

Variables of Interest	Parameter of Interest	Statistic of Interest	Descriptive Methods	Inferential Methods	Assumptions for Inferential Methods
<b>Single Numerical Variable</b>	True Population Mean ( $\mu$ )	Sample Mean ( $\bar{x}$ )	<ul style="list-style-type: none"> <li>▪ Report measures of center and variation</li> <li>▪ Dotplot, boxplot, histogram, etc.</li> <li>▪ Describe shape + outliers</li> </ul>	<ul style="list-style-type: none"> <li>▪ One-sample t-test</li> <li>▪ CI for population mean</li> </ul>	<ul style="list-style-type: none"> <li>▪ Either the sample size is fairly large or the data reasonably follow a normal distribution</li> </ul>
<b>Comparing Numerical Variable across Two Categories of a Categorical Variable (INDEPENDENT samples)</b>	Difference in True Population Means ( $\mu_1 - \mu_2$ )	Difference in Sample Means ( $\bar{x}_1 - \bar{x}_2$ )	<ul style="list-style-type: none"> <li>▪ Report <math>\bar{x}_1</math>, <math>\bar{x}_2</math>, and <math>s_1</math>, <math>s_2</math></li> <li>▪ Side-by-side boxplots, facet histograms, etc.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Two-sample t-test</li> <li>▪ CI for <math>\mu_1 - \mu_2</math></li> </ul>	<ul style="list-style-type: none"> <li>▪ Observations are independent</li> <li>▪ Either both sample sizes are fairly large or the data from each group reasonably follow a normal distribution</li> </ul>
<b>Comparing Numerical Variable across Two Categories of a Categorical Variable (DEPENDENT samples)</b>	True Mean Difference ( $\mu_d$ )	Sample Mean Difference ( $\bar{x}_d$ )	<ul style="list-style-type: none"> <li>▪ Report measures of center and variation for the differences</li> <li>▪ Dotplot, boxplot, histogram, etc.</li> </ul>	<ul style="list-style-type: none"> <li>▪ paired t-test</li> <li>▪ CI for population mean difference</li> </ul>	<ul style="list-style-type: none"> <li>▪ Either the number of pairs is fairly large or the differences reasonably follow a normal distribution</li> </ul>