# Various Statistical, Mathematical, and Greek Symbols and Their Meanings

| Symbol or Operator | Meaning |
|---|---|
| $\sum$ | Sigma means *add everything up* |
| $\prod$ | Multiply everything |
| $\alpha$ | Alpha – the probability of making a Type I error (identifying something that really doesn't exist in the population) |
| $\beta$ | Beta – the probability of making a Type II error (failing to identify something that really does exist in the population |
| $\beta i$ | The **standardized** regression coefficient |
| $\chi^2$ | Chi-square test statistic |
| $X_F^2$ | Friedman's ANOVA test statistic |
| $\varepsilon$ | Error |
| $\eta^2$ | Eta-squared |
| $\mu$ | The population mean |
| $\rho$ | The correlation in the population |
| $\sigma^2$ | The variance in the population |
| $\sigma$ | The standard deviation in the population |
| $\sigma_{\bar{X}}$ | The standard error of the mean |
| $\tau$ | Kendall's tau (the non-parametric correlation coefficient) |
| $\omega^2$ | Omega squared |
| $b_i$ | The **unstandardized** regression coefficient |
| $df$ | Degrees of freedom |
| $\varepsilon_i$ | The error associated with the *ith* person |
| $F$ | *F*-ratio test statistic used in ANOVA |
| $H$ | Kruskal-Wallis test statistic |
| $k$ | The number of levels of a variable, or the number of treatment conditions, or the number of predictors in a regression model |
| ln | Natural logarithm |
| MS | The mean squared error, or the average variability in the data |
| $N, n, n_i$ | Sample size. *N* usually indicates total sample size; *n* usually indicates the number of groups |
| $P$ | Probability |
| $p$ | The *p*-value, or significance level of a test. Although this may casually be referred to as *probability* it is different from *P* (above) |
| $r$ | Person's correlation coefficient |
| $r_S$ | Spearman's rank correlation coefficient |
| $R$ | The multiple correlation coefficient |
| $R^2$ | The coefficient of determination (or, the proportion of data explained by the model) |
| $s^2$ | The variance of the sample |
| $s$ | The standard deviation of the sample |

| Symbol or Operator | Meaning |
|---|---|
| $SS$ | The sum of the squares |
| $SS_A$ | The sum of the squares for variable $A$ |
| $SS_M$ | The sum of the squares for the model (the variability explained by the model fitted to the data |
| $SS_R$ | The residual sum of the squares for the model (the variability that the model can't explain) |
| $SS_T$ | The total sum of the squares (the total variability within the data) |
| $t$ | The test statistic for Student's $t$-test |
| $T$ | The test statistic for Wilcoxon's matched-pairs signed-rank test |
| $U$ | The test statistic for the Mann-Whitney test |
| $W_s$ | The test statistic for Wilcoxon's rank-sum test |
| $\bar{X}$ | The mean of a sample of scores |
| $z$ | A $z$-score; or, a data point expressed in standard deviation units |

Table adapted from:

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Los Angeles, CA: Sage.