Perceptual evaluation of post-focal prominence in Italian by L1 and L2 naïve listeners

Caterina Ventura[1], Martine Grice[1], Michelina Savino[2], Aviad Albert[1] and Petra B. Schumacher[1]
[1]University of Cologne, [2]University of Bari

It is claimed that Italian is more rigid in the position of focus in comparison to West Germanic languages (see the continuum proposed by Face and D'Imperio [1]), with a larger tendency for the former to change the word order to maintain prominence in sentence-final position. Moreover, in this position Italian reportedly resists deaccenting words that are out of focus [2, 3], and it provides cues for post-lexical prominence in the post-focal domain even when this is not associated with any pitch movement [4].

The study explores the perception of prosodic prominence in Italian utterances as judged by Italian listeners, and by German listeners learning Italian. The aim is to ascertain whether the patterns of prominence perceived by native Italian listeners differ from those perceived by German listeners, given that the attenuation of post-focal material in Italian is claimed to be realized in a less categorical way than in German. The stimuli presented to the judges, structured as in (1), were produced by a Bari Italian speaker in a previous reading task.

(1) Bisogna pesare$_{\text{verb}}$ la farina$_{\textbf{TARGET}}$ con la bilancia$_{\text{noun}}$ *(You need to weigh the flour with the scales)*

For each sentence, three different renditions were produced: (i) with target word in Broad Focus (BF), (ii) contrastive Narrow Focus (NF) on the target, or (iii) Post-Focal (PF, verb focussed; target part of the background). Subjects (16 native speakers of Bari Italian;18 German learners of Italian, intermediate level) listened to 30 stimuli (10 items × 3 conditions) and rated the perceived prominence of each of the three content words (henceforth "critical words") in the utterance, corresponding to the verb preceding the target, the target word and the noun following the target. Ratings were given by using a slider, adapting the Rapid Prosody Transcription method [5] to include continuous responses and to relate the answers for the target to the other critical words, to address the relational property of prominence.

This paper focusses on the perceptual evaluation of BF and PF utterances, as they are the most relevant when comparing Italian and German in relation to post-focal prominence. Interestingly, our results show that Italian listeners do not perceive any difference between BF and PF in the degree of prominence of the target word (Fig. 1, left panel), whereas Germans do, as they assign a higher degree of prominence to the target word in BF than PF (Fig. 1, right panel). The latter outcome is reflected in the observed acoustic cues to prominence: in all stimuli, the target word in BF had a falling F0 contour (H+L*), whereas in PF the contour was flat. We also measured the Periodic Energy Mass (PEM) [6] for the stressed syllable of the three critical words, where PEM corresponds to the sum integral of periodic energy (directly linked to the acoustic intensity of f_0 and thus indicating the strength of perceived pitch) and duration, reflecting the prosodic strength of the corresponding syllable. Relative PEM is calculated by assigning a value of 100 to the strongest syllable of the utterance and calculating the value of the other syllables in relation to it. As shown in Fig. 2, in PF the verb is the only critical word that features a pitch movement, and exhibits a distinctively high PEM distribution, which is not the case for the target word (or following noun). Therefore, it appears that the main acoustic cues to prominence for the target in PF are neutralized, whereas the target in BF exhibits a pitch movement and a corresponding high PEM. These acoustic observations support the interpretation of our prominence perception results as implying language-specific differences that are projected onto the L2: Germans appear to follow a more pitch-driven strategy, interpreting the flat pitch of post-focal targets as completely attenuated, as it would be in their native language [7]. By contrast, when estimating post-focal prominences Italian listeners seem to pay attention to factors other than pitch and energy, relying more on their native language-driven expectations to find cues for prominence in post-focal position.

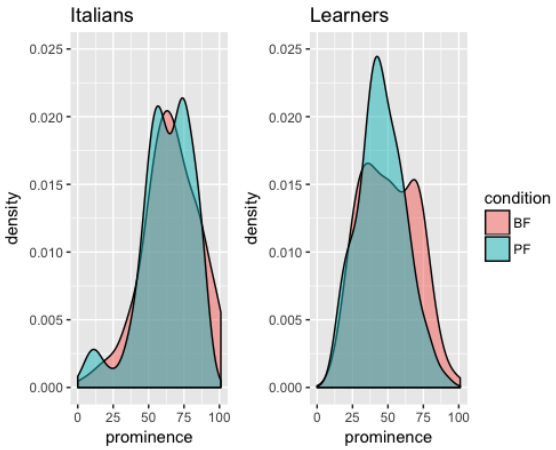

Figure 1. Prominence judgements of target word in Broad Focus (BF) and Post-Focal (PF) conditions by native Italians and German learners.

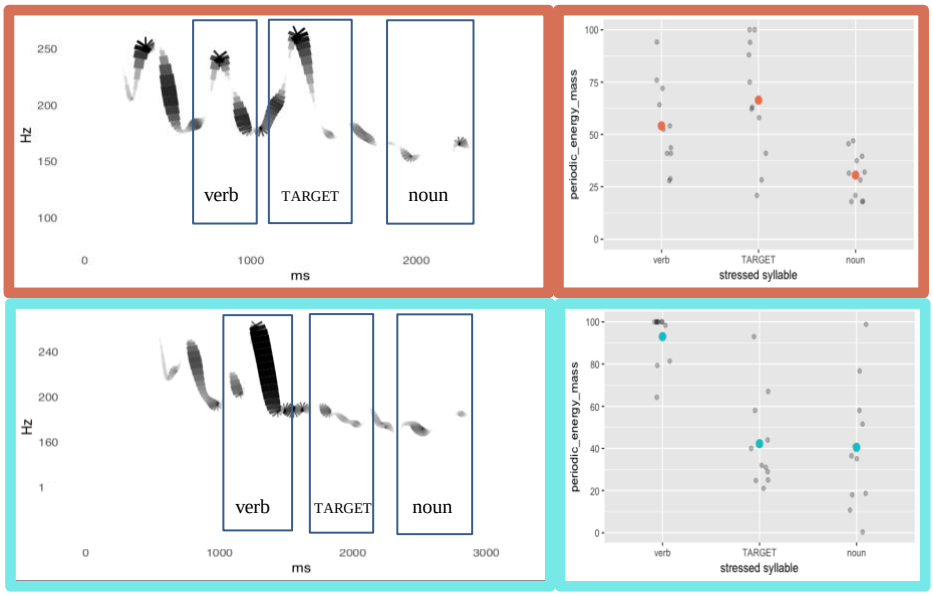

Figure 2. Left panels: Estimated perceived pitch contour (*Periograms* [6]) of the utterance "Bisogna pesare$_{verb}$ la farina$_{TARGET}$ con la bilancia$_{noun}$" in BF (upper panel) and PF (bottom panel). Right panels: Periodic Energy Mass for critical words in BF (upper panel) and PF (bottom panel).

[1] Face, T. L. & D'Imperio, M. 2005. Reconsidering a Focal Typology: Evidence from Spanish and Italian. In Pacini (Ed.), *Italian Journal of Linguistics / Rivista di linguistica*, 271-289.

[2] Grice, M., D'Imperio, M., Savino, M., Avesani, C. 2005. Strategies for intonation labelling across varieties of Italian. In Sun-Ah Jun (Ed.), *Prosodic Typology: the Phonology of Intonation and Phrasing*, New York: Oxford University Press, 362-389.

[3] Swerts, M., Krahmer, E. & Avesani, C. 2002. Prosodic marking of information status in Dutch and Italian: A comparative analysis. *Journal of Phonetics*, 30 (4), 629-654.

[4] Bocci, G. & Avesani, C. 2011. Phrasal prominences do not need pitch movements: postfocal phrasal heads in Italian. *Proceedings of INTERSPEECH 2011*, Florence, 1357-1360.

[5] Cole, J., Mo, Y., & Hasegawa-Johnson, M. 2010. Signal-based and expectation-based factors in the perception of prosodic prominence. *Laboratory Phonology, 1*, 425–452.

[6] Albert, A., Cangemi, F. & Grice, M. 2018. Using periodic energy to enrich acoustic representations of pitch in speech: A demonstration. *Proceedings of the 9th International Conference on Speech Prosody*, Poznan, 804-808.

[7] Röhr C. & Baumann, S. 2010. Prosodic marking of information status in German. *Proceedings of the 5th International Conference on Speech Prosody*, Chicago, USA, 1-4.