The contribution of individual frequency bands to the loudness of broadband noise was evaluated using loudness matches in a previous study (Pollack, 1951, 1952; Stevens, 1956; Bonding and Elberling, 1980; Chalupper and Fastl, 1998). The goal of the first experiment was to determine the difference in level required to match the loudness of variable bandwidth noises (comprised of sets of 2-ERB wide bands) between normal hearing (NH) and sensorineural hearing loss (SNHL) listeners. The overall level of each 2-ERB wide band varied individually between the low and high bands contribute nearly the same amount of loudness in all but the narrowest width bands.

**RESULTS**

Loudness matches for subjects with NH and SNHL are shown in Fig. 3. The data shown are preliminary. The number of subjects tested is small and large variability in loudness matching exists across subjects with both SNHL and NH listeners. Results obtained with the model show good agreement with observed matching data for both subjects with NH and subjects with SNHL. For the narrowest width bands, the model slightly overestimates the loudness match level. This set of data shows that the relative contributions of individual frequency bands to the loudness of a broadband noise can be predicted. The contributions of the SNHL group are greater compared to the NH group, which shows that the stimuli being requited for audibility across all bands. In general, subjects with NH place more weight on the high bands compared to the SNHL subjects. The model accurately predicts the loudness of the 2-ERB wide reference noise across all bands for both groups. The model accurately predicts the loudness of the 2-ERB wide reference noise across all bands for both groups.

**DISCUSSION**

The loudness matches for subjects with NH and SNHL, as shown in Fig. 3, are significantly different. The loudness matches for subjects with NH and SNHL are shown in Fig. 3. The model accurately predicts the loudness of the 2-ERB wide reference noise across all bands for both groups. The model accurately predicts the loudness of the 2-ERB wide reference noise across all bands for both groups.

**REFERENCES**


Chalupper, R.R. and Fastl, H. (1998). Perceptual weights of a broadband noise did not depend highly on the overall level of the complex. The weights were measured using a two-interval, forced-choice loudness-judgment task.

**SUMMARY AND CONCLUSIONS**

- Perceptual weights provide a valid measure of the contribution of individual frequency bands to the loudness of a broadband noise.
- Perceptual weights of a broadband noise did not depend highly on the overall level of the complex.
- Subjects with NH placed increased weights on the lowest and highest band in the 22-ERB wide reference noise compared to the lowest and highest bands in the symmetric reference noise. The loudness match for both subjects with NH and those with SNHL.
- The model and the SNHL subject data are > .90 in all but 1 subject with SNHL (SNHL 2). The data from the subjects with NH show that both the model and the SNHL subject data are > .90 in all but 1 subject with SNHL (SNHL 2). The data from the subjects with NH show that both the model and the SNHL subject data are > .90 in all but 1 subject with SNHL (SNHL 2).