Prosodic marking of information status in L1 Italian and L2 German

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Introduction. Previous studies on prosodic marking of information status within noun phrases have found that unlike West-Germanic languages, in which post-focal given information is deaccented, in Italian the second word of a noun phrase is always accented independently of information status (Swerts, et al., 2002). Italian learners transfer this feature to their L2 productions (Avesani, et al., 2015). However, the categorical description offered by these studies does not provide information about modulation of continuous prosodic parameters. To address this gap, we test a new method to investigate how far prosody is modulated to mark information status in both native Italian (L1) and Italian learners of German (L2) at beginner, intermediate and advanced proficiency levels (Council of Europe, 2001).

Method. We designed two comparable versions of a semi-spontaneous board game eliciting three information structures – new-new (NN), given-new (GN), new-given (NG) – within noun phrases (NPs) with a disyllabic paroxytone noun and adjective (eg.: *mela nera*; *grüne Welle*). The NPs always occurred in the same syntactic and pragmatic contexts and had the same degree of contextual expectedness, as they were visually represented in the game instructions. We use periograms to display F0 trajectories as modulated by periodic energy (Albert, *et al.*, 2018, Albert, *et al.*, 2020) and extract measures relative to periodic energy, i.e. synchrony and scaling (Cangemi, *et al.*, 2019). Synchrony is the distance between the *Centre of Gravity* (CoG) of F0 (Barnes *et al*., 2012) and the *Centre of Mass* (CoM) of periodic energy within a syllable. Its negative and positive values respectively indicate falling or rising F0 *within* that syllable. *Scaling* is obtained by comparing F0 values at the CoM between two consecutive syllables. Its negative and positive values respectively describe falling or rising F0 movement *across* those syllables.

Results. We report on preliminary results for 15 speakers, five for each level of proficiency. Figure 1 provides examples of periograms and periodic energy curves for GN and NG noun phrases by the same advanced speaker in L1 and L2. In both languages the timing of the falling F0 is distinct across the two conditions. For **L1** in **GN** condition, positive synchrony values on the first syllable indicate a rising F0 on this syllable and positive scaling values on the second syllable indicates a rise across the first and second syllables. By contrast, in **NG** condition the negative synchrony value on the first syllable indicates a predominantly falling F0 and the negative scaling value on the second syllable indicates a fall across the first and second syllables. For **L2**, the **GN** condition has positive values for synchrony on the first syllable, indicating rising F0, but zero scaling value for the second syllable, indicating a stable F0 across the two syllables. In **NG**, the values for both synchrony and scaling are similar to L1, in that they are negative. In all cases, the third syllable has the lowest F0 with the most negative values for both synchrony (F0 is mostly falling within this syllable) and scaling (F0 is mostly falling from the second syllable to the third). The values averaged across all speakers for synchrony and scaling [Fig.2] confirm that these observations are representative. The main difference between the two patterns is achieved by modulation of F0 on the first word in the NP rather than on the second, where it might be expected, as it is there that deaccentuation occurs in German. Although **L2** patterns are similar to those in **L1**, the wide distribution of synchrony values on the first syllable indicates less control over the early modulation. Moreover, the fact that synchrony and scaling values in the second and third syllables are closer to zero in L2 German compared with L1 Italian shows a weaker differentiation in L2 and perhaps also diminished expressiveness. Differences between L1 and L2 are also confirmed by a preliminary analysis of the variance in the distribution of values. Results of Levene's test of homogeneity of variance (Levene, 1960) registered for synchrony a higher variance in L2 than in L1 ($F(1) = 25.51$, $p < .0001$), indicating less control over the F0 modulation in L2, whereas for scaling a higher variance in L1 than in L2 ($F(1) = 13.8$, $p < .001$), indicating an overall reduced F0 range in L2. In L2 we found an effect of proficiency on synchrony value distribution, with advanced learners showing less variance than intermediate ($F(1) = 7.42$, $p = .01$) and beginners ($F(1) = 8.22$, $p < .01$), indicating more coherence in modulating F0 within syllables.

Conclusion. Analysing continuous prosodic parameters (F0 and periodic energy and related measures) is especially beneficial when analysing dynamic and complex systems like interlanguages, which are often unsuitable for a purely categorical analysis. This method allowed us to track the subtle modulations of prosodic cues used to mark different information structures in both L1 and L2. The analysis of the whole corpus, as well as a comparison with L1 German data, which is currently being recorded, will shed more light on the acquisition of strategies for prosodic marking of information status.

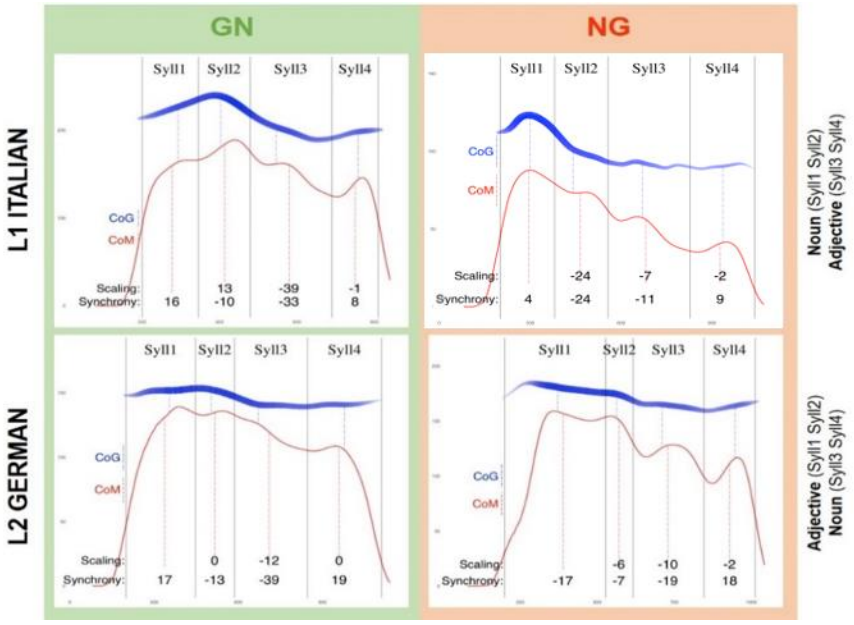

Figure 1. Periograms and periodic energy curves for noun phrases with different information structures in L1 Italian and L2 German. Gray solid lines signal syllable boundaries. Vertical dashed/dotted lines denote the centre of gravity (CoG, in blue) and the centre of mass (CoM, in red) between two syllable boundaries. Numerical values for each syllable indicate *scaling*, measured as the difference between F0 values at the CoM of consecutive syllables; and *synchrony*, measured as the distance between the centres (CoG minus CoM) within each syllable (negative values reflect falling F0, positive values rising F0).

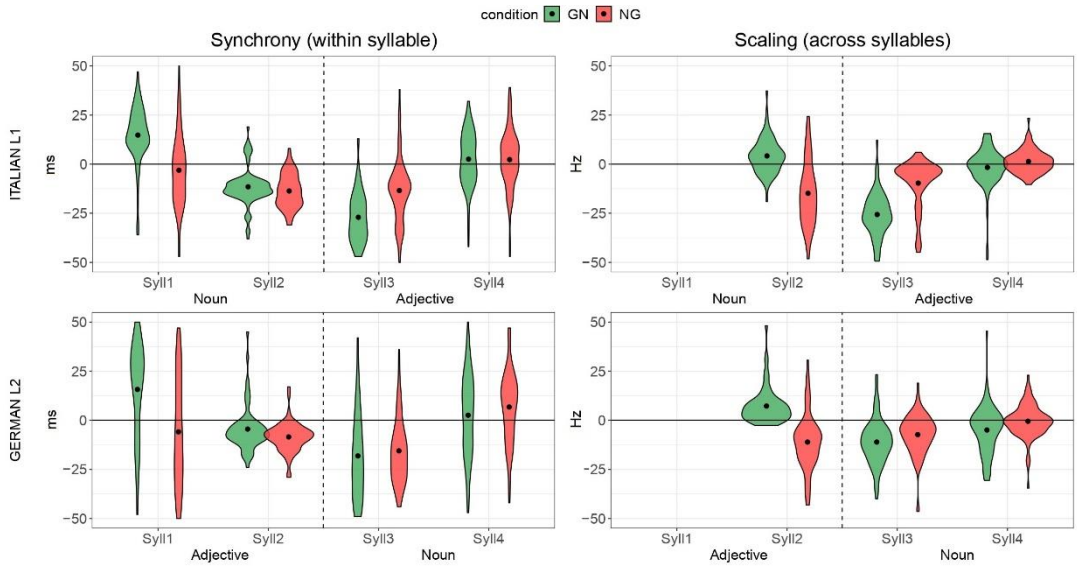

Figure 2. Violin plots for synchrony (left) and scaling (right) measures in noun phrases with different information structures averaged across all speakers in L1 Italian (above) and L2 German (below). Information structure is colour-coded, green violins refer to the given-new condition; red violins refer to the new-given condition. The x-axis displays the four syllables of the noun phrase. The y-axis shows values for synchrony (ms) and scaling (Hz). Values above the horizonal line crossing zero are positive, below it negative. Black points on the violins represent mean values.

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