Network Analysis in R

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Contents

Overview

Materials for the 2.5 day Network Analysis course.

This course covers skills such as installing R, opening fies, data wrangling with tidyverse, and data visualisation with ggplot2. It also introduces network analysis as a statistical concept.

Chapter 1

Starting with R

Welcome to the Course!

1.1 Overview

Installing R and opening files

In this session you will learn:

1. What is R?
2. How to install R
3. How to open files.
4. How to maniuplate data and save scripts.

1.1.1 What is R?

For network analysis, 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.

1.1.2 Base R

Install base R from https://cran.rstudio.com/. Choose the download link for your operating system (Linux, Mac OS X, or Windows).

1.1.3 R Studio

Go to https://rstudio.com and download the RStudio Desktop (Open Source License) version for your operating system under the list titled **Installers for Supported Platforms.**

1.1.4 Advantages of using R

Quickfire Questions

We have put questions throughout to help you test your knowledge. When you type in or choose the correct answer, the dashed box will change color and become solid green.

- From the following options, how do you get R on your machine? Installing Base R & R Studio Installing R Studio Installing Base R

Explain This Answer!

R is the basic package. R Studio is an add-on that make R much easier to use.

Chapter 2

Working With Data in R

2.1 Overview

This is the most basic introduction to R. The material is based on the data skills course for MSc students. Find lots and lots of useful resources here: https://gupsych.github.io/data_skills/01_intro.html Please take a look at these resources in your own time.

2.1.1 Setting Working Directory

First things first, we have to set our Working Directory to the place our file is. In RStudio we do this by hitting 'Session > Set Working Directory > Source File Location'. This lets us interact with other files that are outside of our current script (and keeps our project nice and tidy).

2.1.2 Code

RStudio generally has four panels: Current file, Console, Environment, and Viewer. You can think of the console as a place to try things out, and the file to write down ideas you want to stick around. Go to the console and type

```
x <- 1 + 5
x
```

Notice how now the environment shows we have a Value x that is 6. We have just created a variable. In the above, we would say "the variable x is assigned to 1 + 5" or "x gets 1 + 5"

Chapter 3

Network Analysis

3.1 Overview

3.2 Background

Recent thinking conceptulises mental wellbeing as comprising of environmental, psychological and social factors. Psychologists wishing to study all of these factors together may wish to consider a complexity science perspective such as network analysis.

3.3 What is a network?

A network is a set of nodes connected by a set of edges.

Several packages are used in the network analysis, including `network`, `statnet`, `igraph` and `qgraph`.

qgraph was developed in the context of psychometrics approach by Dr. Sacha Epskamp and colleagues in 2012. We will be be working with `qgraph`.

Chapter 4

Practical

4.1 Description of Data

We will work with a local dataset gathered from high school age children.

Appendix A

References

Network Analysis Cookbook - Also covers R introduction

We are grateful to PsyTeachR from the University of Glasgow for allowing us to build upon their open source teaching materials.