

Context Effects on Schwa Production in “Gotta” Distinguish “Got to” from “Got a”

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The articulatory posturing that happens in advance of speech motor targets is referred to as anticipatory coarticulation because it suggests speech planning. According to psycholinguistic theory, this planning results in executable chunks. One idea is that chunks are defined by prosodic structure (e.g., Wheeldon & Lahiri, 2002; Shattuck-Hufnagel, 2015); another is that they are associated with units of to-be communicated conceptual information, including those that follow from syntactic relations (e.g., Redford, 2015). The current study tested the latter hypothesis, using anticipatory effects to index articulatory cohesion in grammatical + content word sequences that varied in their conceptual cohesion.

We addressed the question of chunk identity from a developmental perspective under the hypothesis that supra-lexical chunking is likely to emerge over developmental time (Redford, 2015). A set of 12 target sentences were elicited from 16 school-aged children, aged 5 and 8 years old. Half of the sentences had “got” as the verb and half had “need” as the verb. Raising versus transitive constructions were used to elicit “gotta” and “needa” as verb + infinitive and verb + determiner sequences. The verb + grammatical word sequences were followed by a homophonous content word, which was either a matrix verb in the raising construction (e.g., “do” meaning perform) or an object noun in the transitive construction (e.g., “do” short for hairdo). The content word vowel was also varied (e.g., N/V “do” versus N/V “deal”). The goal of the manipulation was to vary vowel context and the conceptual boundary between the grammatical word and subsequent content word while holding the prosodic boundary constant. Participants were trained on the sentences with corresponding pictures that illustrated each of the target sentences. They were then prompted to say the target phrase while being shown the visual stimuli. Each target phrase was elicited 6 times from each participant (total 576 tokens). To ensure that our child participants grasped the meaning difference between the raising versus transitive constructions, the target sentences were elicited as responses: “What do you got/need to do?” for the raising construction; “What did/do you get/need today?” for the transitive construction. The prediction was that schwa production would vary with the subsequent vowel in the transitive construction, but not in the raising construction. This prediction follows from the conceptual cohesion of the raising verb + infinitive that motivates the grammaticalization of their fusion in high frequency constructions (e.g., “gotta”, “hafta”, “wanna”; see Tagliamonte, 2004; Lorenz, 2013); it does not follow from syntactic structure per se.

Formants were normalized using a Bark-Normalized method. Normalized F1 and F2 were compared using a linear mixed effects models were used to test for effects of age group, construction type, and subsequent content word vowel on grammatical word vowel production in analyses that were split by verb. Results showed no effect of age group, but there was a main effect of construction type on normalized schwa F1 for “got” sentences [$t(226) = 2.18, p = 0.031$] as well as a significant interaction between construction type and content word on normalized F1 and F2 (see Figure 1): determiner schwa varied systematically with the subsequent content word vowel [$t(225) = -2.84, p = 0.005$], but infinitive schwa did not [$t(226) = 0.91, p = 0.376$]. In contrast, there was no effect of construction type on schwa production in the “need” sentences, but there was a main effect of content word [F1: $t(157) = 2.41, p = 0.017$; F2: $t(157) = -3.67, p < 0.001$]. Thus, anticipatory effects were equally strong no matter the grammatical identity of schwa (i.e., “to” or “a”) in “need” sentences. When the subsequent content word form was held

constant, normalized schwa F1 and F2 varied with construction type in the “got” sentences [F1: $t(182) = 2.94, p = 0.014$; F2: $t(181) = 2.98, p = 0.012$], but not in the “need” sentences (Figure 2).

Overall, the results suggest that “got to” as “gotta” is planned as a chunk, but otherwise grammatical words are chunked by default with a subsequent content word. The results are consistent with the view of holistic lexical representations (e.g., Davis & Redford, 2019), but not with the idea that anticipatory coarticulation references a linguistically-structured speech plan.

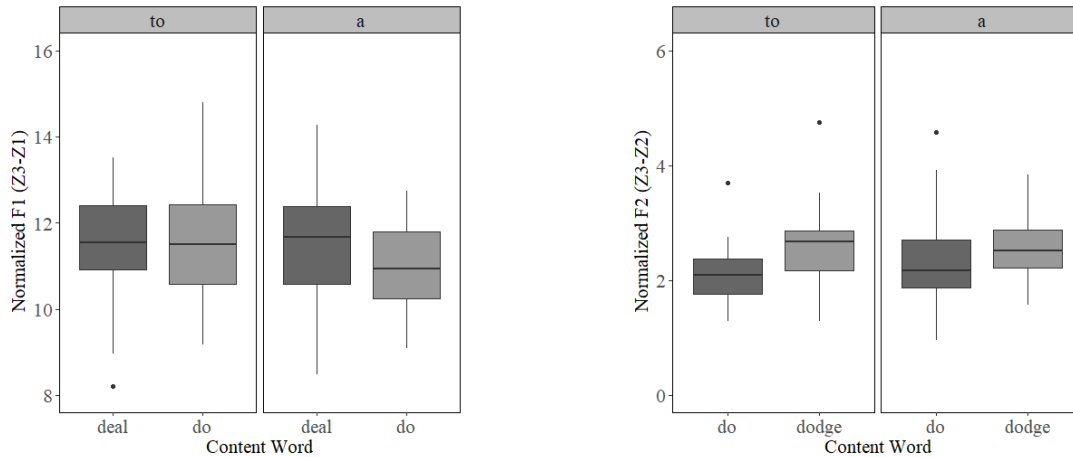


Figure 1. Strongest effect of content word on normalized schwa formant values shown as a function of construction type (raising vs. transitive) for “got” (left) and “need” (right).

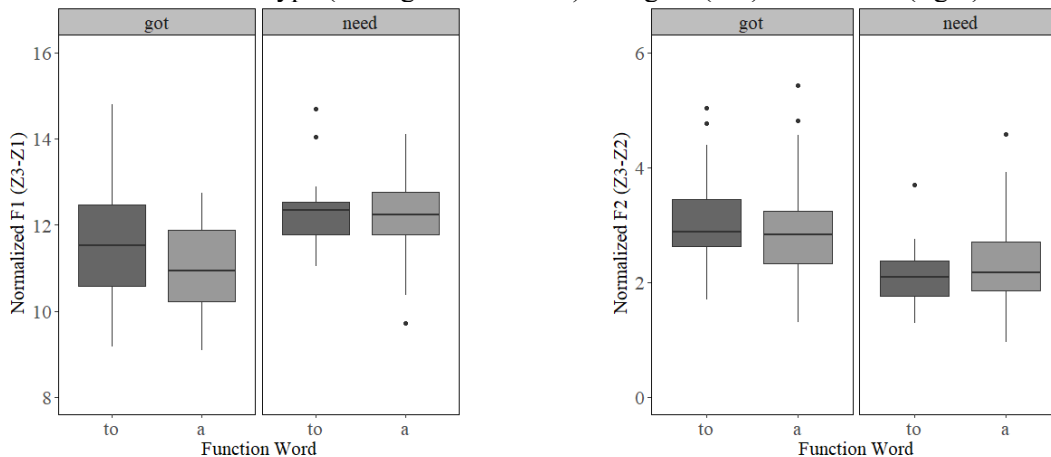


Figure 2. Effect of construction type (raising = “to” vs. transitive = “a”) on normalized schwa F1 (left) and F2 (right) in the “do” context for “got” (left panels) and “need” (right panels).

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