Scenario	One Categorical Response	One Quantitative Response or Paired Differences	Two Categorical Variables	Quant. Response and Categ. Explanatory (independent samples)	Two Quantitative Variables
Type of plot	Bar plot	Dotplot, histogram, boxplot	Segmented bar plot, Mosaic plot	Side-by-side boxplots, Stacked dotplots or histograms	Scatterplot
Summary measure	Proportion	Mean or Mean difference	Difference in proportions	Difference in means	Slope or correlation
Parameter notation	π	μ or μ_d	$\pi_1 - \pi_2$	$\mu_1 - \mu_2$	β_1 or ρ
Statistic notation	$\hat{p}$	$\bar{x}$ or $\bar{x}_d$	$\widehat{p_1} - \widehat{p_2}$	$\bar{x}_1 - \bar{x}_2$	b_1 or r
Null hypothesis	$H_0: \pi = \pi_0$	$H_0: \mu = \mu_0$ or $H_0: \mu_d = 0$	$H_0: \pi_1 - \pi_2 = 0$	$H_0: \mu_1 - \mu_2 = 0$	$H_0: \beta_1 = 0$ or $H_0: \rho = 0$
Conditions for simulation-based methods	Independent cases	Independent cases	Independent cases (within and between groups)	Independent cases (within and between groups)	Independent cases; Linear form
Simulation test (how to generate a null distn) p-value = proportion of null simulations at or beyond (H_A direction) the observed statistic	Spin spinner with probability equal to π_0, n times or draw with replacement n times from a deck of cards created to reflect π_0 as probability of success. Plot the proportion of successes. Repeat 10000 times. Centered at π_0	Shift the original data by adding $(\mu_0 - \bar{x})$ or $(0 - \bar{x}_d)$. Sample with replacement from the shifted data n times. Plot sample mean or sample mean difference. Repeat 10000 times. Centered at μ_0 for a single quantitative response or 0 for paired data.	Label cards with response values from original data; mix cards together; shuffle into two new groups of sizes n_1 and n_2. Plot difference in proportion of successes. Repeat 10000 times. Centered at 0.	Label cards with response variable values from original data; mix cards together; shuffle into two new groups of sizes n_1 and n_2. Plot difference in means. Repeat 10000 times. Centered at 0.	Separate the (x,y) pairs. Hold the x values constant; shuffle new y's to x's. Find the regression line for shuffled data; plot the slope or the correlation for the shuffled data. Repeat 10000 times. Centered at 0.
Bootstrap CI (how to generate a boot. distn) X% CI: $\left(\frac{1-X}{2}\%tile, \left(X+\frac{1-X}{2}\right)\%tile\right)$	Label n cards with the original responses. Randomly draw with replacement n times. Plot the resampled proportion of successes. Repeat 10000 times. Centered at $\hat{p}$.	Label n cards with the original responses. Randomly draw with replacement n times. Plot the resampled mean difference. Repeat 10000 times. Centered at $\bar{x}$ for a single quantitative response or $\bar{x}_d$ for paired data.	Label n_1 cards with the original responses from group 1 and n_2 cards with the original responses from group 2. Keep groups separate. Randomly draw with replacement n_1 times from group 1 and n_2 times from group 2. Plot the resampled difference in proportion of successes. Repeat 10000 times. Centered at $\widehat{p_1} - \widehat{p_2}$	Label n_1 cards with the original responses from group 1 and n_2 cards with the original responses from group 2. Keep groups separate. Randomly draw with replacement n_1 times from group 1 and n_2 times from group 2. Plot the resampled difference in means. Repeat 10000 times. Centered at $\bar{x}_1 - \bar{x}_2$.	Label n cards with the original (explanatory, response) pairs. Randomly draw with replacement n times. Plot the resampled slope or correlation. Repeat 10000 times. Centered at b_1 for slope or r for correlation.
Theory-based distribution	Standard Normal	t- distribution with $n-1$ df	Standard Normal	t- distribution with min of $n_1 - 1$ or $n_2 - 1$ df	t- distribution with $n-2$ df
Conditions for theory-based hypothesis tests and confidence intervals	Independent cases; Number of successes and number of failures in the sample both at least 10.	Independent cases; $n < 30$ with no clear outliers OR $30 \le n < 100$ with no extreme outliers OR $n \ge 100$	Independence (within and between groups); Number of successes and number of failures in EACH sample all at least 10. (All four cell counts at least 10.)	Independent cases (within and between groups); In each sample, $n < 30$ with no clear outliers OR $30 \le n < 100$ with no extreme outliers OR $n \ge 100$	Linear form; Independent cases; Nearly normal residuals; Variability around the regression line is roughly constant.
Theory-based standardized statistic (test statistic)	$Z = \frac{\hat{p} - \pi_0}{SE_0(\hat{p})}$ $SE_0(\hat{p}) = \sqrt{\frac{\pi_0 \times (1-\pi_0)}{n}}$	$T = \frac{\bar{x} - \mu_0}{SE(\bar{x})}$ OR $T = \frac{\bar{x}_d - 0}{SE(\bar{x}_d)}$ $SE(\bar{x}) = \frac{s}{\sqrt{n}}, SE(\bar{x}_d) = \frac{s_d}{\sqrt{n}}$	$Z = \frac{\widehat{p_1} - \widehat{p_2} - 0}{SE_0(\widehat{p_1} - \widehat{p_2})}$ $SE_0(\widehat{p_1} - \widehat{p_2}) = \sqrt{\widehat{p_{pool}} \times (1 - \widehat{p_{pool}}) \times \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$	$T = \frac{\bar{x}_1 - \bar{x}_2 - 0}{SE(\bar{x}_1 - \bar{x}_2)}$ $SE(\bar{x}_1 - \bar{x}_2) = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$	$T = \frac{b_1 - 0}{SE(b_1)}$ $SE(b_1)$ is the reported standard error (std. error) of the slope term in the lm() output from R.
Theory-based confidence interval	$\hat{p} \pm z^* \times SE(\hat{p})$ $SE(\hat{p}) = \sqrt{\frac{\hat{p} \times (1-\hat{p})}{n}}$	$\bar{x} \pm t^* \times SE(\bar{x})$ $\bar{x}_d \pm t^* \times SE(\bar{x}_d)$ $SE(\bar{x}) = \frac{s}{\sqrt{n}}, SE(\bar{x}_d) = \frac{s_d}{\sqrt{n}}$	$\widehat{p_1} - \widehat{p_2} \pm z^* \times SE(\widehat{p_1} - \widehat{p_2})$	$\bar{x}_1 - \bar{x}_2 \pm t^* \times SE(\bar{x}_1 - \bar{x}_2)$ $SE(\bar{x}_1 - \bar{x}_2) = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$	$b_1 \pm t^* \times SE(b_1)$ $SE(b_1)$ is the reported standard error (std. error)

			$SE(\widehat{p_1} - \widehat{p_2}) = \sqrt{\frac{\widehat{p_1} \times (1 - \widehat{p_1})}{n_1} + \frac{\widehat{p_2} \times (1 - \widehat{p_2})}{n_2}}$		of the slope term in the lm() output from R.