

## Wrap-Up (Inference for Relationships)

### Video

**Video:** [Full Course Overview & Summary](#) (68:32)

**Learn By Doing:** [Supplemental Examples and Exercises for Unit 4B](#)  
([Non-interactive Version](#))

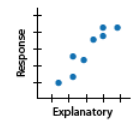
We've just completed the part of the course about the inferential methods for relationships between variables. The overall goal of inference for relationships is to assess whether the observed data provide evidence of a significant relationship between the two variables (i.e., a true relationship that exists in the population).

Much like the unit about relationships in the Exploratory Data Analysis (EDA) unit, this part of the course was organized according to the role and type classification of the two variables involved.

However, unlike the EDA unit, when it comes to inferential methods, we further distinguished between three sub-cases in case  $C \rightarrow Q$ , so essentially we covered 5 cases in total.

The following very detailed role-type classification table summarizes both EDA and inference for the relationship between variables:

Role-Type Classification Table

		Response																
Explanatory		Categorical	Quantitative															
		<b>C → C</b> <b>To Visualize</b> 2-Way Table <table><tr><th></th><th>Outcome A</th><th>Outcome B</th><th>Outcome C</th></tr><tr><td>Group 1</td><td></td><td></td><td></td></tr><tr><td>Group 2</td><td></td><td></td><td></td></tr><tr><td>Group 3</td><td></td><td></td><td></td></tr></table> <b>Numerical Summary</b> Conditional Percentages  <b>Formal Inference</b> Chi-Square test for Independence		Outcome A	Outcome B	Outcome C	Group 1				Group 2				Group 3			
		Outcome A	Outcome B	Outcome C														
Group 1																		
Group 2																		
Group 3																		
Quantitative	<b>Q → C</b> <b>Logistic Regression</b> Not covered in this course	<b>Q → Q</b> <b>To Visualize</b> Scatterplot  Response Explanatory  <b>Numerical Summaries</b> Correlation Coefficient  <b>Formal Inference</b> Regression line. Significance test for the linear relationship (t-test for the slope).																

## Case C-Q

Here is a summary of the tests for the scenario where  $k = 2$ .

Independent Samples (More Emphasis)	Dependent Samples (Less Emphasis)
<b>Standard Tests</b> <ul style="list-style-type: none"> <li>Two Sample T-Test Assuming Equal Variances</li> <li>Two Sample T-Test Assuming Unequal Variances</li> </ul> Non-Parametric Test <ul style="list-style-type: none"> <li>Mann-Whitney U (or Wilcoxon Rank-Sum) Test</li> </ul>	<b>Standard Test</b> <ul style="list-style-type: none"> <li>Paired T-Test</li> </ul> Non-Parametric Tests <ul style="list-style-type: none"> <li>Sign Test</li> <li>Wilcoxon Signed-Rank Test</li> </ul>

Here is a summary of the tests for the scenario where  $k > 2$ .

Independent Samples (Only Emphasis)	Dependent Samples (Not Discussed)
<b>Standard Tests</b> <ul style="list-style-type: none"> <li>One-way ANOVA (Analysis of Variance)</li> </ul> Non-Parametric Test <ul style="list-style-type: none"> <li>Kruskal-Wallis One-way ANOVA</li> </ul>	<b>Standard Test</b> <ul style="list-style-type: none"> <li>Repeated Measures ANOVA (or similar)</li> </ul>

## Case C-C

Independent Samples (Only Emphasis)	Dependent Samples (Not Discussed)
<b>Standard Tests</b> <ul style="list-style-type: none"><li>• <b>Continuity Corrected Chi-square Test for Independence</b> (2×2 case)</li><li>• <b>Chi-square Test for Independence (RxC case)</b></li></ul> Non-Parametric Test <ul style="list-style-type: none"><li>• Fisher's exact test</li></ul>	<i>Standard Test</i> <ul style="list-style-type: none"><li>• <i>McNemar's Test – 2×2 Case</i></li></ul>

## Case Q-Q

Independent Samples (Only Emphasis)	Dependent Samples (Not Discussed)
<b>Standard Tests</b> <ul style="list-style-type: none"><li>• <b>Test for Significance of Pearson's Correlation Coefficient</b></li><li>• <b>Test for Significance of the Slope in Linear Regression</b></li></ul> Non-Parametric Test <ul style="list-style-type: none"><li>• Test for Significance of Spearman's Rank Correlation</li></ul>	<i>Standard Test</i> <ul style="list-style-type: none"><li>• <i>Not Covered (Longitudinal Data Analysis, etc.)</i></li></ul>

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