# MSc Conversion in Psychological Studies

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# Overview

In RM2 you will learn core data skills that allow you to manipulate and analyse quantitative data, a key component of an accredited psychology programme. In addition to this book, there are video walkthroughs available on Moodle and you can use Teams to ask any R related questions that you have.

The ability to work with quantitative data is a key skill for psychologists and by using R as our tool we can also promote reproducible research practices. Although it may seem like writing a programming script is more time-consuming than other point-and-click software you may have used, this is not the case! Once you have a script you can easily re-run your analysis without having to go through each step again manually which is a) easier and b) less likely to result in errors if you do something slightly different or forget one of the steps.

Crucially, with an analysis script other researchers can also see how you got from the raw data to the statistics you report in your final paper. Sharing analysis scripts online on sites such as the Open Science Framework is now seen as an important open science practice. Even if you don't continue with quantitative research in the future, the skills you develop on this course will allow you to evaluate quantitative research and to understand what goes on behind the scenes with data before the conclusions are presented.

## 0.1 How to use this book

For each session there will be a chapter of the book to work through as an activity. **It is crucial that you work through this book consistently throughout the term**. You will learn R much more easily if you work on it each week and give yourself time to build and practice your skills. If you are comfortable with R and/or have programming experience, please feel free to work through this book at your own pace and complete more advanced chapters.

## 0.2 Intended Learning Outcomes

By the end of this course students will be able to:

- Clean and wrangle data into appropriate forms for analysis
- Visualise data using a range of plots
- Conduct and interpret a core set of statistical tests (t-test, correlation, ANOVA, regression)

# Chapter 1

# Programming Basics

## 1.1 Introduction

In this chapter we will go over some basic programming concepts and terminology, common pitfalls, helpful hints, and where to get help. Those of you who have no programming experience should find this chapter particularly helpful, however, even if you've used R before there may be some helpful hints and tips so please make sure you read through this chapter before moving on.

We don't expect you to memorise the information that is contained in this chapter and some sections of it will make more sense when you start writing your own code - just make sure you know what help is available!

## 1.2 R and R Studio

For this course, you need two different bits of software, R and RStudio. R is a programming language that you will write code in and R Studio is an Integrated Development Environment (IDE) which makes working with R easier. Think of it as knowing English and using a plain text editor like NotePad to write a book versus using a word processor like Microsoft Word. You could do it, but it wouldn't look as good and it would be much harder without things like spell-checking and formatting. In a similar way, you can use R without R Studio but we wouldn't recommend it. The key thing to remember is that although you will do all of your work using R Studio for this course, you are actually using two pieces of software which means that from time-to-time, both of them may have separate updates.

If you're at the University of Glasgow, all computers have R and R Studio installed, however, we can only guarantee that the correct packages and updates

are installed in the Boyd Orr Level 5 and 6 psychology labs. Both pieces of softwarde are freely available so you we'd reccomend that you install them on your own machine.

If you need help installing R and R Studio, you may find this page useful.

### 1.2.1 Getting to know R Studio

R Studio has a console that you can try out code in (appearing as the bottom left window in Figure **??**), there is a script editor (top left), a window showing functions and objects you have created in the "Environment" tab (top right window in the figure), and a window that shows plots, files packages, and help documentation (bottom right).

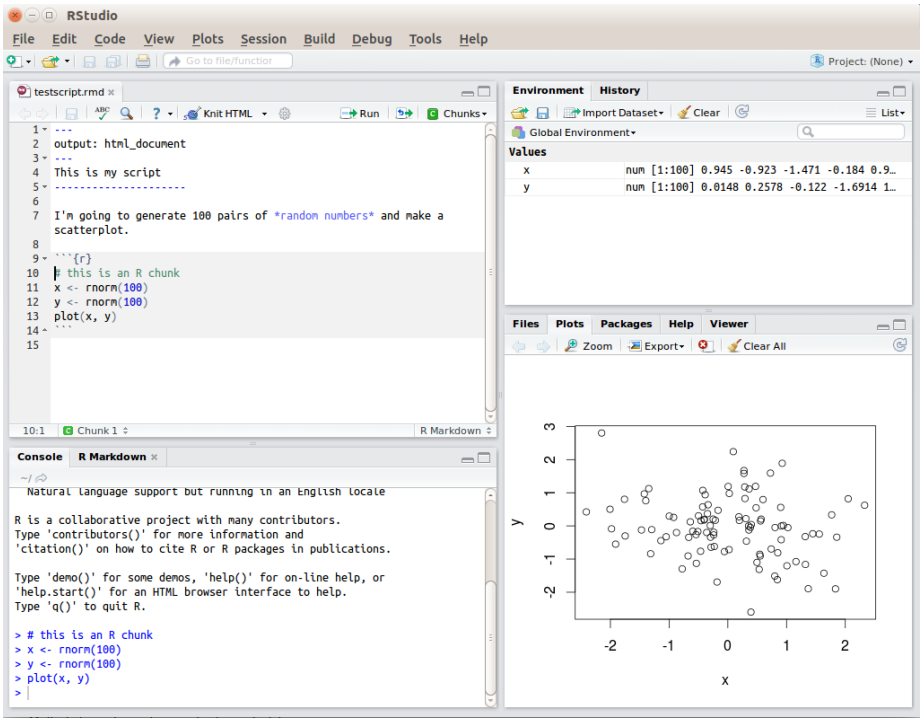


Figure 1.1: RStudio interface

You will learn more about how to use the features included in R Studio throughout this course, however, we highly recommend watching RStudio Essentials 1 from the R Studio team. The video lasts ~30 minutes and gives a tour of the main parts of R Studio.