hearing were presented with voices that varied systematically in terms of their aspiration noise and spectral slope. The stimuli, five male and five female voices, were generated using the Klatt synthesizer and were modeled after naturally occurring voices. Listeners rated breathiness for each of these stimuli using a 7-point rating scale. Results show the relative contribution of spectral slope and aspiration noise to the perception of breathiness.

**5pSC32. Intensity variation in vowels across acoustic and auditory spectra.** Ewa Jacewicz and Robert Allen Fox (Dept. of Speech and Hearing Sci., The Ohio State Univ., Columbus, OH 43210, jacewicz.1@osu.edu)

Changes to vowel intensity are affected primarily by an increased physiological effort of the speaker. A second source of intensity variation comes from immediate consonant environment of the vowel as a result of coarticulation [House & Fairbanks, J. Acoust. Soc. Am. **22**, 105–113 (1953)]. Variation in intensity distribution across the vowel spectrum was measured for eight American English vowels in ten symmetrical CVC environments (consonants included both stops and fricatives) at four different locations (at the vowels rms peak and at points corresponding to 20%, 50%, and 80% of the vowels duration). Three types of spectral intensity distribution were examined: (1) the relative amplitudes of formants $F1$-$F4$; (2) the summed intensity in four contiguous frequency bands of 0–0.5, 0.5–1.0, 1.0–2.0 and 2.0–4.0 kHz [Sluijter and Van Heuven, J. Acoust. Soc. Am. **100**, 2471–2485 (1996)]; and (3) the intensity distribution following three stages of auditory processing (using an auditory filter bank consisting of 33 filters, equal loudness pre-emphasis, and intensity-loudness compression). The nature and size of the effects of spectral intensity variation as a function of consonant environment in the acoustic spectrum (formants) and in auditory pre-processing of the acoustic spectrum will be compared. [Work supported by NIDCD R03 DC005560-01.]

**5pSC33. Voice onset time is shorter in high-frequency words.** Mark VanDam and Robert Port (Dept. of Linguist., Indiana Univ, Bloomington, IN 47405)

Frequency of occurrence is known to have many effects on speech production [see J. Bybee, *Phonology and Language Use* (Cambridge, 2001)] including vowel quality, overall duration, rate of deletion, assimilation, coarticulation, etc. The current work addresses voice-onset time (VOT) in words with differing lexical frequency estimates from published materials and addresses whether words in a list exhibit similar effects to words in sentential context. Four talkers produced 20 low frequency words and 10 high frequency words four times each in isolation and again in non-idiomatic, sentential context. VOT was measured in monosyllabic content words with initial /t/. Results show that frequent words (e.g., *talk, table*) have a mean VOT roughly 10 ms shorter than less frequent words (e.g., *talc, taint*) ($p<0.01$). The effect was significantly stronger for words in a sentence (e.g., *He will talk to his supervisor*) than in a list. These findings are consistent with linguistic theories that propose detailed auditory representations for words and finely controlled productions, but are in conflict with traditional, abstract phonological representations.

**5pSC34. Tension asymmetries in a finite element model of the vocal folds.** Greg S. Davidson (Univ. of Chicago, Chicago, IL 60637) and Fariborz Alipour (Univ. of Iowa, Iowa City, IA 52242)

Tension asymmetries in a finite element model of the vocal folds were examined as a function of lung pressure. The vocal fold model had an asymmetry in the tension ratio ranging from 1.1 to 2.0, corresponding to a 10%–100% increase in tension of the left fold compared to the right, and lung pressure was increased over the range 5–40 cm $H_2O$. For tension ratios greater than 1.6, oscillation was not supported over most of this range. For tension ratios less than 1.6, the fundamental frequency was found to increase up to approximately 22 cm $H_2O$. Mean vocal fold contact area showed a broad maximum over the range 8–13 cm $H_2O$ and decreased between 13 and 22–25 cm $H_2O$. Open quotient decreased between 7.5 and 13–15 cm $H_2O$ and increased afterwards to reach a maximum value between 20 and 23 cm $H_2O$. For these three parameters, the behavior above the upper thresholds was tension ratio dependent. Mean glottal area linearly increased with lung pressure with differing slopes over different pressure ranges. Taken together, the four parameters provide evidence for different vibratory domains. [Work supported by NIDCD grant No. DC03566.]

**5pSC35. Not just any contour: Intonation marking semantic domain narrowing.** Karsten A. Koch (Univ. of British Columbia, Vancouver, BC, Canada)

*Not just any* statements (*Natalie won't drink just ANY wine from France*) carry an intonational contour. Previous studies have characterized the contour as fall-rise [D. Robert Ladd, *The structure of intonational meaning* (1980)], but more intricate acoustic analysis that considers the semantics of the construction has not been performed. Preliminary data shows that for speakers of Canadian English, the contour contains a rise-fall and stress accent on *any*, followed by a rise on the sentence-final syllable. If the stressed rise-fall on *any* indicates a topic accent, then the meaning of the construction can be calculated semantically: the presence of the topic accent indicates a disputable topic (in this case, Which wines will Natalie drink?) [following Daniel Buering, Linguistics and Philosophy **20**, 175–194 (1997) for German]. This operation narrows the domain of *any wine* from all wine from France to some smaller amount perhaps Natalie only drinks expensive cabernets. Furthermore, the same intonational contour occurs in other quantificational statements, like *ALL gamblers aren't addicted*. Here, the disputable topic is: How many gamblers *are* addicted? Again, the intonation serves to narrow the domain to a subset of all the gamblers. Thus, documenting this intonational contour identifies a more general semantic process.

**5pSC36. The role of stress accent in the understanding of sentences in noise.** Pierre Divenyi and Alex Brandmeyer (Speech and Hearing Res., VA Medical Ctr., 150 Muir Rd., Martinez, CA 94553)

When a target sentence is presented in noise, the stressed syllables therein will constitute epochs with a high likelihood of S/N increase. Since in spontaneous speech stressed syllables have significantly higher information content than unstressed syllables [S. Greenberg *et al.*, in Proc. 2d Intern. Conf. Human Lang. Technol. Res. (2002), pp. 36–43], it follows that masking the stressed syllables will negatively impact the perception of neighboring unstressed syllables. This hypothesis was tested by varying the S/N of only the stressed syllables in sentences embedded in otherwise unmodulated speech-spectrum noise. Results suggest that, compared to conditions with absent or decreased-S/N stressed syllables, increasing the S/N during stressed syllables increases intelligibility of the unstressed syllable or syllables that follow. Since the unstressed syllables are rarely masked in the classic, energetic sense, the phenomenon reported constitutes an instance of informational masking. The masking can affect perception at the phonemic as well as on higher linguistic levels, depending on the information provided by sentence context.