

Acoustic Prominence as a Result of Production Difficulty

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Speakers' choices about when to accent words are generally thought to reflect meaningful distinctions, for example signaling semantic contrast, or marking linguistic focus (e.g., Krahmer & Swerts, 2001). Accenting results in a host of prosodic indicators of acoustic prominence, e.g. longer duration, higher pitch, and higher intensity, and possibly pausing. Measures of these characteristics reveal that speakers use acoustically prominent prosody for non-repeated reference (Bard et al., 2001; Fowler & Housum, 1987), or for words that are not predictable either statistically (Bell et al., 2002) or based on the task (Watson et al., 2007). Such findings could be taken as evidence that speakers mark low-predictable, low-accessibility information with accenting and/or acoustic prominence, again supporting the use of acoustic prominence for communicative purposes.

On the other hand, we hypothesize that acoustic prominence may also result from effort in speech production. When speakers are disfluent (an indication of production difficulty) the surrounding words tend to be longer and produced with a fuller vowel (Bell et al., 2003), and possibly higher in pitch (Arnold, et al., 2007). A production effort account could also explain the association of predictability with acoustic attenuation, since predictability likely facilitates production processes.

We tested this hypothesis in an experiment measuring the duration and pitch of references in an effortful production situation.

Six speakers were recorded as they referred to screen objects that were either familiar (easy condition; e.g., apple) or unfamiliar designs (effortful condition; e.g. squiggly shape). Each screen contained two familiar and two unfamiliar pictures (E.g., blue apple, orange apple, blue squiggle, orange squiggle). The target picture was highlighted, the speaker described it to their addressee (also a naïve participant), using the carrying phrase "Click on the".

The area of interest was the segment "Click on the [color]". These words were identical across conditions, but may reveal effects of increased planning difficulty in the effortful condition, compared with the familiar condition. As expected, the effortful condition resulted in greater acoustic prominence on the first four words. When the following target word was unfamiliar there were longer latencies to begin speaking, higher average pitch on the color word, longer durations for all words, and more frequent pauses (all p 's < .05).

These results suggest that acoustic prominence does not only mark meaningful distinctions in the message, but also results from speaker-internal production

difficulty. This raises questions about the processes underlying accenting in other conditions. The conditions where acoustic prominence occurs (reference to unpredictable, nonrepeated, or low discourse status entities) are likely to be effortful, suggesting that these patterns may at least in part stem from production-internal processes.

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