

This Week's Citation Classic

Poulton E C. The new psychophysics: six models for magnitude estimation. *Psychol. Bull.* 69:1-19, 1968. [Applied Psychology Research Unit, Cambridge, England]

Six pictorial models describe the effects on numerical magnitude judgments of the experimenter's choices of the independent variables. The effects are more compatible with a learned calibration theory of numerical magnitude judgments than with a simple transducer theory. Transfer effects within and between experiments are also described. [The Social Sciences Citation Index® (SSCI™) indicates that this paper has been cited over 135 times since 1968.]

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"This review had its beginning when I worked as a research fellow under S.S. Stevens at Harvard in 1953-1954. Smitty Stevens and Didi Stone, later to become his second wife, met my young family and me at the boat in Boston during Thanksgiving, and drove us to the temporary accommodations they had arranged for us. Stevens then took me to the Psychological Laboratories in the basement of Memorial Hall, and got me to make numerical magnitude judgments of loudness. I came away feeling that I had been brainwashed.

"Soon I found myself playing Stevens's role, getting the graduate students to judge loudness using numbers. As I tried out one idea after another, the graduate students became resistant to my frequent requests to them to serve as observers. Their judgments ceased to be affected by my innovations. They were skeptical of the validity of the kind of experiments that I was conducting on Stevens's behalf. To make any sense, I realized that I needed large numbers of uninitiated observers. After what appeared to be an almost unbearable delay, I obtained the volunteer services of a student practical

class at Harvard, and later of students from the Harvard Summer School. When I left after 11 months as a research fellow, I had discovered to my cost most of the biases that affect numerical magnitude judgments.

"I returned to the other Cambridge, and tried to forget my unfortunate experiences. Then in 1959, Dick Warren, who was visiting Cambridge, suggested that we should collaborate. He had just published his physical correlate theory of numerical magnitude judgments.¹ The theory states that judgments of loudness and brightness are based on judgments of the apparent distance of the source of the sound or light. Together we invaded the Junior Combination Rooms of the Cambridge colleges at about the time of Hall Dinners in the evening. We collected two, or at most four, judgments of the lightness of grey papers from each student. We used separate groups of 50 undergraduates for each data point. When Warren returned to the US, John Webster and then Derek Simmonds took his place. Our results clearly demonstrate the biases in magnitude judgments, which were often obscured at Harvard by transfer from prior experiments of a similar kind.

"In July 1966 I reviewed our findings in a talk entitled 'The New Pseudophysics.' But the editor of *Psychological Bulletin* refused to accept this title. I suppose my 1968 review is often cited because it represents the first extensive criticism of Stevens's work that is accompanied by experimental evidence to support it.

"One of the reviewers suggested that my review should be extended to cover category rating as well as magnitude judgments. The composite review he asked for was delayed until 1979.² It describes six main biases in quantifying judgments. The biases occur, either separately or combined in various ways, in every kind of quantitative judgment. My forthcoming book³ describes how the biases occur in the quantitative judgments of everyday life, and shows how Stevens⁴ soon made use of the biases to obtain the results he wanted."

1. Warren R M. A basis for judgments of sensory intensity. *Amer. J. Psychol.* 71:675-87, 1958.

2. Poulton E C. Models for biases in judging sensory magnitude. *Psychol. Bull.* 86:777-803, 1979.

3., Bias in judgment. San Francisco: Academic Press. Expected date of publication, 1982.

4. Stevens S S. *Psychophysics: introduction to its perceptual, neural, and social prospects*. New York: Wiley, 1975. 329 p.