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The Polynomial Law

We were very impressed with Professor Sue Doe Nihm's (November 1976) polynomial law of sensation, which states that the degree of the polynomial is always one less than the number of stimuli. However, a distinguished visitor to our university, Professor Hoff Witt of the Frohliche Hochschule, has found that the law applies not only to psychophysical data but to psychological data in general. In recognition of Professor Witt's generalization of Nihm's law, we hope other psychologists will join us in referring to their joint contribution as the Nihm–Witt law of just enough numbers. The important implication of this law is, of course, that psychology's promise has been fulfilled. We now have a single law descriptive of all psychological data. The work of Professor Nihm and Professor Witt, as well as our own work, has convinced us that no single psychological law will ever be more powerful.

REFERENCE

Nihm, S. D. Polynomial law of sensation. *American Psychologist,* 1976, *31,* 808–809.

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Nihm Refuted

I have read with interest the article by Sue Doe Nihm (November 1976) entitled "Polynomial Law of Sensation." Since I did not follow her arguments very well, I gave the article to a professor of mathematics, who commented as follows:

> It surely is possible to fit almost any data with a polynomial. The polynomial fit, however, obscures the basic relation between the variables. It is of course the basic relations we seek.
>
> Nihm needs to be educated in science and mathematics. Her claims are either vacuous or preposterous; for example, (1) to say that laws of physics are often polynomials is like saying numbers are often integers, and (2) the coefficients in the equation $H = a_0 + a_1 t + a_2 t^2$ (p. 809) have definite significance. This equation comes from Newton's law of motion: $F = ma$, and a_0, a_1, a_2 are *precisely* related to initial and other conditions according to this fundamental law. This work is meaningless.

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Nihm, S. D. Polynomial law of sensation. *American Psychologist,* 1976, *31,* 808–809.

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Nihm's Law Only Perfect on the Average

Any theory which not only claims to fit the data better than existing laws but obtains a perfect fit every time should call forth a certain amount of skepticism in the mind of any critical reader. Nihm's (November 1976) polynomial law of sensation makes such claims and thus deserves severe scrutiny.

Small differences in Pearson correlation coefficients may represent large deviations of the data from the model. For example, the integers from 1 to 9 correlate .955 with their logarithms, .999 with their square roots, and .975 with their squares. These correlations are well within the range of values obtained to measure the fit of the power function to data. Therefore, any discrepancies from a perfect correlation may represent serious problems for the polynomial law!

Thanks to the kindness of Sue Doe Nihm, who forwarded all of the previously published psychophysical data, and Barbara Mellers, who carried out the reanalyses using an HP-21 calculator, I have taken a closer look at the fit of the polynomial function. Correlations that were reported as perfect actually ranged from .999997 to 1.000002. On the *average,* the correlation was 1.000—but not for any given data set. These findings contradict Nihm's results and may be extremely important!

Hence, the polynomial law of sensation does not rule out other possible theories. Despite the elegance and simplicity of Nihm's law, sensation is not *always* a polynomial function of physical intensity, although the average correlation of the theory with the data is 1.000.

REFERENCE

Nihm, S. D. Polynomial law of sensation. *American Psychologist,* 1976, *31,* 808–809.

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Sue Doe Replies

I was saddened to see that Nihm's law is regarded as "meaningless" by a professor of mathematics. I have given a copy of Tomlinson's letter to a mathematics professor on our faculty here who has confirmed my