

The following is a study I conducted in about 1989 using an availability sample of texts – never wrote it up, just did it more for curiosity than for any other reason. Never did put the references page together (sorry about that).

Attitude of Social Scientists Toward Robustness

To determine the general attitude toward the robustness of parametric statistics among social and behavioral researchers, an investigation of the prescriptions found in commonly used social and behavioral science statistical and research texts was conducted using an availability sample of 51 textbooks. Thirty statistical texts included such as Winer (1971), Hays (1973) and Blaloch (1979) and twenty research texts included Kirk (1968), Campbell and Stanley (1963), Kerlinger (1973) and Lindquist (1953). Four texts (one statistical and three research offered no specific statements related to the topic. All comments could be generally classified into one of the following categories:

1. Most if not all distributions may be considered normal or a very close approximation, therefore the statistical question of robustness need not be raised.
2. Although some distributions differ from the normal, tests and statistics are adequately robust for most purposes so that conclusions will not be damaged.
1. 3. Distributions differ, but statistics are robust if certain conditions hold in the sample.
3. If a distribution differs from normality, seek an alternative to the parametric statistic.

Table 1 shows the percentage of different types of texts falling into the various categories defined above. As the table shows, the distribution of statements regarding the existence of normality and its influence on statistical procedures ranges fairly evenly across the attitude continuum.

TABLE 1
Percentage of Texts Holding Different Views on Distributions

	Stated Attitude							
	1		2		3		4	
	Normality is Norm		Parametric Statistics are Robust		Conditional Robustness		Not Robust	
	N	Pct	N	Pct	N	Pct	N	Pct
Statistical Texts	9	31%	7	24%	6	21%	7	24%
Research Texts	1	6%	6	33%	6	33%	5	28%
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	10	21%	13	28%	12	26%	12	26%

Most of these comments appear to derive from the early work on the robustness of statistical tests carried out by such as Box (???), Boneau (1960), Gayen (???), Pearson (1931). About 50% of the authors suggest either that the Gaussian is almost universal, or that parametric statistics are robust to non-normality. Another 25% suggest that under certain conditions which apparently are common (equal n's greater than 20) tests such as the t or F are robust. Only 25% contend that alternative statistics be used if the researcher has reason to believe the distribution to be nonnormal. Some authors take one position for descriptive statistics (estimates of location and/or scale) and another for tests of significance. For example, Winer (1971, p. 29) states regarding the mean and standard deviation.

If the form of the distribution of the measurements were not approximately bell-shaped, other statistics might be more appropriate to summarize the information in the samples. To indicate the degree of conservativeness in the classification of texts, this extremely well qualified statement of parametric appropriateness, containing such vague terms as "...not approximately bell-shaped" and "...might be more appropriate" was enough to place Winer (1971) into class 4 of Table 1, despite the following statement (p. 167) regarding tests of significance. The magnitude of Type I error is not seriously affected if the distributions depart moderately from normality or if the population variances depart moderately from equality.

Since considerable difference of opinion appears to exist, two major questions remain open following this survey:

1. Do empirical distributions closely approximate the Gaussian (normal), and
2. are parametric statistics and tests of significance robust to violations of the normality assumption?