

Interpreting pitch accents through the lens of informativity

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Introduction: Language users exploit pitch modulations to express post-lexical meaning and important communicative functions. For example, English has been described as using pitch accenting to express information structure [1], with a perceptually and acoustically prominent rising pitch accent used to mark contrastive focus, less prominent high accents associated with (non-contrastive) new information, and even less prominent low or falling pitch accents with information that is given [2]. Yet as noted by many researchers, empirical evidence for these associations of pitch accent and discourse meaning is weak and the mapping between pitch accent type and information structure is many-to-many [3, 4]. Insight into possible sources of this variability comes from work showing that contextual factors like the predictability and informational importance of a word and its referent influence pitch accent assignment and related measures of acoustic prominence [5, 6, 7]. As an alternative to the conventional view of pitch accent meaning, we consider the *Informativity Hypothesis* (IH): Pitch accent meaning derives from the direct association between intonational prominence and informativity, where informativity is determined in relation to contextually salient meaning dimensions, including predictability, importance, and focus alternatives. Differences in the relative prominence of pitch accents relate to contextually determined, scalar distinctions in informativity.

Method: We test the IH in an intonation comprehension experiment. 100 speakers of American English (62 male, mean age = 39.2) participated in a comprehension experiment designed as a game played with a virtual partner (Fig. 1A) who receives three types of gems from a gumball machine. Participants kept track of the gem received on each trial by clicking the corresponding response button. There were three between-subject conditions: the PREDICTABILITY condition varied the frequency of the three gem types; the IMPORTANCE condition varied their point value; and the CONTROL condition kept frequency and point value equal. On approximately half of the trials the received gem was displayed visually with no verbal cue, but in the other half of the trials the visual cue was absent and the participant instead heard a recorded verbal cue which used the word “thingy” to refer to all gems: “*Ahhh...now I’ve got a thingy*”. The accentual prominence of the verbal cue phrase varied between three patterns, with a Low, Falling, or Rising pitch accent on “thingy” (Fig. 1B). Participants had to guess the gem intended as the referent of “thingy” based on its accentual prominence, with no explicit instruction about intonation, and no feedback on their response. The Informativity Hypothesis predicts that the relative accentual prominence of “thingy” will be associated with the salient meaning dimensions of Predictability or Importance, and predicts no systematic pairing of pitch accent and gem response in the Control condition. Responses modeled with Bayesian parameter estimation based on multilevel multinomial regression models strongly confirm the predictions (Fig. 1C). The proportion of responses selecting the gem with low, mid or high frequency / importance varied in the predicted direction, according to the pitch accent of “thingy”.

Conclusion: Listeners associate distinctions in intonational prominence with contextually salient distinctions in informativity that are unrelated to focus or givenness, without explicit training or instruction. This association was equally strong for informativity related to predictability or importance, e.g., a more prominent pitch accent is associated with less predictable (or more important) information. These findings provide evidence from listeners’ interpretation of intonation that supports the emerging theory of intonational meaning grounded in the

relationship between prosodic prominence and scalar meaning distinctions in informativity along various contextually specified meaning dimensions [5, 6].

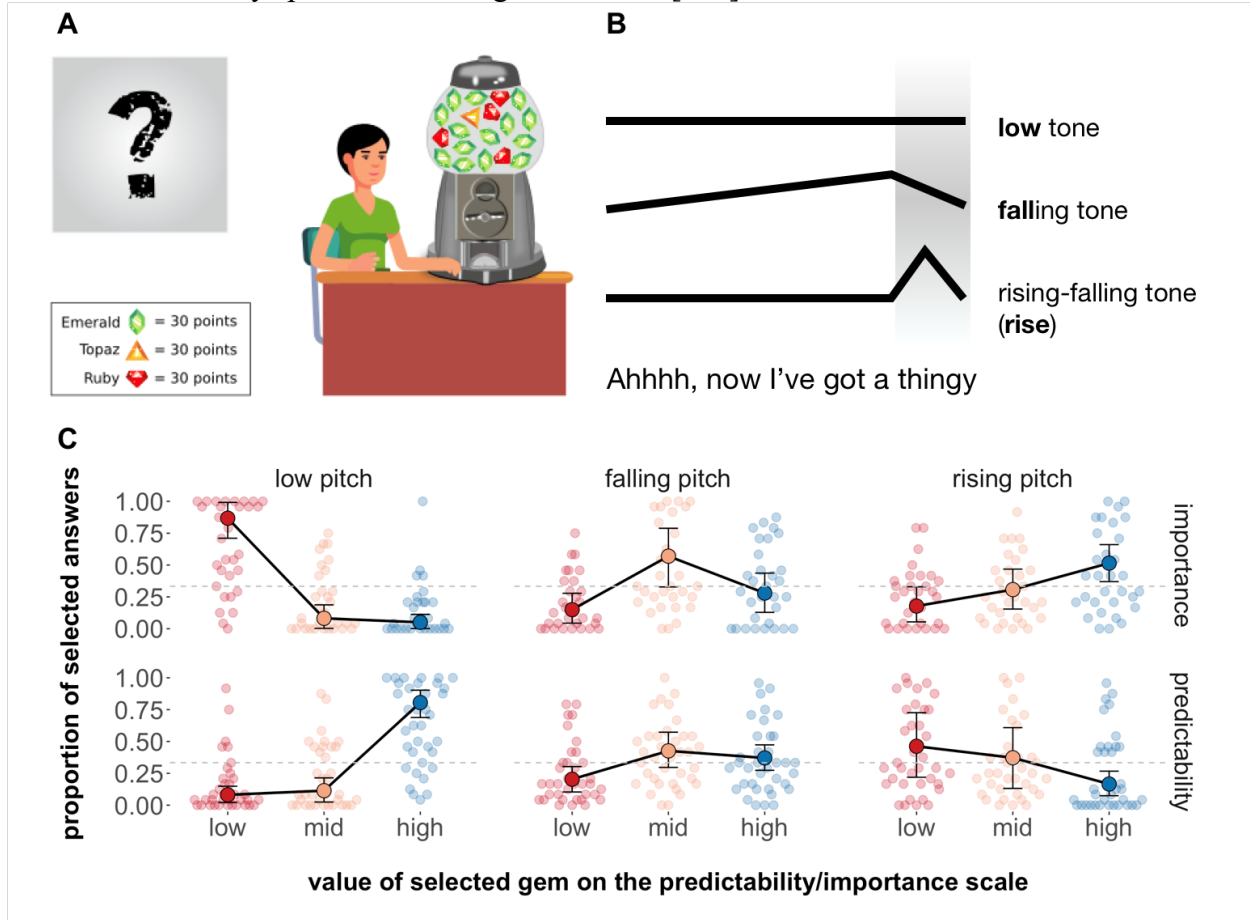


Figure 1: A – Example of visual display showing a skewed distribution of gems in the gumball machine. In critical trials, participants have to guess the correct gem based on the way “thingy” is pronounced. B – Schematic pitch contours of verbal cue sentences. C – Results of experiment for the IMPORTANCE and PREDICTABILITY conditions, illustrating that more prominent accent patterns (ranked low < fall < rise) are interpreted as low-valued predictable and more important. Semitransparent points are participant averages. Solid point and whiskers represent posterior means and 95% Credible Intervals.

References.

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