

Programmieren mit R für Einsteiger

0. Intro / 0.3 Einrichtung: R & Rstudio



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frei verwenden, zitieren

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- ▶ Programmiersprache für Datenanalyse / -visualisierung und Statistik in Forschung und Wirtschaft
- ▶ kostenlos, open source (nachvollziehbar, erweiterbar)
- ▶ große Nutzer-community (viele Methoden)
- ▶ macht deine Arbeit effizient und produktiv



- ▶ **I**ntegrated **D**evelopment **E**nvironment (IDE) für R:
Umgebung zur Entwicklung von Code, mit R integriert

Installation

- ▶ **Anleitung**
- ▶ Für den Kurs bitte eine aktuelle R **V**ersion (> 4.0) nutzen

The image shows the RStudio desktop environment. The top-left pane contains an R script file named 'r_5min.R' with the following code:

```
1 # R in 5 minutes
2 # Berry Boessenkool
3
4 # R as calculator:
5 7 * 6
6
7 # create objects for later use
8 height <- 183
9 height - 5
10
11
12
13
14
15
16
```

The top-right pane shows the 'Environment' tab with a list of objects. The 'values' section shows a variable 'height' with the value 183.

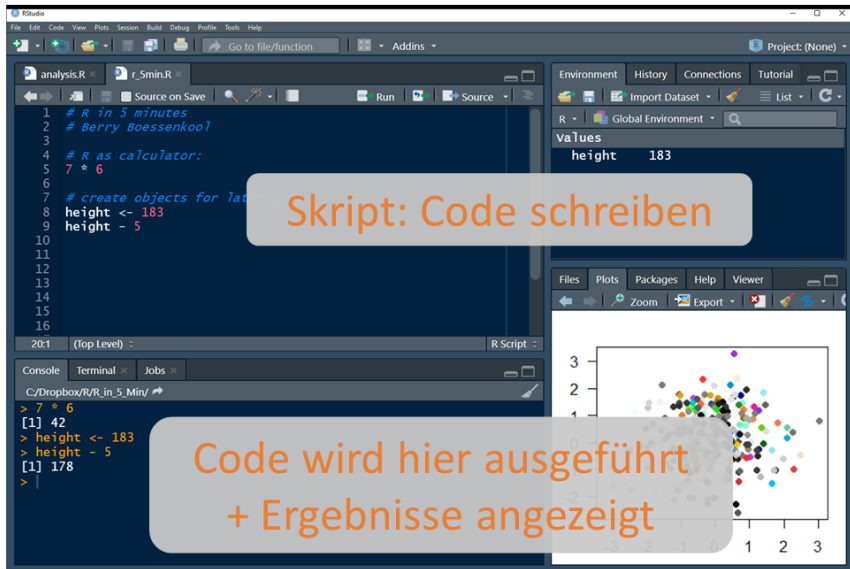
The bottom-left pane shows the 'Console' tab with the output of the script:

```
> 7 * 6
[1] 42
> height <- 183
> height - 5
[1] 178
> |
```

The bottom-right pane shows a scatter plot with data points colored by density. The x and y axes both range from -3 to 3.

Four callout boxes are overlaid on the image:

- Skripte (.R Dateien)**: Points to the script editor.
- Objekte**: Points to the Environment pane.
- Grafiken**: Points to the Plots pane.
- Die Konsole zum tatsächlichen R**: Points to the Console pane.



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5 7 * 6
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7 # create objects for later use
8 height <- 183
9 height - 5
10
11
12
13
14
15
16
```

The top-right pane shows the Environment window with the variable `height` assigned the value `183`.

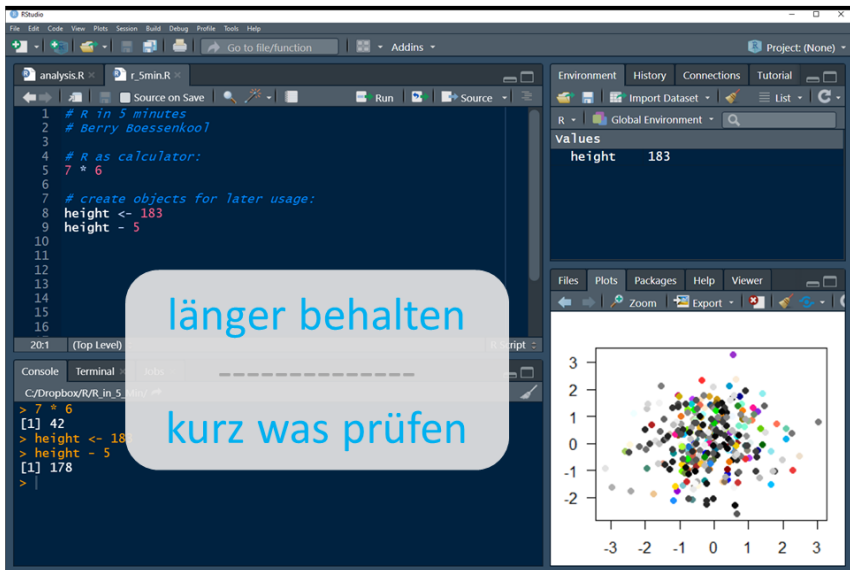
The bottom-left pane shows the Console window with the following output:

```
> 7 * 6
[1] 42
> height <- 183
> height - 5
[1] 178
> |
```

The bottom-right pane shows a scatter plot with data points colored by density, ranging from -3 to 3 on both axes.

Skript: Code schreiben

**Code wird hier ausgeführt
+ Ergebnisse angezeigt**

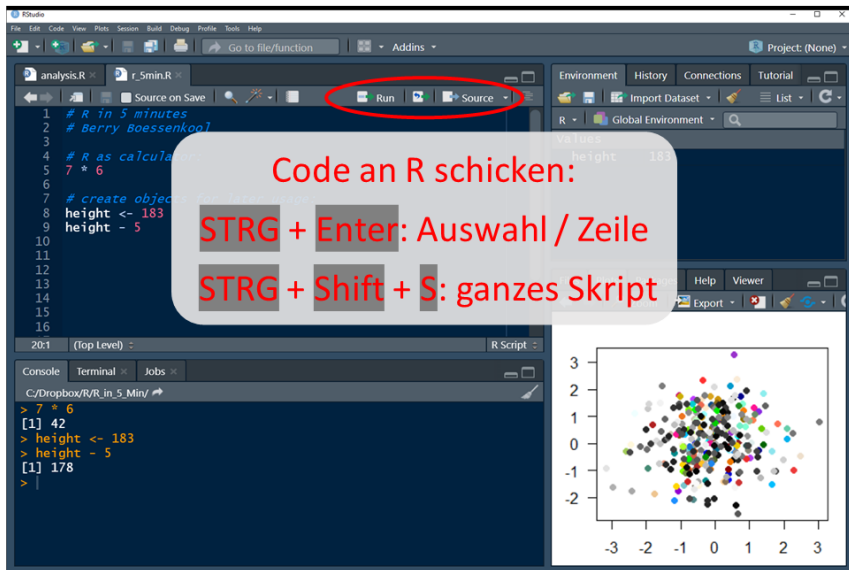


The screenshot shows the RStudio IDE with the following components:

- Source Editor:** Contains R code for a script named `r_5min.R`. The code includes comments and assignments for a variable `height`.
- Environment Pane:** Shows the `Global Environment` with a single variable `height` having a value of `183`.
- Console:** Displays the output of the code execution, showing the result of the multiplication and the updated value of `height`.
- Plots Pane:** Displays a scatter plot with points colored by a categorical variable, showing a dense cluster of points centered around the origin.

Overlaid on the console area are two text boxes:

- A light blue box with the text `länger behalten` (keep longer).
- A light blue box with the text `kurz was prüfen` (check quickly).



The screenshot displays the RStudio environment. The source editor on the left contains R code for a script named 'r_5min.R'. The code includes comments and assignments for variables 'height' and 'height - 5'. The console at the bottom shows the execution of these commands, resulting in the values 42 and 178. The top toolbar features a red circle around the 'Run' button. A semi-transparent text box in the center provides instructions on how to execute code. The right-hand pane shows the 'Environment' tab with a list of variables, and the bottom-right pane displays a scatter plot of the data.

Code an R schicken:

- STRG + Enter: Auswahl / Zeile
- STRG + Shift + S: ganzes Skript

```
# R in 5 minutes
# Berry Boessenkool

# R as calculator
7 * 6

# create objects for later usage
height <- 183
height - 5
```

Console output:

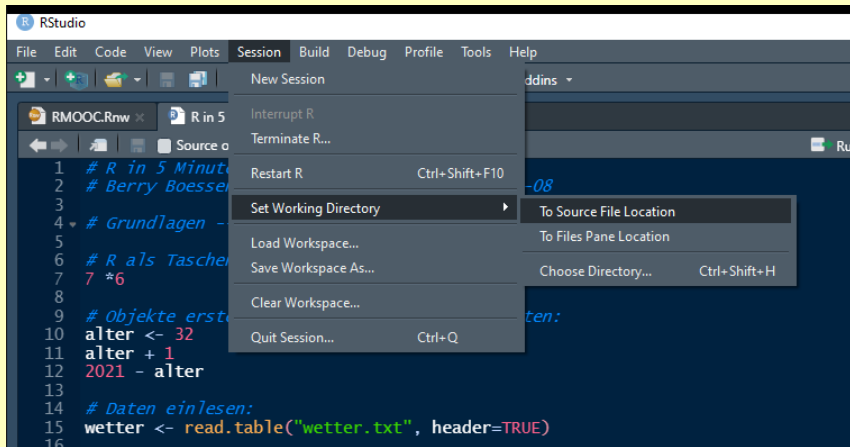
```
> 7 * 6
[1] 42
> height <- 183
> height - 5
[1] 178
> |
```

Scatter plot showing a distribution of points in a 2D space, with axes ranging from -3 to 3.

Einrichtung der R Arbeitsumgebung:

- ▶ R & Rstudio installieren und nutzen
- ▶ Skripte
- ▶ Zeilen ausführen

Für einfache Skripte:



The image shows a sequence of four screenshots illustrating the steps to create a new R project in RStudio:

- Step 1:** The RStudio File menu is open, and "New Project..." is highlighted.
- Step 2:** The "New Project Wizard" dialog box is shown, with the "Create Project" section selected. The "New Directory" option is chosen.
- Step 3:** The "New Project Wizard" dialog box is shown, with the "Project Type" section selected. The "New Project" option is chosen.
- Step 4:** The "New Project Wizard" dialog box is shown, with the "Create Project from Existing Directory" section selected. The "Project working directory:" field is populated with "C:/Users/berry/Desktop/HP_pdf".

Soll deine Arbeit reproduzierbar sein, setze unter

Rstudio - Tools - Global Options - General

OFF: Restore .Rdata into workspace at startup

Save workspace to .RData on exit: **NEVER**

Weitere hilfreiche **Rstudio Einstellungen**

Im Folgenden einige praktische Tastaturkürzel aus

rviews.rstudio.com/categories/tips-and-tricks

Rstudio keyboard shortcuts (**ALT** + **SHIFT** + **K**)

STRG + **ENTER** im Skript: Zeile / Auswahl an R senden

UP / **DOWN** in der Console: letzte Befehle

STRG + **UP** Befehlsgeschichte

STRG + **SHIFT** + **P** vorherige Auswahl (mit Änderungen) senden

STRG + **SHIFT** + **S** / **ENTER** Gesamtes Skript ausführen

STRG + **SHIFT** + **N** Neue Skriptdatei anlegen

STRG + **O** / **S** Datei öffnen / Skript speichern

STRG (+ **SHIFT**) + **TAB** nächstes (vorheriges) Skript

ALT + Maus für Mehrzeilen-Cursor. *oder:* **STRG** + **ALT** + **UP** / **DOWN**

Windows Bildschirmrotation ausschalten: Desktop Rechtsklick - Grafikoptionen - Tastenkombinationen - deaktivieren

ALT + **UP** / **DOWN** Zeile im Skript verschieben

STRG + **1** Cursor auf Panel (1:source, 2:console, 3:help, 4:history, 5:files, 6:plot...)

STRG + **SHIFT** + **1** / **2** / **3** / ... Panel Vollbild

STRG + **SHIFT** + **C** Zeile auskommentieren

STRG + **SHIFT** + **O** Inhaltsübersicht (**# abschnitt ----**)

STRG + **SHIFT** + **M** pipe operator einfügen

- ▶ Working directory (Arbeitsverzeichnis)
- ▶ Projekte
- ▶ Effektiv arbeiten in Rstudio