Testdoc\_pivot\_2024

Dr. Pivot

Table of contents

## How to use pivot function

#### STEP 1: load packages and read the data file. The data file (widedata.xlsx) has the variable name “rawdata”

pacman::p\_load(conflicted, tidyverse, readxl, wrappedtools, here, flextable)  
rawdata <- read\_excel(here("~/Desktop/2024\_Bioinfo\_Biostats/CQ/Bioinfo\_Biostat\_Weiterbildung/Kurs/Module4\_Applied\_Biostatistics/RStatsbook2/widedata.xlsx"))

#### Visualizing the content of rawdata

rawdata

# A tibble: 17 × 6

Tumorgrowth Treatment AnimalCode Weight [g] 0 h Weight [g] 24 h 1 fast A A1 28.7 29.2 2 fast A A2 28.1 27.9 3 medium A A3 33.6 34.8 4 medium A A4 27.2 27.7 5 slow A A5 29.0 29.3 6 fast B B1 32.1 32.0 7 fast B B2 26.2 26.2 8 medium B B3 30.2 30.1 9 medium B B4 28.3 27.9 10 medium B B5 32.2 31.8 11 slow B B6 31.1 33.2 12 fast C C1 29.0 28.6 13 fast C C2 25.8 26.0 14 fast C C3 24.7 23.9 15 medium C C4 30.4 29.9 16 medium C C5 30.0 29.3 17 slow C C6 29.9 30.8 # ℹ 1 more variable: Weight [g] 72 h

#### Visualizing the rawdata using flextable()

rawdata |>  
 flextable()|>  
 theme\_zebra() |>  
 set\_table\_properties(width =1,  
 layout = "autofit")

| **Tumorgrowth** | **Treatment** | **AnimalCode** | **Weight [g] 0 h** | **Weight [g] 24 h** | **Weight [g] 72 h** |
| --- | --- | --- | --- | --- | --- |
| fast | A | A1 | 28.69 | 29.24 | 30.12 |
| fast | A | A2 | 28.12 | 27.92 | 28.84 |
| medium | A | A3 | 33.65 | 34.76 | 36.52 |
| medium | A | A4 | 27.20 | 27.67 | 29.21 |
| slow | A | A5 | 29.05 | 29.28 | 29.97 |
| fast | B | B1 | 32.13 | 32.02 | 31.89 |
| fast | B | B2 | 26.24 | 26.25 | 27.43 |
| medium | B | B3 | 30.22 | 30.07 | 29.10 |
| medium | B | B4 | 28.26 | 27.92 | 30.88 |
| medium | B | B5 | 32.24 | 31.78 | 32.46 |
| slow | B | B6 | 31.08 | 33.21 | 34.56 |
| fast | C | C1 | 29.05 | 28.57 | 28.04 |
| fast | C | C2 | 25.85 | 25.95 | 26.04 |
| fast | C | C3 | 24.73 | 23.92 | 25.00 |
| medium | C | C4 | 30.38 | 29.88 | 31.31 |
| medium | C | C5 | 30.05 | 29.32 | 30.31 |
| slow | C | C6 | 29.87 | 30.78 | 31.08 |

#### STEP 2: Modify table rawdata to longer using pivot\_longer

##### Once the rawdata is in Global environment, start using pivot\_longer to modify the table. This modification doesn’t modify the original rawdata. Remember: to export the table with a comprehensive aesthetics, please use flextable() function.

rd\_long1 <- pivot\_longer(rawdata,  
 starts\_with("We"))  
rd\_long1 |>  
 flextable()|>  
 theme\_zebra() |>  
 set\_table\_properties(width =1,  
 layout = "autofit")

| **Tumorgrowth** | **Treatment** | **AnimalCode** | **name** | **value** |
| --- | --- | --- | --- | --- |
| fast | A | A1 | Weight [g] 0 h | 28.69 |
| fast | A | A1 | Weight [g] 24 h | 29.24 |
| fast | A | A1 | Weight [g] 72 h | 30.12 |
| fast | A | A2 | Weight [g] 0 h | 28.12 |
| fast | A | A2 | Weight [g] 24 h | 27.92 |
| fast | A | A2 | Weight [g] 72 h | 28.84 |
| medium | A | A3 | Weight [g] 0 h | 33.65 |
| medium | A | A3 | Weight [g] 24 h | 34.76 |
| medium | A | A3 | Weight [g] 72 h | 36.52 |
| medium | A | A4 | Weight [g] 0 h | 27.20 |
| medium | A | A4 | Weight [g] 24 h | 27.67 |
| medium | A | A4 | Weight [g] 72 h | 29.21 |
| slow | A | A5 | Weight [g] 0 h | 29.05 |
| slow | A | A5 | Weight [g] 24 h | 29.28 |
| slow | A | A5 | Weight [g] 72 h | 29.97 |
| fast | B | B1 | Weight [g] 0 h | 32.13 |
| fast | B | B1 | Weight [g] 24 h | 32.02 |
| fast | B | B1 | Weight [g] 72 h | 31.89 |
| fast | B | B2 | Weight [g] 0 h | 26.24 |
| fast | B | B2 | Weight [g] 24 h | 26.25 |
| fast | B | B2 | Weight [g] 72 h | 27.43 |
| medium | B | B3 | Weight [g] 0 h | 30.22 |
| medium | B | B3 | Weight [g] 24 h | 30.07 |
| medium | B | B3 | Weight [g] 72 h | 29.10 |
| medium | B | B4 | Weight [g] 0 h | 28.26 |
| medium | B | B4 | Weight [g] 24 h | 27.92 |
| medium | B | B4 | Weight [g] 72 h | 30.88 |
| medium | B | B5 | Weight [g] 0 h | 32.24 |
| medium | B | B5 | Weight [g] 24 h | 31.78 |
| medium | B | B5 | Weight [g] 72 h | 32.46 |
| slow | B | B6 | Weight [g] 0 h | 31.08 |
| slow | B | B6 | Weight [g] 24 h | 33.21 |
| slow | B | B6 | Weight [g] 72 h | 34.56 |
| fast | C | C1 | Weight [g] 0 h | 29.05 |
| fast | C | C1 | Weight [g] 24 h | 28.57 |
| fast | C | C1 | Weight [g] 72 h | 28.04 |
| fast | C | C2 | Weight [g] 0 h | 25.85 |
| fast | C | C2 | Weight [g] 24 h | 25.95 |
| fast | C | C2 | Weight [g] 72 h | 26.04 |
| fast | C | C3 | Weight [g] 0 h | 24.73 |
| fast | C | C3 | Weight [g] 24 h | 23.92 |
| fast | C | C3 | Weight [g] 72 h | 25.00 |
| medium | C | C4 | Weight [g] 0 h | 30.38 |
| medium | C | C4 | Weight [g] 24 h | 29.88 |
| medium | C | C4 | Weight [g] 72 h | 31.31 |
| medium | C | C5 | Weight [g] 0 h | 30.05 |
| medium | C | C5 | Weight [g] 24 h | 29.32 |
| medium | C | C5 | Weight [g] 72 h | 30.31 |
| slow | C | C6 | Weight [g] 0 h | 29.87 |
| slow | C | C6 | Weight [g] 24 h | 30.78 |
| slow | C | C6 | Weight [g] 72 h | 31.08 |

#### STEP 3: Improve a bit more the pivot\_longer

rd\_long2 <- pivot\_longer(rawdata,  
 starts\_with("We"),  
 values\_to="Weight [g]")  
rd\_long2|>  
 flextable()|>  
 theme\_zebra() |>  
 set\_table\_properties(width =1,  
 layout = "autofit")

| **Tumorgrowth** | **Treatment** | **AnimalCode** | **name** | **Weight [g]** |
| --- | --- | --- | --- | --- |
| fast | A | A1 | Weight [g] 0 h | 28.69 |
| fast | A | A1 | Weight [g] 24 h | 29.24 |
| fast | A | A1 | Weight [g] 72 h | 30.12 |
| fast | A | A2 | Weight [g] 0 h | 28.12 |
| fast | A | A2 | Weight [g] 24 h | 27.92 |
| fast | A | A2 | Weight [g] 72 h | 28.84 |
| medium | A | A3 | Weight [g] 0 h | 33.65 |
| medium | A | A3 | Weight [g] 24 h | 34.76 |
| medium | A | A3 | Weight [g] 72 h | 36.52 |
| medium | A | A4 | Weight [g] 0 h | 27.20 |
| medium | A | A4 | Weight [g] 24 h | 27.67 |
| medium | A | A4 | Weight [g] 72 h | 29.21 |
| slow | A | A5 | Weight [g] 0 h | 29.05 |
| slow | A | A5 | Weight [g] 24 h | 29.28 |
| slow | A | A5 | Weight [g] 72 h | 29.97 |
| fast | B | B1 | Weight [g] 0 h | 32.13 |
| fast | B | B1 | Weight [g] 24 h | 32.02 |
| fast | B | B1 | Weight [g] 72 h | 31.89 |
| fast | B | B2 | Weight [g] 0 h | 26.24 |
| fast | B | B2 | Weight [g] 24 h | 26.25 |
| fast | B | B2 | Weight [g] 72 h | 27.43 |
| medium | B | B3 | Weight [g] 0 h | 30.22 |
| medium | B | B3 | Weight [g] 24 h | 30.07 |
| medium | B | B3 | Weight [g] 72 h | 29.10 |
| medium | B | B4 | Weight [g] 0 h | 28.26 |
| medium | B | B4 | Weight [g] 24 h | 27.92 |
| medium | B | B4 | Weight [g] 72 h | 30.88 |
| medium | B | B5 | Weight [g] 0 h | 32.24 |
| medium | B | B5 | Weight [g] 24 h | 31.78 |
| medium | B | B5 | Weight [g] 72 h | 32.46 |
| slow | B | B6 | Weight [g] 0 h | 31.08 |
| slow | B | B6 | Weight [g] 24 h | 33.21 |
| slow | B | B6 | Weight [g] 72 h | 34.56 |
| fast | C | C1 | Weight [g] 0 h | 29.05 |
| fast | C | C1 | Weight [g] 24 h | 28.57 |
| fast | C | C1 | Weight [g] 72 h | 28.04 |
| fast | C | C2 | Weight [g] 0 h | 25.85 |
| fast | C | C2 | Weight [g] 24 h | 25.95 |
| fast | C | C2 | Weight [g] 72 h | 26.04 |
| fast | C | C3 | Weight [g] 0 h | 24.73 |
| fast | C | C3 | Weight [g] 24 h | 23.92 |
| fast | C | C3 | Weight [g] 72 h | 25.00 |
| medium | C | C4 | Weight [g] 0 h | 30.38 |
| medium | C | C4 | Weight [g] 24 h | 29.88 |
| medium | C | C4 | Weight [g] 72 h | 31.31 |
| medium | C | C5 | Weight [g] 0 h | 30.05 |
| medium | C | C5 | Weight [g] 24 h | 29.32 |
| medium | C | C5 | Weight [g] 72 h | 30.31 |
| slow | C | C6 | Weight [g] 0 h | 29.87 |
| slow | C | C6 | Weight [g] 24 h | 30.78 |
| slow | C | C6 | Weight [g] 72 h | 31.08 |

#### STEP 4: Improve a bit more the pivot\_longer

rd\_long3 <- pivot\_longer(rawdata,  
 starts\_with("We"), # here 'cols' was omitted but by following the order of factors, we can omit it  
 values\_to="Weight [g]",  
 names\_to="Time [h]",  
 names\_pattern = ".+ (\\d+).+") #regular expression meaning: search for one or more than one character, followed by a space and then for one or more numbers, and after the number there's something else  
rd\_long3|>  
 flextable()|>  
 theme\_zebra() |>  
 set\_table\_properties(width =1,  
 layout = "autofit")

| **Tumorgrowth** | **Treatment** | **AnimalCode** | **Time [h]** | **Weight [g]** |
| --- | --- | --- | --- | --- |
| fast | A | A1 | 0 | 28.69 |
| fast | A | A1 | 24 | 29.24 |
| fast | A | A1 | 72 | 30.12 |
| fast | A | A2 | 0 | 28.12 |
| fast | A | A2 | 24 | 27.92 |
| fast | A | A2 | 72 | 28.84 |
| medium | A | A3 | 0 | 33.65 |
| medium | A | A3 | 24 | 34.76 |
| medium | A | A3 | 72 | 36.52 |
| medium | A | A4 | 0 | 27.20 |
| medium | A | A4 | 24 | 27.67 |
| medium | A | A4 | 72 | 29.21 |
| slow | A | A5 | 0 | 29.05 |
| slow | A | A5 | 24 | 29.28 |
| slow | A | A5 | 72 | 29.97 |
| fast | B | B1 | 0 | 32.13 |
| fast | B | B1 | 24 | 32.02 |
| fast | B | B1 | 72 | 31.89 |
| fast | B | B2 | 0 | 26.24 |
| fast | B | B2 | 24 | 26.25 |
| fast | B | B2 | 72 | 27.43 |
| medium | B | B3 | 0 | 30.22 |
| medium | B | B3 | 24 | 30.07 |
| medium | B | B3 | 72 | 29.10 |
| medium | B | B4 | 0 | 28.26 |
| medium | B | B4 | 24 | 27.92 |
| medium | B | B4 | 72 | 30.88 |
| medium | B | B5 | 0 | 32.24 |
| medium | B | B5 | 24 | 31.78 |
| medium | B | B5 | 72 | 32.46 |
| slow | B | B6 | 0 | 31.08 |
| slow | B | B6 | 24 | 33.21 |
| slow | B | B6 | 72 | 34.56 |
| fast | C | C1 | 0 | 29.05 |
| fast | C | C1 | 24 | 28.57 |
| fast | C | C1 | 72 | 28.04 |
| fast | C | C2 | 0 | 25.85 |
| fast | C | C2 | 24 | 25.95 |
| fast | C | C2 | 72 | 26.04 |
| fast | C | C3 | 0 | 24.73 |
| fast | C | C3 | 24 | 23.92 |
| fast | C | C3 | 72 | 25.00 |
| medium | C | C4 | 0 | 30.38 |
| medium | C | C4 | 24 | 29.88 |
| medium | C | C4 | 72 | 31.31 |
| medium | C | C5 | 0 | 30.05 |
| medium | C | C5 | 24 | 29.32 |
| medium | C | C5 | 72 | 30.31 |
| slow | C | C6 | 0 | 29.87 |
| slow | C | C6 | 24 | 30.78 |
| slow | C | C6 | 72 | 31.08 |

#### STEP 5: from longer to wider

rd\_long <-  
 pivot\_longer(rawdata,  
 cols = starts\_with("We"),  
 names\_to=c(".value","Time [h]"),  
 names\_pattern = "(W.+\\]) (\\d+).+") # dot(.) is a wild card and it can be anything. Plus (+) means that there's one or more characters after "W"  
  
rd\_wide <-  
 pivot\_wider(rd\_long,  
 names\_from = `Time [h]`,  
 values\_from = `Weight [g]`,  
 names\_glue = "Weight [g] @{`Time [h]`}h") # in {} we are referring the name of the columns generated from "Time [h]"  
rd\_wide|>  
 flextable()|>  
 theme\_zebra() |>  
 set\_table\_properties(width =1,  
 layout = "autofit")

| **Tumorgrowth** | **Treatment** | **AnimalCode** | **Weight [g] @0h** | **Weight [g] @24h** | **Weight [g] @72h** |
| --- | --- | --- | --- | --- | --- |
| fast | A | A1 | 28.69 | 29.24 | 30.12 |
| fast | A | A2 | 28.12 | 27.92 | 28.84 |
| medium | A | A3 | 33.65 | 34.76 | 36.52 |
| medium | A | A4 | 27.20 | 27.67 | 29.21 |
| slow | A | A5 | 29.05 | 29.28 | 29.97 |
| fast | B | B1 | 32.13 | 32.02 | 31.89 |
| fast | B | B2 | 26.24 | 26.25 | 27.43 |
| medium | B | B3 | 30.22 | 30.07 | 29.10 |
| medium | B | B4 | 28.26 | 27.92 | 30.88 |
| medium | B | B5 | 32.24 | 31.78 | 32.46 |
| slow | B | B6 | 31.08 | 33.21 | 34.56 |
| fast | C | C1 | 29.05 | 28.57 | 28.04 |
| fast | C | C2 | 25.85 | 25.95 | 26.04 |
| fast | C | C3 | 24.73 | 23.92 | 25.00 |
| medium | C | C4 | 30.38 | 29.88 | 31.31 |
| medium | C | C5 | 30.05 | 29.32 | 30.31 |
| slow | C | C6 | 29.87 | 30.78 | 31.08 |

#### STEP 6:

#### Changing the appearance 1

rd\_wide|>  
 flextable()|>  
 theme\_zebra(odd\_header = "#ccd5ae") |>  
 set\_table\_properties(width =1,  
 layout = "autofit")

| **Tumorgrowth** | **Treatment** | **AnimalCode** | **Weight [g] @0h** | **Weight [g] @24h** | **Weight [g] @72h** |
| --- | --- | --- | --- | --- | --- |
| fast | A | A1 | 28.69 | 29.24 | 30.12 |
| fast | A | A2 | 28.12 | 27.92 | 28.84 |
| medium | A | A3 | 33.65 | 34.76 | 36.52 |
| medium | A | A4 | 27.20 | 27.67 | 29.21 |
| slow | A | A5 | 29.05 | 29.28 | 29.97 |
| fast | B | B1 | 32.13 | 32.02 | 31.89 |
| fast | B | B2 | 26.24 | 26.25 | 27.43 |
| medium | B | B3 | 30.22 | 30.07 | 29.10 |
| medium | B | B4 | 28.26 | 27.92 | 30.88 |
| medium | B | B5 | 32.24 | 31.78 | 32.46 |
| slow | B | B6 | 31.08 | 33.21 | 34.56 |
| fast | C | C1 | 29.05 | 28.57 | 28.04 |
| fast | C | C2 | 25.85 | 25.95 | 26.04 |
| fast | C | C3 | 24.73 | 23.92 | 25.00 |
| medium | C | C4 | 30.38 | 29.88 | 31.31 |
| medium | C | C5 | 30.05 | 29.32 | 30.31 |
| slow | C | C6 | 29.87 | 30.78 | 31.08 |

#### STEP 6:

#### Changing the appearance 2

rd\_wide|>  
 flextable()|>  
 theme\_tron\_legacy() |>  
 set\_table\_properties(width =1,  
 layout = "autofit")

| **Tumorgrowth** | **Treatment** | **AnimalCode** | **Weight [g] @0h** | **Weight [g] @24h** | **Weight [g] @72h** |
| --- | --- | --- | --- | --- | --- |
| fast | A | A1 | 28.69 | 29.24 | 30.12 |
| fast | A | A2 | 28.12 | 27.92 | 28.84 |
| medium | A | A3 | 33.65 | 34.76 | 36.52 |
| medium | A | A4 | 27.20 | 27.67 | 29.21 |
| slow | A | A5 | 29.05 | 29.28 | 29.97 |
| fast | B | B1 | 32.13 | 32.02 | 31.89 |
| fast | B | B2 | 26.24 | 26.25 | 27.43 |
| medium | B | B3 | 30.22 | 30.07 | 29.10 |
| medium | B | B4 | 28.26 | 27.92 | 30.88 |
| medium | B | B5 | 32.24 | 31.78 | 32.46 |
| slow | B | B6 | 31.08 | 33.21 | 34.56 |
| fast | C | C1 | 29.05 | 28.57 | 28.04 |
| fast | C | C2 | 25.85 | 25.95 | 26.04 |
| fast | C | C3 | 24.73 | 23.92 | 25.00 |
| medium | C | C4 | 30.38 | 29.88 | 31.31 |
| medium | C | C5 | 30.05 | 29.32 | 30.31 |
| slow | C | C6 | 29.87 | 30.78 | 31.08 |