

## Editorial

# Loudness and Smiling Caterpillars



All too rarely do we see the findings of basic research applied successfully to the day-to-day problems of the practicing clinician. In this issue of *JAAA*, however, investigators Yula Serpanos and Judy Gravel show how cross-modality matching, a psychophysical technique studied extensively in the laboratory, can be applied to a real-life problem, fitting amplification to hearing-impaired children.

In 1958, S. Smith Stevens began his now classic studies of direct comparisons between two sensory continua by asking students at the Harvard Psychoacoustic Laboratory to equate the loudness of sound with the amplitude of a vibrating button held to the tip of the finger and with the strength of an electric current passed through the finger. Stevens, his colleagues, and his students went on to broaden the domain of cross-modality matching to as many as 10 different sensory continua including brightness, strength of handgrip, redness, vocal effort, and, of special relevance for the work of Serpanos and Gravel, the length of a line drawn on a piece of paper. Stevens' pioneering contribution was to show that, quite contrary to the conventional wisdom of the time, such direct comparisons between different sensory modalities were, indeed, possible, and that subjects could execute them with remarkable ease. Stevens went on to show that

5-year-old children could equate loudness and brightness as well as adults and that by equating loudness with amplitude of vibration, one could demonstrate loudness recruitment in persons with sensorineural hearing loss.

In the paper, "Assessing Growth of Loudness in Children by Cross-Modality Matching," investigators Serpanos and Gravel show how the cross-modality matching of line length and loudness can be used to explore the dynamic ranges of hearing-impaired children too young to produce stable estimates of the more conventional yardsticks of comfortable and uncomfortable loudness levels. In both normal and hearing-impaired children over the age range from 4 to 12 years, they showed that cross-modality matching of loudness and line length can produce stable and reliable estimates of loudness growth functions, which can, in turn, be used to optimize hearing aid fitting parameters. In order to make the concept of variable line length more immediate for children, they attached pictures of smiling caterpillars to each line, the length of the caterpillar matched to the length of the line.

This application of psychophysics to a genuine clinical problem would have pleased Smitty Stevens very much.

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