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Variation in Prosodic and segmental marking of yes-no questions in Tunisian Arabic

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AUTHOR'S NOTE

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Introduction

- 1 Tunisian Arabic (TA) displays a segmental marker of yes-no questions, in the form of a vowel epenthesis to the end of polar interrogatives. Although the marker appears to be well known – being described as “the pan-Tunisian question marker clitic” (Herin and Zammit 2017: 141) – there seems to be little work on its realisation and distribution. Recent work on TA intonational phonology has shown variable use of the segmental marker by gender, and that it always co-occurs with a rise-fall prosodic contour, rather than a plain rise (Hellmuth in press). This suggests that the prosodic (i.e. tonal) component of the question marker is at least as important as its vocalic content in marking yes-no questions in TA.
- 2 This paper reports the results of a small production study designed to further explore the relationship between segmental and prosodic marking of yes-no questions in TA. We focus on regional variation between the north (Tunis) and the south-east of Tunisia, and transfer of the pattern into speakers’ spoken second language English, due to anecdotal observations of variable use of the segmental marker in these contexts. The study also

serves to replicate the results of Hellmuth (in press) with a new set of speakers in the same age range.

1. Background

1.1. Prior descriptions of the Tunisian Arabic question marker

- 3 The existence of a vocalic question polar interrogative clitic in TA is not a wholly new discovery, since it is described as a pan-Tunisian feature as noted above. However, no detailed descriptions exist, to the best of our knowledge, and the marker fails to be mentioned in some descriptions (e.g. Gibson 2008). In an investigation of data from the TUNICO corpus (Procházka and Mörth 2017), Dallaji, Gabsi & Procházka (n.d.) argue against Gibson's (2008) suggestion that the suffix *-ši* functions as an interrogative marker in TA, noting instead that "the overwhelming majority of yes/no questions in the Arabic dialect of Tunis are not marked as questions except by a rising intonation" (Dallaji et al. n.d.: 1), and without any mention of an accompanying segmental (vocalic) marker.
- 4 Recent work on the intonational phonology of TA as spoken in Tunis (Hellmuth in press) revealed frequent co-occurrence of the segmental marker (an epenthesis vowel) with a prosodic marker (a complex prosodic contour) in yes-no questions extracted from the TA portion of the Intonational Variation in Arabic database (Hellmuth and Almbark 2017). The data were recorded with 12 TA speakers (6 females/6 males) from Tunis, aged 20-24, and were taken from read (a scripted dialogue) and semi-spontaneous speech (a map task). Incidence of the segmental marker was variable, but always contingent on use of a complex prosodic contour, as no tokens of epenthesis were observed in yes-no questions produced with a plain rising or falling contour. The reverse was not true, however, as some speakers produced complex rise-fall contours in yes-no questions without accompanying epenthesis. A marginal effect of gender was found, with female speakers using the segmental marker more frequently than male speakers. A range of potentially explanatory properties of the last lexical item in the analysed utterances was investigated, including number of syllables, position of stress and final consonant type, but none showed any association with the occurrence of the epenthetic vowel. This last finding supports analysis of the epenthesis vowel in TA yes-no questions as a question clitic particle, rather than as a by-product of the choice to deploy a complex prosodic contour as has been argued for other languages (see Hellmuth in press for details). Nevertheless, the segmental and prosodic marking strategies are clearly very closely tied together, and further work is needed to understand the role of each in marking yes-no questions, to which we hope to contribute here.

1.2. Dialectal variation in the Tunisian Arabic regions under study

- 5 Our data were collected with speakers from two regions of Tunisia (North and South East) which are approximately 500 km apart, and whose dialects are known to differ. Examples of lexical variation (south~north, respectively) include: /'tʃala~/ /iʒa/ 'come here' and /masnId~/ /'mxada/ 'pillow'. Phonological variation at segmental and prosodic levels is sufficiently prominent to function as an indicator of speaker identity. The phoneme /q/ has two variants /g~/ /q/ in the south, but is realized as /q/ in the north, as in (1) below;

the [g] realization is found in other regions also and is generally an indicator of a rural accent.

(1) /qal/ (North) /gal/ (South) 'to say'

Vowel quality differences between the north and south are illustrated in (2).

(2) a. /dwe/ (North) /dwa/ (South) 'medicine'

b. /hwe/ (North) /hwa/ (South) 'air'

Finally, Ghazali (1973) notes differences in stress assignment, which we find also, as in (3).

(3) /'stilu:/ (North) /sti'lɔ:/ (South) <stylo> (French) 'pen'

- 6 Recent work suggests that the two regions also exhibit variation in use of intonation in different contexts. Saadi (2014) is the first study of regional variation in TA intonation, treating dialects from the cities in the north (Nabeul, in north east Tunisia, 60 km from Tunis), the centre (Mahdia, 250 km from Tunis) and the south (Gabes, in south east Tunisia), and investigating intonation in a range of sentence types. The main locus of variation between dialects was in the realization of declaratives, imperatives, exclamations and yes/no questions. The author did not investigate co-occurrence of epenthetic vowels with specific contours in yes/no questions in any of the regions under study, though we note that figures illustrating the productions of southern speakers are consistent with the presence of epenthetic vowels (e.g. Saadi 2014: 94-6).

1.3. L1 transfer effects in L2 English

- 7 It is common in research on second language (L2) speech production to assume that the learner's first language (L1) sound system affects pronunciation in the target L2, in an effect known as 'transfer', and to differing extents through the acquisition process (Odlin 1989). Early theories, such as the Contrastive Analysis Hypothesis (Lado 1957), suggested that differences between languages would cause the most difficulties for learners, but recent studies have shown that the presence of similar (but not identical) sounds, or patterns of sounds, in the L1 and L2 makes an equal if not greater contribution to perception of an L2 learner's speech as displaying a non-native or foreign accent (Flege 1995).
- 8 Ghazali and Bouchhioua (2003) show that the stress rules of TA influence Tunisian learners' production of L2 English lexical stress. In TA stress is assigned to a final superheavy syllable (with a VVC or VCC rhyme), otherwise to the penult syllable. The Tunisian students often incorrectly put stress on the initial syllable in English 'until' *['ʌntɪl] and 'upset' *['ʌpsɛt], and on the final syllable in 'backward' *[bæk'wɜːd], following precisely the rule which assigns stress to TA words. At the phonetic level, Bouchhioua (2008) compared the acoustic correlates of word-level and phrase-level stress in TA and English to look for evidence of use of L1 phonetic correlates of stress and accent in L2 productions. Results showed frequent use of TA L1 stress correlates, in particular F0 (pitch) and unreduced vowel quality; the learners produced L2 English stressed syllables with higher pitch, greater intensity and less vowel reduction than native English speakers do. Finally, Aloulou (2003: 115) found that intermediate Tunisian learners used different intonation patterns from those used by native English speakers in almost all sentence types, except in yes/no questions and exclamations. The author attributed this behavior to various factors, including interference from the native language's intonation patterns or lack of exposure to native English speech. The same tendency was also observed in Saadi (2014), who found differences in the boundary tones used by Tunisian learners

compared to native English speakers (especially in declaratives). In all these studies, L1 transfer was hypothesized to be the major cause of the pronunciation errors observed, informing our decision to investigate the L2 English of Tunisian learners in the present study.

2. Methods

2.1. Materials

- 9 The material used to elicit yes-no questions in Tunisian Arabic consisted of the same scripted dialogue used in Hellmuth (in press) which yields 6 yes-no questions, and a new role play conversation script designed to yield a further 8 yes-no questions, controlling for the final consonants in the last lexical item in the utterance (4 obstruents + 4 sonorants). To elicit L2 English, an English role play conversation script was devised which yields 9 yes-no questions, again controlling for the final sound in the utterance (4 obstruents, 4 sonorants, 1 vowel). The speakers read each dialogue twice, exchanging roles so that each speaker plays both roles. They were asked to speak as naturally as possible. Arabic tasks were performed first, then tasks in English. Recordings were made via the internal microphone of a laptop computer in a quiet language laboratory, directly to .wav format, using Praat software (Boersma and Weenink 2015).

2.2. Participants and procedures

- 10 The participants in this study are 10 speakers (4 females and 6 males), aged between 22 and 24 years. They are all native speakers of Tunisian Arabic and none of them had a parent who is not Tunisian. They come from two different regions in Tunisia. Two male and two female speakers represent the North since they were born and have lived their whole lives in Tunis. The other six speakers represent the South East region of Tunisia since they have lived most of their lives in south eastern towns (Zarzis, Djerba, Tatawin). All the speakers were students of English at the University of La Manouba, Tunis at the time of recording. The level of study differed: 8 speakers (2 males + 2 females from the North, and 2 males + 2 females from the South East) were first year students; the two other South-Eastern speakers were third year students. All the speakers had the same educational background; they all studied in public Tunisian schools where they learn Standard Arabic (the official language of the country) from the age of six, French (a first foreign language which almost has the status of a second language) from the age of eight, and English as a foreign language from the age of 12-14. The rationale for recruiting first year English major students as participants was twofold. First, the goal was to record Southern participants who still retain their local accent and are less likely to be influenced by other accents since moving to study and live in the capital city of Tunis. Second, these students have not yet studied the phonetics or prosody of English, unlike third year students who have studied English phonetics for two years.

2.3. Analysis

- 11 Individual utterances were extracted from the recorded conversations for analysis. Each of the 10 speakers produced 14 yes-no questions in Arabic (6 from the scripted dialogue

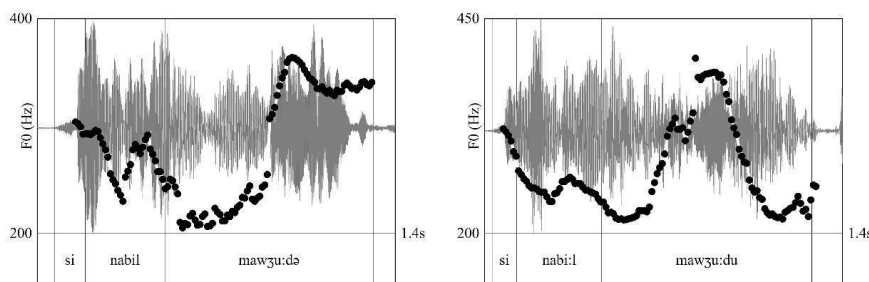
coded 'ynq' + 8 from the Arabic conversation, coded 'arc') and 9 in English (from the English conversation, coded 'enc'), yielding a potential dataset of 230 questions for analysis (140 in Arabic + 90 in English). The 230 extracted questions were annotated by all authors independently for presence of a question marker vowel and prosodic contour shape (to identify non-rising contours). If the authors disagreed regarding the presence of epenthesis, the majority ('2 out of 3') view was recorded; there was however full agreement in 77% of cases (N=176). A total of 10 tokens in Arabic and 8 tokens in English were identified by the first author as disfluent or not interpretable as a question, and excluded from further analysis. The remaining 212 tokens were subjected to quantitative acoustic analysis: the target word and (if present) question marker vowel were manually labelled in a Praat Textgrid by the second author, and a Praat script used to extract F1 and F2 values at the midpoint of the epenthetic vowel and the trajectory of F0 through the target word (20 measuring points). Statistical analysis was performed in R (R Core Team 2014).

3. Results

3.1. L1 Tunisian Arabic regional variation

- 12 The results in Arabic show the same basic generalisation as found in Hellmuth (in press), regarding the relationship between segmental and prosodic marking of TA yes-no questions. No epenthesis was observed on any of the small number of tokens (N=6) produced with a falling contour. Among fluent tokens produced with a rise-fall contour (N=130), 80 tokens (62%) were produced with an epenthetic vowel (cf. 54% in Hellmuth in press); two examples are provided in Figure 1.

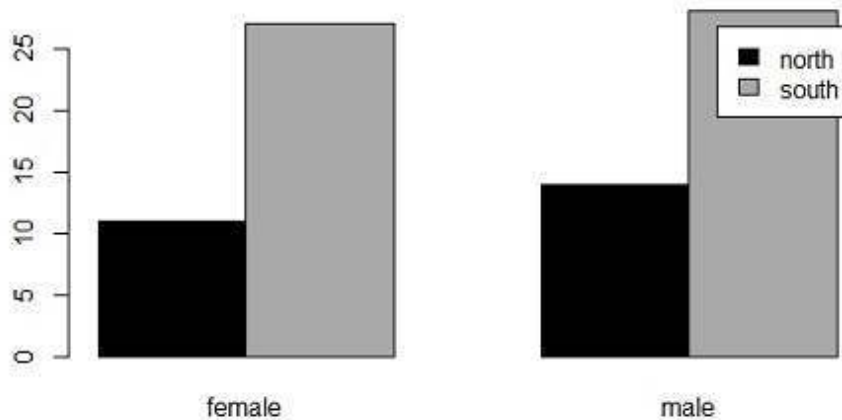
Figure 1: Pitch trace of yes-no questions from a north (left) and a south-east (right) speaker.



SI NA'BIL /MAW'ʒUD/ [MAW'ʒUDə/ʊ]
MR NABIL PRESENT
'IS MR NABIL THERE?' (TUNO-ARC1-F&/TUSE-ARC1-F1)

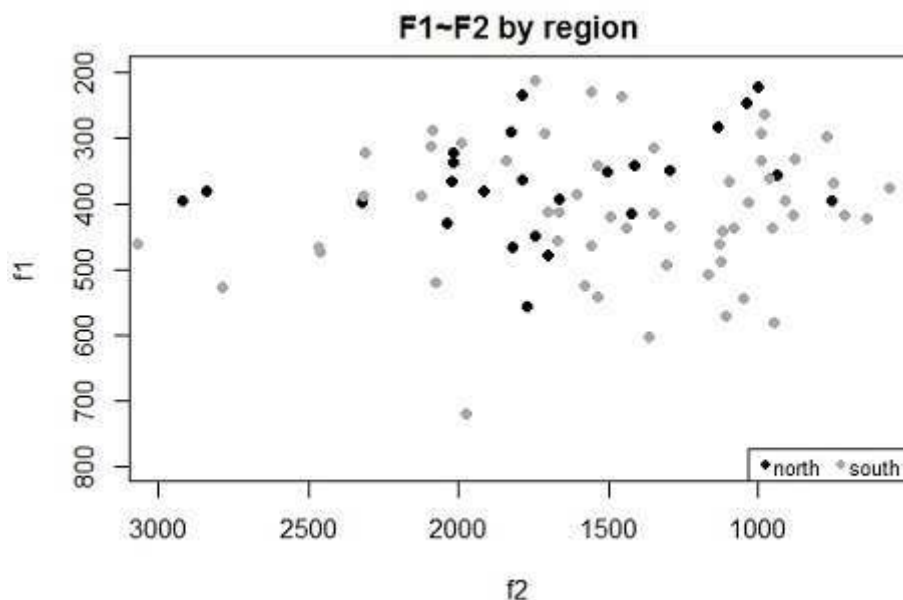
- 13 Although female speakers use epenthetic vowels more frequently than males (70% vs. 55%), a Classification by Regression Tree (CART) analysis, exploring gender, final consonant type and region as predictors of the occurrence of epenthesis in tokens with a rise-fall contour, shows that the only significant predictor of presence of an epenthetic vowel in this dataset is region¹, with a much higher incidence of epenthesis among speakers from the south-east, as illustrated in Figure 2.

Figure 2: Count of epenthesis tokens by region and gender in TA yes-no questions.



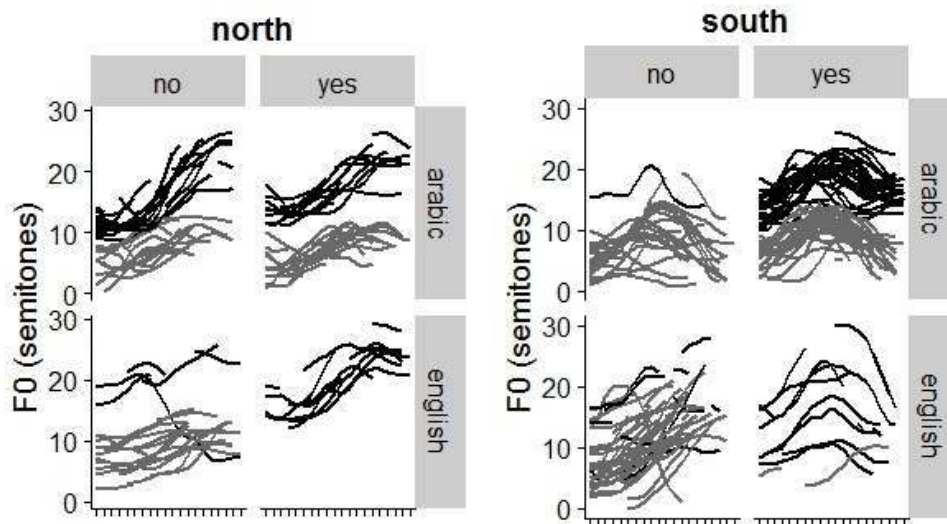
- 14 A breakdown of the results by speaker (see top panel of Figure 6 below for details) reveals that all south-east speakers produce epenthesis to some degree, but that both female speakers from the south-east produce epenthesis near categorically (that is, in 90-100% of tokens); a similar near-categorical pattern is observed for one northern female speaker.
- 15 Auditorily, the quality of the epenthesis vowel tends towards a high back vowel [u] for south-east speakers, though a plot of F1/F2 of vowels split by region (Figure 3) indicates considerable variability in the quality of the epenthesis vowel. This suggests probable vowel harmony, influenced by the vowel in the preceding syllable, but further investigation of this possibility is beyond the scope of this initial study.

Figure 3: F1/F2 values in epenthesis vowels in TA yes-no questions, by region.



- 16 Inspection of the shape of the prosodic contour in the last lexical item in each utterance (Figure 4) shows a clear regional difference in the shape of the contour, with a rise-plus-partial-fall (a 'rise-plateau') in the north, but a full rise-fall contour in the south-east.

Figure 4: F0 contours in semitones for female (black) and male (grey) speakers, by presence of epenthesis (yes/no) and by language (Arabic/English).

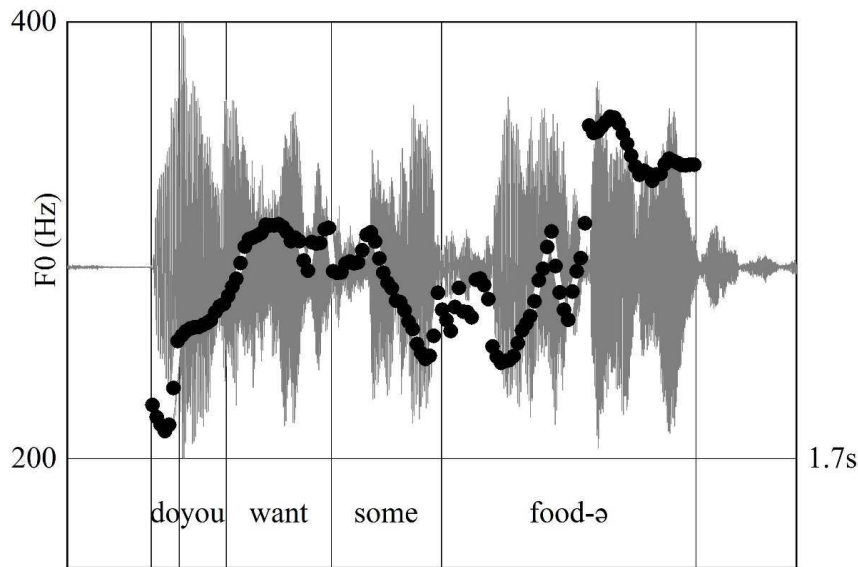


- 17 In summary, we find that yes-no questions are consistently marked in TA with a rising prosodic contour, confirming the observations of Dallaji et al (n.d.) for data from Tunis. Our study allows us to provide further detail about the shape of the contour, which is a rise-plateau in Tunis, but a rise-fall in the South-East. This prosodic marking is accompanied by segmental marking (an epenthetic vowel), to a variable extent across speakers, with more epenthesis produced by speakers from the south-east, and near categorical use of prosodic and segmental marking in parallel by female speakers from the south-east (and one northern female speaker).

3.2. L2 English

- 18 A total of 8 English tokens were produced with a falling contour, though were interpretable as a question in context; none of these tokens were produced with an epenthetic vowel, and they are excluded from further analysis. Of the remaining tokens produced with a non-falling contour, just 18 tokens (22%) were produced with an epenthetic vowel; an example is provided in Figure 5.

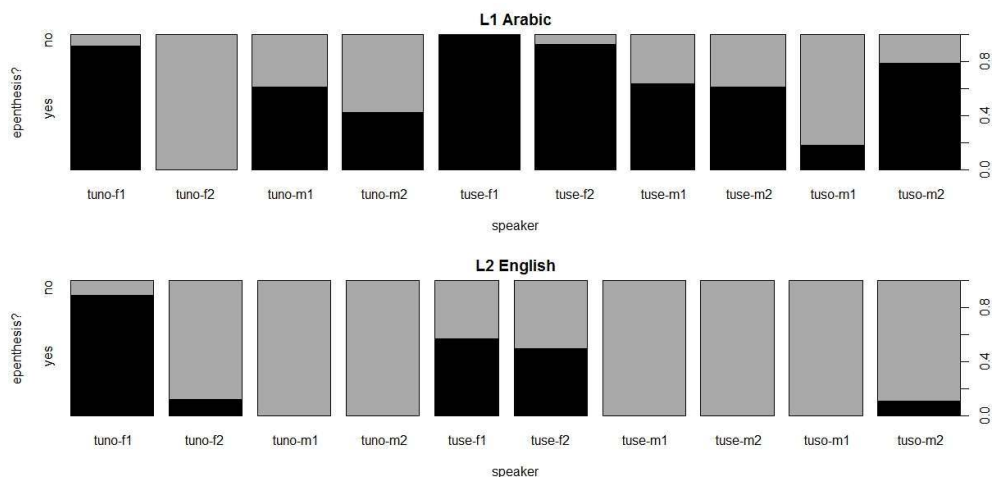
Figure 5: Pitch trace of an L2 English yes-no question produced with epenthesis.



'DO YOU WANT SOME FOOD?' [FʊDə] (TUNO-ENC2-F1)

- 19 Inspection of the prosodic contours (in Figure 4 above) shows that all of the L2 English tokens which were produced with epenthesis have a prosodic contour which is similar in shape to that used by speakers in their L1 dialect (a rise-plateau for females from the north, a rise-fall for speakers from the south-east).
- 20 Figure 6 below shows the proportion of tokens produced with/without epenthesis by speaker in both Arabic and English. The three (female) speakers who regularly produce epenthesis in their L2 English are those who produce epenthesis in their L1 Arabic to a near-categorical degree.

Figure 6: Count of epenthesis tokens by individual speaker in L1 Arabic and in L2 English.



- 21 The male speakers (from both regions) who produce epenthesis to a variable extent in their L1 Arabic generally produce no epenthesis in their L2 English; however, they also generally produce an English-like plain rise contour (see Figure 4) rather than a rise-fall contour.
- 22 Due to the small sample size it is not possible to draw strong conclusions regarding which factors may support blocking of L1 transfer effects in the production of yes-no questions. Nevertheless the results suggest that mastery of the correct prosodic contour may be sufficient to prevent erroneous transfer of the accompanying segmental marker.

Conclusion

- 23 We find consistent use of prosodic marking in TA yes-no questions, consistent with earlier claims (e.g. Dallaji n.d.), co-occurring to a varying extent with a segmental vowel marker. There is a difference in the shape of the prosodic contour produced on yes-no questions in TA; the south-east region uses a more pronounced rise-fall prosodic contour, which is accompanied by increased use of the segmental marker. Three out of our four female participants produced the segmental + prosodic markers in parallel and to a near-categorical extent, as markers of yes-no questions; these speakers were also those who showed the greatest tendency to produce a complex contour and epenthetic vowel on yes-no questions in their L2 English. None of the male speakers in the study produced complex rise-fall contours in their L2 English, and no epenthetic vowels either. It seems that the distribution of segmental and prosodic markers in TA yes-no questions is quite closely related, and further research is needed to determine the relative contribution of each marker to the perception of an utterance as a question, or not. The quality of the epenthetic vowel appears to be variable and future research could usefully investigate vowel harmony as an explanation of this variation, and whether the degree of harmony also varies across regions.
- 24 The presence of a clear transfer effect of the L1 Arabic question marking strategy into the L2 English of some speakers confirms that question marking would be a suitable variable for inclusion in larger studies of Tunisian learners' L2 English phonological acquisition.

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NOTES

1. A cost complexity pruned CART model showed only marginal improvement (32% vs. 35% misclassification) over a baseline model in which only region is included as a predictor (Baayen 2008).

ABSTRACTS

Recent work has highlighted the consistent co-occurrence of a partial rise-fall prosodic contour with a segmental vowel epenthesis marker to mark yes-no questions in the Tunisian Arabic of Tunis; the incidence of the segmental marker (epenthesis) varied according to the external factor gender, but did not vary according to language internal factors, such as phonological environment. In this paper we explore the relationship between the prosodic and segmental question-marking strategies further in a production study which investigates: i) regional variation between the north (Tunis) and the south-east of Tunisia; and ii) potential transfer of one or both strategies into speakers' spoken second language English. Greater incidence of epenthesis is observed in yes-no questions produced by speakers from the south-east, accompanied by a different prosodic contour (with a lower boundary tone), and a difference in the quality of the inserted vowel (tending towards [u]). In L2 English yes-no questions, a small subset of speakers displayed TA epenthesis in their English productions, but only when accompanied by a TA rise-fall contour. Taken together the results confirm the close relationship between the presence of epenthesis and the complexity of the accompanying prosodic contour (a rise-fall rather than a plain rise).

INDEX

Keywords: Tunisian Arabic, prosody, intonation, epenthesis, regional variation, L2 transfer

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