Summary stats - Lithic analysis Balver Höhle

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# Goal of the script

This script computes standard descriptive statistics for each group.  
The groups are based on:

* Tool type
* state of the tool (Complete, distal/proximal fragment, medial fragment)

It computes the following statistics:

* n (sample size = length): number of measurements
* smallest value (min)
* largest value (max)
* mean
* median
* standard deviation (sd)

dir\_in <- "analysis/Balve/derived\_data/"  
dir\_out <- "analysis/Balve/summary\_stats/"

Raw data must be located in ~/analysis/Balve/derived\_data/.  
Formatted data will be saved in ~/analysis/Balve/summary\_stats/. The knit directory for this script is the project directory.

# Load packages

library(openxlsx)

Warning: package 'openxlsx' was built under R version 4.0.3

library(R.utils)  
library(tools)  
library(doBy)

Warning: package 'doBy' was built under R version 4.0.3

# Get names, path and information of the file

data\_file <- list.files(dir\_in, pattern = "\\.xlsx$", full.names = TRUE)  
md5\_in <- md5sum(data\_file)  
info\_in <- data.frame(file = basename(names(md5\_in)), checksum = md5\_in, row.names = NULL)

The checksum (MD5 hashes) of the imported file is

file checksum  
1 Balve\_lithic\_analysis.xlsx a4d7b432556150ee5eb0e3ea35ac69d1

# Load data into R object

imp\_data <- loadObject(paste0(dir\_in, "Balve\_lithic\_analysis.Rbin"))

The imported file is: “~/analysis/Balve/derived\_data/Balve\_lithic\_analysis.xlsx”

# Define numeric variables

# changes the order of columns   
imp\_data <- imp\_data[c(1:22, 27,23:26, 28:34)]  
num.var <-19:23

The following variables will be used:

[19] length  
[20] width  
[21] thickness  
[22] weight  
[23] thickness.back

# Compute summary statistics

## Create function to compute the statistics at once

nminmaxmeanmedsd <- function(x){  
 y <- x[!is.na(x)]  
 n\_test <- length(y)  
 min\_test <- min(y)  
 max\_test <- max(y)  
 mean\_test <- mean(y)  
 med\_test <- median(y)  
 sd\_test <- sd(y)  
 out <- c(n\_test, min\_test, max\_test, mean\_test, med\_test, sd\_test)  
 names(out) <- c("n", "min", "max", "mean", "median", "sd")  
 return(out)  
}

## Compute the summary statistics

### Dimensions

# Dimensions Keilmesser, Keilmesser-points, Pradnik scraper, scraper & Later sharpening spall   
dimensions <- summaryBy(length + width + thickness ~ technological.class + artefact.state,  
 data = imp\_data, FUN = nminmaxmeanmedsd)  
str(dimensions)

'data.frame': 8 obs. of 20 variables:  
 $ technological.class: chr "Keilmesser" "Keilmesser" "Keilmesser" "lateral\_sharpening\_spall" ...  
 $ artefact.state : chr "complete" "Keilmesser\_tip" "semifinished\_product" "complete" ...  
 $ length.n : num 158 21 12 110 4 3 27 12  
 $ length.min : num 29.7 18 42.7 12.4 20.5 ...  
 $ length.max : num 135.6 91.9 154.7 55.8 52.9 ...  
 $ length.mean : num 56.4 45.2 84.6 29.3 33.4 ...  
 $ length.median : num 52.6 43.2 72.6 27.6 30.2 ...  
 $ length.sd : num 16.59 16.58 35.21 9.18 14.31 ...  
 $ width.n : num 158 21 12 110 4 3 27 12  
 $ width.min : num 18.7 22.9 37.9 7 16.7 ...  
 $ width.max : num 81.4 53.2 91.7 29.9 20.6 ...  
 $ width.mean : num 34.1 35.6 54 17.4 18.3 ...  
 $ width.median : num 33.1 35.6 43.9 17 18 ...  
 $ width.sd : num 8.91 8.99 19.54 5.17 1.81 ...  
 $ thickness.n : num 158 21 12 110 4 3 27 12  
 $ thickness.min : num 7.35 9.53 13.6 2.14 5.66 ...  
 $ thickness.max : num 29.25 23.6 26.08 10.96 7.69 ...  
 $ thickness.mean : num 16.28 15.47 18.92 6.02 6.37 ...  
 $ thickness.median : num 15.67 15.31 18.34 5.87 6.07 ...  
 $ thickness.sd : num 4.208 3.418 4.157 2.012 0.899 ...

# Save data

## Format name of output file

file\_out <- "Balve\_lithic\_analysis\_stats"

The file will be saved as “~/analysis/Balve/summary\_stats/.[ext]”.

## Write to XLSX

write.xlsx(list(dimensions = dimensions),   
 file = paste0(dir\_out, file\_out, ".xlsx"))

## Save R object

saveObject(list(dimensions = dimensions),   
 file = paste0(dir\_out, file\_out, ".Rbin"))

# sessionInfo() and RStudio version

sessionInfo()

R version 4.0.2 (2020-06-22)  
Platform: x86\_64-w64-mingw32/x64 (64-bit)  
Running under: Windows 10 x64 (build 19041)  
  
Matrix products: default  
  
locale:  
[1] LC\_COLLATE=German\_Germany.1252 LC\_CTYPE=German\_Germany.1252   
[3] LC\_MONETARY=German\_Germany.1252 LC\_NUMERIC=C   
[5] LC\_TIME=German\_Germany.1252   
  
attached base packages:  
[1] tools stats graphics grDevices utils datasets methods   
[8] base   
  
other attached packages:  
[1] doBy\_4.6.8 R.utils\_2.10.1 R.oo\_1.24.0 R.methodsS3\_1.8.1  
[5] openxlsx\_4.2.3   
  
loaded via a namespace (and not attached):  
 [1] zip\_2.1.1 Rcpp\_1.0.6 compiler\_4.0.2 pillar\_1.4.7   
 [5] digest\_0.6.27 lattice\_0.20-41 evaluate\_0.14 lifecycle\_0.2.0   
 [9] tibble\_3.0.6 gtable\_0.3.0 pkgconfig\_2.0.3 rlang\_0.4.10   
[13] Matrix\_1.2-18 DBI\_1.1.1 yaml\_2.2.1 xfun\_0.20   
[17] dplyr\_1.0.3 stringr\_1.4.0 knitr\_1.31 generics\_0.1.0   
[21] vctrs\_0.3.6 grid\_4.0.2 tidyselect\_1.1.0 glue\_1.4.2   
[25] R6\_2.5.0 rmarkdown\_2.6 tidyr\_1.1.2 purrr\_0.3.4   
[29] ggplot2\_3.3.3 magrittr\_2.0.1 backports\_1.2.1 scales\_1.1.1   
[33] ellipsis\_0.3.1 htmltools\_0.5.1.1 MASS\_7.3-51.6 assertthat\_0.2.1   
[37] colorspace\_2.0-0 Deriv\_4.1.2 stringi\_1.5.3 munsell\_0.5.0   
[41] broom\_0.7.4 crayon\_1.4.0

RStudio version 1.3.1056.

END OF SCRIPT