The relative weight of the acoustic and intonational cues involved in verbal irony detection in French

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Research on verbal irony has found that prosodic features such as pitch range expansion, syllable lengthening, and specific intonational contours are common prosodic resources that languages use to mark irony in speech (e.g. Bryant 2010, González-Fuente et al. 2015, Padilla 2012, Rockwell 2000). However, results on the perceptual value of these three prosodic cues are not consistent across studies and across languages. Whereas syllable lengthening has been documented as one of the prosodic cues that signal the presence of ironic intent across languages, the results of pitch are more controversial, as they show inconsistencies in their relative importance and also in their specific patterns (i.e., higher vs. lower), both across studies and across languages. Moreover, little is known about the potential role of specific 'ironic' pitch contours and their relationship with other cues. As Loevenbruk et al. (2013) note, more data is needed in order to determine whether specific intonational contours (with pitch accents at specific locations and/or specific boundary tones) can affect the detection of irony and even override the presence of other prosodic features. In sum, to our knowledge, there are no studies focused on the relative weight of these three prosodic features in the detection of irony in languages that use these prosodic correlates.

In this paper we present the results of two experiments designed to shed light on the relative contribution of the acoustic and intonational cues involved in verbal irony detection in French. The first experiment –a production task- was designed to confirm that these three prosodic features are typical of irony in French. In this experiment we used twelve 'story-frameworks' adapted from Spotorno et al. (2012). These stories led to a target sentence whose reading could be ironic or literal depending on one key word or phrase in the context. Importantly, the target sentence was exactly the same in both ironic and literal versions and the key word to determine whether the sentence was ironic or not was always the last word of the utterance (e.g. the word *formidable* in the sentence *Nous sommes allées voir un film formidable* 'We went to see a fantastic film'). A total of 60 ironic performances and 60 literal performances produced by 10 French native speakers were submitted to acoustic analysis at two levels: across the whole sentence and during the last word of the target sentence. Results of Experiment 1 showed that, indeed, these three features revealed themselves when the 10 participants produced a just read ironic utterance as opposed to a literal one. Moreover, we identified a specific pitch configuration associated with ironic speech in French, namely H+!H* !H%. The second experiment –a perception task- presented the same stories as in the first experiment, but removed a single word from the context that would otherwise determine whether an acoustically presented utterance (which had been based on a literal reading) was ironic or not. The final word in these utterances was manipulated synthetically so as to create five experimental conditions: Not Modified, Modified Pitch Range (expanding the range of the pitch accent by 1 semitone), Modified Duration (a 30% increase for each word), Modified Intonation (from L*L% to H+!H* !H%), and Modified All (pitch, duration, and intonation pattern) (see Figure 1). Results of Experiment (101 French native speakers participated; 1212

responses were obtained) showed that (a) speakers tended to interpret utterances as ironic when all the modifications (i.e. pitch range expansion, syllable lengthening and marked intonation) were presented together (i.e. Modified All); and (b) the Modified Duration and Modified Intonation conditions were significantly more likely to encourage ironic readings than the Not Modified and Modified Pitch Range conditions (see Figure 2). Overall, our results confirm previous findings reported in the literature on the production of irony in French and also shed light on the potential crosslinguistic weight of different acoustic and intonational markings in verbal irony detection. However, further studies with other languages on the detection of the ironic tone of voice are needed in order to confirm the existence of these pragmatic tendencies.

Figure 1. Example of the 5 MODIFICATION conditions performed on the word 'formidable' in the sentence *Nous sommes allées voir un film formidable* 'We went to see a fantastic film'.
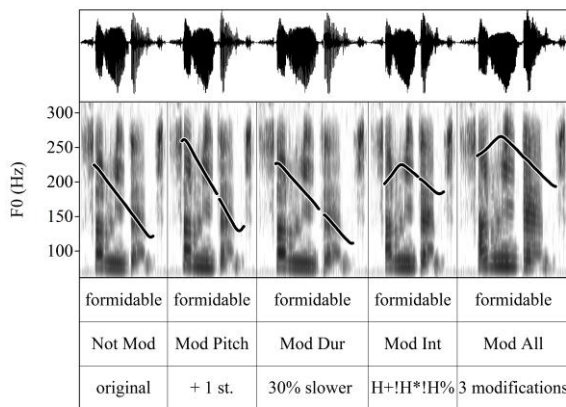
Figure 2. Mean rate of ironic scores (from 0 'Literal' to 1 'Ironic', y-axis) for MODIFICATION conditions ('Not Modified', 'Mod Pitch Range', 'Mod Duration', 'Mod Intonation', 'Mod All', x-axis).
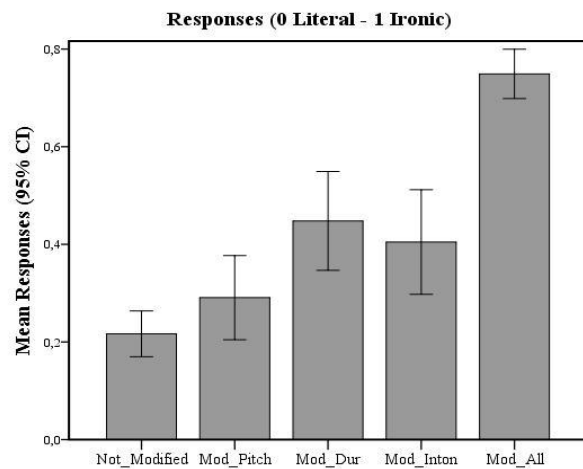
References

Bryant, G.A. (2010). "Prosodic contrasts in ironic speech". *Discourse Processes* 47(7): 545-566.

González-Fuente, S., Escandell-Vidal, V. and Prieto, P. (2015). "Gestural codas pave the way to the understanding of verbal irony". *Journal of Pragmatics* 90: 26-47.

Loevenbruck, H., BenJannet, M., D'Imperio, M., Spini, M., and Champagne-Lavau, M. (2013). "Prosodic cues of sarcasm speech in French: slower, higher, wider", in *INTERSPEECH 2013 – 14th Annual Conference of the International Speech Communication Association, August 2013,* Lyon, France, pp. 3537-3541.

Padilla, X. (2012). "¿Existen rasgos prosódicos objetivos en los enunciados irónicos?" *Oralia* 14: 203-224.

Rockwell, P. (2000). "Lower, slower, louder: Vocal cues of sarcasm". *Journal of Psycholinguistic Research* 29: 483-495.

Spotorno, N., Koun, E., Prado, J., Van Der Henst, J.B., and Noveck, I.A. (2012). "Neural evidence that utterance-processing entails mentalizing: The case of irony". *NeuroImage*, 63: 25-39.