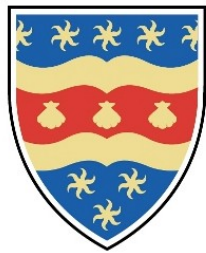


# **From SPSS to R at Plymouth Psychology**

Prof. Andy J. Wills

# From SPSS to R

In **2018**, the School of Psychology at the University of Plymouth began **teaching R to all new undergraduates.**

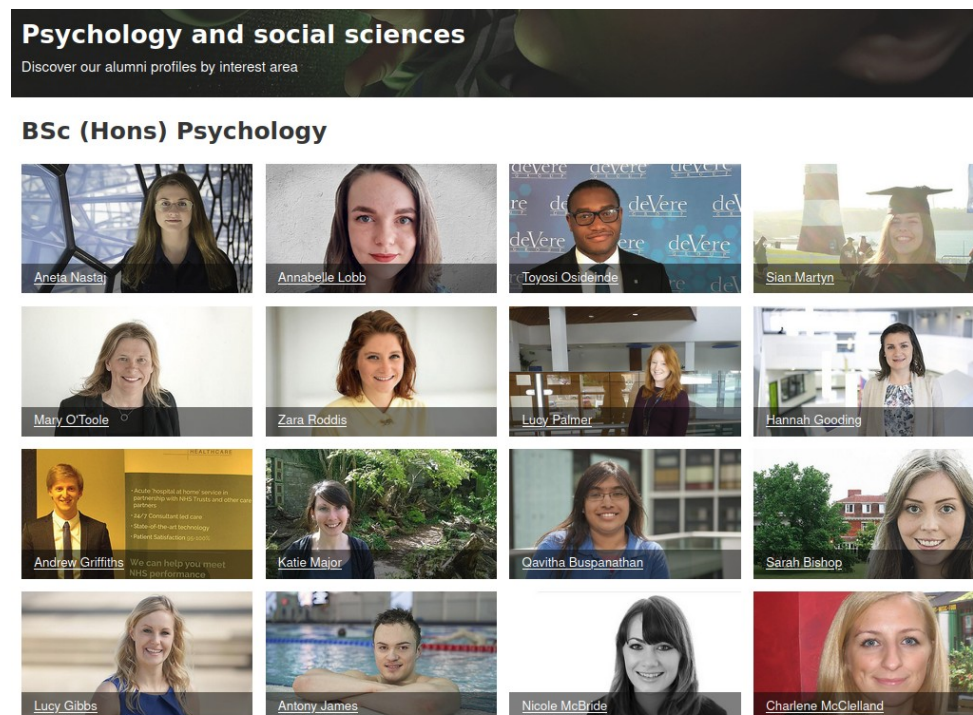


UNIVERSITY OF  
PLYMOUTH



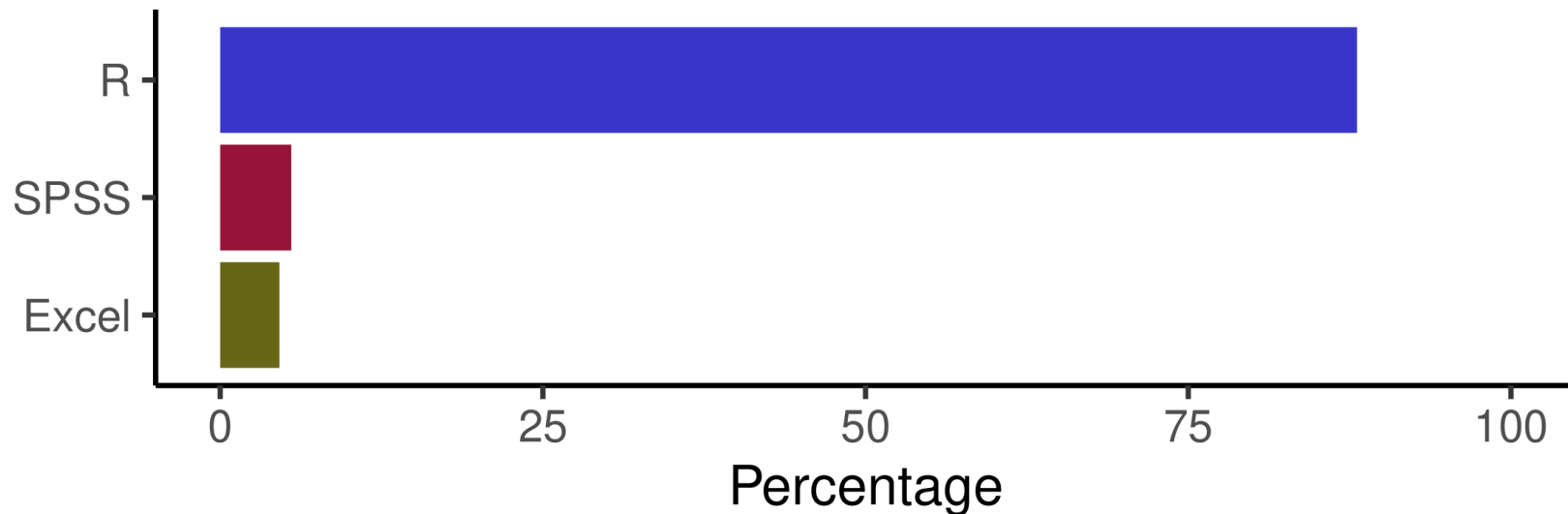
# From SPSS to R

We're typical in terms of entry grades  
(65<sup>th</sup> of 115; Guardian 2021)



# From SPSS to R

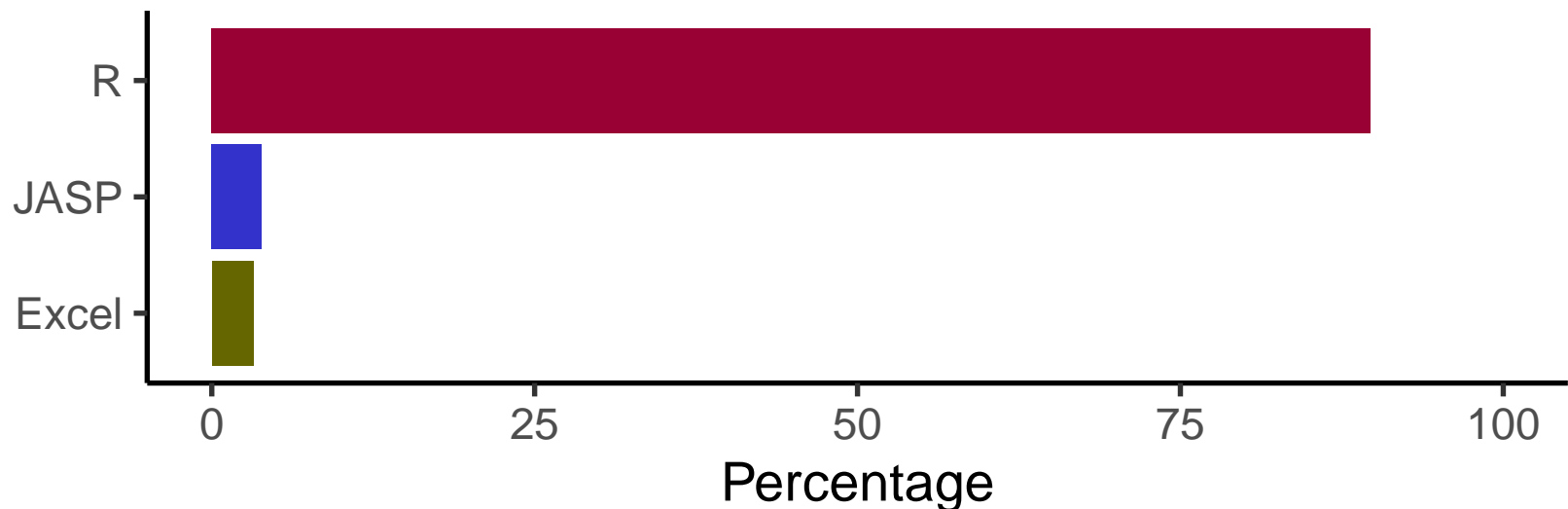
In 2021, our first R cohort graduated.  
**88% primarily used R** in their final project.



Methodology: Data comprise 2020/21 PSYC605 dissertations submitted via the DLE before the referral period (N=133). Submissions containing no quantitative analysis were excluded (N=13), as were dissertations where the software used was not apparent (N=11). Where projects involved neuroscience (N=8), results indicate the software for behavioural analysis. The graph above does not represent two cases where idiosyncratic software was clearly used (JASP, and an online chi-square calculator).

# From SPSS to R (2022 edition)

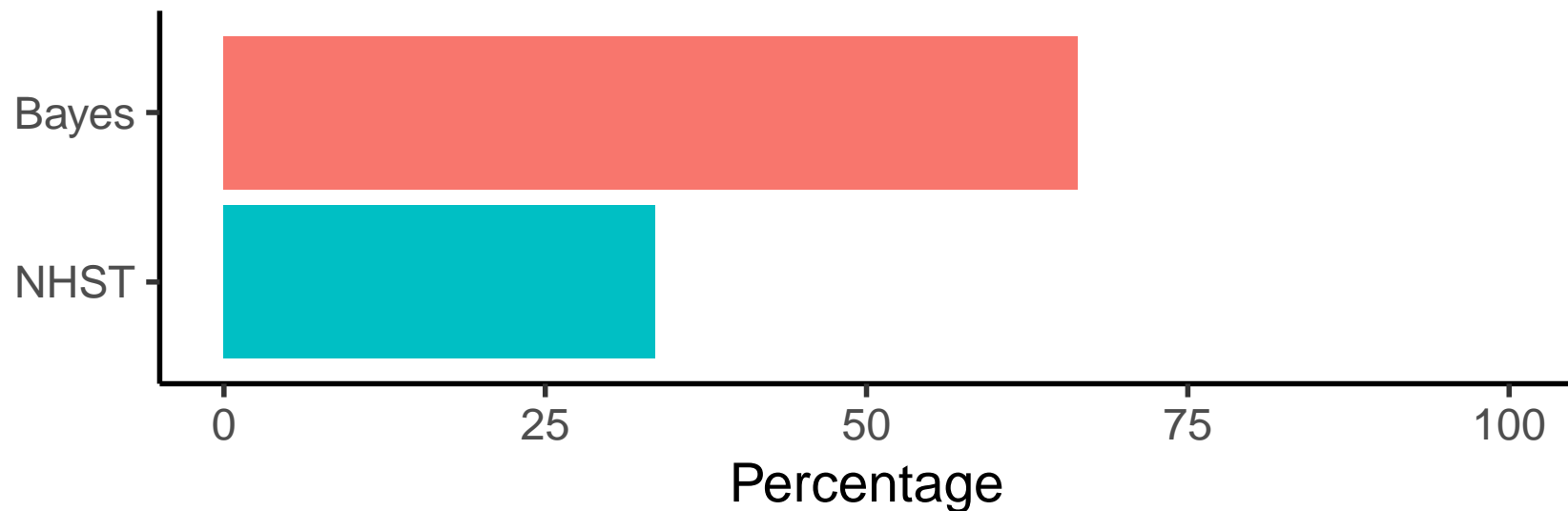
In 2022, our second R cohort graduated.  
**90% primarily used R** in their final project. SPSS didn't make the Top 3.



Methodology: Data comprise 2021/22 PSYC605 dissertations submitted via the DLE before the referral period (N=215). Submissions containing no quantitative behavioural analysis were excluded (N=26), as were dissertations where the software used was not apparent (N=33). The graph above represents the top 3 software choices, which overall account for 97% of choices. Both SPSS and Jamovi were chosen twice; Stata was chosen once.

# Majority Bayesian analysis

In 2022, **two-thirds of students used Bayesian analysis** in their final project.

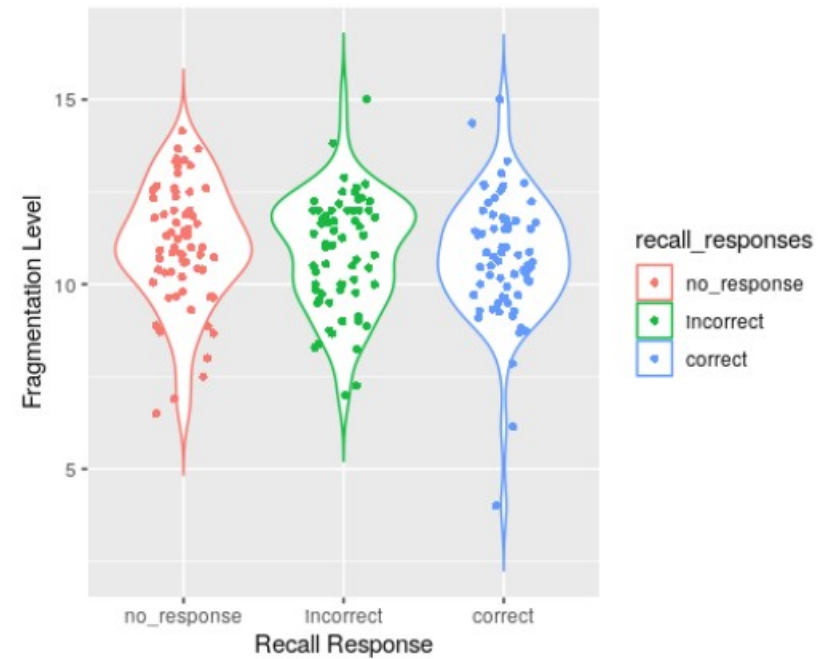
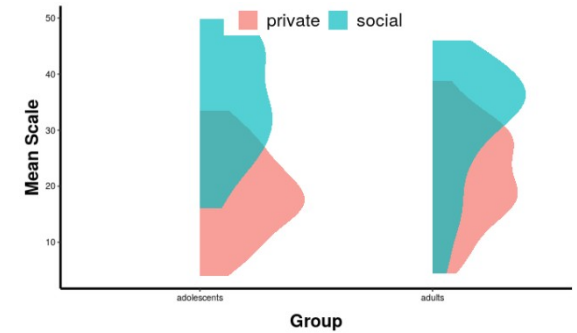
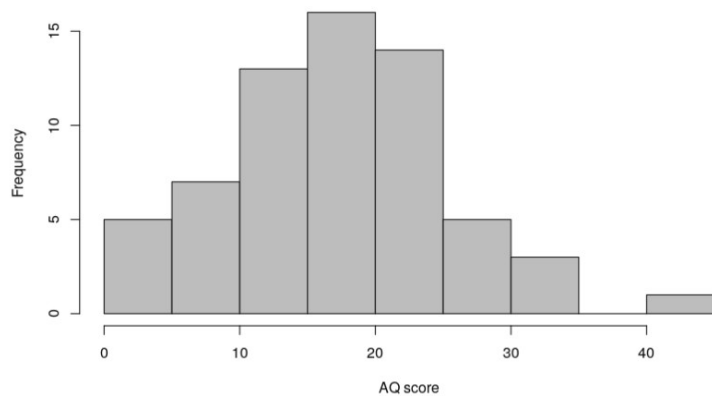
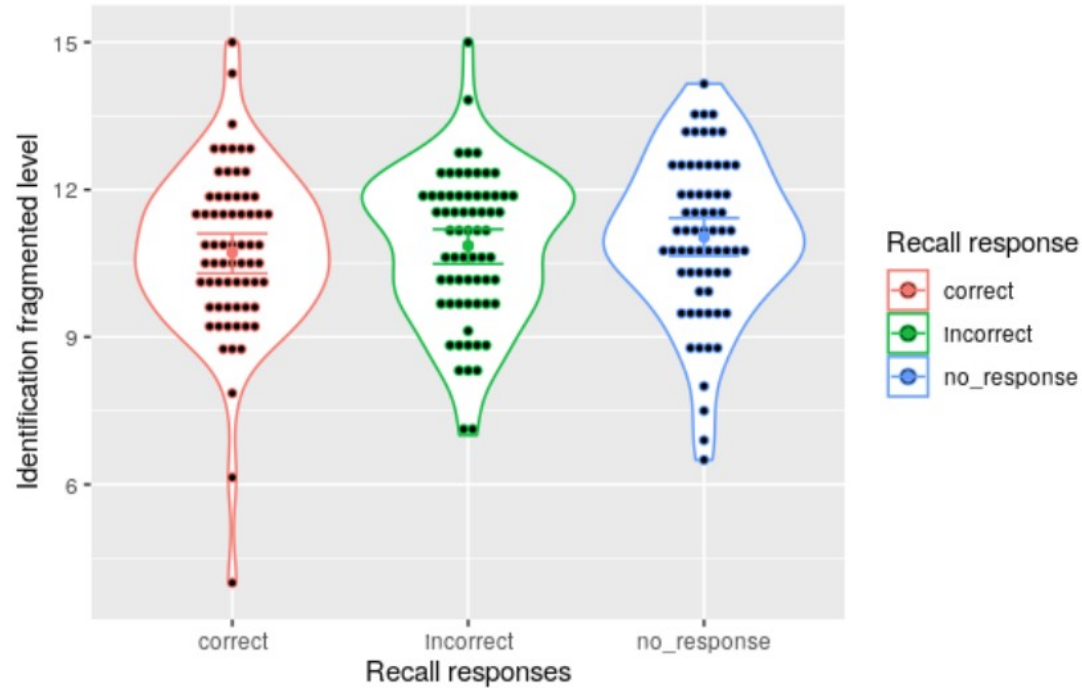


Methodology: As previous graph

# Beautiful graphs

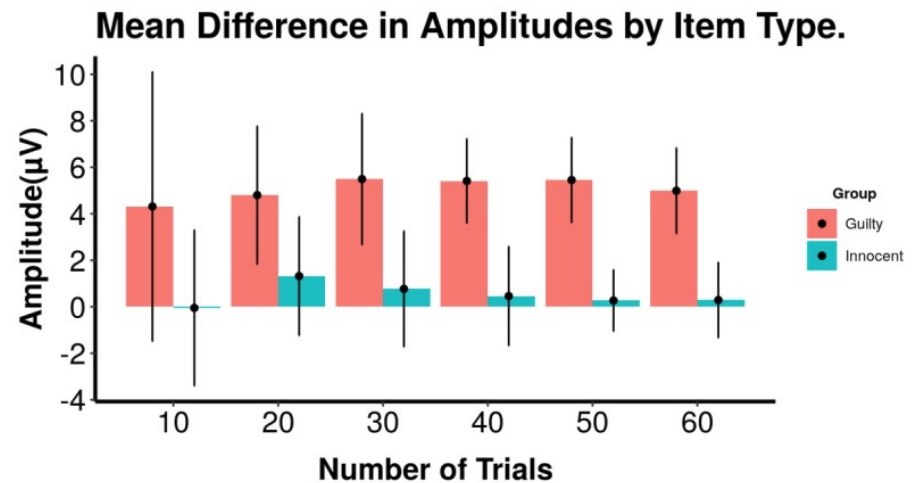
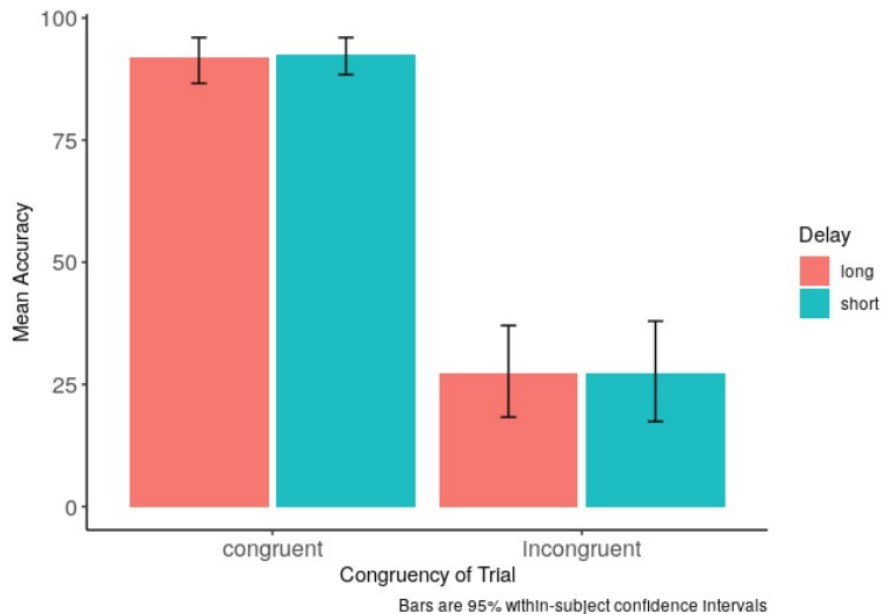
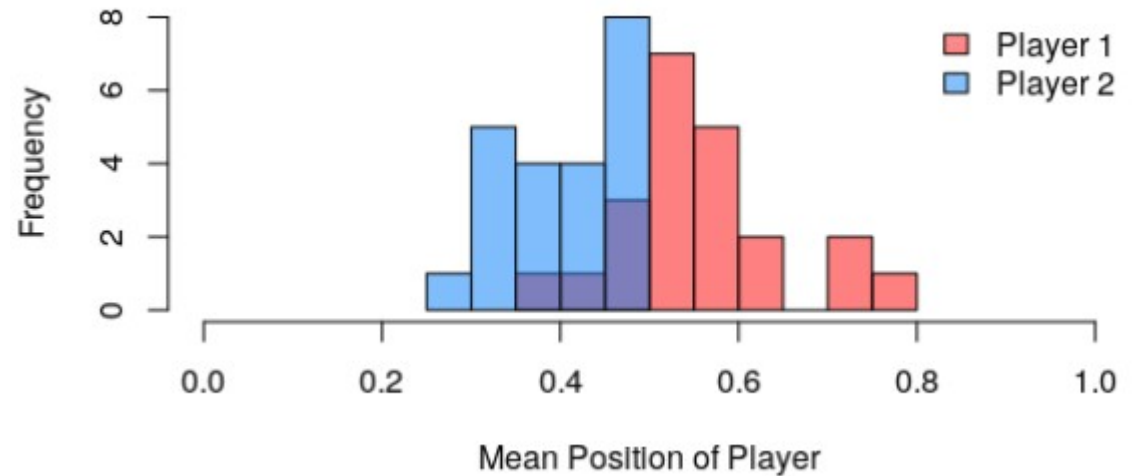
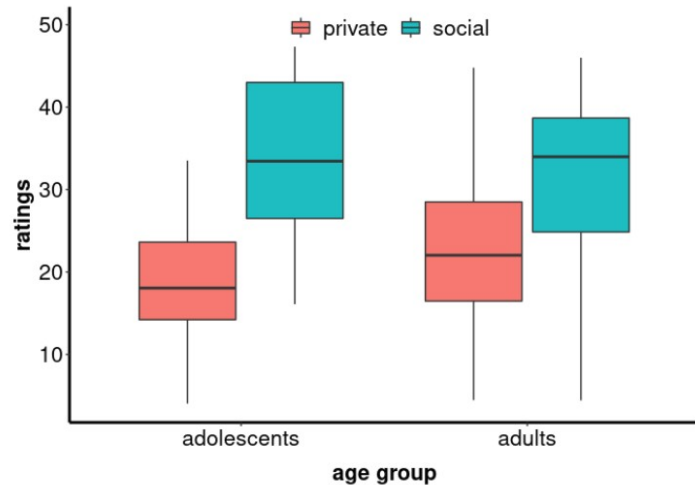
*Here are some of the things they produced...*

# R gallery (2021)

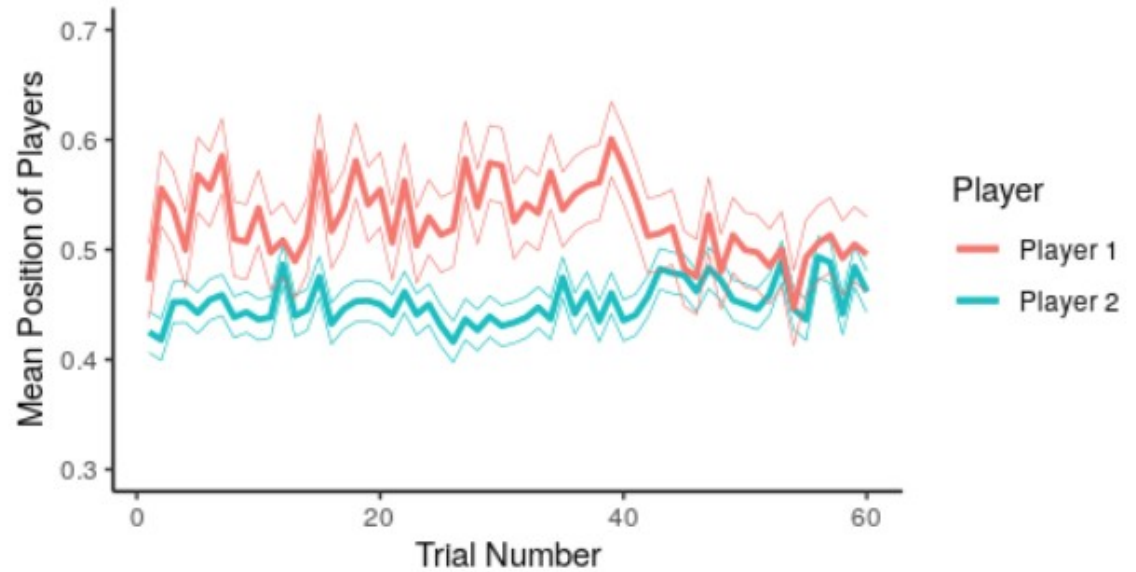
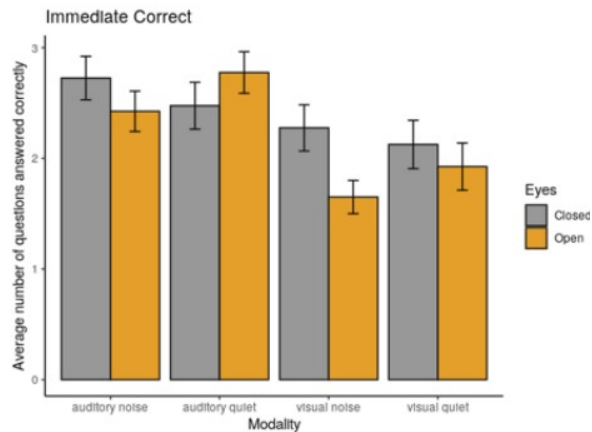




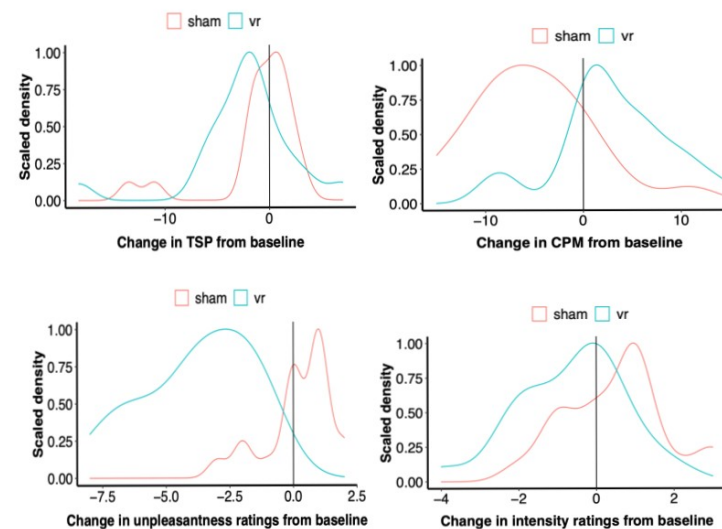
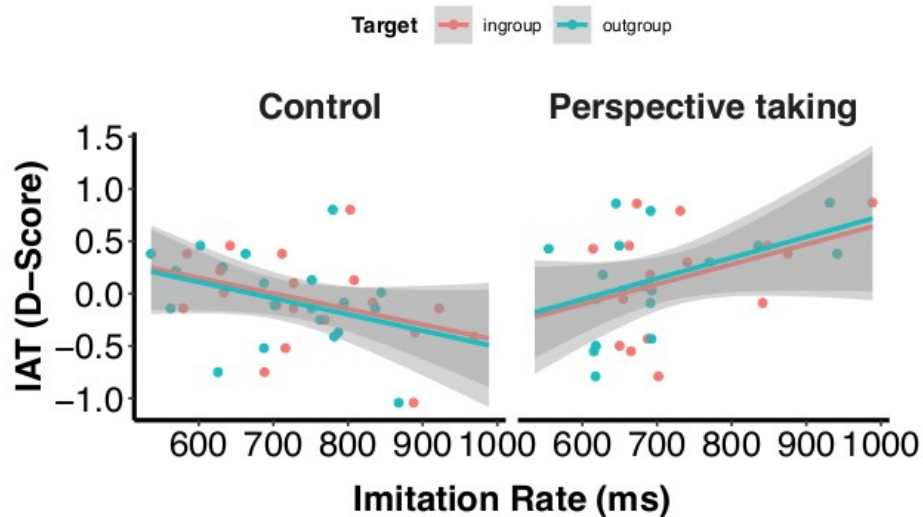
# R gallery (2021)



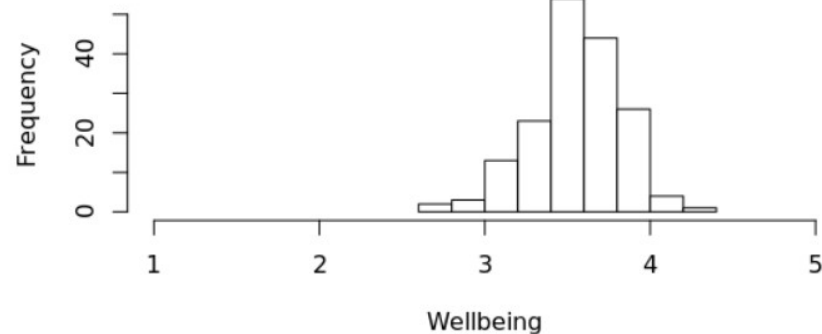
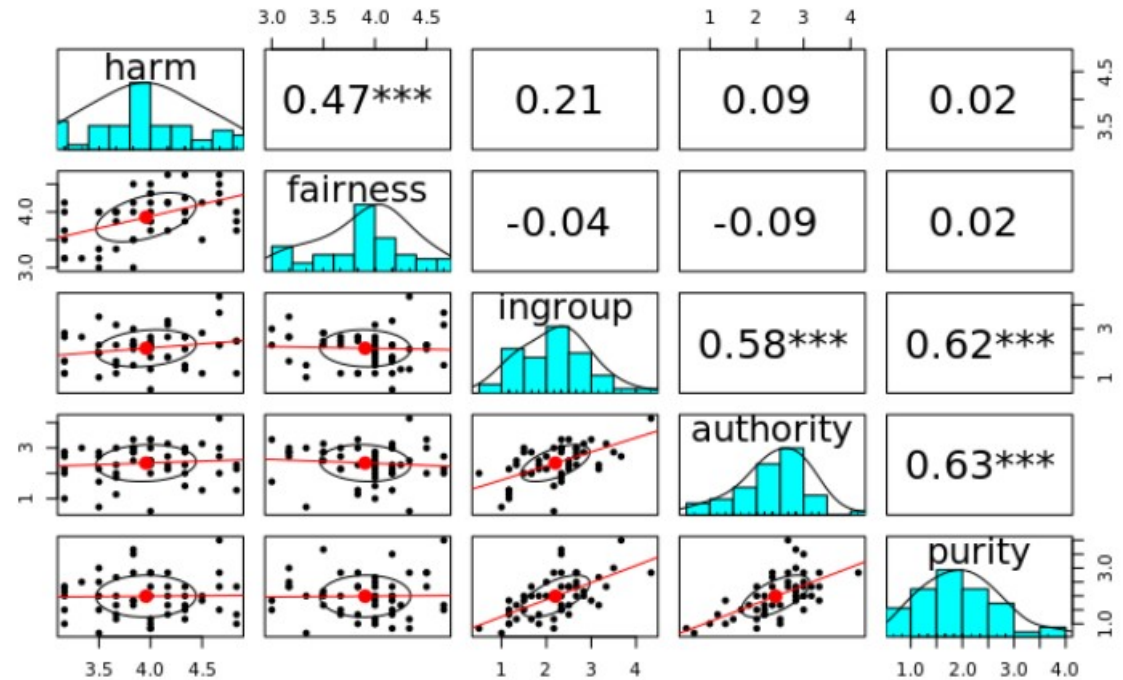
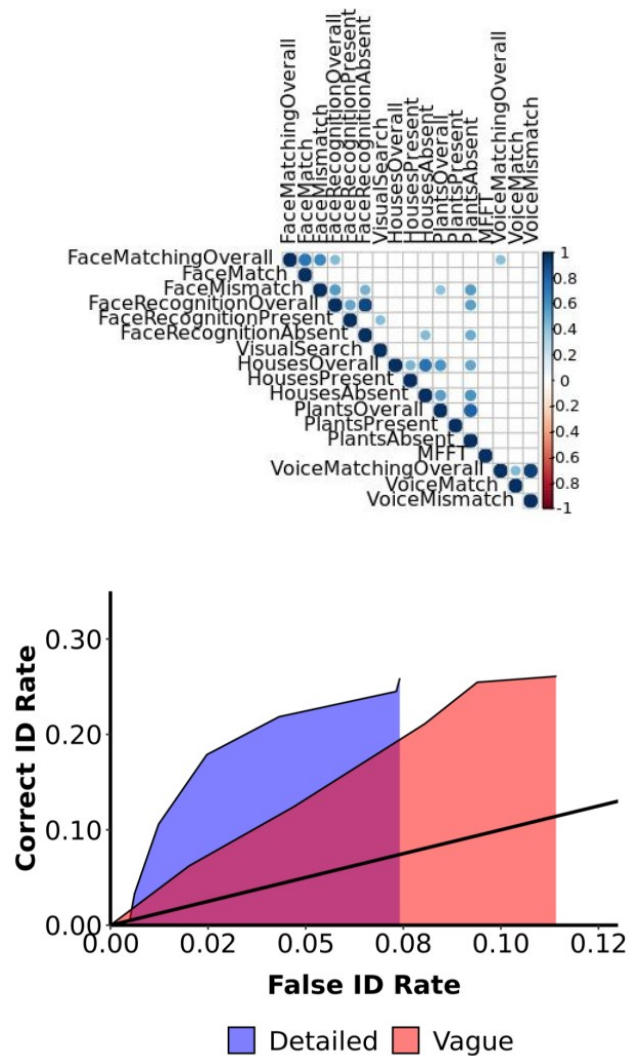
# R gallery (2021)



IAT Scores v Imitation Rates

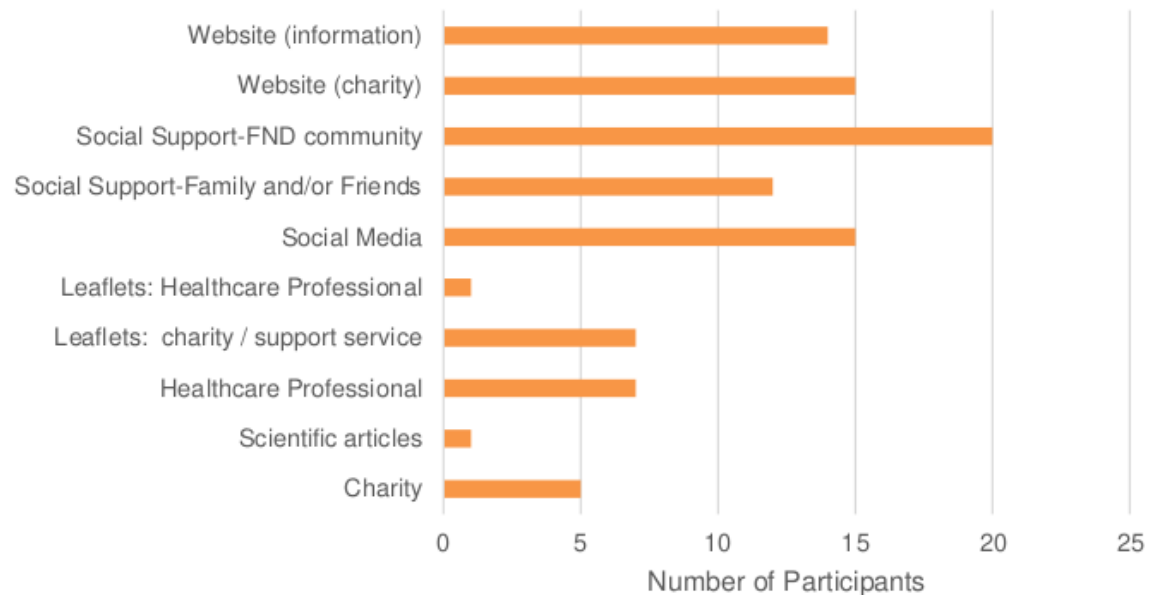
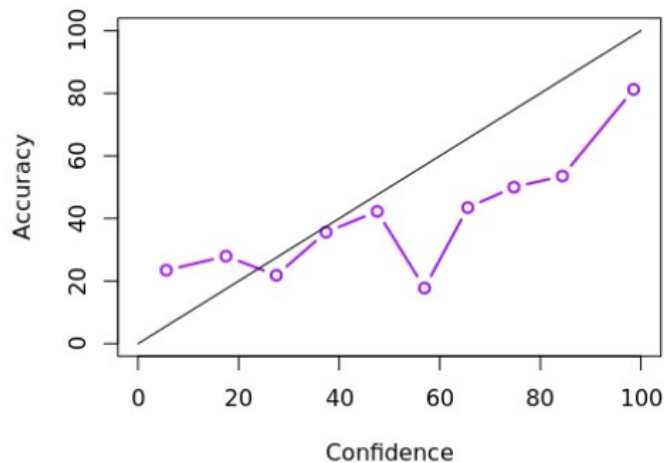
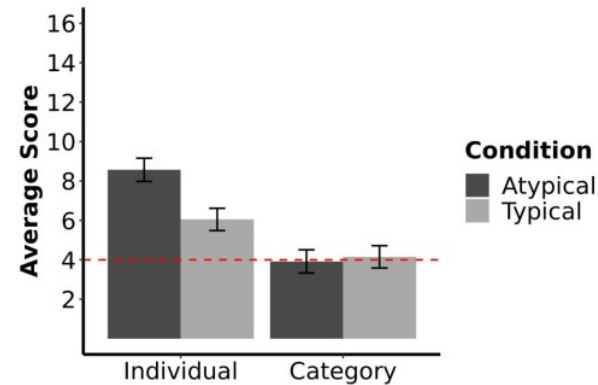
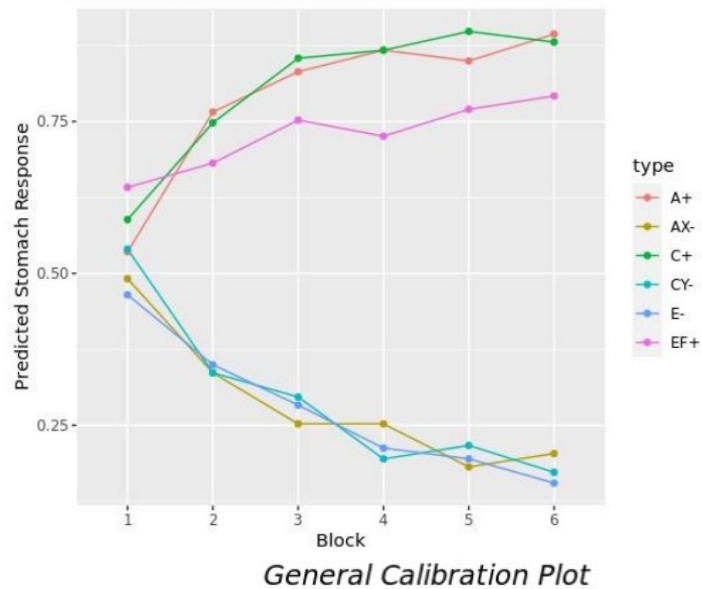


# R gallery (2022)



# R gallery (2022)

Figure 1. Training Stage 1 Data.



# Outline

- 1st **Why teach R? Nine reasons.**
- 2nd **How to teach R.**
- 3rd **Organizational change.**

# Why R? Student experience



University  
of Glasgow

School of Psychology  
Institute of Neuroscience & Psychology

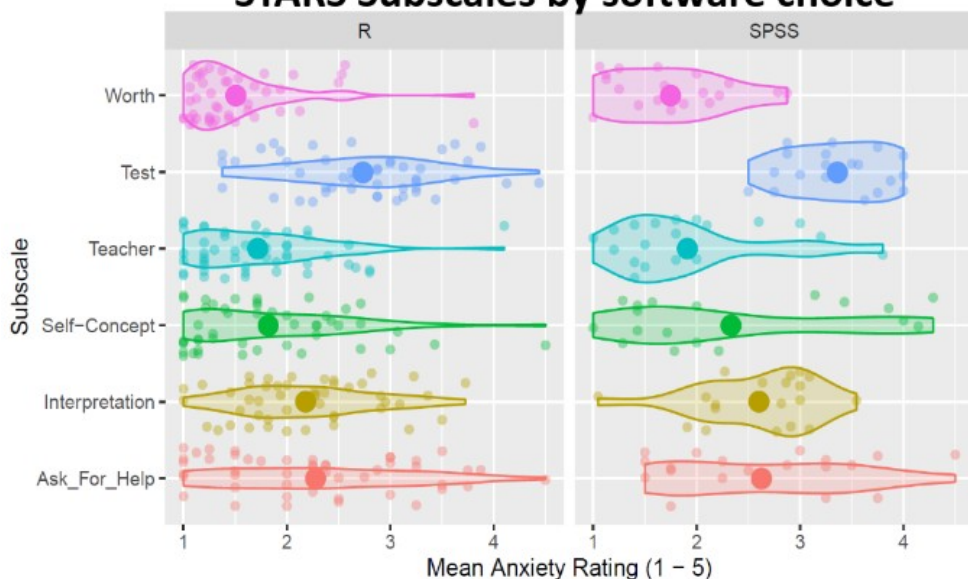
To R or to SPSS: Does autonomous choice of learning technology affect competency & anxiety in Psychology undergraduates?

Dale J. Barr, Phil McAleer, Niamh Stack and Maxine V. Swingler

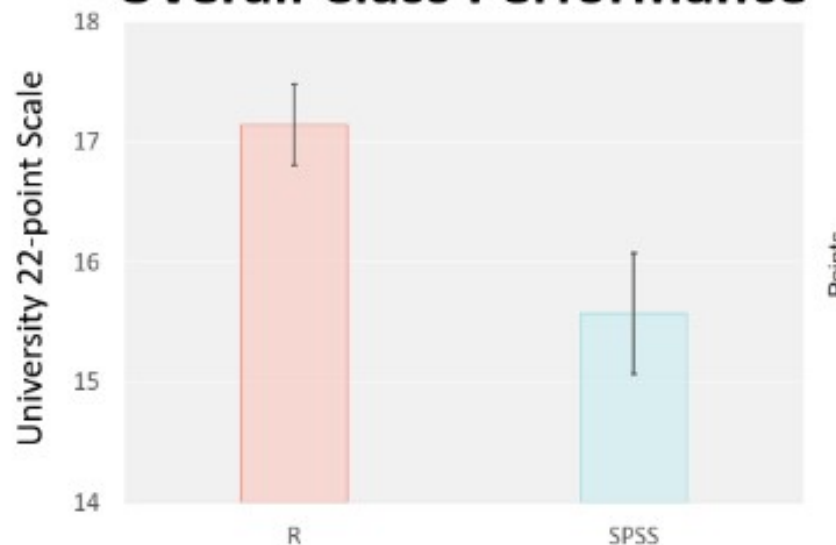
Contact: philip.mcaleer@glasgow.ac.uk

Twitter: @UofGPsychology, @dalejbarr, @mcaleerp, @Eavanmac

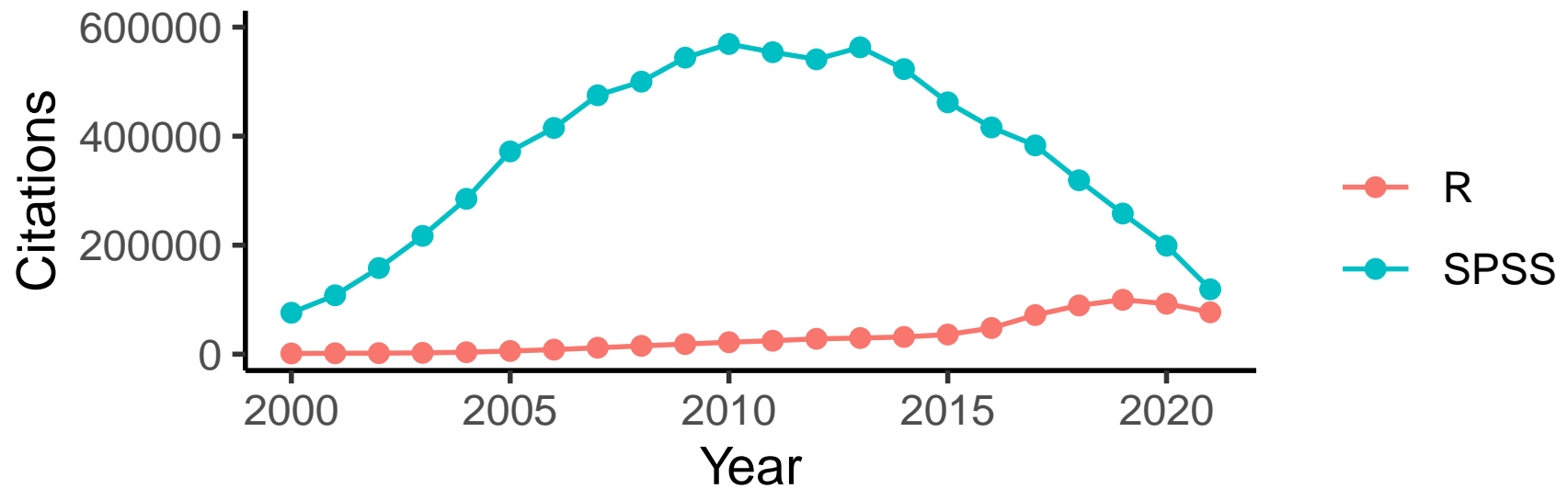
STARS Subscales by software choice



Overall Class Performance



# Why R? Employability



# Why R? Free

The screenshot shows the IBM SPSS Statistics subscription configuration interface. Annotations with arrows point to specific elements:

- Configure your IBM product**: Points to the left sidebar.
- SPSS**: Points to the "IBM SPSS Statistics" header in the sidebar.
- One year**: Points to the "12 months" subscription term selection.
- One person**: Points to the "1" authorized user selection in the "Plan Options" section.
- All features**: Points to the "Custom Tables & Advanced Statistics Users" add-on selection.
- \$4032**: Points to the "Up Front total price" of \$4,032.00 USD.

The configuration details shown are:

- Subscription details**: Choose subscription term: 12 months (selected).
- Plan Options**: Unit price: \$1,188.00 USD per authorized user. Enter the number of authorized users: 1. Total: + \$1,188.00 USD.
- Add-Ons (optional)**:
  - Custom Tables & Advanced Statistics Users**: Unit price: \$948.00 USD per authorized user. Enter the number of authorized users: 1. Total: + \$948.00 USD.
  - Complex Sampling & Testing Users**: Unit price: \$948.00 USD per authorized user. Enter the number of authorized users: 1. Total: + \$948.00 USD.
  - Forecasting & Decision Trees Users**: Unit price: \$948.00 USD per authorized user. Enter the number of authorized users: 1. Total: + \$948.00 USD.
- Up Front total price**: \$4,032.00 USD.



# Why R? Never out of date



## Contributed Packages

### Available Packages

Currently, the CRAN package repository features 18258 available packages.

☰ IBM | IBM Developer

Tutorial

## Calling R from SPSS

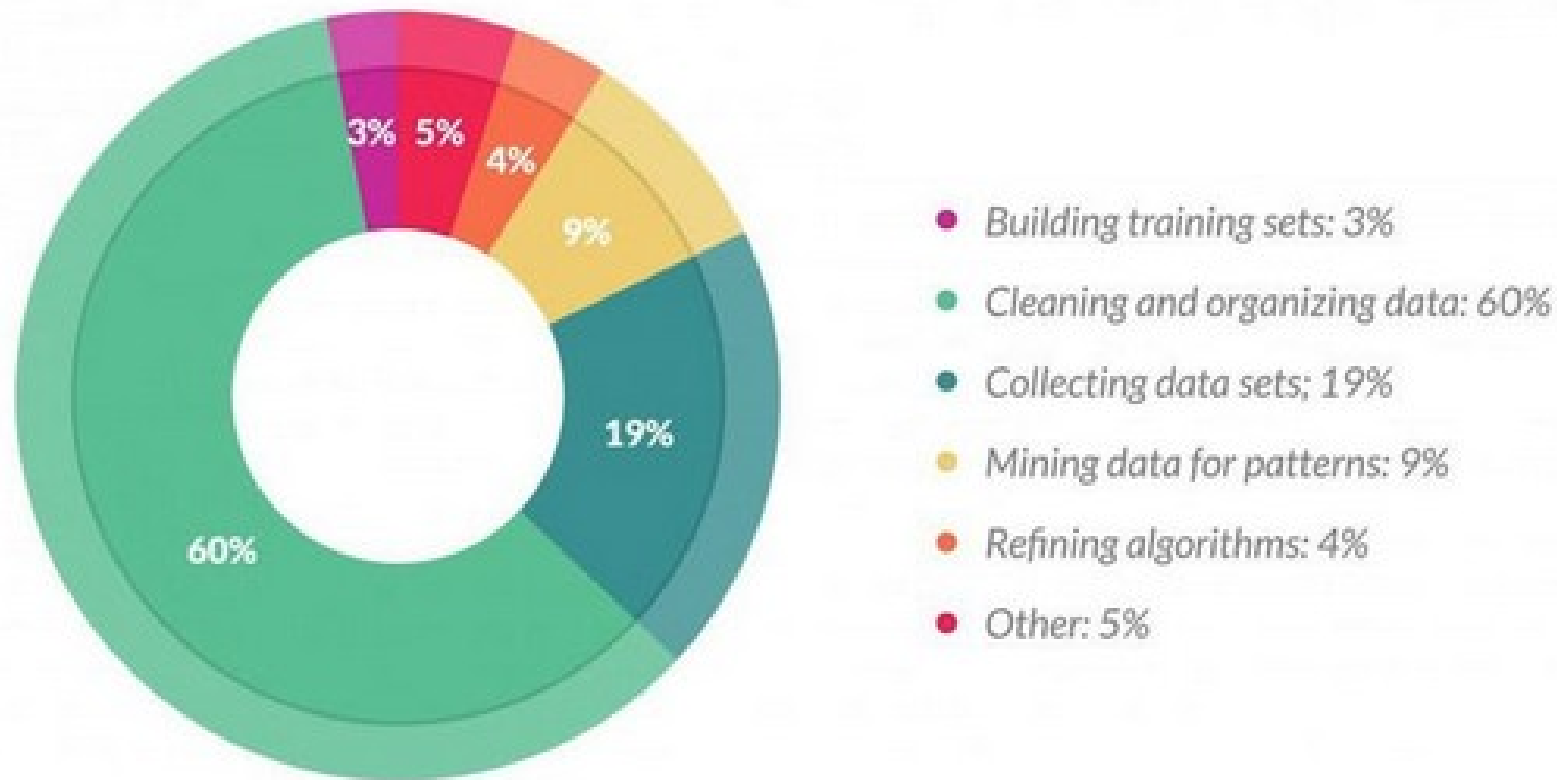
An introduction to the R plug-in for SPSS

☆ Save 👍 Like

By Catherine Dalzell  
Published October 31, 2013

IBM® SPSS® can talk to R. It's something of a well-kept secret,

# Why R? Great at preprocessing



# Why R? Accurate



BIZ & IT TECH SCIENCE POLICY CARS GAMING & CULTURE STORIES

POLICY —

## Microsoft Excel: The ruiner of global economies?

A paper used to justify austerity economics appears to contain an Excel error.

ARS STAFF - 4/16/2013, 11:20 PM



# Why R? Reproducible

	A	B	C
1	ppt	staff	primary_soft
2	11294669		SPSS
3	11294836		R

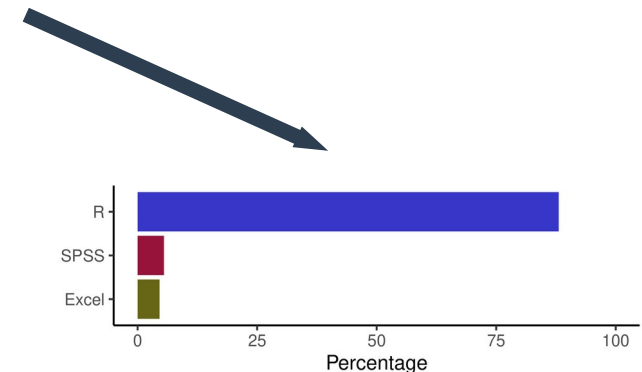
```
## Analysis of 2020/21 dissertations

## Load
library(tidyverse)
dta <- read_csv("outcomes.csv")

## Data is all PSYC605 dissertations submitted before referral

## Descriptives
nrow(dta) # N = 133
quant <- dta %>% filter(primary_soft != "qual") # Remove qual projects
nrow(quant) # N = 120
quant <- quant %>% filter(primary_soft != "unclear") # Remove unclear cases
N <- nrow(quant) # 109
soft <- quant %>% group_by(primary_soft) %>% summarise(N = n()) # Count softwares
soft$pc <- soft$N * 100 / N
soft <- soft %>% arrange(N)

## Graph
horbar <- soft %>%
  ggplot(aes(x = reorder(primary_soft, N), y = pc, fill = primary_soft)) +
  ylim(0, 100) +
  geom_col() + coord_flip() + theme_classic() + ylab("Percentage") + xlab("") +
  theme(legend.position="none") +
  scale_fill_manual(values=c( "#666600", "#3333CC", "#990033"))
horbar
ggsave(file = "horbar.pdf", plot = horbar, units = "cm", width = 12, height = 4)
```



# Why R? Open source

- **All software has bugs.** Making the source code available means it's more likely those bugs are found and fixed.
- **All software is abandoned by its creators.** Open source software only dies if no one in the world cares enough to maintain it.

# Why R? Works inside a browser

The screenshot displays the RStudio Workbench interface within a Firefox web browser. The browser's address bar shows the URL `https://rstudio.plymouth.ac.uk/s/4566a95dcb94a0f9aa2b/`. The RStudio interface includes a menu bar (File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help), a toolbar, and a main workspace divided into several panes.

**Code Editor:** The main pane shows an R script with the following content:

```
1 ---
2 title: "More on relationships"
3 author: "Michaela Gummerum, Andy Wills, Gokcek Kul"
4 output: html_document
5 ---
6
7 ```{r setup, include=FALSE}
8 ## DEVELOPERS: Uncomment one option, as appropriate
9
10 ## Show only commands.
11 ## knitr::opts_chunk$set(echo = TRUE, message = FALSE, results='hide', fig.keep = 'none', comment=NA)
12
13 ## Show commands and output.
14 knitr::opts_chunk$set(echo = TRUE, comment=NA)
15
16
17 ```{r init-load, echo = FALSE, message=FALSE}
18 library(tidyverse)
19 library(BayesFactor, quietly = TRUE)
20 friends <- read_csv("chi.csv")
21
22 This worksheet contains further information about the analysis of relationships.
23
24
25 ## Contents
26
27 - [Ordered variables](#order)
28 - [Bayes Factor analysis](#bf)
```

**Console:** The bottom pane shows the R startup output:

```
R 4.1.0 -- "Camp Pontanezen"
Copyright (C) 2021 The R Foundation for Statistical Computing
Platform: x86_64-pc-linux-gnu (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[Workspace loaded from ~/rmnr/.RData]
>
```

**Environment:** The right-hand pane shows the current environment with the following files:

Staged	Status	Path
<input type="checkbox"/>		Rplots.pdf
<input type="checkbox"/>		anova4.R
<input type="checkbox"/>		docs/README.html
<input type="checkbox"/>		src/table1.doc

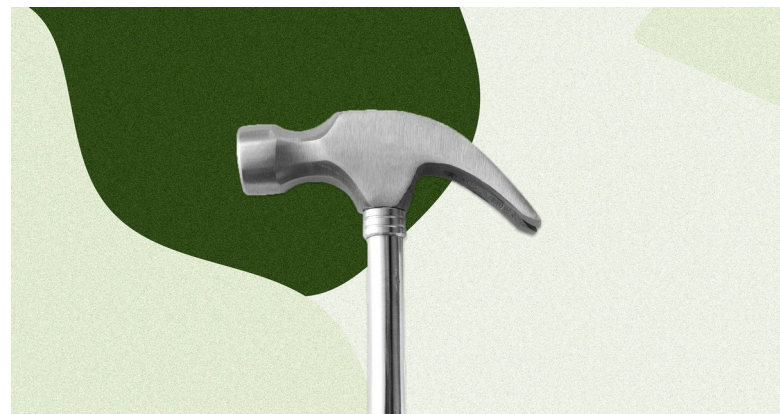
**Files:** The bottom-right pane shows a file explorer view of the project directory:

Name	Size	Modified
analyse-scales.Rmd	8.9 KB	Jul 20, 2020, 3:55 PM
andy-notes-to-paul-part-2.md	6.1 KB	Jul 2, 2020, 4:16 PM
andy-notes-to-paul.md	4.2 KB	Jul 2, 2020, 4:16 PM
animals.csv	754 B	Mar 9, 2020, 8:08 PM
anova		
anova_plots.Rmd	8.8 KB	Aug 5, 2020, 11:10 AM
anova-rough.org	15.3 KB	Mar 9, 2020, 8:08 PM
anova1_cache		
anova1_files		
anova1.html	1.1 MB	Jun 18, 2021, 4:55 PM
anova1.Rmd	33 KB	Jun 18, 2021, 4:54 PM
anova2_cache		
anova2_files		
anova2.Rmd	19.3 KB	Jul 3, 2020, 4:48 PM
anova3_cache		
anova3_files		
anova3.Rmd	18.2 KB	Jul 3, 2020, 5:35 PM
anova4_cache		
anova4_files		
anova4.html	748.3 KB	Aug 5, 2020, 3:27 PM
anova4.Rmd	16 KB	Oct 9, 2020, 1:26 PM
aw-notes-better-tables.md	471 B	Jul 27, 2020, 9:15 AM
awdiss_cache		



# How to teach R

- **Stats is a tool**
- **Training an apprentice**
  - Lots of practice on few techniques
  - Build competence by fading support
  - Breadth through optionality



# Organizational change – 1 of 3

- **Cohort roll-out**

  - 2017: Planning

  - 2018: Stage 1 R

  - 2019: Stage 1+2 R

  - 2020: Dissertation students only know R.

- **Support from Head of School**

- **Curriculum Review Group**



# Organizational change – 2 of 3

- **Applied social psychology**

- Care more.
- Work harder, longer, more persistently.
- Have better arguments.

- **Communication**

- Synchronous versus asynchronous

- **Staff training**

A World  
Without  
Email

Reimagining  
Work in the Age  
of Overload



Cal Newport  
*Author of Digital Minimalism*

Find focus,  
transform  
productivity,  
improve  
communication

*"Read this superb book. It might just change your life. It's changing mine!"*  
*Tim Harford, author of How to Make the World Add Up*

# Organizational change – 3 of 3

- **Written materials**

- [andywills.info/rminr](http://andywills.info/rminr) (Creative Commons)
- Trial your materials
- Systems for co-authorship
- Maintaining oversight

- **Minimize tech support**

- [rstudio.plymouth.ac.uk](http://rstudio.plymouth.ac.uk)
  - 2080 users, 100 simultaneous.
  - 12 core, 128GB – never exceeds 50% utilization.

# Questions?

[andy@willslab.co.uk](mailto:andy@willslab.co.uk)  
[www.andywills.info](http://www.andywills.info)  
[@ajwills72](https://twitter.com/ajwills72)