

The Garden Path Leading to Intonational Phonology

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Background: The well-attested mapping between information structure and the acoustic properties of sentences can be captured either by assuming a *direct* mapping between semantics and acoustics [1, 2, 3], or invoking the mediation of phonological processes operating on well-defined syntactic or prosodic domains (*indirect* approaches) [4, 5, 6]. Although these two types of accounts make aligned predictions in many cases [e.g., 7], we take advantage of a previously understudied contrast for which direct mapping from information structure and indirect mapping through prosodic structure make different predictions [see also 4, 8]. Specifically, through 3 experiments (1 planned production and 2 comprehension studies) on English, we tested the prosody of *it*-clefts containing string-identical Connected Clauses (CC, 1) or restrictive Relative Clauses (RC, 2) that have focused elements of different structural sizes. While RCs are typically assumed to convey background information, the RC in (2) is nested within the element it modifies and is thus also in focus. The CC in (1), instead, attaches higher in the structure [9] and is given. In a background study, we established that, in the absence of prosody, RCs trigger garden path effects in the environment of clefts. We show that prosody obviates these effects and supports indirect accounts.

Predictions: Indirect accounts predict highly localised effects of prominence in the two structures. Specifically, while in CCs focus and prominence should fall solely on the clefted noun (*humorist*), for RCs the Nuclear Stress Rule predicts higher prosodic prominence at the rightmost constituent within the longer focused phrase, leading to distinct predictions for the acoustic properties of the NP2 (*scene*), the verb (*leaving*) and NP1 (*humorist*) of RCs, despite these being also content words and part of the focused element. Direct accounts, however, appear not to make localised predictions for RCs, i.e., about whether and how the prosodic patterns between the content words in the focused element in CCs (*humorist*, *leaving*, and *scene*) will be differentiated without making reference to syntactic and/or prosodic domains.

Experiment 1: In a production study (N=8 English speakers) we examined the prosody of 24 pairs of CCs and RCs like in (1) and (2). In line with the predictions of Intonational Phonology accounts, speakers produced clear prosodic differences in multiple regions across the two structures (see Fig. 1). Particularly, acoustic analyses showed significantly contrasting durational and F0 range patterns at NP1 (*humorist*) and NP2 (*scene*), and different pitch properties at the Verb (*leaving*) vs. NP2 (*scene*) for RCs.

1. -Who was leaving the scene?

-It was [*the humorist*]_{Focus} [CC that was leaving the scene].

2. -Who called?

-It was [*the humorist* [*RC that was leaving the scene*]]_{Focus} ([CC that called])

Experiment 2: An auditory comprehension study (N=64 English speakers) investigated whether listeners use such prosodic cues to disambiguate between the two structures. Participants judged the acceptability of auditorily presented sentences (produced by a trained linguist and matched the prosodic patterns in Experiment 1) answering to preceding contexts and questions which elicited CC or RC reading, following a paradigm in [10]. The prosody of the target sentences either matched or mismatched the context, leading to a 2 Context *2 Prosody design. Mismatched prosody was less accepted than matched ($\beta=-0.76$, $SE=0.21$, $z=-3.62$, $p<.001$, Fig. 2), indicating listeners' sensitivity to their prosodic differences. This effect was crucially smaller for CCs than RCs ($\beta=-1.70$, $SE=0.33$, $z=-5.20$, $p<.001$), suggesting that prosodic disambiguation is more important for the garden-path RCs.

Discussion: Results show that prosody disambiguates CCs and RCs in both production and comprehension, eliminating the garden path effects previously observed with RCs. More importantly, production data show that the prominence of focused constituents appears to be governed by specific principles (e.g., the Nuclear Stress Rule) [4, 6, 8, 11] which make reference to syntactic and/or prosodic levels of representation. These results, i.e., the localised effects of focus on prominence, cannot be easily accounted for by a direct account.

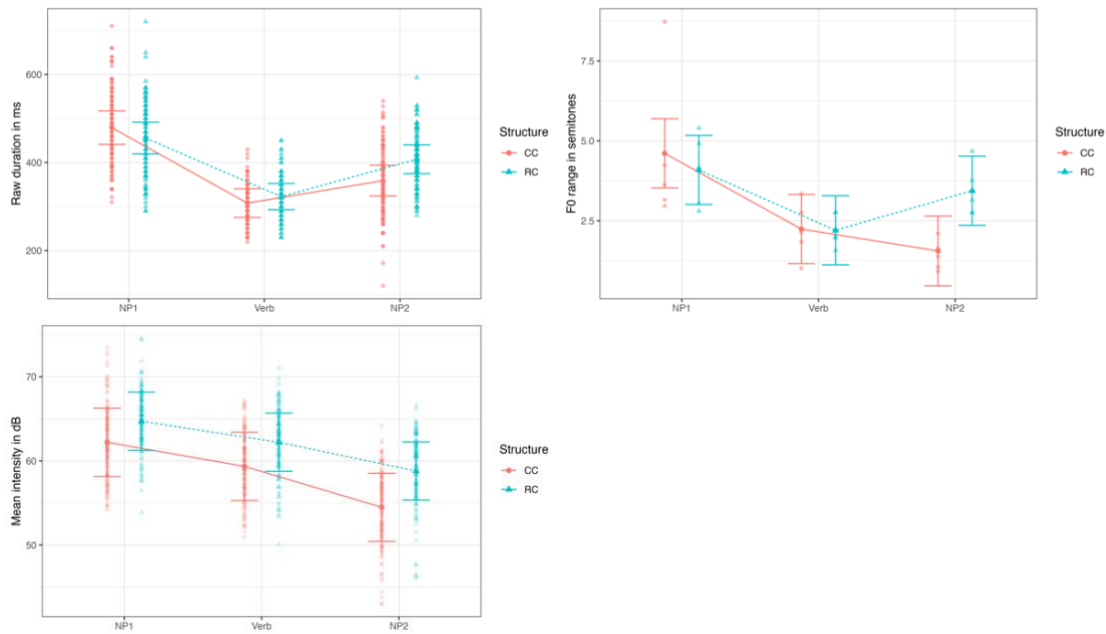


Fig. 1. Duration, F0 range, and intensity patterns across the critical regions in Experiment

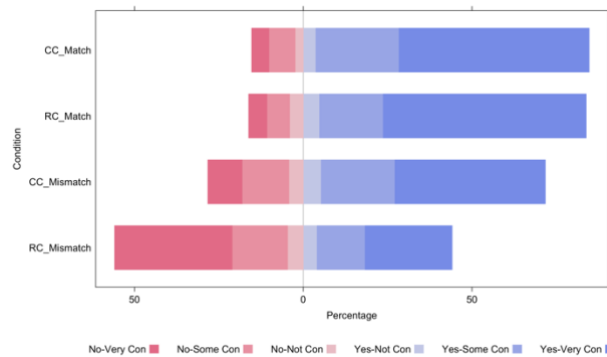


Fig. 2. The distribution of the acceptability scores in Experiment 2

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