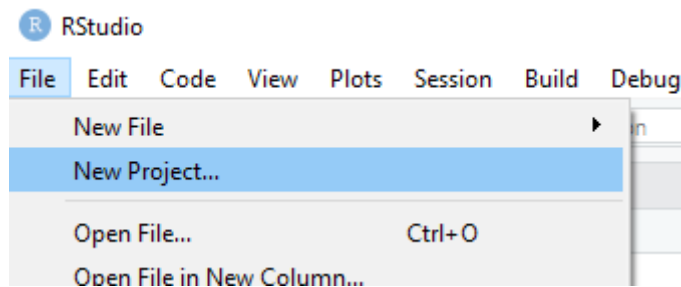


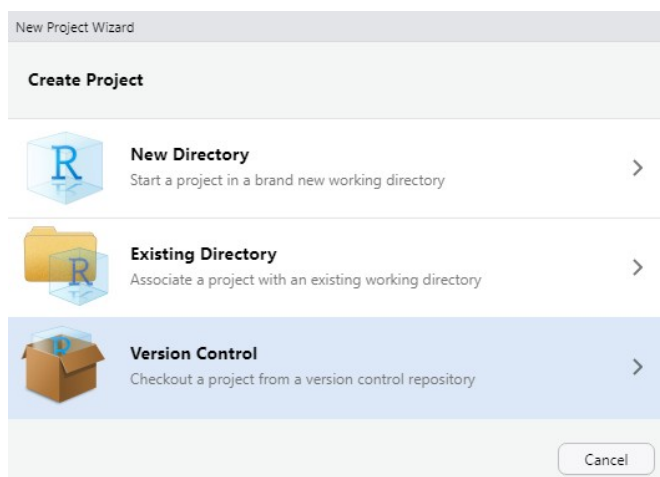
Program **COMPANOVA2** is a program for the analysis of paired comparisons (Gies Bouwman/Toni Rietveld, Radboud University Nijmegen), on the basis of: Scheffé, H. (1952). An analysis of variance for paired comparisons. *Journal of the American Statistical Association* 47, 381-400.

A) Procedure:

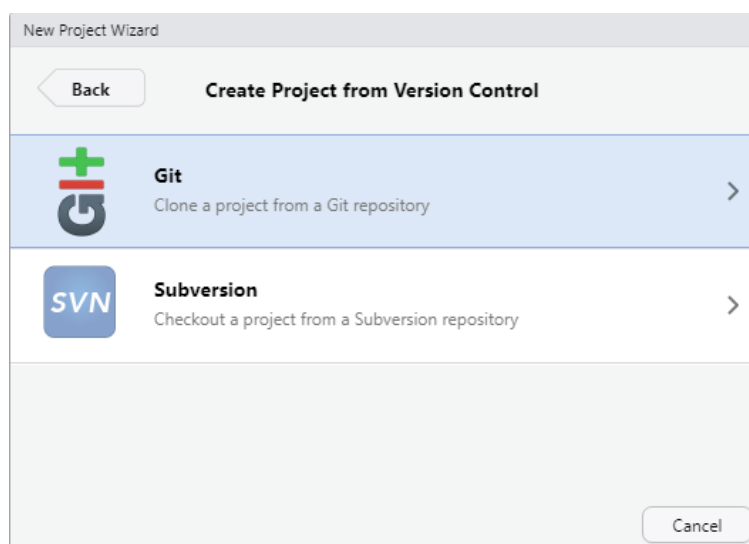
1. In case you haven't already done so, install **git** from <http://git-scm.com/downloads>
2. After starting **RStudio**, pick New Project... from the **File** menu.



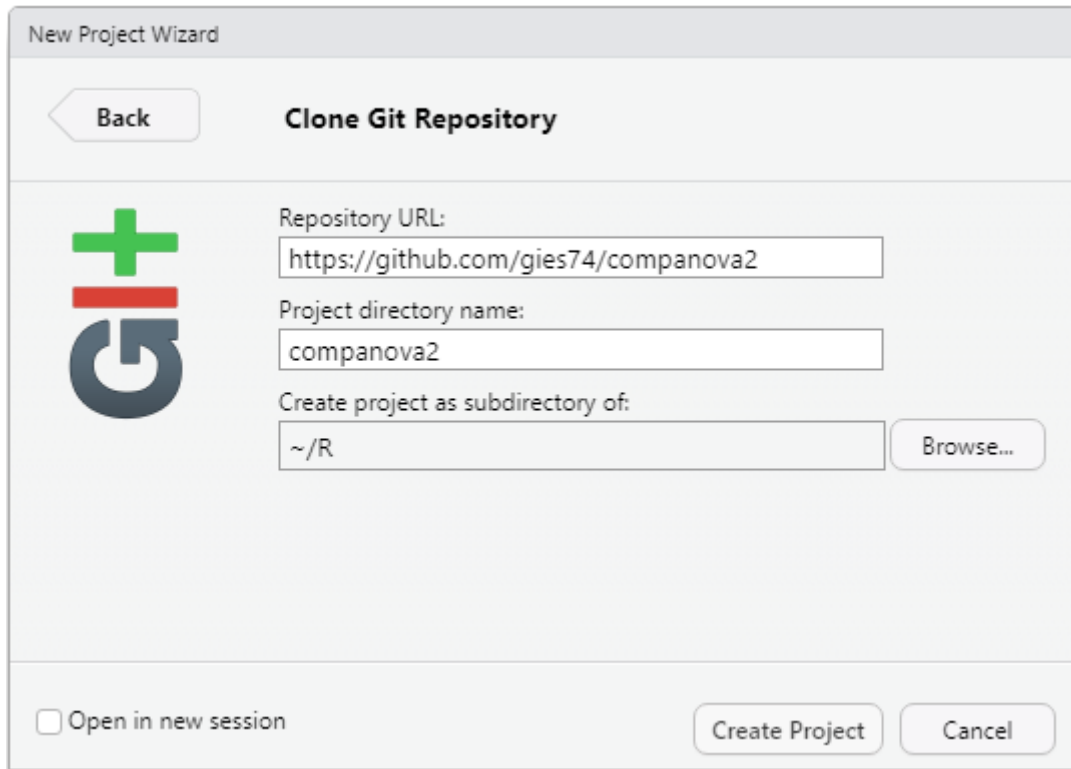
3. In the first screen of the wizard, choose **Version Control**



4. On the next screen, click on **Git**



5. On the final screen, enter the URL of the **companova2** git repository. A project directory name is automatically suggested, just like the default directory on the file system of your computer. Click **Create Project** to clone the repository locally and open the project.



The dialog box is titled "New Project Wizard" and has a "Back" button. The main heading is "Clone Git Repository". On the left is a logo consisting of a green plus sign above a red horizontal bar, which is above a blue stylized 'G'. The form contains three input fields: "Repository URL:" with the text "https://github.com/gies74/companova2", "Project directory name:" with the text "companova2", and "Create project as subdirectory of:" with the text "~/R". A "Browse..." button is to the right of the last field. At the bottom left is a checkbox labeled "Open in new session". At the bottom right are "Create Project" and "Cancel" buttons.

Back

Clone Git Repository

Repository URL:
https://github.com/gies74/companova2

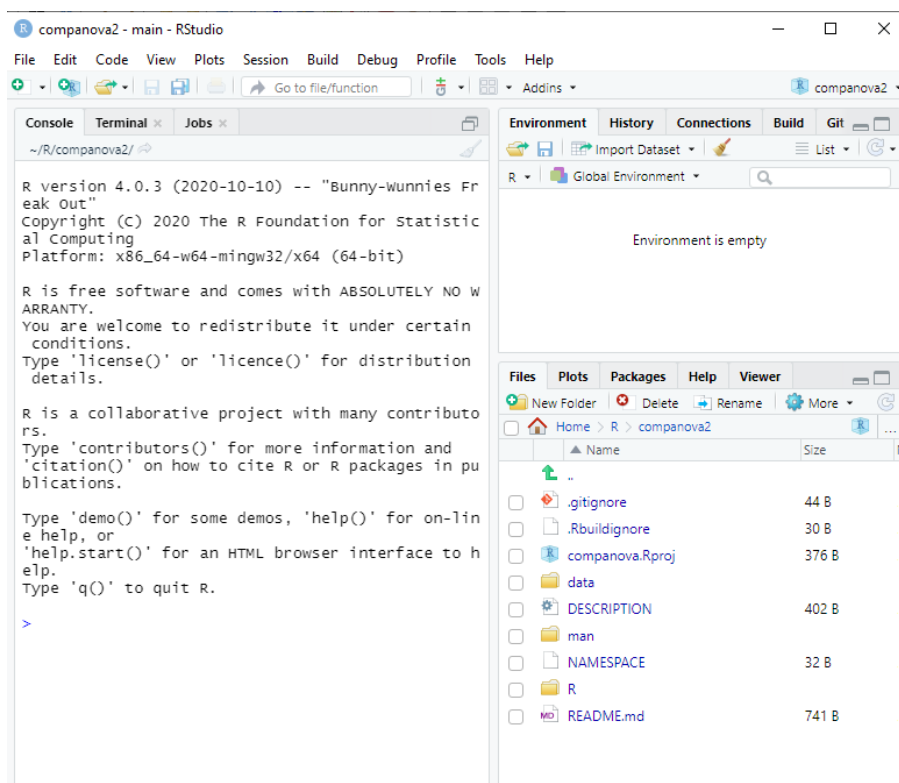
Project directory name:
companova2

Create project as subdirectory of:
~/R

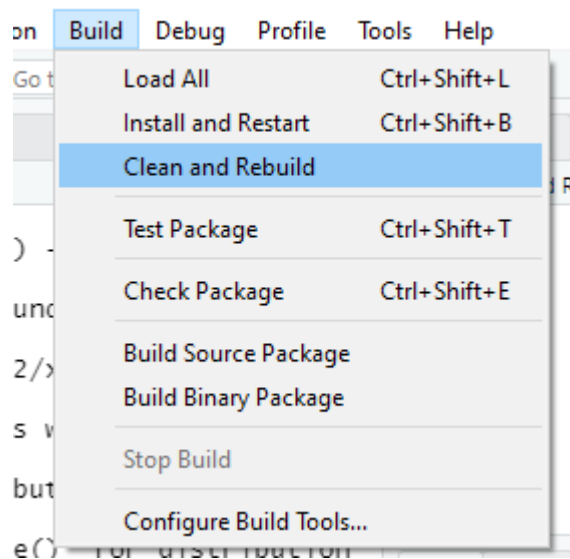
Browse...

☐ Open in new session

Create Project Cancel



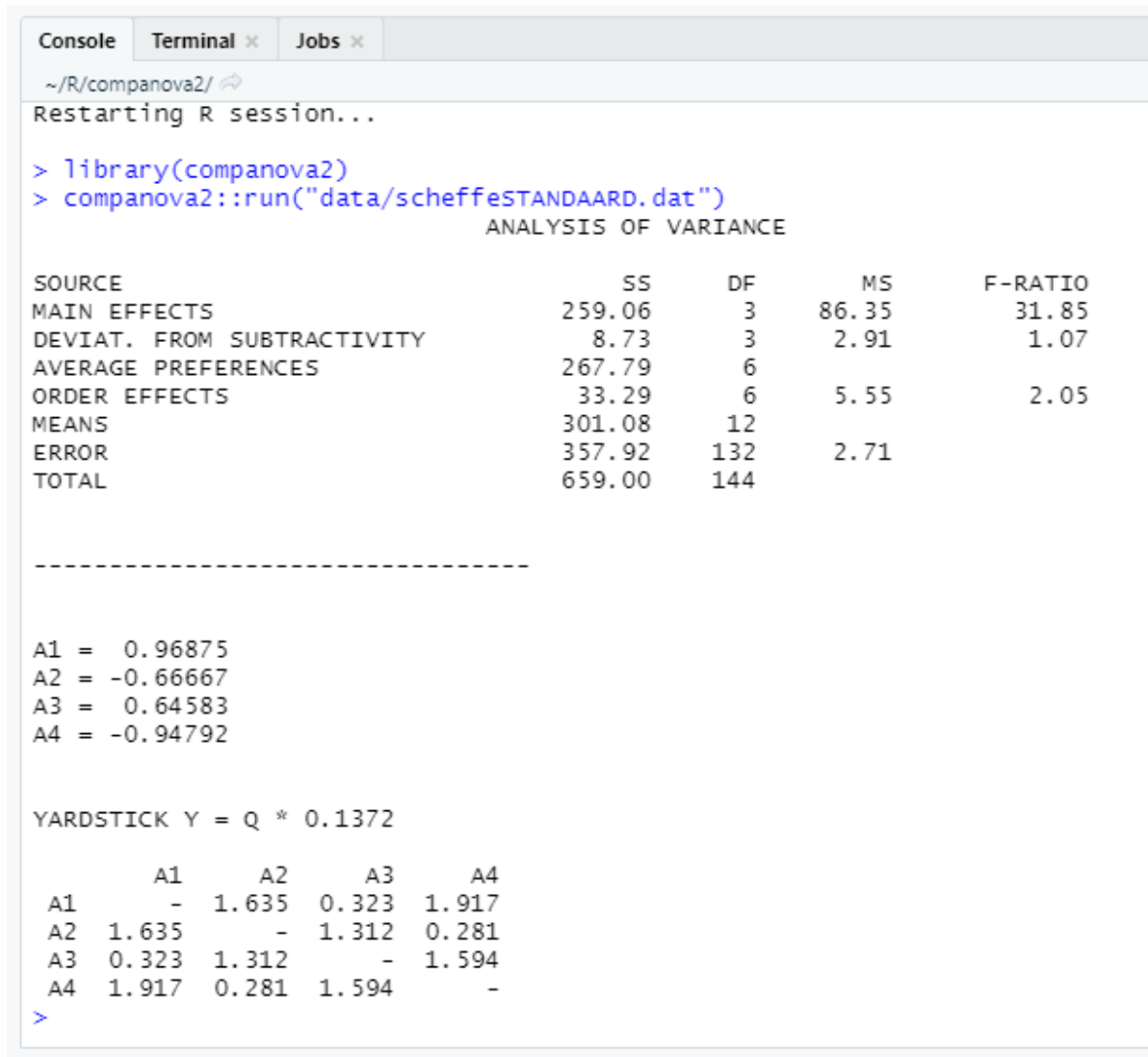
6. Next, build the package: choose Clean and Rebuild from the Build menu.



The Console panel should display a text that the R session has been restarted and the *companova2* library is loaded as a library.

7. As a final step, run the analysis using the included sample data file `scheffeSTANDAARD.dat`

```
companova2::run("data/scheffeSTANDAARD.dat")
```



The screenshot shows an R console window with the following output:

```
~/R/companova2/ ↗
Restarting R session...

> library(companova2)
> companova2::run("data/scheffeSTANDAARD.dat")
```

ANALYSIS OF VARIANCE

SOURCE	SS	DF	MS	F-RATIO
MAIN EFFECTS	259.06	3	86.35	31.85
DEVIAT. FROM SUBTRACTIVITY	8.73	3	2.91	1.07
AVERAGE PREFERENCES	267.79	6		
ORDER EFFECTS	33.29	6	5.55	2.05
MEANS	301.08	12		
ERROR	357.92	132	2.71	
TOTAL	659.00	144		

```
A1 = 0.96875
A2 = -0.66667
A3 = 0.64583
A4 = -0.94792
```

YARDSTICK Y = Q * 0.1372

	A1	A2	A3	A4
A1	-	1.635	0.323	1.917
A2	1.635	-	1.312	0.281
A3	0.323	1.312	-	1.594
A4	1.917	0.281	1.594	-

```
>
```

The output should look like the screenshot above.

Scale values: The scale values (A1...) represent preferences, going from left (highest preference) to the right (lowest preference). For more details, see Scheffé (1952), and Rietveld (2021).

B) Format input file (example)

For the assessment of 4 Items (A, B, C and D) two groups of raters have to be arranged:
One group assesses the pairs AB, AC, AD, BC, BD etc;
The other group assesses the pairs BA, CA, DA, CB, DB etc.

For the assessments the following scale is used:

Item A better	-3	-2	-1	0	1	2	3	Item B better
---------------	----	----	----	---	---	---	---	---------------

If Item A is strongly preferred to Item B, -3 should be scored. If Item B is moderately preferred to Item A, a 2 should be scored, if Item A is slightly preferred to B, -1 should be scored etc. When there is no preference, category 0 should be used.

The results are stored in a data matrix with the extension .DAT, and the following format:

- The data are separated by a blank.
- The 1st column indicates the number i of the item of a pair (i,j) , in which i is the first member of a pair that was assessed. The next 7 columns represent the frequencies of the judges who assessed the first item (A) as better etc (-3, -2, -1) than B, and assessed the Item B as better etc. than item A
- Thus, with four items there will be 12 rows, $m \times (m-1)$, with in the first column:

1
2
1
3
1
4
2
3
2
4
3
4

These numbers stand for (1,2), (2,1), (1,3), (3,1)..... (3,4), (4,3)

As an example we present here the first two rows of a matrix with 12 judges per order:

1 0 0 0 3 3 2 4
2 6 3 1 0 1 1 0

Item B is clearly preferred over Item A in both presentation orders: AB (1,2) and BA (2,1).

C) References

- Beijer, L.J., Rietveld, A.C.M., Ruiter, M.B. & Geurts, A.C.H. (2014). Preparing an E-learning-based Speech Therapy (EST) efficacy study: Identifying suitable outcome measures to detect within-subject changes of speech intelligibility in dysarthric speakers. *Clinical Linguistics & Phonetics*, 28 (12), 927-950.
- Rietveld, Toni (2021). *Human Measurement Techniques for Speech and Language Pathology*: London: Routledge
- Ozaki, K. (2008). Twin Analysis on Paired Comparison Data. *Behavioral Genetics*, 38, 212-222.
- Scheffé, H. (1952). An analysis of variance for paired comparisons. *Journal of the American Statistical Association* 47, 381-400.