Correlational Research in Jamovi

A Guide for Chapter 5: Examining Relationships Between Variables

# Welcome to Correlational Research!

You've come a long way! In Chapter 3, you learned to describe data. In Chapter 4, you learned to compute total scores and assess reliability. Now in Chapter 5, we're taking the next big step: examining **relationships between variables**.

This is where research gets interesting. Instead of just describing what people are like, we can now ask questions like:

* Do people with higher anxiety also tend to have higher depression?
* Does age relate to symptoms of mental health?
* Do men and women differ in depression scores?

**🔄 Building on What You Know:** You'll use your skills from previous chapters — opening files, running Descriptives, computing variables — and add new analytical tools to your toolkit!

## What You'll Learn in This Chapter

* **Correlations (Pearson's r)** — for relationships between two continuous variables
* **Scatterplots** — to visualize correlational relationships
* **Correlation matrices** — to see all relationships at once
* **T-tests** — to compare groups on a continuous variable
* **Chi-square tests** — for relationships between categorical variables

# Getting Started: Opening the Chapter 5 Data

Good news! You can use the same clinical dataset from Chapter 4 (with the total scores you already computed), or download the pre-prepared file.

1. **Go to the OSF page** (https://osf.io/a8kev/) and find the "Ch. 5 – Correlational Research" folder.
2. **Download** the .csv version of RITC\_DATA\_CH05\_ClinicalStudy
3. **Open it in Jamovi** using ☰ → Open

# Research Activity 5.1: Running Your First Correlation

Let's examine whether anxiety and depression are related. Based on previous research, we'd expect a **positive correlation.** People with higher anxiety should also tend to have higher depression.

## Step-by-Step: Running a Correlation in Jamovi

1. **Click "Analyses"** in the top menu.
2. **Select "Regression"** from the dropdown.
3. **Click "Correlation Matrix."**
4. **Move your anxiety and depression variables** (e.g., TotalAnxiety and TotalDepression) to the Variables box.
5. **Look at the Results panel:** you'll see the correlation coefficient (r) and p-value. It should look like the image below.

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**💡 Expected Result:** You should find r = .82 (a strong positive correlation). This means anxiety and depression are highly related; people with more anxiety tend to have more depression.

## Creating a Scatterplot to Visualize the Relationship

A scatterplot shows each participant as a dot, with one variable on each axis. It's a great way to "see" the correlation.

1. **In the Correlation Matrix window, find the area labeled "Plot"**
2. **Check "Correlation matrix"** under the Plot options
3. **A scatterplot matrix will appear** showing the relationship between your variables (see image below).

**📊 What to Look For:** In a positive correlation, the dots form a pattern going from lower-left to upper-right. The tighter the dots cluster around an imaginary line, the stronger the correlation.

A screen shot of a graph

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# Research Activity 5.2: Examining Negative Correlations

Now let's look at age and mental health. Research suggests older adults tend to have **lower** levels of anxiety and depression, which is a negative correlation.

## Step-by-Step

1. **Go to Analyses → Regression → Correlation Matrix**
2. **Add Age, TotalAnxiety, and TotalDepression** to the Variables box
3. **Examine the correlations with Age.** It should look like the image below.

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**💡 Expected Results:** Age and Depression: r = -.20 (small negative correlation). Age and Anxiety: r = -.23 (small negative correlation). The negative signs indicate that older people tend to report lower anxiety and depression.

# Research Activity 5.3: Creating a Full Correlation Matrix

When you have many variables, a **correlation matrix** lets you see all relationships at once. This is incredibly useful for exploring patterns in your data.

## Step-by-Step: Building a Correlation Matrix

* **Go to Analyses → Regression → Correlation Matrix**
* **Add ALL variables you want to examine:** Depression, Anxiety, Sleep, Trauma, Age, Income, Education.
* **Check options:**

• "Report significance" — shows p-values. On by default.

•"Flag significant correlations" — adds asterisks to significant results

• "N" — shows sample size for each correlation

The asterisks for significant correlations and N for sample size are not necessary. But if they help you make sense of the table, check the boxes to turn them on.

### Reading the Correlation Matrix

* **The diagonal always shows 1.00** (each variable correlates perfectly with itself). In Jamovi these boxes are marked with a dash (—).
* **Asterisks (\*) indicate statistical significance** (\* = p < .05, \*\* = p < .01)
* **The matrix is symmetrical,** so you only need to read one half

Your result should look something like what is below:

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# Research Activity 5.4: Comparing Groups with T-Tests

What if you want to compare the association between two groups? For example: Do men and women differ in depression scores? For this kind of analysis, we use an **Independent Samples T-Test**.

A t-test compares the **average scores** of two groups and tells us if the difference is statistically significant. The t-test is necessary because gender is a categorical variable.

## Step-by-Step: Running a T-Test in Jamovi

Jamovi can only conduct a t-test when a variable has two levels. Because the gender question allowed people to identify in multiple ways or to say “I choose not to disclose” we will need to create a filter before conducting the analysis. The filter will select only people who reported man or woman as their gender.

1. **Click “Data”** and then **“Filters.”** The drop down menu should appear like the image below:

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1. To **exclude a level of the variable**, type the following expression into the function box:

gender ! = "3"

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1. **Click "Analyses"** in the top menu.
2. **Select "T-Tests"** from the dropdown.
3. **Click "Independent Samples T-Test."**
4. **Move your continuous variable** (e.g., TotalDepression) to the "Dependent Variables" box.
5. **Move your grouping variable** (e.g., Gender) to the "Grouping Variable" box. Then the analysis will run.

### Getting More Information

Expand the options to get additional useful statistics:

* **Under "Tests":** Keep "Student's" checked (this is the standard t-test)
* **Under "Additional Statistics":** Check "Mean difference," "Effect size" (Cohen's d), and "Descriptives." The result should look like the image below.

**💡 Expected Result:** Women (M = 7.27) score higher than men (M = 6.10) on depression, t = 2.38, p < .05, d = 0.21. The effect size (d = 0.21) is small but the difference is statistically significant.

A screenshot of a test results

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## Understanding Effect Sizes: Cohen's d

Just like correlations have guidelines for "small, medium, large," so do t-tests. We use **Cohen's d** to describe how big the difference between groups is:

| **Cohen's d** | **Effect Size** | **Interpretation** |
| --- | --- | --- |
| 0.2 | Small | Subtle but real difference |
| 0.5 | Medium | Noticeable difference |
| 0.8+ | Large | Obvious, substantial difference |

# Research Activity 5.5: Chi-Square Tests

What if **both** variables are categorical? For example: Are women more likely than men to experience **severe** depression (yes/no)? For this, we use a **Chi-Square test**.

## First: Creating a Categorical Variable

If you need to create a categorical variable from a continuous one (like "severe depression" from depression scores), you'll need to use the recode function.

* **Go to Data → Highlight the Depression Variable → Transform**
* **A dropdown will appear with options for transforming the variable. Type a new variable name, such as “severe\_dep,” and a description into the appropriate boxes.**

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* Beneath the description, there is a “Source variable” box and a dropdown menu labeled “using transform.” Click on the dropdown menu next to “using transform” and select “Create New Transform…”

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* **In the new box, enter the name of the transformation and describe what the function does.** This description may be similar to how you described the variable. Then, use the “+ Add recode condition” options to enter two recode statements.

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* **Create a new computed variable** using an IF function:

IF $source >= 20 Use 1

IF $source <= 19 Use 0

*This creates: 1 = severe depression, 0 = not severe*

**💡 Tip:** You may have to click around or enter these values multiple times for them to take effect. But, you can see when the transformation is complete by keeping an eye on the variable within the data view. It should show 0’s and 1’s for all participants when the function is complete. Then, you should spot check a few values.

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## Step-by-Step: Running a Chi-Square Test

* **Go to Analyses → Frequencies → Independent Samples**
* **Move one categorical variable to "Rows"** (e.g., Gender)
* **Move the other to "Columns"** (e.g., Severe\_dep)
* **Under "Statistics," check "χ² test"**
* **Under "Cells," check "Row" percentages** to compare rates between groups. The result should look like the image below.

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**💡 Expected Result:** 5.6% of women vs. 0.7% of men experience severe depression. χ² = 10.71, p < .05, indicating a significant relationship between gender and severe depression.

# Quick Reference: Which Test Should I Use?

| **Variable Types** | **Use This Test** | **Jamovi Location** |
| --- | --- | --- |
| Continuous + Continuous | **Correlation (Pearson's r)** | Regression → Correlation Matrix |
| Categorical + Continuous | **T-Test** | T-Tests → Independent Samples |
| Categorical + Categorical | **Chi-Square (χ²)** | Frequencies → Independent Samples |

# How to Report Your Results

The textbook provides templates for writing up your findings. Here's a quick guide:

## Reporting a Correlation

*"There was a significant positive correlation between anxiety and depression, r(524) = .82, p < .05, indicating a strong relationship between the two variables."*

## Reporting a T-Test

*"Women (M = 7.27, SD = 6.49) reported significantly higher depression than men (M = 6.10, SD = 5.31), t(525) = 2.38, p < .05, d = 0.21."*

## Reporting a Chi-Square

*"There was a significant association between gender and severe depression, χ²(1) = 10.71, p < .05. Women were more likely to experience severe depression (5.6%) than men (0.7%)."*

Heinz Dilemma Guided Project

*Moral Foundations & The Heinz Dilemma*

# Project Overview

In this guided project, you'll investigate whether people's **moral foundations** predict their judgments about the Heinz dilemma. This project builds on what you learned in Chapter 3 (descriptive statistics) and earlier in Chapter 5 (correlations and t-tests).

**What you'll do:**

* Calculate scores for the five moral foundations (Care, Fairness, Loyalty, Authority, Sanctity)
* Create a correlation matrix to examine relationships between the moral foundations and moral acceptability ratings
* Run t-tests comparing moral foundation scores between "yes" and "no" groups
* Create bar graphs to visualize group differences

**🔄 Skills You'll Use:** Computing variables (Ch. 4), correlations, t-tests, and creating visualizations (Ch. 5). This project ties everything together!

# Step 1: Download and Open the Data

1. **Go to the OSF page:** https://osf.io/a8kev/
2. **Navigate to the "Ch. 5 – Correlational Research" folder**
3. **Download** the Heinz Dilemma data file (.csv version if available, or .sav)
4. **Open Jamovi** and load the file (☰ → Open)

Once opened, you'll see data from 200 participants who completed the Moral Foundations Questionnaire (MFQ-30) and answered questions about the Heinz dilemma.

# Step 2: Calculate Moral Foundation Scores

The MFQ-30 has 30 items total — **6 items for each of the 5 moral foundations**. You need to calculate the **average** of each foundation's items to create subscale scores.

## The Five Moral Foundations

| **Foundation** | **What It Measures** |
| --- | --- |
| **Care/Harm** | Concern for others' suffering; compassion and kindness |
| **Fairness/Cheating** | Justice, rights, and fair treatment; reciprocity |
| **Loyalty/Betrayal** | Group loyalty and patriotism; self-sacrifice for the group |
| **Authority/Subversion** | Respect for authority, tradition, and social hierarchy |
| **Sanctity/Degradation** | Purity and avoiding contamination; disgust sensitivity |

## Step-by-Step: Computing the Harm/Care Score

1. **Click on the "Data" tab** at the top of Jamovi
2. **Click "Compute"** to create a new computed variable. The compute dialog menu will drop down.
3. **Name the variable:** Harm
4. **In the formula box, enter:**

MEAN(Harm1, Harm2, Harm3, Harm4, Harm5, Harm6)

1. **Press Enter** to apply

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**💡 Why MEAN instead of SUM?** Using MEAN keeps scores on the original 0-5 scale, making them easier to interpret. A score of 4.5 means someone strongly endorses that foundation on average.

## Repeat for the Other Four Foundations

Create computed variables for each foundation using the same process:

| **Variable Name** | **Formula** |
| --- | --- |
| Harm | MEAN(Harm1, Harm2, Harm3, Harm4, Harm5, Harm6) |
| Fairness | MEAN(Fairness1, Fairness2, Fairness3, Fairness4, Fairness5, Fairness6) |
| Loyalty | MEAN(Loyalty1, Loyalty2, Loyalty3, Loyalty4, Loyalty5, Loyalty6) |
| Authority | MEAN(Authority1, Authority2, Authority3, Authority4, Authority5, Authority6) |
| Purity | MEAN(Purity1, Purity2, Purity3, Purity4, Purity5, Purity6) |

**⚠️ Check Your Variable Names!** The exact variable names in your dataset might differ slightly (e.g., Harm\_1 vs Harm1). Be sure you have the names and sentence case (lower vs upper case) correct for each variable.

# Step 3: Create a Correlation Matrix

Now let's see how the moral foundations relate to judgments of **moral acceptability** (how acceptable participants thought it was for Heinz to steal the drug).

## Step-by-Step Instructions

1. **Go to Analyses → Regression → Correlation Matrix**
2. **Move all FIVE moral foundation variables** to the Variables box:

Harm, Fairness, Loyalty, Authority, Sanctity

1. **Also add the "Acceptability" variable** (moral acceptability rating)
2. **Under options, check:**

• "Flag significant correlations"

• "Report significance" (to see p-values)

1. **Examine the results** — look at the correlations between each moral foundation and Acceptability. The table should look like the image below.

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### What to Look For

* **Significant correlations** will have asterisks (\* or \*\*)
* **Positive correlations** mean higher foundation scores → higher acceptability ratings
* **Negative correlations** mean higher foundation scores → lower acceptability ratings

**🎯 Hypothesis Check:** Does your hypothesized moral foundation show a significant correlation with acceptability? Record the r value and p-value for your write-up!

# Step 4: Compare Groups with T-Tests

Now let's see if people who said Heinz **should** steal the drug differ from those who said he **should not** on the moral foundations.

## Step-by-Step: Running the T-Test

1. **Go to Analyses → T-Tests → Independent Samples T-Test**
2. **Move your moral foundation variable(s)** to the "Dependent Variables" box

*(Start with the foundation you hypothesized about)*

1. **Move the "Steal" variable** (Yes/No decision) to the "Grouping Variable" box
2. **Under "Additional Statistics," check:**

• "Mean difference"

• "Effect size" (Cohen's d)

• "Descriptives" (to get means and SDs for each group)

1. **Examine the results.** They should look like what is below.

**A screenshot of a test

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### Understanding the Output

The t-test output will show you:

* **Group Statistics:** Mean (M) and Standard Deviation (SD) for each group
* **t-value:** The test statistic
* **p-value:** If p < .05, the difference is statistically significant
* **Cohen's d:** Effect size (0.2 = small, 0.5 = medium, 0.8 = large)

**💡 Tip:** You can add multiple moral foundations to the Dependent Variables box at once to run all the t-tests simultaneously!

# Step 5: Create Bar Graphs

A bar graph helps visualize the differences between groups. You'll create a graph showing moral foundation scores for "Yes" vs. "No" groups.

## Option A: Quick Bar Plot from Descriptives

The easiest way to get a basic visualization:

1. **Go to Analyses → Exploration → Descriptives**
2. **Move your moral foundation variable** to Variables
3. **Move "Steal"** to "Split by"
4. **Under Plots, check "Bar plot"**

The result should look like this:

A graph of a diagram

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# Step 6: Writing Up Your Results

Using the templates below, report the results of your analysis.

## Reporting the Correlation

*"I conducted a Pearson correlation analysis to examine the relationship between [foundation name] and judgments of moral acceptability in the Heinz dilemma. There was a [significant/non-significant] [positive/negative] correlation between [foundation name] and moral acceptability ratings, r(198) = [value], p = [value]."*

## Reporting the T-Test

*"I conducted an independent samples t-test to compare [foundation name] scores between participants who said Heinz should steal the drug and those who said he should not. There was a [significant/non-significant] difference in scores for yes (M = [value], SD = [value]) and no (M = [value], SD = [value]) groups; t(198) = [value], p = [value]."*

# Project Checklist

Before submitting, make sure you have:

* ☐ Computed all five moral foundation scores (Harm, Fairness, Loyalty, Authority, Sanctity)
* ☐ Created a correlation matrix with all foundations and Acceptability
* ☐ Run t-tests comparing Yes/No groups on moral foundation scores
* ☐ Created a bar graph with error bars
* ☐ Written up your correlation result using the template
* ☐ Written up your t-test result using the template
* ☐ Interpreted whether your hypotheses were supported

**🎉 You've Got This!** This project brings together everything you've learned about computing variables, running correlations, and conducting t-tests. Take it step by step, and don't hesitate to refer back to the main Chapter 5 Jamovi guide if you need a refresher on any technique.

# Summary

Congratulations! You've learned a powerful set of analytical tools in this chapter:

* **Correlations** — to examine relationships between continuous variables
* **Scatterplots** — to visualize correlational relationships
* **Correlation matrices** — to explore multiple relationships at once
* **T-tests** — to compare two groups
* **Chi-square tests** — to examine relationships between categorical variables

Remember: correlations tell us that variables are **related**, but they don't prove that one **causes** the other. That's a key concept you'll explore more in Chapter 6!

**📚 Looking Ahead:** In Chapter 6, you'll learn about causal inference — how researchers try to determine whether one variable actually causes changes in another. You'll build on the correlational skills you learned here!