The Table!	**Categorical Data** proportions, percentages, counts	**Numeric Data** means, correlation, regression, slope
Basic Tests 1 or 2 groups, samples, categories, choices, factors, levels, answers, or responses 2 SD Rule applies Can be left, right, or both tails	one proportion (3.1) $p=0.40$ 1 group, 2 choices 40% of people favor banning cell phones on public transportation. Less than 20% of people approve of the job Congress is doing. two proportions (3.2) $p_1=p_2$ 2 groups, 2 choices Men are more likely than women to chew tobacco. Blacks are less likely than Whites to trust police. Gender is not a factor in whether a person owns a gun.	one mean (4.1) $\mu=61.5$ 1 group, 1 numeric variable The mean weight of a Skittles bag is 61.5g. paired means (4.2) $\mu_d=0$ 1 group, 2 numeric variables – checking equality The length of a person's foot is equal to the length of their forearm. two independent means (4.3) $\mu_1=\mu_2$ 2 groups, 1 numeric variable Women have higher pain tolerance than men. correlation (5.x) $\rho=0$ 1 group, 2 numeric variables – checking relationship The length of someone's index finger is related to their height.
Distribution	Normal, Z	Student's T
Test Statistic	$z = \frac{\text{observed} - \text{expected}}{\text{standard deviation}}$	$t = \frac{\text{observed} - \text{expected}}{\text{standard error}}$
Advanced Tests more than 2 groups, samples, categories, choices, factors, levels, answers, or responses Always right tail	goodness of fit (3.3) 1 grouping variable w/ more than 2 choices 25% of people are Republican, 35% are Democrats, and 40% are independents. The colors of Skittles are equally distributed. The 68-95-99.7 rule applies to a set of data. test for association (3.4) 2 grouping variables w/ more than 2 choices Race and political party are associated. A person's religion and gender are related. A person's race is not a factor in whether they were stopped by the police.	one-way ANOVA (4.4) $\mu_1=\mu_2=\mu_3$ 1 grouping variable w/ more than 2 choices, 1 numeric variable Race is not a factor in a person's SAT score. two-way ANOVA 2 grouping variables, 1 numeric variable. 3 sets of hypotheses Race and gender are related to income. simple regression (5.x) $\beta_1=0$ 1 response variable, 1 predictor variable – see correlation A person's age is not related to their income. multiple regression (6.x) $\beta_1=\beta_2=\beta_3=0$ 1 response variable, multiple predictor variables A student's score on a test is related to the time spent studying, the amount of sleep the night before, and their SAT score.
Distribution	Chi-Square, χ^2	F
Test Statistic	$\chi^2 = \sum\left(\frac{\text{observed} - \text{expected}}{\sqrt{\text{expected}}}\right)^2$	$F = \frac{\text{Variance}_1}{\text{Variance}_2} = \frac{MS_{source}}{MS_{error}}$

The symbolic representation is for a typical null hypothesis and may not match the example claims. Example claims may be the null hypothesis or the alternative hypothesis. Groups and samples mean the same thing. Categories, choices, factors, levels, answers, and responses are synonyms. A grouping or classification variable is a categorical variable used to identify the groups. There is more to hypothesis testing than will fit on a single page unless you make the font so small you cannot read it, so this should be considered a quick, rather than comprehensive, guide.

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Method Aliases

The exact name used for a statistical method varies by textbook and software package. Here are some of the alternative names for the methods. The (number) at the end of each method is the number of categorical variables used by that method.

Basic Categorical Methods

- One Proportion, Single Proportion, 1P (one)
- Two Proportions, Difference in Proportions, 2P (two)

Basic Numeric Methods

- One Mean, Single Mean, 1T, 1 Sample T (none)
- Two Means, Independent Means, Difference of the Means, Difference in Means, 2T, 2 Sample T (none)
- Paired Means, Dependent Means, Mean of the Difference, Paired T (none)
- Correlation, Linear Correlation, Slope (none)

Advanced Categorical Methods

These methods are often prefaced with χ^2 or chi-square.

- Goodness of Fit (one)
- Test for Association, Test for Independence, Test for Homogeneity (two)

Advanced Numeric Methods

- One-Way ANOVA, 1-Way ANOVA, 1-Way Analysis of Variance, ANOVA for difference in means (one)
- Two-Way ANOVA, 2-Way ANOVA, 2-Way Analysis of Variance (two)
- Simple Regression, Regression, Linear Regression, Least Squares Regression (none)
- Multiple Regression (none)

Hypothesis Testing Approaches

- The probability value approach rejects H_0 if the p-value is smaller than α. The default α is 0.05.
- The confidence interval rejects H_0 if the claimed value falls outside the confidence interval.
- The classical approach rejects H_0 if the test statistic is more extreme than the critical value(s).

Decisions, Conclusions, and Best Statements

- The **decision** is always about the null hypothesis. Reject H_0 when there is enough evidence and retain H_0 when there is not enough evidence.
- The **conclusion** is a template statement followed by a claim:
  There (is | is not) enough evidence to (reject | support) the claim that ...
- The **best statement** is a correct, simple, and strong (when possible) statement. Write it in a clear, understandable way that avoids any statistical jargon.