

The perception of intonational contours: a cross-linguistic study

Malina Radu, Gabrielle Klassen, Laura Colantoni,
Matthew Patience, Ana Teresa Pérez-Leroux and Olga Tararova
University of Toronto

Cross-linguistically, intonation is used to convey a wide-range of linguistic information, such as the type of sentence (interrogative vs. declarative) (Liu & Rodríguez 2012). Tonal and durational variations can be used to mark statements (falling contour), questions (rising contour) or that the speaker will continue speaking (mid-rising contour). To some extent, Spanish is similar to English in the use of intonation to differentiate between interrogatives and declaratives. In both languages, falling and rising contours at the end of constituents are mapped to similar meanings (e.g. Hualde 2002; 2005). In spite of the typological similarities between English and Spanish, however, some aspects of sentence prosody are not mastered even by advanced L2 speakers. Grabe et al (2003) found that linguistic meaning diminishes the discrimination capacity of L2 listeners, since speakers from different L1s discriminated intonation contours in non-speech stimuli equally well, while their discrimination of intonation contours of English sentences worsened; this suggests that while keeping their auditory resolution to intonation cues in non-speech tasks, adult speakers failed to relate these contours to appropriate L2 meanings.

Based on previous studies (e.g. Grabe et al. 2003), we expect native and non-native English speakers to behave similarly in their discrimination of intonational contours in non-meaning-related tasks, but to diverge in their capacity to perceive language-specific (English) form-meaning mappings. To test this hypothesis, we compared the perception of statements, and inverted and non-inverted interrogatives across two groups of speakers: L2 English-L1 Spanish vs. L1 English (N=15 per group). Participants completed three tasks (administered with Super Lab Pro) as well as a language background questionnaire. In Task 1 (forced-choice identification) participants had to indicate whether the low-pass filtered stimulus (N=30 plus distractors) was a statement, question or exclamation. This task was designed to test participants' ability to use acoustic cues. Task 2 was identical to Task 1 but stimuli consisted of unaltered sentences. In Task 3, participants heard a scenario and three options, and subsequently had to choose one answer that best completed the scenario. Measurements included the mean accuracy rates per language group (L1 English and L1 Spanish) for each of the three tasks, as well as the reaction time (RT).

Preliminary results showed that overall, the L1 English speakers made fewer perception errors than the L1 Spanish speakers across all three tasks. As for the individual tasks, both groups of speakers had the highest accuracy for Task 2 (L1 English: .97; L1 Spanish: .67), followed by Task 1 (L1 English: .90; L1 Spanish: .58). As for Task 3 (i.e. the most contextualized task), both groups had the lowest accuracy rate (L1 English: .89 vs. L1 Spanish: .54), and the longest reaction times (participants took four times longer to answer than in the other two tasks). Confusion matrices also revealed interesting patterns: while L1 English speakers tend to confuse questions with statements, L1 Spanish speakers are equally likely to misinterpret questions as either exclamations or statements. These findings are consistent with the hypothesis that perception difficulties in L2 prosody are not primarily related to any loss of sensory capabilities but to the modulation of the listeners' sensitivity to acoustic cues by selective attention to meaningful units, and confirm previous findings that L2 speakers are more successful in perception tasks where there is no context versus those in which a context is provided (e.g. Ortega Llebaria & Colantoni 2013). Results are also consistent with findings that L1 affects the perception of linguistic and auditory processing alike (Kuhl et al. 2008).

References

- Grabe, E., Rosner, B., García-Albea, J., & Zhou, X. (2003). Perception of English intonation by English, Spanish and Chinese Listeners. *Language and Speech, 46*, 375-401.
- Hualde, J. I. (2002). Intonation in Romance: Introduction to the special issue. *Probus, 14*, 1-7.
- Hualde, J. I. (2005). *The sounds of Spanish*. Cambridge: Cambridge University Press.
- Kuhl, P. K., Conboy, B. T., Coffey-Corina, S., Padden, D., Rivera-Gaxiola, M., & Nelson, T. (2008). Phonetic learning as a pathway to language: new data and native language magnet theory expanded (NLM-e). *Philosophical Transactions of the Royal Society, 363*, 979-1000.
- Liu, C., & Rodriguez, A. (2012). Categorical Perception of Intonation Contrasts: Effects of Listeners' Language Background. *The Journal of the Acoustical Society of America, 131*(6), 427-433.
- Ortega-Llebaria, M., & Colantoni, L. (2013). The L2 acquisition of English intonation: Relations between form-meaning associations, access to meaning and L1 transfer. *Studies in Second Language Acquisition, 36*(2).