The intonation of Bulgarian Judeo-Spanish spontaneous speech

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ABSTRACT

Our contribution addresses the intonation of present-day Bulgarian Judeo-Spanish. Based on recordings of narrative interviews, conducted with four Judeo-Spanish-Bulgarian bilinguals and four Bulgarian monolinguals (all females; ages: 79–88), we show that, in Bulgarian, both speaker groups use considerably higher F0 maxima, a wider pitch range and a more variable pitch as compared to the realizations in Judeo-Spanish. Furthermore, the Bulgarian data present shorter pauses and longer IPs. Our autosegmental-metrical analysis reveals that the bilinguals use the same inventory of underlying tonal targets in both languages; differences between the data sets refer to the use of the same pitch accents and boundary tones, but not to different repertoires.

Keywords: intonation, bilingualism, Judeo-Spanish, Bulgarian, spontaneous speech.

1. INTRODUCTION

Judeo-Spanish (JUSPA) refers to the varieties of Spanish spoken by the Sephardic Jews in their new areas of settlement (mostly in the former Ottoman Empire) after their expulsion from Spain in 1492. From the 15th c. onwards, it developed independently from other Spanish varieties, entering in contact with the respective surrounding languages. The Bulgarian variety of JUSPA is still spoken by about 250–300 native speakers at maximum, the youngest of whom were born in the 1960ies. All speakers are bilingual and dominant in Bulgarian (BULG). The use of JUSPA is nowadays restricted to informal communication within the community ([1]). An important area of interaction in JUSPA is the *Club ladino*, founded in Sofia in 1998, where the speakers meet on a regular basis to practice their language.

Apart from some remarks included in general descriptions, the literature on JUSPA phonology is sparse and mainly focuses on varieties spoken outside Bulgaria, e.g. in Morocco ([2]) and Turkey ([3], [4], [5]). The only comprehensive study on Bulgarian JUSPA phonology is [6], which patterns with the aforementioned studies in that it focuses on segmental features. As for intonation, [7] argue that the main F0 contours of İstanbul JUSPA do not differ substantially from those of Peninsular Spanish and that intonational transfer to Turkish is typical of bilingual Turkish-JUSPA language use.

Recent studies showed that BULG-JUSPA bilinguals transfer the feature of vowel raising from their dominant to their weaker language, though to different degrees depending on the variety of BULG acquired in early childhood ([8]). As shown in [9], vowel raising is mirrored in speech rhythm, in that JUSPA and BULG_b(ilingual) are situated between BULG_m(onolingual) and Peninsular Spanish regarding the variability of vocalic intervals. The authors argue that Sofian JUSPA has converged with BULG at the rhythmic level, thereby conceiving the term of convergence as a bidirectional type of cross-linguistic influence ([10]). Concerning intonation, [11] showed that bilinguals use the same pitch accent types in their reading pronunciation of both JUSPA and BULG. Based on a rating experiment they also showed that the bilinguals were not perceived as different from same-aged monolingual speakers of Sofian BULG, which they interpreted as a signal of prosodic convergence of the two languages spoken by the bilinguals.

We concentrate on the intonation of both of the languages spoken by mature BULG-JUSPA bilinguals and aim to examine whether JUSPA and BULG have converged at the intonational level to the same extent in spontaneous speech as was shown in [11] for read speech. In Section 2, we outline the methodology, before presenting the results (Section 3) and discussing them in the context of contact-induced language change (Section 4).

2. METHODOLOGY

To answer the question of whether convergence with BULG shows up in JUSPA spontaneous speech to the same extent as was found for read speech, we created a corpus consisting of extracts from semi-focused narrative interviews; speakers were asked to speak freely about their lives. The recordings with the JUSPA-BULG bilinguals were made in Sofia in 2011 (four females, 80–88); the monolingual BULG control group (four females, 79–86) was recorded in 2016. We recorded the bilinguals in JUSPA and BULG(_b), the monolinguals only in BULG(_m). For the present study, we analyzed extracts of these recordings; the net amount of speaking time for each speaker, excluding pauses, is given in Table 1.

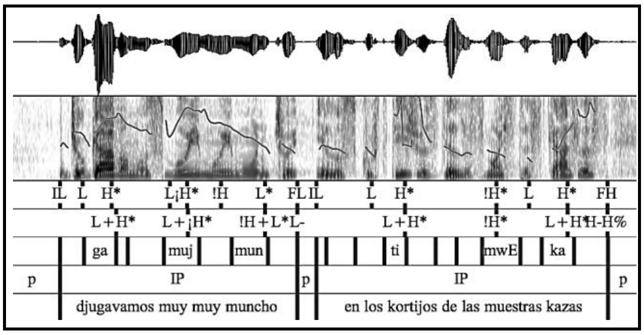
Table 1: Material analyzed per speaker (seconds).

	SP1	SP2	SP3	SP4	*Total*
BULG_m	151.39	169.51	169.14	154.77	644.81
BULG_b	160.74	74.62	82.09	148.26	465.71
JUSPA	176.84	179.72	184.85	198.06	739.47

The bilinguals were born in different cities (Kjustendil, Pazardžik, Kazanlăk, Karnobat); they are native speakers of JUSPA who regularly used this language in private situations during childhood. BULG became dominant when they moved to Sofia for study purposes between 1947 and 1950. Regarding their pronunciation in BULG, all subjects display the features typical of the capital; the bilinguals are not perceived as different from the monolinguals ([11]). Two of the monolinguals had spent all their lifetime in Sofia; the other two had moved there in early childhood. All subjects hold an academic degree.

First, we manually marked syllable and intonation phrase (IP) boundaries and prominent syllables using Praat ([12]; Figure 1). According to [13], F0 values can be attributed to two partially related but distinct characteristics of a speaker's performance: (a) pitch level, i.e. the overall height of the voice, and (b) pitch span, i.e. the range of frequencies covered by the speaker. Praat scripts were used to extract F0 values; irregular voiced stretches of speech caused by laryngealization were excluded from further analyses. The following long-term distributional (LTD) measures were calculated per IP: mean and median F0 values (Hz) for level, and minimum and maximum F0 for span (Hz). Pitch range measurements were calculated in semitones by means of the formula 39.863 * log10(maximum/minimum) ([14]).

Figure 1: Data labeling. Tier 1: tonal landmarks, tier 2: ToBI labels; tier 3: syllable boundaries and prominent syllables; tier 4: IPs and pauses (p); tier 5: orthographic transcription (here: JUSPA).



The measure describing the variation of the F0 distribution is the standard deviation (SD; in Hz). Additionally, the mean duration of IPs and pauses as well as mean syllable duration per IP was measured.

First, we provide a phonetic description of the F0 contours, following [15], [16]. This approach distinguishes between tonal landmarks (local F0 maxima/minima) associated with prominent vs non-prominent syllables and initial vs non-initial peaks. Every tonal landmark was identified auditorily and visually. Local maxima (H) and minima (L) were labeled as H*/L*, if aligned with a stressed syllable, and as H/L, if aligned with an unstressed syllable. Initial and final landmarks were labeled separately; the phrase-initial/final lows were labeled as IL/FL; phrase-initial/final highs as IH/FH (tier 1, Figure 1).

In a next step, we labeled the relevant F0 movements according to the ToBI labeling conventions ([17]), based on the repertoires of pitch accents and boundary tones proposed in [18] for Spanish and [19]–[22] for Sofian Bulgarian. An example of the ToBI labeling is provided in tier 2 in Figure 1.

For statistic validation, we used the software JMP 13 to perform Linear Mixed Models with the respective measure as dependent variable, SPEAKER as random factor and DATA SET (BULG_m, BULG_b, JUSPA) as fixed factor. Separate Tukey post-hoc tests were carried out per variable, if appropriate. For frequency counts of the pitch accents realized by the different groups we used χ^2 tests. The confidence level was set at $\alpha=0.05$.

3. RESULTS

Mean values for each of the F0 and durational measures by data set are presented in Table 2.

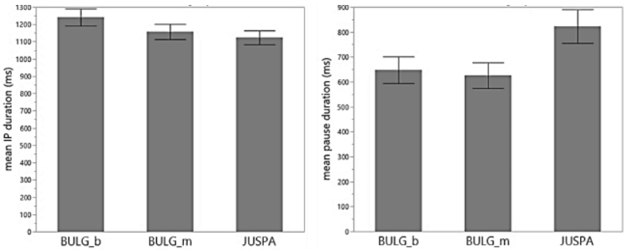
Table 2: Measures by data set.

Parameter	BULG_m	BULG_b	JUSPA
mean (Hz)	178.43	180.88	172.71
median (Hz)	174.21	176.72	169.95
minimum (Hz)	124.99	124.26	118.43
maximum (Hz)	257.61	258.04	237.94
pitch range (semitones)	12.53	12.94	12.19
SD (Hz)	32.31	31.61	28.54
mean IP duration (ms)	1157.65	1241.87	1123.87
mean pause duration (ms)	626.03	647.85	823.11
mean syll. duration (ms)	225.69	232.41	256.09

A systematic comparison of the LTD measures of F0 showed that the realizations in the BULG_m and BULG_b data sets have a considerably higher standard deviation ($F [2, 16] = 5.0554$, $p<0.05$) and a higher F0 maximum ($F [2, 16] = 8.2049$, $p<0.01$) as compared to the realizations in JUSPA. As for pitch range ($F [2, 16] = 4.7932$, $p<0.05$) only the bilingual speakers show higher values when speaking BULG.

Statistical analyses for the duration measurements revealed a significant effect of DATA SET on the duration of IPs ($F [2, 28] = 7.0979$, $p<0.01$) and pauses ($F [2, 16] = 4.0213$, $p<0.05$). Separate post-hoc tests showed that the bilinguals produce longer IPs and shorter pauses in the BULG_b data set than in the JUSPA data set (Figure 2).

Figure 2: IP duration (left) and pause duration (right) for BULG_b, BULG_m and JUSPA.



Additionally we found that the realizations in the BULG_m and BULG_b data sets have shorter mean syllable durations as compared to the realizations in JUSPA ($F [2, 16] = 12.3329$, $p<0.001$).

As for the distribution of pitch accents, our analysis revealed that the same repertoire of six pitch accents (L*, H*, H+L*, L*+H, L+<H*, L+H*), was used in each of the three data sets. Note that essentially the same inventory of pitch accents was found in read data produced by the same speakers ([11]).

Concerning the realization of nuclear pitch accents, we found that both the bilingual and the monolingual speakers use predominantly H*, but also L* and L+H*. However, for the bilingual group, we found slightly more monotonal L* and for the monolingual group more bitonal rising pitch accents of the L+H* type, where the F0 peak is reached at the end of the stressed syllable. In pre-nuclear position, both groups of speakers use again mostly H* and to a lesser extent L+H* and L*; see Table 3.

Table 3: Distribution of pitch accents (%).

	H*	H+L*	L*	L*+H	L+H*	L+<H*
			nuclear pitch accents			
JUSPA	42	2	29	0	25	2
BULG_b	44	3	26	1	23	3
BULG_m	40	5	22	0	32	1
			pre-nuclear pitch accents			
JUSPA	67	1	8	0	19	5
BULG_b	63	1	10	5	15	5
BULG_m	68	3	12	2	14	1

As far as IP- and ip-final boundary tones are concerned, our analysis revealed that the same repertoire is used in the three data sets (%H, H-%, L-H%, H-L%, L-%, H-, LH-, HL-, L-). Significant differences were found in the relative frequency of the different boundary tones between JUSPA and BULG_m [$\chi^2(8, n=1174) = 123.818$, $p < 0.001$], JUSPA and BULG_b [$\chi^2(8, n=1024) = 63.477$, $p < 0.001$] and between BULG_m and BULG_b [$\chi^2(8, n=962) = 83.452$, $p < 0.001$]; see Table 4. The bilinguals use predominantly H-L% and H-% when speaking BULG and L-%, H-L%, H-% and H- when speaking JUSPA. The monolinguals also show a preference for H-L% and H-%, but also frequently use HL-, H- and L-%.

Table 4: Distribution of boundary tones (in %).

boundary tones	JUSPA	BULG_b	BULG_m
%H	1	5	6
H-%	18	22	17
L-H%	5	7	3
H-L%	22	30	19
L-%	26	2	10
H-	12	7	15
LH-	1	7	4
HL-	9	8	22
L-	6	2	4

It should be noted, as well, that in both BULG data sets, the speakers do not reach the bottom of their range at the end of an IP. When speaking JUSPA, however, the bilinguals go down to the lower part of their range in 32% of the IPs, which is in accord with the results from the durational analysis (longer pauses) and might be caused by planning difficulties in the speakers' weaker language.

Since we deal with uncontrolled spontaneous data and the differences between the data sets apply to frequencies of use and not to different repertoires, these might be explained by referring to the metrical structures of the prosodic words used. We thus examined the distribution of pitch accents according to stress patterns. Table 5 summarizes the stress patterns according to the position in the prosodic word. As can be seen, the most frequent pattern in both JUSPA and BULG is penultimate stress, for both pre-nuclear and nuclear position. The second most frequent pattern in JUSPA is ultimate stress, whereas in BULG either stress on the last or the antepenultimate syllable is second most frequent. While in JUSPA there are only few words with stress on the antepenultimate and 4^{th}-to-last syllable and no words stressed on the 5–7^{th}-to-last syllable, the BULG data exhibit some occurrences of such items.

Table 5: Distribution of stress patterns (in %).

	ultimate	penultimate	antepenultimate	4^{th}-to-last	5^{th}-to-last	6^{th}-to-last	7^{th}-to-last
			pre-nuclear position				
JUSPA	30	65	4	1	-	-	-
BULG_b	18	51	26	5	-	-	-
BULG_m	34	46	15	5	-	-	-
			nuclear position				
JUSPA	29	63	8	-	-	-	-
BULG_b	23	40	30	4	5	-	-
BULG_m	22	42	25	7	2	1	1

The analysis reveals significant differences between the three data sets, concerning the use of different pre-nuclear pitch accents in words with ultimate and penultimate stress. The comparison of BULG_m vs JUSPA shows that when stress is on the last syllable there are more L* accents in BULG_m and more L+H* in JUSPA [χ^2 (4, n=312) = 12.294, $p < 0.05$]. With penultimate stress, there are more L+<H* accents in JUSPA [χ^2 (5, n=531) = 15.632, $p < 0.01$]. The comparison BULG_b vs JUSPA showed that with ultimate stress more L+H* accents were produced in JUSPA [χ^2 (5, n=191) = 13.621, $p < 0.05$] and more L*+H pitch accents occurred on the penultimate in BULG_b [χ^2 (5, n=457) = 20.069, $p < 0.01$]. Finally, the comparison between the two Bulgarian data sets shows more L*+H and L+<H* with stress on the last [χ^2 (5, n=243) = 12.165, $p < 0.05$] and the penultimate syllable [χ^2 (5, n=426) = 15.826, $p < 0.01$] for the bilinguals.

However, the amounts of L*+H and L+<H* sum up to only 1% and 6% (see Table 3), which suggests that these differences are of limited relevance. Hence, only the differences BULG_b vs JUSPA and BULG_m vs JUSPA in words with ultimate stress seem to be substantial. As for the nuclear accents in structures with ultimate stress, significant differences were found for the comparisons BULG_m vs JUSPA (more L+H* realized by the monolinguals) [χ^2 (4, n=295) = 26.981, $p < 0.001$] and BULG_b vs BULG_m (again more L+H* in the monolingual data) [χ^2 (4, n=205) = 14.452, $p < 0.01$]. In penultimate words, BULG_m vs JUSPA show significant differences (more L+<H* in JUSPA) [χ^2 (4, n=599) = 11.851, $p < 0.05$]; no such difference was found for BULG_b vs JUSPA.

As already stated, the difference found between BULG_m and JUSPA with respect to the most frequent stress pattern (penultimate stress) is a minor one because of the few realizations of L+<H*. It is important, though, to point out that monolingual speakers realize more nuclear L+H* than the bilinguals in words with ultimate stress.

4. DISCUSSION AND CONCLUSION

Based on a corpus of spontaneous speech (narrative interviews), we showed that the bilinguals use considerably lower F0 maxima, a narrower pitch range and a generally less variable pitch when they speak JUSPA as compared to the two BULG data sets. Furthermore, the JUSPA data show the longest pauses and the shortest IPs. In addition, when speaking JUSPA the bilinguals are slower and go down to the bottom of their range at the end of about one third of the IPs, presumably because of possible planning difficulties. These results indicate that the speakers feel some insecurity when speaking their original mother tongue, which was replaced consistently by the surrounding language in the course of the decades.

In contrast to these differences, the bilinguals use the same inventory of pitch accents and boundary tones in both JUSPA and BULG_b, which, in turn, does not differ from the repertoire of tonal units used by the monolingual Bulgarians (BULG_m). As for the occurrences of pre-nuclear L+H* placed on words bearing ultimate stress, the bilinguals produce more instances of this accent type when speaking JUSPA. We found no considerable differences with respect to the occurrences of nuclear accents. The fact that the bilingual speakers use the same pitch accent types, i.e. L*, H*, H+L*, L*+H, L+<H*, and L+H*, in both of their languages, holds true not only for the spontaneous data analyzed in the present paper, but also for the read data produced by the same speakers analyzed in [11]. This finding strongly suggests that convergence, conceived as a mechanism of linguistic change that increases the similarities between two languages, operates at different linguistic levels: The Spanish diaspora variety (JUSPA) seems to have converged towards the surrounding language (BULG) not only with regard to durational properties (see the raising of unstressed vowels and its effect on global speech rhythm; [9] and Section 1), but also at the level of intonation, in both read and spontaneous speech. This view is underpinned by the fact that this phenomenon is also apparent with respect to stress assignment: Unlike mainstream Spanish, where comparative constructions such as *más fuerte* ‘stronger’ are produced with a stress on the adjective, i.e. *más FUERte*, our bilinguals largely follow the Bulgarian model in assigning stress to the comparative particle (see BULG *SIlen* ‘strong’, *PO-silen* ‘stronger’), which yields productions such as *MAS fuerte*. This phenomenon not only shows up in the read materials analyzed by [11], but also in our spontaneous data, where examples such as *MAS bueno* ‘better’ occur.

It should be pointed out, however, that the striking parallels between Sofian JUSPA and the surrounding language, BULG, might also be attributed to L1 attrition ([23], [24]) under the influence of the individuals’ dominant language. This interpretation is plausible since our speakers ceased to use their L1 on a daily basis at the latest when they left their families and moved to the capital to enroll their university studies. However, since no earlier recordings of the same speakers are at our disposal, it is impossible to decide whether they (directly) acquired a diaspora variety of Spanish whose prosody was already influenced by BULG or their original L1 (JUSPA) was still prosodically different from BULG at the time of L1 acquisition and changed under the influence of BULG due to language attrition.

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