

The processing of Italian nuclear and non-nuclear accents by L1-German-L2-Italian listeners

Jacopo Torregrossa¹, Diana Kolev², Martine Grice², Petra Schumacher²

¹ Goethe University Frankfurt, ² University of Cologne

It is claimed that L2-listeners do not process prosodic information in the same way as native listeners. Although they appear to be sensitive to prosodic features enhancing a constituent's prominence (Patterson et al. 2017), they may nonetheless experience difficulties in integrating prosodic and semantic information (Reichle & Birdsong 2014). Some studies have even claimed that L2-listeners' sentence processing is "shallow", since it only relies on semantic-pragmatic (and not structural, e.g., syntactic, prosodic) information (Clahsen & Felser 2006). Cross-linguistic effects and language proficiency have been identified as factors modulating L2-listeners' processing behaviour (Takahashi et al. 2018 and Reichle & Birdsong 2014).

The present study investigates whether L1-German-L2-Italian listeners differ from Italian native listeners in their sensitivity to nuclear (narrow focus) vs. non-nuclear (prenuclear broad focus and post-focal) accents during sentence processing. Several studies on Germanic languages have used speed of detection of semantic incongruence as an indicator of processing depth of pitch-accents: listeners allocate more attention to anomalous words when they bear a nuclear accent as compared to when they are deaccented (Sanford & Graesser 2006; Wang et al. 2009). The application of the same methodology to Italian may lead to different results, since it is generally claimed that Italian attenuates given information to a lesser extent than German (Face & D'Imperio 2005), especially post-focally (Bocci & Avesani 2011). This is supported by a recent ERP-study showing that listeners allocate attention to utterance final words carrying a narrow-focus and post-focal accent in declarative sentences to the same extent (Ventura et al. 2020). The analysis of how L2-listeners of Italian (with German as L1) process different types of pitch accents, especially post-focal ones, may shed some new light on which mechanisms (shallow processing, cross-linguistic effects) drive L2-processing.

We tested 48 participants: 24 native speakers of a central variety of Italian (age range 19-59; M: 34 y.o.) and 24 German native speakers learning Italian as an L2 (being all exposed to Italian after the age of 18), whose level of proficiency varied between B2 and C1 of the CEFR. Proficiency was also tested by using a cloze-test (Kuiken & Vedder 2008). The cloze-test score ranged between 58 and 92 (over 100; M = 77.09). L1 and L2 participants had to listen to pre-recorded sentences where two factors were manipulated: semantic congruence (congruent vs. incongruent) and pitch-accent on the target word (prenuclear broad focus, narrow focus and post-focal) (6 conditions x 20 items, see Table 1). The 120 target sentences were combined with 80 fillers and recorded by an Italian speaker of a central variety. We tested if listeners detected semantic incongruence (e.g. the nurse instead of the butcher in examples (2)-(4)-(6) vs. (1)-(3)-(5) in Table 1) more easily when the associated constituent carries a nuclear accent (narrow-focus, as in (3)-(4)) than when it carries a non-nuclear accent (prenuclear accent, i.e. accent before the focus exponent; broad focus, as in (1)-(2) and post-focal, as in (5)-(6)). Participants listened to single sentences and judged whether the sentence was meaningful or not by pressing a yes-no button at the end of each sentence. Accuracy and reaction times (RTs) were recorded.

The mean accuracy score (including target sentences and fillers) was 88.66% (range 79-95) for L1-participants and 69.21% (range 52.5-88.5) for L2-participants. We performed two different LME-analyses (for L1 and L2-participants, respectively) using R and *lme4* (Bates et al. 2012). RTs of correct answers was chosen as the outcome variable. As fixed effects, we had the interaction between semantic congruence (congruent vs. incongruent) and pitch accent (broad, narrow and postfocal). Among the L1-listeners, we found a significant lower-order effect of pitch-accent (narrow-focus) – with participants being faster in the narrow-focus condition ($\beta = -78.20$, $t = -2.20$, $p = .03$) – and semantic congruence – with participants being

faster with incongruent stimuli ($\beta = -109.84$, $t = -3.33$, $p = .001$; Figure 1). Among L2-listeners, we also found a significant semantic-congruence effect, but in a different direction from L1-listeners: The LME-analysis shows that they are faster with congruent sentences ($\beta = 154.10$, $t = 2.14$, $p = .04$; Figure 2). Including the interaction with L2-listeners' cloze-test scores in the model considered thus far led to no improvement in the model ($\chi^2(1) = 2.72$, $p = .89$).

The results from the L1-listeners are consistent with findings from Germanic languages in showing that nuclear pitch accents (narrow-focus accents), but not non-nuclear accents (prenuclear broad-focus and post-focal accents) speed up the detection of incongruent information. For L2-listeners, by contrast, nuclear accents do not facilitate the processing of incongruent information: L2-listeners' judgements are faster with semantically congruent than semantically incongruent information, across all accent types. Therefore, L2-listeners do not seem to be sensitive to differences in pitch-accent type or rely on prosodic information to detect incongruence, consistently with the "shallow processing" hypothesis. Crucially, "shallow" processing is usually visible among advanced learners too, which accounts for the absence of any effect of language proficiency.

Table 1: Examples of stimuli for each condition

(1) Per comprare la carne, bisogna dare i soldi <i>al macellaio</i> nel negozio. (To buy the meat, we should give the money to the butcher in the shop)	broad focus accent semantically congruent
(2) Per comprare la carne, bisogna dare i soldi <i>all'infermiere</i> nel negozio. (To buy the meat, we should give the money to the male nurse in the shop)	broad focus accent semantically incongruent
(3) Per comprare la carne, bisogna dare i soldi <i>AL MACELLAIO</i> nel negozio.	narrow focus accent semantically congruent
(4) Per comprare la carne, bisogna dare i soldi <i>all'INFERMIERE</i> nel negozio.	narrow focus accent semantically incongruent
(5) Per comprare la carne, bisogna dare <i>I SOLDI</i> <i>al macellaio</i> nel negozio.	post-focal accent semantically congruent
(6) Per comprare la carne, bisogna dare <i>I SOLDI</i> <i>all'infermiere</i> nel negozio.	post-focal accent semantically incongruent

Figures 1, 2: Reaction times (RTs) associated with congruent (light grey) and incongruent (dark grey) sentences across accent types in L1-Italian and L1-German-L2-Italian listeners, respectively.

Figure 1. L1 Listeners

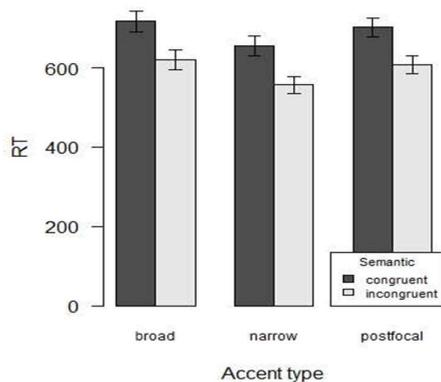


Figure 2. L2 Listeners

