

# BCS 511 Minilab 2 - Data import

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## 1 Creating the data file from MatLab and Excel output

This file is provided to illustrate how one can import information from MatLab and Excel into R using functions from the libraries *readr*, *R.matlab*, and *openxlsx*.

The raw psychophysics data consists of individual trials with various stimulus durations (log-transformed to base 10, *LogDuration*) and contrast values (between 0-100, *Contrast*). Each trial was either answered correctly (*Correct* == 1) or not (0). Each *Subject* participated in three *Tasks* ("Motion", "Static", "Angular"), completing multiple *Blocks* for each task. A total of 40 subjects were run, balanced across *Sex* (1 = "Female" vs. 0 = "Male"). Additionally, five individual difference variables were collected for each subject: *EmphasizingQuotient*, *SystemizingQuotient*, *AutismQuotient*, *ADHD*, and the hours/day spent *VideoGaming*.

The data for each unique combination of Subject, Task, and Block are stored in separate MatLab (.mat) files. Within each MatLab file the matrix *emat* contains all the relevant information. The individual difference information is stored in a comma-separated file (.csv). The following code was used to combine all the .mat files, join it with the csv file, and standardize variable naming.

```
d = tibble()

for (f in list.files(pattern="*.mat", path = "./data/raw", full.names=TRUE)) {
  cat(paste("Processing file", f, "\n"))
  df = readMat(f)

  d %<>%
    rbind(
      df[["emat"]] %>%
        as_tibble() %>%
        mutate(
          Subject = as.numeric(gsub("^.*p([0-9]+)[A-Za-z]+.*$", "\\1", f)),
          Task = gsub("^.*p[0-9]+([A-Za-z]+)\\|.*$", "\\1", f),
          Block = as.numeric(gsub("^.*([0-9]).mat$", "\\1", f))
        ) %>%
        select(Subject, Task, Block, 1,2,6,9)
    )
}
```

```
## Processing file ./data/raw/p10Angular|Contrast|1.mat
```

```
## Warning: `as_tibble.matrix()` requires a matrix with column names or a `name_repair` argument. Using
## This warning is displayed once per session.
```

```
## Processing file ./data/raw/p10Angular|Contrast|2.mat
```

```
## Processing file ./data/raw/p10Angular|Contrast|3.mat
```

```
## Processing file ./data/raw/p10Angular|Contrast|4.mat
```

```
## Processing file ./data/raw/p10Angular|Contrast|5.mat
```

```
## Processing file ./data/raw/p10Mask|Contrast|1.mat
```

```
## Processing file ./data/raw/p10Mask|Contrast|2.mat
```

```
## Processing file ./data/raw/p10Mask|Contrast|3.mat
```

```
## Processing file ./data/raw/p10Mask|Contrast|4.mat
```

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]



[illegible]

[illegible]

[illegible]

[illegible]

```

## Processing file ./data/raw/p7Angular|Contrast|4.mat
## Processing file ./data/raw/p7Angular|Contrast|5.mat
## Processing file ./data/raw/p7Mask|Contrast|1.mat
## Processing file ./data/raw/p7Mask|Contrast|2.mat
## Processing file ./data/raw/p7Mask|Contrast|3.mat
## Processing file ./data/raw/p7Mask|Contrast|4.mat
## Processing file ./data/raw/p7Mask|Contrast|5.mat
## Processing file ./data/raw/p7Motion|Contrast|1.mat
## Processing file ./data/raw/p7Motion|Contrast|2.mat
## Processing file ./data/raw/p7Motion|Contrast|3.mat
## Processing file ./data/raw/p7Motion|Contrast|4.mat
## Processing file ./data/raw/p7Motion|Contrast|5.mat
## Processing file ./data/raw/p8Angular|Contrast|1.mat
## Processing file ./data/raw/p8Angular|Contrast|2.mat
## Processing file ./data/raw/p8Angular|Contrast|3.mat
## Processing file ./data/raw/p8Angular|Contrast|4.mat
## Processing file ./data/raw/p8Angular|Contrast|5.mat
## Processing file ./data/raw/p8Mask|Contrast|1.mat
## Processing file ./data/raw/p8Mask|Contrast|2.mat
## Processing file ./data/raw/p8Mask|Contrast|3.mat
## Processing file ./data/raw/p8Mask|Contrast|4.mat
## Processing file ./data/raw/p8Mask|Contrast|5.mat
## Processing file ./data/raw/p8Motion|Contrast|1.mat
## Processing file ./data/raw/p8Motion|Contrast|2.mat
## Processing file ./data/raw/p8Motion|Contrast|3.mat
## Processing file ./data/raw/p8Motion|Contrast|4.mat
## Processing file ./data/raw/p8Motion|Contrast|5.mat
## Processing file ./data/raw/p9Angular|Contrast|1.mat
## Processing file ./data/raw/p9Angular|Contrast|2.mat
## Processing file ./data/raw/p9Angular|Contrast|3.mat
## Processing file ./data/raw/p9Angular|Contrast|4.mat
## Processing file ./data/raw/p9Angular|Contrast|5.mat
## Processing file ./data/raw/p9Mask|Contrast|1.mat
## Processing file ./data/raw/p9Mask|Contrast|2.mat
## Processing file ./data/raw/p9Mask|Contrast|3.mat
## Processing file ./data/raw/p9Mask|Contrast|4.mat
## Processing file ./data/raw/p9Mask|Contrast|5.mat
## Processing file ./data/raw/p9Motion|Contrast|1.mat
## Processing file ./data/raw/p9Motion|Contrast|2.mat
## Processing file ./data/raw/p9Motion|Contrast|3.mat
## Processing file ./data/raw/p9Motion|Contrast|4.mat
## Processing file ./data/raw/p9Motion|Contrast|5.mat

```

Data clean up, and import of subject information:

```

d %<>%
  rename(
    Trial = V1,
    Contrast = V2,
    LogDuration = V6,
    Correct = V9
  )

d %<>%
  left_join(

```

```

read_csv(file = "data/SubjectInformation.csv") %>%
  rename(
    Subject = `sub ID`,
    Sex = `Male (0), Female (1)`,
    VideoGaming = `Video game playingh`,
    EmphatizingQuotient = `Emphatizing quotient`,
    SystemizingQuotient = `Systemizing quotient`,
    AutismQuotient = `Autism Quptient`
  ) %>%
  rename(
    TaskOrder_MO = Motion,
    TaskOrder_MA = `Static Mask`,
    TaskOrder_AN = `Static Angle`
  ) %>%
# select(-c(Motion, `Static Mask`, `Static Angle`)) %>%
# select(-starts_with("LOG_")) %>%
rename_at(vars(starts_with("slope_n")), .fun = function(x) gsub("_n", "", x)) %>%
rename_at(vars(starts_with("LOG")), .fun = function(x) gsub("LOG", "Log", x)) %>%
gather("key", value = "value",
       -c("Subject", "Sex",
          "VideoGaming", "ADHD",
          "EmphatizingQuotient", "SystemizingQuotient", "AutismQuotient")) %>%
separate(col = key, into = c("par", "Task"), sep = "_") %>%
spread(key = par, value = value) %>%
mutate(
  Task = case_when(
    Task == "MO" ~ "Motion",
    Task == "AN" ~ "Angular",
    Task == "MA" ~ "Mask"
  )
),
by = c("Subject", "Task")) %>%
mutate_at(
  c("Subject", "Task"),
  factor
) %>%
rename(
  Slope = slope
) %>%
select(
  Subject, Sex, Task, TaskOrder, Block, Trial, Contrast, LogDuration, Correct,
  Rmax, Slope, C50, Asymp, LogAsymp, LogC50, Weibull,
  everything()
)

```

```

## Parsed with column specification:
## cols(
##   .default = col_double()
## )
## See spec(...) for full column specifications.

```

```
save(d, file = "./data/Minilab2 data-10-30-19.RData")
```

## 2 Session info

```
## - Session info -----
## setting value
## version R version 3.6.0 (2019-04-26)
## os      macOS High Sierra 10.13.6
## system  x86_64, darwin15.6.0
## ui      X11
## language (EN)
## collate en_US.UTF-8
## ctype   en_US.UTF-8
## tz      America/New_York
## date    2019-11-04
##
## - Packages -----
## package      * version date      lib source
## assertthat   0.2.1  2019-03-21 [1] CRAN (R 3.6.0)
## backports    1.1.5  2019-10-02 [1] CRAN (R 3.6.0)
## broom        0.5.2  2019-04-07 [1] CRAN (R 3.6.0)
## callr        3.3.2  2019-09-22 [1] CRAN (R 3.6.0)
## cellranger   1.1.0  2016-07-27 [1] CRAN (R 3.6.0)
## cli          1.1.0  2019-03-19 [1] CRAN (R 3.6.0)
## colorspace   1.4-1  2019-03-18 [1] CRAN (R 3.6.0)
## crayon       1.3.4  2017-09-16 [1] CRAN (R 3.6.0)
## desc         1.2.0  2018-05-01 [1] CRAN (R 3.6.0)
## devtools     2.2.1  2019-09-24 [1] CRAN (R 3.6.0)
## digest       0.6.22 2019-10-21 [1] CRAN (R 3.6.0)
## dplyr        * 0.8.3  2019-07-04 [1] CRAN (R 3.6.0)
## ellipsis     0.3.0  2019-09-20 [1] CRAN (R 3.6.0)
## evaluate     0.14   2019-05-28 [1] CRAN (R 3.6.0)
## forcats     * 0.4.0  2019-02-17 [1] CRAN (R 3.6.0)
## fs           1.3.1  2019-05-06 [1] CRAN (R 3.6.0)
## generics     0.0.2  2018-11-29 [1] CRAN (R 3.6.0)
## ggplot2     * 3.2.1  2019-08-10 [1] CRAN (R 3.6.0)
## glue        1.3.1  2019-03-12 [1] CRAN (R 3.6.0)
## gtable       0.3.0  2019-03-25 [1] CRAN (R 3.6.0)
## haven       2.1.1  2019-07-04 [1] CRAN (R 3.6.0)
## hms         0.5.2  2019-10-30 [1] CRAN (R 3.6.0)
## htmltools   0.4.0  2019-10-04 [1] CRAN (R 3.6.0)
## httr        1.4.1  2019-08-05 [1] CRAN (R 3.6.0)
## jsonlite    1.6     2018-12-07 [1] CRAN (R 3.6.0)
## knitr       1.25   2019-09-18 [1] CRAN (R 3.6.0)
## lattice     0.20-38 2018-11-04 [1] CRAN (R 3.6.0)
## lazyeval    0.2.2  2019-03-15 [1] CRAN (R 3.6.0)
## lifecycle   0.1.0  2019-08-01 [1] CRAN (R 3.6.0)
## lubridate   1.7.4  2018-04-11 [1] CRAN (R 3.6.0)
## magrittr    * 1.5     2014-11-22 [1] CRAN (R 3.6.0)
## memoise     1.1.0  2017-04-21 [1] CRAN (R 3.6.0)
## modelr      0.1.5  2019-08-08 [1] CRAN (R 3.6.0)
## munsell     0.5.0  2018-06-12 [1] CRAN (R 3.6.0)
```

```

## nlme          3.1-141 2019-08-01 [1] CRAN (R 3.6.0)
## pillar        1.4.2  2019-06-29 [1] CRAN (R 3.6.0)
## pkgbuild      1.0.6  2019-10-09 [1] CRAN (R 3.6.0)
## pkgconfig     2.0.3  2019-09-22 [1] CRAN (R 3.6.0)
## pkgload       1.0.2  2018-10-29 [1] CRAN (R 3.6.0)
## prettyunits   1.0.2  2015-07-13 [1] CRAN (R 3.6.0)
## processx      3.4.1  2019-07-18 [1] CRAN (R 3.6.0)
## ps            1.3.0  2018-12-21 [1] CRAN (R 3.6.0)
## purrr         * 0.3.3  2019-10-18 [1] CRAN (R 3.6.0)
## R.matlab      * 3.6.2  2018-09-27 [1] CRAN (R 3.6.0)
## R.methodsS3    1.7.1  2016-02-16 [1] CRAN (R 3.6.0)
## R.oo           1.22.0  2018-04-22 [1] CRAN (R 3.6.0)
## R.utils       2.9.0  2019-06-13 [1] CRAN (R 3.6.0)
## R6            2.4.0  2019-02-14 [1] CRAN (R 3.6.0)
## Rcpp          1.0.2  2019-07-25 [1] CRAN (R 3.6.0)
## readr         * 1.3.1  2018-12-21 [1] CRAN (R 3.6.0)
## readxl        1.3.1  2019-03-13 [1] CRAN (R 3.6.0)
## remotes       2.1.0  2019-06-24 [1] CRAN (R 3.6.0)
## rlang         0.4.1  2019-10-24 [1] CRAN (R 3.6.0)
## rmarkdown     1.16   2019-10-01 [1] CRAN (R 3.6.0)
## rprojroot     1.3-2   2018-01-03 [1] CRAN (R 3.6.0)
## rstudioapi    0.10   2019-03-19 [1] CRAN (R 3.6.0)
## rvest         0.3.4  2019-05-15 [1] CRAN (R 3.6.0)
## scales       1.0.0  2018-08-09 [1] CRAN (R 3.6.0)
## sessioninfo   1.1.1  2018-11-05 [1] CRAN (R 3.6.0)
## stringi       1.4.3  2019-03-12 [1] CRAN (R 3.6.0)
## stringr      * 1.4.0  2019-02-10 [1] CRAN (R 3.6.0)
## testthat     2.2.1  2019-07-25 [1] CRAN (R 3.6.0)
## tibble       * 2.1.3  2019-06-06 [1] CRAN (R 3.6.0)
## tidyr        * 1.0.0  2019-09-11 [1] CRAN (R 3.6.0)
## tidyselect    0.2.5  2018-10-11 [1] CRAN (R 3.6.0)
## tidyverse    * 1.2.1  2017-11-14 [1] CRAN (R 3.6.0)
## usethis       1.5.1  2019-07-04 [1] CRAN (R 3.6.0)
## vctrs         0.2.0  2019-07-05 [1] CRAN (R 3.6.0)
## withr         2.1.2  2018-03-15 [1] CRAN (R 3.6.0)
## xfun          0.10   2019-10-01 [1] CRAN (R 3.6.0)
## xml2          1.2.2  2019-08-09 [1] CRAN (R 3.6.0)
## yaml          2.2.0  2018-07-25 [1] CRAN (R 3.6.0)
## zeallot       0.1.0  2018-01-28 [1] CRAN (R 3.6.0)
##
## [1] /Library/Frameworks/R.framework/Versions/3.6/Resources/library

```