

## Foreign accent perception and L2 production: The case of Polish-accented French prosody

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It is generally accepted that an impression of foreign accent is caused by unusual renditions on both segmental and prosodic levels. However, a proper articulation of phonemic segments is not enough to erase an impression of accent [Birdsong, 2003]. Several studies have pointed out the role of prosody in the perception of a foreign accent [Jilka, 2000; Boula de Mareüil & Virou-Dimulescu, 2006]. Our pilot study [Kaglik, 2003] also revealed that decisive criteria to identify a foreign (Polish) accent in French spoken as a second language (L2) relate to the intonational organisation: an impression of jerky productions.

This work addresses the mastery of French L2 prosody in various groups of Polish-speaking subjects, whether bilinguals or skilled learners (despite a prolonged stay on the French territory). From an acquisition viewpoint, we seek to provide answers to the following questions. What is the contribution of prosody to the perception of a foreign accent (here a Polish accent in French)? Is it possible to achieve a native command of prosody in an L2, whenever the age of first exposure to the L2 is? Does this impression of a “jerky” non-native prosody result from a prosodic transfer from L1 to L2 or a universal acquisition process?

The corpus analysed in this study is composed of narratives in which the participants told a film scene after watching it. Thirty-five samples (of 36 seconds on an average), from 5 French monolinguals and 30 Polish bilinguals or learners of French were used in perceptual experiments. They were transcribed orthographically, from which a segmentation into phonemes was obtained by automatic alignment. The resulting phonemic transcriptions were corrected manually (paying a particular attention to disfluency phenomena, schwas, liaisons and pauses), and were given as input to a speech synthesis system. The synthesis output was also segmented by automatic alignment. Phoneme by phoneme, the duration and fundamental frequency ( $F_0$ ) parameters of the originals were then grafted onto synthetic voices. All in all, 8 specialists in prosody assessed the resulting stimuli, presented in a different pseudo-random order for each subject. They had to estimate the native/non-native character of prosody on a 5-degree scale, from 0 (certainly non-native) to 4 (certainly native).

The results obtained are tabulated below, averaged for 8 groups of speakers. For bilinguals, the age of first exposure to French is reported (< 6, 6-10, etc.). Bracketed figures stand for the numbers of speakers in each group.

Speakers (#)	Native Fr. (5)	<6 (5)	6–10 (4)	11–15 (6)	16–20 (4)	21–26 (3)	27–34 (5)	Learners (3)
Eval. prosody	2.52	2.37	2.12	1.98	2.50	2.12	2.05	1.12
Eval. originals	3.32	3.55	3.56	1.58	1.47	1.72	2.72	NA

Inspection of the prosody transplantation evaluations shows that monolinguals and bilinguals (whether early or late) have comparable scores. Only the group of learners is clearly distinguished. On the original productions (combining the segmental and prosodic levels), native speakers and early bilinguals (who began to learn French before the age of 10) are perceived in a rather similar way, whereas late bilinguals (exposed to French after the age of 10) form a second group, whose behaviour is quite different from the first one. An analysis of variance (ANOVA) of the results on prosody transplantations reveals a significant effect of the group of speakers [ $F(7,272) = 3.38$ ;  $p < 0,01$ ]. However, pairwise  $t$ -tests only show a significant effect with the group of learners. Indeed, we have too few answers for each group of speakers, even though overall results suggest that the earlier speakers began to learn French, the more native-like their prosody sounds to the judges. On originals, the effect of the group of speakers is very significant [ $F(6,249) = 24$ ;  $p < 0,001$ ]. Yet, the differences

are not significant between early bilingual and native French speakers. These findings may be interpreted as follows: prosody plays a crucial role in the perception of a Polish accent in French in the sense that it allows proficient speakers to be distinguished from learners; but unlike phonemic segments, it does not seem to be constrained by the age of first exposure to the L2.

All learners and a few other speakers were judged to have a non-native prosody. Indeed, prosodic analyses of their speech excerpts show different strategies in the structure of the intonational period [Lacheret, 2003], its size and its acoustic features. Our results confirm an overall tendency of these speakers towards overemphasis, which leads to intonation breaks and simpler units. The latter could be attributed to a prosodic transfer: in particular, a hypothesis is that syntax codes in French what prosody codes in Polish to structure information; but a comparison with the prosodic structuring (in French and Polish monolinguals) suggests that the overemphasis phenomenon observed in L2 is better explained by the inability to manage structural aspects of discourse organisation as long as the speech production process remains cognitively painful [Perdue & Gaonac'h, 2000]. In that sense, it relates to a universal acquisition process.

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