociolinguistic competence (Canale & Swain, 1980) has been extended to include discourse competence which ultimately received a central position in the model as an intersection of top-down and bottom-up communicative and linguistic processes (Celce-Murcia, 2007, p. 46). The increasing significance of discourse competence brought about an increased interest in discourse intonation, its role in conveying meaning and its contribution to successful communication. Focus has shifted from segmental accuracy to the role of suprasegmental features in structuring and highlighting discourse and information structure. Consequently, accentedness has become more acceptable with intelligibility taking on a more central role (Morley, 1991, p. 499; cf. Jenkins, 2000).

2. Non-native intonation and information structure

Although considerable emphasis was previously placed on eliminating pronunciation errors, there is also ample support to the fact that native-like pronunciation is not a prerequisite of communicative success. In fact, features of non-native speech may even promote intelligibility (Deterding & Kirkpatrick, 2006). Munro and Derwing's (1999) findings lend empirical support to the claim that speakers' perceptions of accentedness and actual comprehension are not as closely related as listeners might generally consider. Results of this study revealed that actual comprehension was more closely related to perceived comprehensibility than accentedness ratings. In fact, in some cases participants were able to correctly transcribe utterances which were perceived as markedly accented. In addition, accentedness showed a significant correlation with

phonetic and phonemic errors, and intonational ratings. However, these measures were less connected to perceived comprehensibility and even less to intelligibility. Judgments of accentedness were assumed to have been made based on features of native-like pronunciation and were not accurate predictors of intelligibility (Munro & Derwing, 1999, pp. 303-4). Finally, perceived comprehensibility and actual comprehension of non-native English were found to be negatively correlated among L3 learners of English (Nagy, 2014a).

Some of the problems that non-native speakers face may not stem from incorrect realizations of phonetic features. Mennen (2004) puts forward the claim that some of the intonational errors identified in previous research were based on an incorrect identification of the source of the error. For example, a perceived incorrect stress placement may not be actually misplaced, only realized differently due to a misalignment of intonational patterns or different use of acoustic cues stemming from the L1 of the speakers. In other words, the error may be a phonetic error and not a phonological one (Mennen, 2004, pp. 58-9). Similarly, Hwang et al. (2007) found no significant difference between native and non-native discrimination of syntactic structures based on prosodic structure and concluded that differences in the use of intonational phrases are likely to be due to differences in establishing the relationship between prosody and syntactical structure (Hwang, Schafer, & Anderson, 2007, p. 713).

There is general consensus on the two main discourse functions of intonation, namely signaling prominence and structuring discourse (Chun, 2002; Grice & Baumann, 2007; Venditti & Hirschberg, 2003). The present study focuses on the issue of prominence associated with new information accomplished marked with (nuclear) pitch accent, which can be measured through its main acoustic cue, fundamental frequency (f0). Additional acoustic cues include, among others, increased intensity and duration (Grice and Baumann 2007, p. 27). Similarly, Ward and Birner (2001) discuss focus and information structure in relation to the discourse functions of intonation and claim that focused elements are marked with prosodic prominence, mostly nuclear pitch accent (Ward & Birner, 2001, p. 120).

Further research has proposed three subcomponents of signaling information status: salience, focus of attention and given/new information (Venditti and Hirschberg 2003; Grice and Baumann, 2007). Chun (2002) draws attention to the previously reported difference between signaling given vs. new information and emphasis or contrast. The former is characterized by high pitch, whereas the latter displays an accentual pattern that diverges from normal focus patterns with the aim of contrasting or emphasizing certain elements of the utterance (Chun, 2002, pp. 58-9). Along similar lines Chafe (2001) maintains that the information flow in spontaneous speech is continuously managed in interaction by the management of focus and periphery. Focus is coupled with “distinctive terminal intonation contour, an initial resetting of the pitch baseline, the presence of silence before and after, a change of tempo at the beginning or end, and boundary changes in voice quality such as whispering or creaky voice” and is a

prevalent feature of natural speech (Chafe, 2001, p. 675). In a study of non-native focus acquisition, Baker (2010) identified several differences in non-native speech such as higher f0 maxima, larger f0 ranges, greater RMS amplitudes and stronger pitch accent cues (Baker, 2010. p. 212). In addition, further research in this area revealed additional distinctions in information status. Prince (1992) categorized information structure into two main sets of information statuses, Hearer-old/Hearer-new and Discourse-old/Discourse-new, which are somewhat independent of each other. For example, Discourse-new information may be new or old information for the Hearer, but Discourse-old information is inevitably Hearer-old as well. The third additional category is that of Inferrables, which are new to both the Hearer and the discourse, but may be activated by certain Discourse-old triggers (Prince, 1992, p. 309).

The aim of this study is to address the issue of prominence and information status in native and non-native speech. The first research question focuses on the use of the acoustic cues of fundamental frequency and intensity to signal prominence of lexical items carrying new information that is both Discourse and Hearer-new. The underlying assumption is that both groups use these acoustic cues to a certain degree to mark prominence, but differences exist. Some researchers propose that non-native speech displays a greater variation in pitch level and range due to the potential transfer of language-specific features from the varied linguistic background of speakers (Mennen, 2004, p. 64). However, there are conflicting views on the actual differences, as non-native speech has been found to display both higher and lower f0 values as compared to native speakers (Baker, 2010; Wennerstrom, 1994). The second question concerns the relationship between the use of f0 and intensity to signal prominence among native and non-native speakers. The initial hypothesis is that native speakers rely on f0 as the main acoustic cue, whereas non-native speakers employ f0 to a lesser amount to signal prominence. Intensity is studied as an additional acoustic cue contributing to marking prominence. The final question is aimed at revealing differences between native and non-native speakers in the use of f0 and intensity to mark new information.

3. Research methods

This study analyzes data from the Wildcat Corpus of Native- and Foreign-Accented English (Van Engen et al., 2010). The corpus contains scripted and spontaneous recordings of native (NS) and non-native speakers (NNS) of varied linguistic background involving 85 speakers from 13 native language backgrounds, in both native and non-native pairings. Non-native spontaneous speech was recorded in 42 conversations using the Diapix elicitation technique. Native and non-native speakers participated in a spot-the-difference task. In order to complete the task, the two speakers had to cooperatively identify the differences in the two pictures they had been presented with. Each speaker underwent a familiarization task before the recording. Recordings were carried out in a sound-treated booth in the Northwestern University Phonetics

Laboratory. The conversations were recorded in stereo using a Marantz PMD 670 flash recorder and participants wore AKG C420 headset microphones (Van Engen et al., 2010, p. 517).

For the purposes of the current study I selected 10 conversations involving 10 native and 10 non-native speakers. In order to reduce the effect of speech accommodation, conversations with NS-NS and NNS-NNS pairs were included. Both native and non-native participants were previously evaluated by native speakers of American English for accentedness on a scale of 1 (no foreign accent) to 9 (very strong foreign accent). A clear-cut difference was measured, as the average NS rating was 1.27 (range: 1.04 to 1.67), whereas the average NNS accentedness rating was 6.35 (range: 3.10 to 8.31) (Van Engen et al. 2010, pp. 518-9).

The diverse linguistic background of non-native speakers raises the issue the effect of L1 transfer. Although the cross-linguistic influences receive some consideration, the central aim is to identify the common features of non-native speech production and establish a set of factors which may be linked with speech perception, and ultimately perceived and actual comprehension. The present study does not address the effects of the various native languages or the accommodation processes which might have taken place during the completion of the task. The overarching aim is to identify the differences occurring in the speech production of native and non-native speakers as regards the acoustic cues of intonation in the wide sense.

Measurements were carried out using Praat version 5.3.61 (Boersma & Weenink, 2014). In the first stage of carrying out measurements, maximum f0 and maximum intensity were measured in Hz on monosyllabic words carrying new information, which are coupled with pitch accent. Measurements were carried out according to the word boundaries established in the corpus transcription, produced by hand corrected automatic alignment of orthographic transcription. ("Wildcat Corpus of Native- and Foreign-Accented English," n.d.) However, as peak height is not the main acoustic cue of prominence, further measurements were included. Perceived prominence is mostly based on the size of pitch excursion (Gussenhoven, 2004, p. 85). In order to measure pitch excursion and enable comparison between speakers of different pitch registers, f0 and intensity peak values were divided by the speaker's average f0 and intensity measured across the entire discussion. F0 and intensity was measured using the maximum and average pitch and intensity commands in Praat. Average values for each speaker were measured separately on each channel of the stereo sound files. The resulting variables were labelled *F0Prom* and *IntProm* and used in each statistical test in the study. Having considered these factors, it must still be noted that these variables represent prominence solely from the perspective of speech production and are not intended to reflect what speakers actually perceive as prominent. Additional issues stem from the segmental effects influencing f0 values, most of which should be viewed as inherent features of naturally occurring speech (Pierrehumbert, 1975, p. 14). In an attempt to control some of these factors, in the final stage of the analysis, prominence

values were measured on 4 words containing the same vowel, thus having the same intrinsic f0 (*cheese, sheep, beef, green*). However, the immediate and wider phonetic and phonological context included several variables which need to be considered in further research. The statistical analysis of the measurements is presented in the following section.

4. Discussion of results

4.1. F0 and intensity as acoustic cues of prominence

Prominence was measured on 7 items in 10 Diapix interactions with 10 native and 10 non-native speakers yielding a sample of 140 items. One item was excluded due to the fact that the speaker used a different word, resulting in a final sample of 139 items. The excursion from the average f0 and intensity (labelled *F0Prom* and *IntProm*) was calculated by dividing f0 and intensity maxima values measured on words carrying new information and thus receiving pitch accent with average f0 and intensity values of each speaker respectively. Both average prominence values M_{F0Prom}=1.39 and the excursion from the average Min_{F0Prom}=0.65, Max_{F0Prom}=4.92 (N=139, SD=0.68) was greater in the case of f0 prominence (Fig. 1), than in the case of intensity prominence ($M_{IntProm}$=1.07, $Min_{IntProm}$=0.78, $Max_{IntProm}$=1.24, N=139, SD=0.08) throughout the entire sample (Fig. 2).

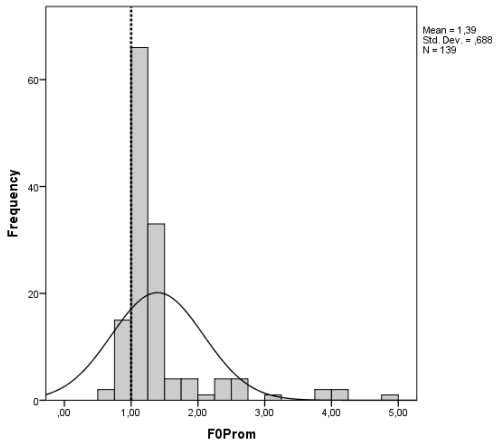

Figure 1 NS and NNS f0 prominence values

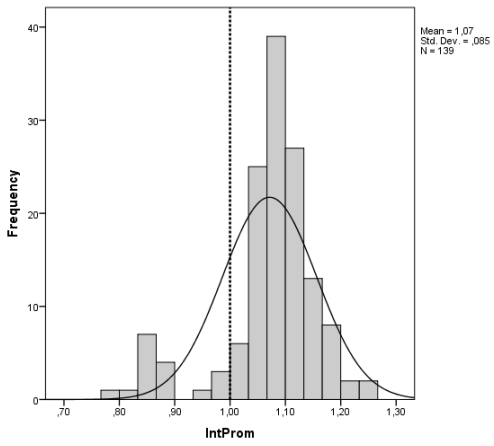

Figure 2 NS and NNS intensity prominence values

In addition, f0 prominence values were lower than 1 in 13% of words carrying new information, that is absolute f0 values were lower than the speaker's average f0. In other words, speakers did not place emphasis on new information using f0 compared to their average f0. Similarly, 12% of new information received lower intensity than the average intensity of the entire conversation per speaker. One possible explanation is that the speaker did not use either fundamental frequency or intensity to highlight new

information. However, instead of a general lack of prominence marking, a closer look at the data points at systematic differences between native and non-native speakers. While new information occurring without f0 prominence appears in the same proportion among non-native and native speakers (NNS 14%, NS 13%), a lack of intensity prominence was measured among a higher proportion of native speakers (22%). Conversely, only 3% of non-native speakers refrain from using intensity to mark prominence. Nonetheless, it must be noted that the average f0 and intensity of the given sentence, the immediate context of the word and the use of other acoustic features require a closer examination for such an assumption to be made. These initial results indicate a clear-cut difference in the use of these acoustic cues by native and non-native speakers which will be examined in more detail in the following sections.

4.2. The relationship between f0 and intensity

The second research question was concerned with the relationship between fundamental frequency and intensity in the speech of native and non-native speakers. After examining the correlation between the variables *F0Prom* and *IntProm*, we can see a clear-cut difference between NS and NNS measurements. While there is no significant correlation between *F0Prom* and *IntProm* among native speakers (Fig. 4), non-native speakers appear to use these two cues in a different manner (Fig. 3). The results of a Spearman correlation reveal a statistically significant weak positive relationship between *F0Prom* and *IntProm* (ρ=.297 $p<.05$, N=70) among non-native speakers. The scatterplots in Figure 3 and 4 below report the results of the Spearman correlation. Non-native speakers appear to use both f0 and intensity to place emphasis on new information, compared to native speakers who rely mainly on f0 as the main acoustic cue of pitch accent.

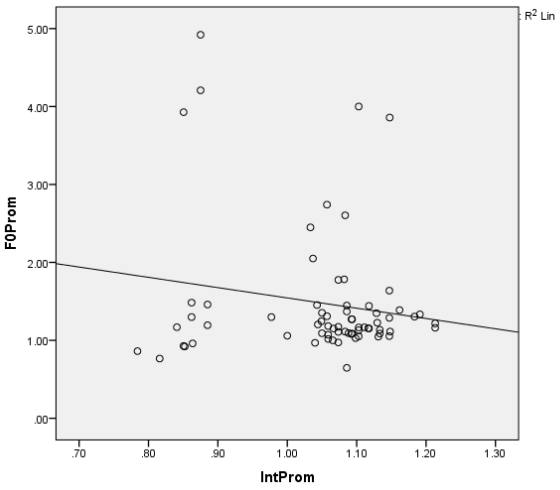

Figure 3 Relationship between native f0 and intensity prominence

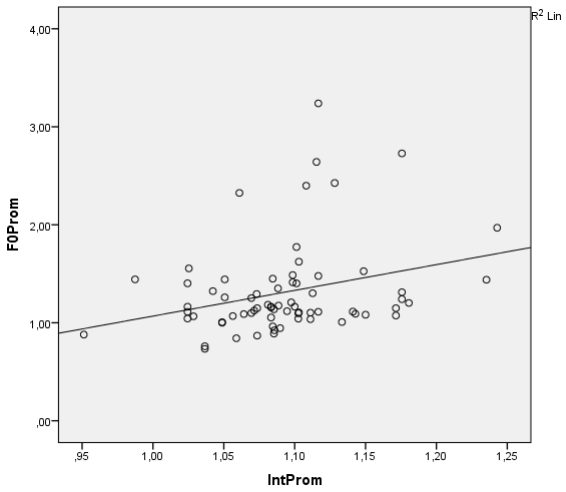

Figure 4 Relationship between non-native f0 and intensity prominence

4.3. F0 and intensity as prominence cues among native and non-native speakers

An independent-samples t-test was conducted to examine whether native speakers and non-native speakers differed in the use of f0 and intensity prominence. An examination of the data indicated that the data are not normally distributed; some data contained outliers, and variances were unequal for the groups (Levene's test $p<.05$). These results correspond to the intrinsic nature of the data, namely that native and non-native speakers are expected to display notable differences in measurements of their phonetic and phonological features, which are perceivable even to the untrained ears as a marked foreign accent. Overall, the data contradicts the prior expectation that non-native speakers produce more heterogeneous results due to their diverse linguistic background. It was in fact the NNS sample which was more homogeneous, while native speaker measurements varied to a greater extent in the degree of prominence and the use of acoustic cues to mark prominence. In the case of native speakers, f0 prominence values are slightly higher and the range of values is also wider (N=69, M_{F0Prom}=1.47 Min_{F0Prom}=0.65, Max_{F0Prom}=4.92, SD=0.85) than for non-native speakers (N=70, M_{F0Prom}=1.31 Min_{F0Prom}=0.73, Max_{F0Prom}=3.24, SD=0.47). In other words, in terms of speech production, native speakers exploited f0 to a greater degree than non-native speakers did. This may contribute to the facilitation of speech perception and processing stemming from more marked speech segmentation and increased intelligibility due to a more easily interpretable information structure. However, native and non-native speakers appear not to diverge in their use of the second acoustic cue, since the differences are less conspicuous in the case of intensity prominence, both in terms of average values and minimum and maximum values (native speakers: $M_{IntProm}$=1.04, $Min_{IntProm}$=0.78, $Max_{IntProm}$=1.21, SD=0.10; non-native speakers: $M_{IntProm}$=1.09, $Min_{IntProm}$=0.95, $Max_{IntProm}$=1.24, SD=0.05). As the lack of normal distribution calls for the use of non-parametric tests, the Mann-Whitney test was used to look into differences in the use of prominence cues between native and non-native speakers. The following section presents the results of the Mann-Whitney test for f0 and intensity prominence.

Firstly, the comparison of f0 prominence values for native and non-native speakers revealed that NNSs generally use lower f0 values and they use them more consistently (Fig. 4), as it is also demonstrated by the differences in standard deviation between the two groups (M_{NNS}=1.31, SD=0.47, N=70; M_{NS}=1.47, SD=0.85, N=69). However, the Mann-Whitney test revealed no statistically significant difference between the f0 prominence values of native and non-native speakers.

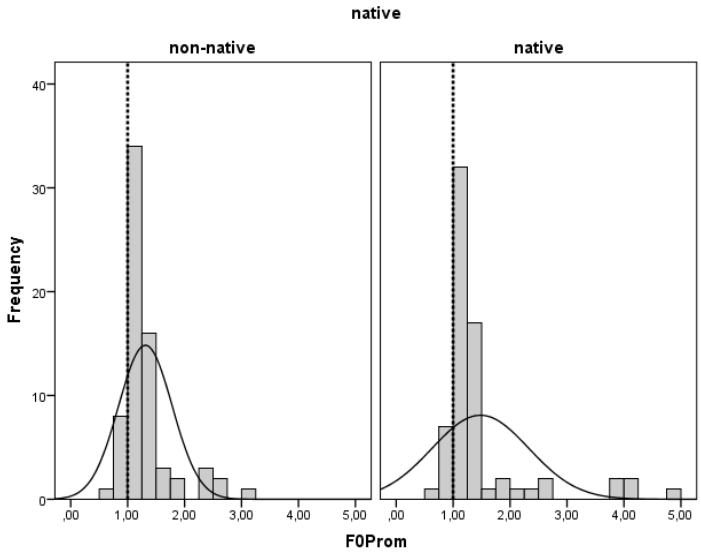

Figure 5. NS and NNS f0 prominence values

Secondly, the comparison of the use of intensity to achieve prominence revealed only a slight difference in the means of the two groups. However, examining the data in more detail, again we can see that non-native speakers are more consistent also in their use of the acoustic cue of intonation. In addition, it is used by almost each non-native speaker to make new information more prominent. On the other hand, lower than average intensity occurs more frequently in non-native items, which corresponds to the general assumption that intensity is not a key acoustic cue of prominence in focused words (M_{NNS}=1.09, SD_{NNS}=0.05, N=70; M_{NS}=1.04, SD_{NS}=0.10, N=69). These differences in intensity prominence are presented in Figure 6. As noted in section 4.1., lack of intensity prominence appears to be more frequent among non-native speakers. This claim is also supported by the results of the Mann-Whitney test. While the two-tailed Mann-Whitney test showed no statistically significant difference between the two groups, the one-tailed test revealed a significant difference between native and non-native speakers (p=.05). In other words, the test revealed that the difference between the two groups occurs in only one direction (Fig. 5).

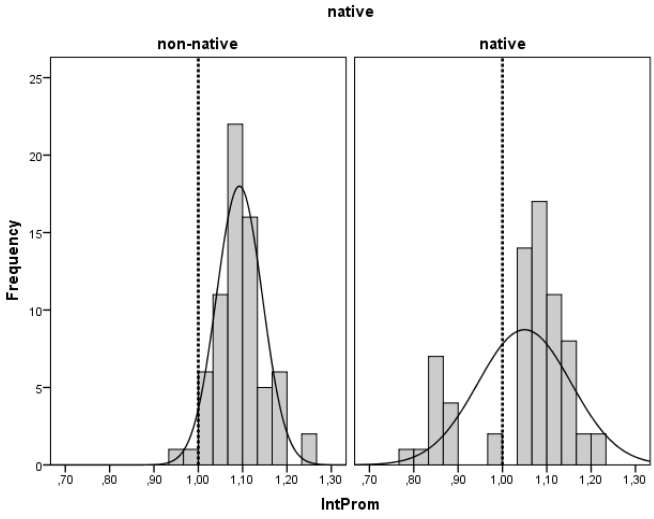

Figure 6. NNS and NS intensity prominence values

In the final stage of analysis, the focus was on a smaller segment of the sample, namely monosyllabic words containing the same vowel. The comparison of f0 and intonation prominence yet again revealed a difference in the prominence patterns of NS and NNS language use. Figure 7 presents the mean prominence values measured in NNS and NS utterances focusing on items in which the measured values surpassed the speaker's average f0 and intensity values (M_{F0Prom}=1.50, Min_{F0Prom}=0.84, Max_{F0Prom}=3.93, SD_{F0Prom} =0.76; $M_{IntProm}$=1.09, $Min_{IntProm}$=0.85, $Max_{IntProm}$=1.24, $SD_{IntProm}$=0.09, N=30).

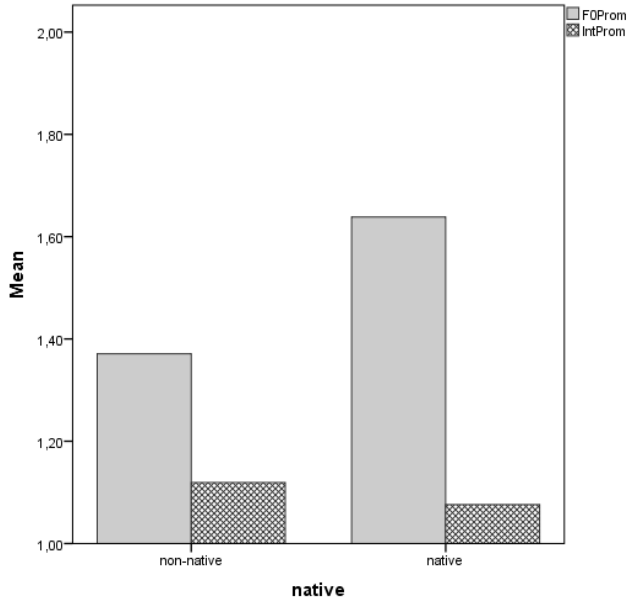

Figure 7. F0 and intensity prominence on monosyllabic words containing [i:]

5. Conclusions

The study revealed systematic differences in the use of acoustic cues of prominence between native and non-native speakers. Non-native speakers displayed a lower pitch range as also revealed by previous research (Baker 2010), but relied on other acoustic cues, in this case intensity. The present study measured the use of intensity and found statistically significant differences in its use compared to native speaker speech. The data suggest that native speakers use fundamental frequency as the main cue, whereas non-native speakers do not rely exclusively on fundamental frequency, but exploit the joint effect of an increased fundamental frequency and intensity.

In order to increase the accuracy of acoustic measurements, the immediate context of the word carrying new information should be examined in more detail, including the use of intonational patterns, pitch alignment and range, duration and pauses. Spontaneous speech phenomena and the grammatical structure of utterances, in this case existential *there* sentences, also require more attention. The information structure of interactions could be mapped in more detail by applying Prince`s multidimensional model, including the incorporation of the third additional category of Inferrables, which are new to both the Hearer and the discourse, but may be activated by certain Discourse-old triggers. (Prince 1992, p. 309).

References

Akker, E., & Cutler, A. (2003). Prosodic cues to semantic structure in native and nonnative listening. *Bilingualism: Language and Cognition*, *6*(2), 81–96. http://doi.org/10.1017/S1366728903001056

Baker, R. E. (2010). *The acquisition of English focus marking by non-native speakers*.

Bamgbose, A. (1998). Torn between the norms: Innovations in world Englishes. *World Englishes*, *17*(1), 1–14. http://doi.org/10.1111/1467-971X.00078

Berns, M. (2008). World Englishes, English as a lingua franca, and intelligibility. *World Englishes*, *27*(3/4), 327–334.

Boersma, P., & Weenink, D. (2014). Praat: Doing phonetics by computer. Retrieved from http://www.praat.org/

Bradlow, A. R., & Bent, T. (2003). Listener adaptation to foreign-accented English. In *Proceedings of the XVth international congress of phonetic sciences* (pp. 2881–2884). Retrieved from http://faculty.wcas.northwestern.edu/~abr137/ICPhS_0400-FAT.pdf

Bradlow, A. R., & Pisoni, D. B. (1999). Recognition of spoken words by native and non-native listeners: Talker-, listener-, and item-related factors. *Journal of the Acoustical Society of America*, *106*(4), 2074–2085.

Canale, M., & Swain, M. (1980). Theoretical bases of communicative approaches to second language teaching and testing. *Applied Linguistics*, *1*(1), 1–47.

Celce-Murcia, M. (2007). Rethinking the role of communicative competence in language teaching. In E. Alcón Soler & M. P. S. Jordà (Eds.), *Intercultural Language Use and Language Learning* (pp. 41–57). Springer.

Chafe, W. (2001). The analysis of discourse flow. In D. Schiffrin, D. Tannen, & H. E. Hamilton (Eds.), *The Handbook of Discourse Analysis* (pp. 673–687). Blackwell Publishing Ltd.

Chun, D. M. (1998). Signal analysis software for teaching discourse intonation. *Language Learning & Technology*, *2*(1), 61–77. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.136.6340&rep=rep1&type=pdf

Chun, D. M. (2002). *Discourse Intonation in L2: From Theory and Research to Practice*. *Discourse*. Amsterdam/Philadelphia: John Benjamins Publishing. Retrieved from http://eric.ed.gov/ERICWebPortal/recordDetail?accno=ED202248

Cutler, A. (2009). Greater sensitivity to prosodic goodness in non-native than in native listeners. *Journal of the Acoustical Society of America*, *125*, 3522–3525.

Derwing, T. M., & Munro, M. J. (2008). Putting accent in its place: Rethinking obstacles to communication. *Language Teaching*, *42*(04), 476–490. http://doi.org/10.1017/S026144480800551X

Deterding, D., & Kirkpatrick, A. (2006). Emerging South-East Asian Englishes and intelligibility. *World Englishes*, *25*(3/4), 391–409.

Grice, M., & Baumann, S. (2007). An introduction to intonation – functions and models. In J. Trouvain & U. Gut (Eds.), *Non-Native Prosody: Phonetic Description and Teaching Practice*. Mouton de Gruyter.

Gussenhoven, C. (2004). *The Phonology of Tone and Intonation*. Cambridge: Cambridge University Press.

Hardison, D. M. (2004). Generalization of computer-assisted prosody training: Quantitative and qualitative findings. *Language Learning & Technology*, *8*(1), 34–52. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.131.6103&rep=rep1&type=pdf

Hwang, H., Schafer, A. J., & Anderson, V. B. (2007). Discrimination of English intonation contours by native speakers and second language learners. In *Proceedings of the XVI. ICPhS. Saarbrücken* (pp. 713–716). Retrieved from http://www2.hawaii.edu/~vanderso/ICPhS2007.pdf

Jenkins, J. (2000). *The phonology of English as an international language: New Models, New Norms, New Goals*. Oxford University Press.

Levis, J. M. (2005). Changing contexts and shifting paradigms in pronunciation teaching. *TESOL Quarterly*, *39*(3), 369–377.

Mennen, I. (2004). Bi-directional interference in the intonation of Dutch speakers of Greek. *Journal of Phonetics*, *32*, 543–563.

Morley, J. (1991). The Pronunciation component in teaching English to speakers of other languages. *TESOL Quarterly*, *25*(3), 481–520.

Munro, M. J., & Derwing, T. M. (1999). Foreign accent, comprehensibility, and intelligibility in the speech of second language learners. *Language Learning*, *49* (Supplement 1), 285–310.

Nagy, J. (2009). Magyar nyelvtanulók angol lexikai hangsúlyának akusztikai vizsgálata. In T. Váradi (Ed.), *Alkalmazott Nyelvészeti Doktorandusz Konferencia 3.* (pp. 87–98). Budapest: MTA Nyelvtudományi Intézet.

Nagy, J. (2014a). Az angol nem anyanyelvi változatainak érthetősége: normák, attitűdök és a hallás utáni szövegértés viszonya. In B. Attila, F. Emese, H. T. Katona, & B. Zsemlyei (Eds.), *Többnyelvűség és kommunikáció Kelet-Közép-Európában - Összefoglalók: XXIV. Magyar Alkalmazott Nyelvészeti Kongresszus.* (pp. 103–111). Babes-Bolyai Tudományegyetem.

Nagy, J. (2014b). The use of speech visualization technology in prosody teaching. In C. Varga (Ed.), *New Trends in Language Didactics: Noi Directii in Didactica Limbilor* (pp. 95–107). Cluj/Kolozsvár: Presa Universitara Clujeana / Kolozsvári Egyetemi Kiadó.

Nelson, C. L. (2008). Intelligibility since 1969. *World Englishes*, *27*(3), 297–308.

Pickering, L. (2006). Current research on intelligibility in English as a lingua franca. *Annual Review of Applied Linguistics*, *26*, 219–233. Retrieved from http://journals.cambridge.org/production/action/cjoGetFulltext?fulltextid=530496

Pierrehumbert, J. B. (1975). *The Phonology and Phonetics of English Intonation*. MIT.

Prince, E. F. (1992). The ZPG letter: Subjects, definiteness, and information-status. In S. A. Thompson & W. Mann (Eds.), *Discourse Description: Diverse Analyses of a Fund Raising Text* (pp. 295–325).

Rajadurai, J. (2007). Intelligibility studies: a consideration of empirical and ideological issues. *World Englishes*, *26*(1), 87–98. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1467-971X.2007.00490.x/full

Ramírez Verdugo, D. (2005). The nature and patterning of native and non-native intonation in the expression of certainty and uncertainty: Pragmatic effects. *Journal of Pragmatics*, *37*(12), 2086–2115. http://doi.org/10.1016/j.pragma.2005.02.012

Smith, L. E., & Nelson, C. L. (1985). International intelligibility of English: Directions and resources. *World Englishes*, *4*(3), 333–342. http://doi.org/10.1111/j.1467-971X.1985.tb00423.x

Trouvain J., & Gut, U. (Eds.). (2007). *Non-Native Prosody: Phonetic Description and Teaching*. Berlin/New York: Mouton de Gruyter.

Van Engen, K. J., Baese-Berk, M., Baker, R. E., Choi, A., Kim, M., & Bradlow, A. R. (2010). The Wildcat corpus of native-and foreign-accented english: Communicative efficiency across conversational dyads with varying language alignment profiles. *Language and Speech*, *53*(4), 510–540. http://doi.org/10.1177/0023830910372495

Venditti, J. J., & Hirschberg, J. (2003). Intonation and discourse processing. In *Proceedings of ICPhS 2003, Barcelona.*

Wang, M. Q., Hirschberg, J., & Hill, M. (1990). Predicting Intonational Phrasing from Text, 285–292.

Ward, G., & Birner, B. J. (2001). Discourse and Information Structure. In D. Schiffrin, D. Tannen, & and H. Hamilton (Eds.), *Handbook of Discourse Analysis* (pp. 119–137). Oxford: Basil Blackwell.

Wennerstrom, A. (1994). Intonational meaning in English discourse: A Study of non-native speakers. *Applied Linguistics*, *15*(4), 399–420.

Wildcat corpus of native- and foreign-accented English. (n.d.). Retrieved from http://groups.linguistics.northwestern.edu/speech_comm_group/wildcat/