Speakers Naturally Use Prosody to Acoustically Distinguish Idioms Intended Figuratively vs. Literally

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Prosody, often thought of as the melody of speech, can manifest itself in many ways, including changes in the duration and fundamental frequency (F0) of utterances. Prosodic cues can play a pivotal role in resolving syntactic and semantic ambiguities [1]. However, whether prosodic cues also signal how a phrase is intended semantically is an open question. In this study, we focus on the production of idiomatic expressions (kick the bucket), which often possess figurative and literal interpretations that must be distinguished [2]. Past idiom production studies suggest that speakers use prosody to mark idioms intended figuratively or literally, although some finding are inconsistent in exactly how speakers achieve this acoustically [e.g., 3,4]. However, such inconsistencies may have arisen from differences across studies in the kinds of idioms produced, or the tasks used to elicit those productions.

In this study, we investigated this issue using a set of well-characterized verb-determiner-noun idioms [2], and a speech elicitation task that may better reflect natural production compared to those used previously. On a given production trial, 14 native English participants saw an idiom only once in a specific interpretive context that biased either its figurative or literal interpretation (see below for example stimuli, including matched non-idiomatic control sentences). Participants silently read context and target sentences at their own pace, and when ready, spoke them aloud while their utterances were digitally recorded. Participants were never informed that the experiment was about prosody, and were instructed to produce the sentences as naturally as possible. Target phrases were acoustically extracted from the speech signal, and an automated forced-alignment process extracted segment and word boundaries.

Our preliminary analyses, which focus on duration and pitch, reveal that when people intend idioms figuratively, they prosodically mark the phrase in a manner that potentially reduces the perceptual salience of its component content words, that is, the verbs and nouns of verb-determiner-noun idioms. This occurs in an absolute sense for both verbs (shorter duration and higher pitch) and nouns (again, shorter duration and higher pitch). It also occurs in a relative sense in that people shorten verbs and nouns at the same time as they lengthen the determiner. In contrast, when people intend idioms literally, the acoustics depend on the dominance or salience of the figurative interpretation, as indexed by idiom familiarity ratings [2]. When figurative interpretations are salient, people still raise the verb's pitch but they no longer lengthen its duration. Moreover, they lengthen rather than shorten the noun’s duration.

Thus, it appears that speakers naturally and reliably use prosody to acoustically mark idioms intended figuratively or literally. Moreover, they appear to do so in a way that optimizes the attentional focus of the listener with respect to an idiom’s component words. That is, they acoustically under-accentuate content words when an idiom is intended figuratively but do not do so when an idiom is intended literally. Whether these prosodic cues actually aid listeners during natural comprehension is an open question that we are currently pursuing.
References:


Example Production Contexts:

**Figurative:** Sam was terribly sick. He *kicked the bucket* last night.

**Literal:** Sam was always running into things with his feet. He *kicked the bucket* last night.

**Control:** Sam went to the theatre. He *watched the movie* last night.