Goodness of Fit Encyclopedia Article

Goodness of Fit

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Goodness of Fit

Term used by statisticians to describe a formula for measuring how well a theoretical hypothesis fits a set of observations.

In 1900, Karl Pearson published a paper describing a statistical test—known as chi-square test of goodness of fit—that measures how closely a researcher's hypothesis matches the observations he or she collects during an experiment. The concept behind this test is relatively simple—in rolling dice, one may assume that each die will fall equally often on each of its six faces. By applying the chi-square goodness of fit test, a researcher can then test whether the hypothesis—that the die will fall equally on all sides—fits what was recorded in the experimental data. Pearson's chi-square test is one measure of how well the hypothesis and data match, and is especially useful where the data falls into discrete categories, called "cells" by statisticians.

Child psychiatrists Alexander Thomas and Stella Chess used the test for goodness of fit in their study in the late 1950s that examined inherent individual differences in children, and the ways these differences contributed to developmental difficulties. Thomas and Chess followed over 100 children from infancy through early adulthood. Their data, gathered from interviews, contained details about children's behavior and parents' values and expectations. They focused on nine characteristics of behavior, including activity level, rhythmicity or regularity in biological functions like eating and sleeping, the tendency to approach or withdraw, adaptability, threshold of responsiveness (degree of stimulation required to evoke a response from the child), intensity or energy level of reactions, quality of mood, distractibility and attention span, and persistence. Thomas and Chess emphasized that goodness of fit—the extent to which the child's temperament fit with the values, expectations, and style of the child's family—was an important factor in the child's growth and development.

For Further Study

Books

Dorr-Bremme, Donald W. *Ethnography and Evaluation: The Goodness of Fit.* Los Angeles: Graduate School of Education, UCLA, 1983.

Periodicals

Hacking, Ian. "Trial by Number; Karl Pearson's Chi-Square Test." *Science* 5, November 1984, pp. 69+.