



Taylor & Francis
Taylor & Francis Group



A Common Error Concerning Kurtosis

Author(s): Irving Kaplansky

Source: *Journal of the American Statistical Association*, Jun., 1945, Vol. 40, No. 230 (Jun., 1945), p. 259

Published by: Taylor & Francis, Ltd. on behalf of the American Statistical Association

Stable URL: <https://www.jstor.org/stable/2280139>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <https://about.jstor.org/terms>



JSTOR

Taylor & Francis, Ltd. and American Statistical Association are collaborating with JSTOR to digitize, preserve and extend access to *Journal of the American Statistical Association*

A COMMON ERROR CONCERNING KURTOSIS

BY IRVING KAPLANSKY

Applied Mathematics Group, Columbia University

IN MANY texts¹ it is stated that a frequency curve with positive kurtosis is higher in the neighborhood of the mean than the corresponding normal curve, while one with negative kurtosis is lower. In the hope of clearing up this error, we offer in this note four examples showing that any combination of peakedness at the mean and kurtosis may occur. All four curves are symmetric about $x=0$, and have been arranged to have standard deviation unity; hence they are properly to be compared with the unit-normal distribution for which the fourth moment $\mu_4=3$, and the value at the mean $x=0$ is $1/\sqrt{2\pi}=.399$.

$$(1) \quad P(x) = \frac{1}{3\sqrt{\pi}} \left(\frac{9}{4} + x^4 \right) e^{-x^2}.$$

$$(2) \quad Q(x) = \frac{3}{2\sqrt{2\pi}} e^{-x^2/2} - \frac{1}{6\sqrt{\pi}} \left(\frac{9}{4} + x^4 \right) e^{-x^2}.$$

$$(3) \quad R(x) = \frac{1}{6\sqrt{\pi}} (e^{-x^2/4} + 4e^{-x^2}).$$

$$(4) \quad S(x) = \frac{3\sqrt{3}}{16\sqrt{\pi}} (2 + x^2) e^{-3x^2/4}.$$

In (1), $\mu_4=2.75$, $P_0=.423$.

In (2), $\mu_4=3.125$, $Q_0=.387$.

In (3), $\mu_4=4.5$, $R_0=.470$.

In (4), $\mu_4=8/3=2.667$, $S_0=.366$.

¹ At the request of the Editor the author has supplied the following examples from authoritative volumes. Many others could be cited.

Kenney, *Mathematics of Statistics*, part I, p. 106; H. L. Rietz, *Mathematical Statistics*, pp. 71-72; Yule and Kendall, *An Introduction to the Theory of Statistics*, p. 165.