The prosody of negative 'yeah'

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Normally, *yeah* has positive polarity; it is used to agree, affirm, accept, etc. However, with a change in prosody, *yeah* can also convey a negative stance, e.g., in expressing polite disagreement or echoing another's negative sentiment. Since its lexical content is by default positive, negative meanings must be carried in the speech signal. This presentation investigates acoustic-prosodic features of such 'negative *yeah*s' by examining the pitch and intensity contours that distinguish four subtypes of 'negative *yeah*s' which were identified via content analysis.

The dataset consists of natural speech taken from the ATAROS corpus (Freeman et al. 2014), which contains dyads completing collaborative tasks designed to elicit frequent stance-taking (the expression of attitudes or opinions about the topic of discussion (Biber et al. 1999; Haddington 2004)). In total, the corpus contains 34 dyads, pairs of strangers from the Pacific Northwest (Washington, Oregon, Idaho) who are matched roughly by age group and either matched or crossed by gender. Each dyad completed five collaborative tasks, totaling about an hour of conversation per dyad (Freeman, Levow & Wright 2014; Freeman et al. 2014). The conversations are manually transcribed in Praat (Boersma & Weenink 2013) following a modification of the ICSI meeting corpus guidelines (Morgan et al. 2001), force-aligned to the audio at word and phone levels using the Penn Phonetics Lab Forced Aligner (P2FA; Yuan & Liberman 2008), and manually annotated for stance at the spurt level. Each spurt, or span of speech between silences of at least 500 ms, is marked holistically for stance strength (none, weak, moderate, strong) and polarity (positive, negative, neutral) (Freeman et al. 2014; Levow et al. 2014). (For more details on the corpus, visit: depts.washington.edu/phonlab/projects.htm.)

The sample in this study includes 46 speakers engaged in two of the collaborative tasks: the Inventory task, in which dyads arrange household items to make a map of an imaginary superstore, and the Budget task, in which they choose services to cut from an imaginary county budget. This sample yields 8.7 hours of conversation and a total of 2870 *yeah*s (54% said by males, 46% by females). The majority of *yeah*s (68%) occur in positive-marked utterances, indicating agreement, encouragement, etc. About 30% occur in neutral or non-stance utterances (backchannels, acknowledgements, etc.). Only 61 *yeah*s (2%) occur in negative-marked utterances, which are examined further to identify more specific stance functions of the *yeah*s. After excluding positive and unclear uses, only 46 *yeah*s said by 24 speakers clearly contribute to the negative stance of their utterances. All but three of these cluster into four common categories which emerge from this analysis:

(a) "yeah but" (N=12): 'yeah' is quickly followed by an explanation against a preceding stance
(b) "reluctance" (N=13): 'yeah' indicates reluctance to accept or agree with a previous stance

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(c) "tough problem" (N=12): 'yeah' contributes to an expression of shared difficulty (e.g., "Shoot, this is a tough problem.")
(d) "that's bad" (N=6): 'yeah' states agreement with a negative assessment without the empathy implied in the "tough problem" category (e.g., "You're right, that's bad.")

For all 2870 *yeah*s, intensity and pitch are measured via a Praat script at every decile of word duration and then z-score normalized speaker-internally to enable cross-speaker comparison. Measurements are compared using smoothing-spline ANOVA plots, which resemble aggregate pitch and intensity traces on a spectrogram by displaying splines connecting mean values at each measurement point, surrounded by shading representing 95% confidence intervals around the means (cf. Davidson 2006).

With all *yeah*s examined together, both pitch and intensity increase with stance strength, and negative *yeah*s display slightly higher pitch and intensity than positive/neutral *yeah*s. Looking at only the negative *yeah*s, the four categories listed above are distinguished by an interaction of pitch and intensity patterns, summarized in Table 1. "Tough problem" and "that's bad" have lower, flat pitch, while "reluctance" has a high dipping contour and "yeah but" a medium-high domed contour (Figure 1a). Cross-cutting these groups, "reluctance" and "tough problem" have lower, flatter intensity contours, while "yeah but" and "that's bad" have higher, domed contours (Figure 1b).

cross-contours	flatter intensity	domed intensity
flat pitch	problem (N=12)	bad (N=6)
contour pitch	reluctant (N=13)	but (N=12)

Table 1. Pitch and intensity cross-contours for 'negative *yeah*s' (N=43)

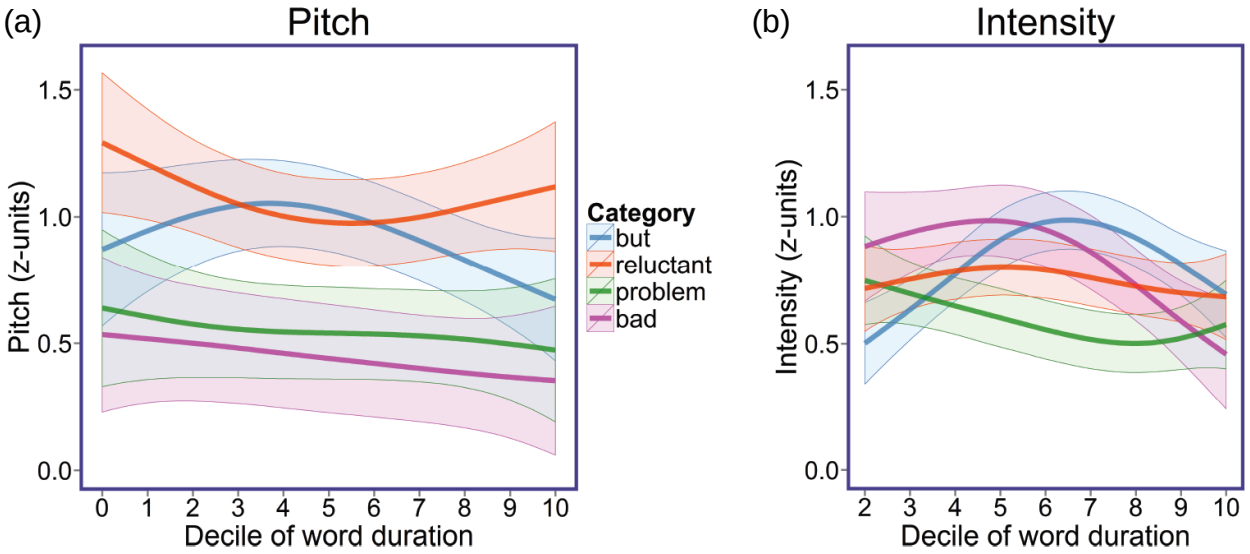

Figure 1. Smoothing-spline ANOVA plots of pitch (a) and intensity contours (b) for 'negative *yeah*s' (N=43). First two deciles removed from (b) due to tracking errors and missing data.

These patterns show that fine-grained stance analysis can reveal word-level acoustic patterns that are not apparent in coarser approaches. With the small sample size, no claims can be made about whether the exact contour shapes or configurations apply to 'negative *yeah*' or the described subcategories in general; rather, the key point is that qualitative methods, such as the content analysis and stance-annotation used here, can work in concert with combinations of acoustic measures to identify patterns in the speech signal that speakers use to convey – and understand – various subtle messages, whether propositional, social, attitudinal, emotional, etc.

Future work on the analysis of polarized lexical material includes the subcategorization of positive-marked *yeah*s and comparison with negative words like 'no' (cf. Freeman 2014). Initial analysis shows that both of these groups' pitch and intensity patterns are intermediate to those of the four categories of negative *yeah*s. Figure 2 shows the smoothing-spline ANOVA plots from Figure 1 with two new splines added: one for the 2824 *yeah*s in the corpus sample that occurred in positive or neutral stance-marked utterances (black), and one for the 246 *no*s in the sample (brown). The intermediate, relatively flat contours strongly resemble the shapes and locations of splines with all 'negative *yeah*s' combined, suggesting that they may also contain diverging subcategories that could be differentiated via more detailed stance-type classification.

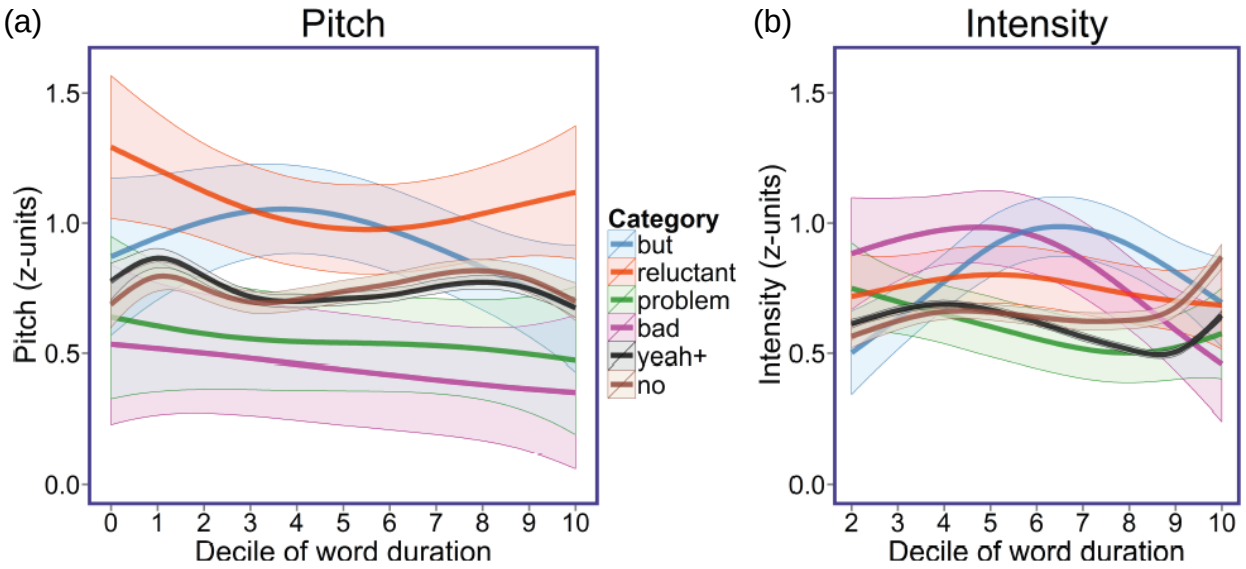

Figure 2. Smoothing-spline ANOVA plots of pitch (a) and intensity contours (b) for 'negative *yeah*s' (colored lines, identical to Figure 1, N=43), positive/neutral *yeah*s (black lines, N=2824), and *no*s (brown lines, N=246). Two deciles removed from (b) due to errors and missing data.

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