and precentral potentials show significant differences between hemispheres, which is suggestive evidence for within-hemispheric localization. These data provide the first direct physiological evidence for localization of language production functions in the intact, normal human brain.

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Neural Events and Psychophysical Law

A verbal report of the intensity of a tone entails considerable processing of sense organ input by the brain. With this come the wide variety of perceptual effects as well as the great individual differences in subjective effect which Stevens has recognized (*1*) but barely alludes to in "Neural events and the psychophysical law" (*2*). Nowhere is this more evident than in data from average evoked responses (AER), which many studies have linked to perceptual and attentional processing. Far from being a reflection of the operation of a power law mechanism governing subjective magnitude in the central nervous system, as Stevens suggests, AER data on stimulus intensity seem more to reflect the operation of a complex system of interpretation and modulation.

We, and others, have found that the amplitude of an individual's AER components (especially after 100 msec) may increase, remain the same, or even decrease with increasing stimulus intensity (*3*). Davis (*4*) found that a single mathematical relationship between amplitude and intensity "may be useful as a first approximation to predict an average trend, but it does not predict usefully for all individuals."

We find that these individual differences in amplitude-intensity functions are fairly reliable across time, and appear to reflect neither trivial physiological artifacts nor purely saturation phenomena.

The changes of an individual's AER amplitude with increasing stimulus intensity may be related to behavior on other perceptual tasks, drug treatment, or even psychiatric diagnosis. In recent studies at the National Institute of Mental Health, for example, manic patients showed AER's which increased strongly (augmented) with increasing stimulus intensity, whereas depressed patients showed less strongly increasing or actually decreasing amplitudes (reducing) with increasing stimulus intensity (*5*). When normal college students were tested on the same AER procedure, those who scored high on the Zuckerman stimulus-seeking questionnaire (*6*) tended to be augmenters, and those who scored low tended to be reducers. Similarly, Hall *et al.* (*7*) report that aggressive, exploratory, stimulus-seeking cats augmented, whereas retiring, timid cats reduced.

Stevens has developed elegant methodologies and a wide body of psychophysical data. The "turbulence of electrophysiology" to which he alludes may reveal the crucial role of individual differences in the study of perception.

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Buchsbaum is indeed correct. It took a century to discover how to elicit and process a subject's "verbal reports" in a way that could disclose the operating characteristics of the various sensory systems. Averaged evoked responses may prove almost as labile, and how to interrogate them effectively may call for ingenuity and a lot of good fortune. An electrode on the skull may or may not be able to reflect the operation of the sensory transducer in a meaningful way. The full answer to that question remains to be discovered. Perhaps it is significant that when evoked potentials at the cortex have been shown to increase as a power function of the intensity of the stimulus, the exponents have tended to be much lower than the exponents that are now thought to characterize the transducer process. In other words, the amplitude of the potential picked up on the skull does not keep pace either with the subject's experience of intensity or with the potential that can be recorded in closer proximity to the sense organ. Much additional processing appears to have intervened.

Granted all the difficulties, I would like to believe that the knowledge that can be gleaned about sensory systems by studying evoked potentials is greater than zero, and I assume that Buchsbaum would concur.

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