Intonational qualities of strong and weak imperatives
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According to recent work on the semantics of imperatives in English, these constructions can convey different types of command. Working in the framework of Dynamic Semantics, Portner (to appear) classifies two sub-types of imperatives as "weak" vs. "strong". Weak imperatives may be paraphrased as advice or may statements (the addressee may do what the speaker instructs), while strong imperatives are commands or should statements (the addressee should perform the content of the imperative). These types of imperatives thus differ along a pragmatic axis of authority, and a conversational one of commitment to the given priority: weak imperatives invite the addressee to prioritize the content of the imperative, while strong ones indicate that the speaker prioritizes the content of the imperative.

Portner proposes that sentence-final intonation plays a key role both in producing this distinction between weak and strong imperatives, and in helping listeners perceive the distinction: specifically, a high (H) tone provides a semantic contribution that makes an imperative weak. We propose that the relevant intonational contours are those given in (1) and (2) below, represented with ToBI transcriptions (Silverman et al. 1992, i.a.). The associated f0 traces are shown in Figure 1.

1) Have a baNAna (weak contour)
H*L-L%

2) Have a baNAna (strong contour)
L*L-L%

Fig.s 1, 2. f0 for baNAna extracted from (1) and (2); solid line H*L-L%, dotted line L*L-L%.

To date there is no empirical experimental evidence that this intonational distinction exists. The present work approaches these issues using the tools of laboratory phonology. We tackle the questions of what the relevant imperative intonations are and whether they are reliably produced and perceived by English listeners. We control the context along two axes: first, whether the speaker is in a position of equal vs. superior authority compared to the addressee, and second, whether the content of the imperative is the speaker's priority or the addressee's. The design is not fully crossed; that is, in this experiment, we tested only the most clear-cut cases of "equal authority, addressee's priority" and "speaker has greater authority, imperative is speaker's priority."

Methods. As an initial investigation, we conducted an experiment to test whether listeners reliably associate H*L-L% vs. L*L-L% contours (produced by one of the authors, vetted by two of the others) with weak and strong imperatives, respectively. We constructed strong and weak discourse contexts for 16 items; the contexts and associated comic for the item have are presented in Table 1. Twenty-six native
English listeners completed the task. Listeners were auditorily presented with a context and then sequentially heard both the H*L-L% (weak) and the L*L-L% (strong) versions of the target imperative, and selected which was more "appropriate" or "natural" in the given context. Each context was presented twice to counterbalance the order of the strong and weak imperatives. Thus, each listener was presented with 64 trials. The order of these trials was fully randomized for each participant.

<table>
<thead>
<tr>
<th>Weak</th>
<th>You and your friend are getting ready to go on a bike ride. Your friend is wondering whether she should have a quick snack before you head out. You just happened to have purchased some bananas, so you say: Have a banana.</th>
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<tr>
<td>Strong</td>
<td>Your daughter is suffering from some health problems that are mostly mysterious, but linked to potassium. According to the doctor she has to eat a banana every six hours or risk serious health consequences; cookies and sweets are off-limits until they've done more tests. Your daughter is whining about having to eat so much fruit. You are getting a little impatient with her and you say: Have a banana.</td>
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Table 1. Sample comic and text contexts for Have a banana.

**Results.** The primary measure of interest is whether listeners reliably associate the H*L-L% contour with weak imperatives and L*L-L% with strong imperatives. Thus, we defined accuracy as selecting the intonation contour which matched the predictions for Dynamic Semantics. Of the data set, 7% of trials were omitted for i) lacking a response, ii) having a response under 250ms, or iii) having a response two standard deviations away from the mean. Using averaged percent correct for each subject, we established that performance was above chance for both weak [M = 67% correct; t(25) = 4.21, p < 0.001] and strong [M = 81% correct; t(25)=14.53, p < 0.001] contexts. We also fit the data to a binomial mixed effects model using accuracy as the dependent measure. Context was a fixed effect with the strong context as the reference level, and Subject and Item were entered as random intercepts, with context fit as a random slope for both Subject and Item. There was a significant intercept [B = 1.73, SE= 0.26, z = 6.56, p < 0.001] and an effect of Context [B = -0.86, SE = 0.35, z = -2.48, p < 0.05], indicating performance was better for the strong contexts.

**Future work.** Continuing work on this project also analyzes the f0 in these intonational events as continuous signals. A strong version of the predictions made by Dynamic Semantics guarantees that the same intonational difference will hold between weak and strong imperatives in production. To test this, participants in ongoing experiments are given the same contexts as in the perception experiment; however, instead of being asked to choose between two recorded responses, they are presented with an imperative sentence (without punctuation) and asked to produce the sentence in a "natural" way that fits the preceding context. As the theory we're exploring uses intonational contours to contribute specific semantic content, a fuller knowledge of which contours participants use in actual production can only improve the descriptive and predictive modelling of strong and weak imperatives.