

STONE OF VOICE HELPS LEARNING THE MEANING OF NOVEL ADJECTIVES

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To understand spoken words listeners have to cope with seemingly meaningless variability in the speech signal. Speakers vary, for example, their tone of voice (ToV) by changing speaking rate, pitch, vocal effort, and loudness. This variation is independent of "linguistic prosody" such as sentence intonation or speech rhythm. The variation due to ToV, however, is not random. Speakers use, for example, higher pitch when referring to small objects than when referring to large objects and importantly, adult listeners are able to use these non-lexical ToV cues to distinguish between the meanings of antonym pairs (e.g., big-small; Nygaard, Herold, & Namy, 2009). In the present study, we asked whether listeners infer the meaning of novel adjectives from ToV and subsequently interpret these adjectives according to the learned meaning even in the absence of ToV. Moreover, if listeners actually acquire these adjectival meanings, then they should generalize these word meanings to novel referents. ToV would thus be a semantic cue to lexical acquisition. This hypothesis was tested in an exposure-test paradigm with adult listeners.

In the experiment listeners' eye movements to picture pairs were monitored. The picture pairs represented the endpoints of the adjectival dimensions big-small, hot-cold, and strong-weak (e.g., an elephant and an ant represented big-small). Four picture pairs per category were used. While viewing the pictures participants listened to lexically unconstraining sentences containing novel adjectives, for example, "Can you find the foppick one?" During exposure, the sentences were spoken in infant-directed speech with the intended adjectival meaning expressed by ToV. Word-meaning pairings were counterbalanced across participants. Each word was repeated eight times. Listeners had no explicit task. To guide listeners' attention to the relation between the words and pictures, three sets of filler trials were included that contained real English adjectives (e.g., full-empty). In the subsequent test phase participants heard the novel adjectives in neutral adult-directed ToV. Test sentences were recorded before the speaker was informed about intended word meanings. Participants had to choose which of two pictures on the screen the speaker referred to. Picture pairs that were presented during the exposure phase and four new picture pairs per category that varied along the critical dimensions were tested. During exposure listeners did not spontaneously direct their gaze to the intended referent at the first presentation. But as indicated by listener's fixation behavior, they quickly learned the relationship between ToV and word meaning over only two exposures. Importantly, during test participants consistently identified the intended referent object even in the absence of informative ToV. Learning was found for all three tested categories and did not depend on whether the picture pairs had been presented during exposure.

Listeners thus use ToV not only to distinguish between antonym pairs but they are able to extract word meaning from ToV and assign this meaning to novel words. The newly learned word meanings can then be generalized to novel referents even in the absence of ToV cues. These findings suggest that ToV can be used as a semantic cue to lexical acquisition.

Nygaard, L. C., Herold, D. S., & Namy, L. L. (2009) The semantics of prosody: Acoustic and perceptual evidence of prosodic correlates to word meaning. *Cognitive Science*, 33. 127-146.