

Effects of focus on prosodic reflections of phrase structure in American English

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Reports in the sentence processing literature on whether untrained speakers reliably disambiguate syntactic phrase structure ambiguities with prosody have shown mixed results. Allbritton et al (1996), Straub (1997), and Snedeker et al (1999) found little to no evidence of prosodic disambiguation of syntax when other factors resolved the ambiguity, and argued that prosodic disambiguation is produced only when required by the situation. Schafer et al (2000) and Warren et al (2000) found strong evidence of prosodic disambiguation even in unambiguous situations. We examine how another factor, focus, affects the prosodic disambiguation of syntactic phrase structure, potentially clarifying these seemingly conflicting results.

One should expect that varying a sentence's focal structure could significantly affect prosodic indications of its syntactic structure. Contrastive focus can induce a stronger prosodic boundary at the edge of a focused phrase in American English (Ferreira, 1993) as well as deprosodification (deaccentuation and dephrasing) of post-focus regions. We examined the prosodic structures produced for sentence pairs as in (1) with high versus low preposition phrase attachments. The primary prosodic cue distinguishing high and low PP attachment is a stronger prosodic boundary preceding the PP for high attachments. If contrastive focus on a low-attached PP strengthens the preceding boundary, its pronunciation could resemble ones found with high-attached PPs. Conversely, if contrastive focus on the subject of a sentence causes deprosodification of following material, such focus could lead to a weaker prosodic boundary preceding a high-attached PP, and thus a pronunciation more like those found with low-attached PPs.

(1) True to his word, the janitor removed the smudges on the [weekend/window].

We tested these predictions with speech collected in a reading task from untrained speakers of American English. Materials consisted of sentence pairs as in (1), pragmatically disambiguated by the final phrase. In each sentence pair, the PP was attached to either the VP or the direct object NP, and the contrasting PPs either stood in an argument relation to its head in each attachment, or in an adjunct relation in each attachment. Each sentence was produced in three focal conditions: with wide focus ("out-of-the-blue"), with contrastive focus on the subject, and with contrastive focus on the object of the PP. Speakers were not told to disambiguate, and the low-attachment versions were presented in a separate session from the high-attachment versions. Utterances were recorded and subjected to detailed acoustic analyses and prosodic transcription.

Preliminary results indicate several effects. First, there was a significant main effect of syntactic phrase structure on prosody. Overall, the productions showed a small but reliable effect of stronger prosodic boundaries and longer durations in the region immediately preceding the PP for high-attached PPs compared to low-attached PPs, even though the situation did not require prosodic disambiguation. Second, there was a significant main effect of focus on the duration of the word preceding the PP. Durations were longer in the wide focus condition than in the object-PP focus condition, and longer in the object-PP focus condition than the subject focus condition. Third, the effect of syntactic phrase structure on prosody varied across the focal conditions. High- and low-attached structures showed reliable differences in prosody for the wide-focus and object-PP-focus conditions. However, this effect was eliminated when speakers produced contrastive focus on the subject. The critical prosodic boundary was frequently weakened in the high-attachment productions with subject focus, resulting in similar prosodic structures for the high- and low-attached structures.

The results support the claim that speakers generally produce prosodic reflections of syntactic phrase structure. They also suggest that prosodic disambiguation of syntax is strongly influenced by the focal structure of the sentence. Varying the focal structure can alter the duration of the region most frequently analyzed in studies of PP disambiguation, and can eliminate prosodic reflections of phrase structure in certain circumstances (e.g., in deprosodified regions following a contrastive focus). We will argue that previous results claiming that prosodic disambiguation of syntax depends on the ambiguity of the situation may instead reflect confounding effects of focal structure. Such an analysis allows a more restrictive model of sentence production, in which calculations of situational ambiguity do not typically influence the generation of sentence prosody.