

This Week's Citation Classic

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Buchsbaum M S & Silverman J. Stimulus intensity control and the cortical evoked response. *Psychosom. Med.* 30:12-22, 1968.
[Laboratory of Psychology and Adult Psychiatry Branch, Clinical Investigations, National Institute of Mental Health, Bethesda, MD]

Cortical evoked potentials (EPs) to light flashes of four intensities and performance on a kinesthetic figural after-effects (KFA) perceptual task were obtained from normal and nonparanoid schizophrenic subjects. Significant correlations were found between EP amplitude/intensity slopes and KFA. [The Science Citation Index (SC[®]) and the Social Sciences Citation Index[®] (SSCI[®]) indicate that this paper has been cited in over 155 publications since 1968.]

Monte S. Buchsbaum
Department of Psychiatry
University of California
Irvine, CA 92717

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"A hypothetical curve showing first increasing and then decreasing evoked potential (EP) amplitude with successive increases in stimulus intensity was first drawn on a napkin (like the famous declining Lauffer curve) at lunch in the National Institutes of Health (NIH) cafeteria in 1966. I had just arrived at the National Institute of Mental Health (NIMH) in David Shakow's laboratory of psychology. My spare moments during medical school had been spent in Enoch Cal-laway's laboratory at Langley Porter Neuro-psychiatric Institute, learning the then fledgling EP methodology.

"The problem of experimentally characterizing the disturbed perceptual process in schizophrenia was beginning to be actively explored at this time. Julian Silverman had written a review article¹ (also highly cited²) relating problems in modulating

sensory input to subtypes of schizophrenia. A particularly intriguing finding was the apparent sensory inhibition or 'reducing' in the kinesthetic figural after-effects (KFA) studies of Petrie.³ Silverman, a psychologist; Robert Henkin, an endocrinologist interested in sensory abnormalities; and I discussed the need for a simple neurophysiological probe free from the need for the subject to follow complicated psychophysical instructions. Presentation of stimuli at various intensities seemed to me a simple way to observe departures from a linear response gradient. With the then state of the art four-channel Mnemotron CAT (computer of average transients) and a Grass photostimulator on hand, the four-intensity 'augmenting-reducing' paradigm was born. Later in the week, our first patient with schizophrenia showed EPs which decreased markedly as stimulus intensity increased — matching his 'reducing' perceptual style on Petrie's test.

"Why was this paper so highly cited? Its historical position in applying EPs to individual differences and consistency with perceptual theories of schizophrenia were important as was the technical ease with which other EP researchers could adopt the paradigm and replicate or refute. This strategy of examining individual differences in pain sensitivity allowed us to detect the subtle actions of naloxone on the endogenous opiate system,⁴ to track the switch process in rapidly cycling manic-depressives,⁵ and to examine multifactor vulnerability models in suicide and other disorders.^{6,8}

"The multidisciplinary total research environment at NIH, the freedom of the Research Associate Program, and the strong interest of the intramural NIMH in new technologies were all factors in the success of this work."

1. **Silvannan J.** The problem of attention in research and theory in schizophrenia. *Psychol. Rev.* 71:352-79, 1964.
2. **Garfield E.** Highly cited articles. 19. Human psychology and behavior. *Essays of an information scientist.* Philadelphia: ISI Press, 1977. Vol. 2. p. 262-8. (Reprinted from: *Current Contents* (18):5-11, 5 May 1975.)
3. **Petrie A.** *Individuality in pain and suffering.* Chicago: University of Chicago Press, 1978. 170 p.
4. **Buchsbaum M S, Davis G C & Bunney W E, Jr.** Naloxone alters pain perception and somatosensory evoked potentials in normal subjects. *Nature* 270:620-2, 1977.
5. **Buchsbaum M S, Post R M & Bunney W E, Jr.** Average evoked responses in a rapidly cycling manic depressive patient. *Biol. Psychiat.* 12:83-99, 1977.
6. **Buchsbaum M S, Haier R I & Murphy D L.** Suicide attempts, platelet monoamine oxidase and the average evoked response. *Acta Psychiat. Scand.* 56:69-79, 1977.
7. **Haier R J, Buchsbaum M S, Murphy D L, Gotteiman I I & Couraey R D.** Psychiatric vulnerability, monoamine oxidase and the average evoked potentials. *Arch. Gen. Psychiat.* 37:340-5, 1980.
8. **Buchsbaum M S.** Neurophysiological studies of reduction and augmentation. (Petrie A.) *Individuality in pain and suffering.* Chicago: University of Chicago Press, 1978. p. 141-57.