

analyseDataEnetGBM.R

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```
# calculate ANOVA to check for effects of manipulated variables in simulation
# interactions between manipulations
library(afex) # für aov_ez()

## Lade nötiges Paket: lme4
## Lade nötiges Paket: Matrix
## ****
## Welcome to afex. For support visit: http://afex.singmann.science/
## - Functions for ANOVAs: aov_car(), aov_ez(), and aov_4()
## - Methods for calculating p-values with mixed(): 'S', 'KR', 'LRT', and 'PB'
## - 'afex_aov' and 'mixed' objects can be passed to emmeans() for follow-up tests
## - Get and set global package options with: afex_options()
## - Set sum-to-zero contrasts globally: set_sum_contrasts()
## - For example analyses see: browseVignettes("afex")
## ****

##
## Attache Paket: 'afex'

## Das folgende Objekt ist maskiert 'package:lme4':
##
##     lmer
library(effectsize) # für Berechnung von Effektstärken; generalisiertes eta2

source("setParameters.R")
source("analysisTools.R")

condGrid <- expand.grid(N = setParam$dgp$N,
                        pTrash = setParam$dgp$pTrash,
                        reliability = setParam$dgp$reliability)

condN_pTrash <- paste0("N",
                       "_pTrash", condGrid$pTrash,
                       "_rel", condGrid$reliability)

# load results files
resFolder <- "results/finalResults/dependentMeasures"

# listDir <- dir(resFolder)
# dataList <- listDir[stringr::str_detect(listDir, "^\$performPerSample")]
# models <- stringr::str_extract(dataList, "_[:alpha:]*.rda$")
# models <- stringr::str_sub(models, start = 2L, end = -5)
```

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# for (iDir in seq_len(length(dataList))){
#   load(paste0(resFolder, "/", iDir))
# }

load(paste0(resFolder, "/performPerSample_ENETw.rda"))
ppsENETw <- performPerSample
load(paste0(resFolder, "/performPerSample_ENETwo.rda"))
ppsENETwo <- performPerSample
load(paste0(resFolder, "/performPerSample_GBM.rda"))
ppsGBM <- performPerSample
rm(performPerSample)

#####
# ANOVA - R2 in test sample
#####
# to do:
#   - für test R2 ist sample immer dasselber aber Hyperparameter kommen von anderem training

# pull data from nested list of all results (fullData)
ppsENETw <- rbindSingleResults(ppsENETw)
ppsENETwo <- rbindSingleResults(ppsENETwo)
ppsGBM <- rbindSingleResults(ppsGBM)

# get informative variables for simulated conditions (N, pTrash, R2, lin_inter)
ppsENETw <- idx2infoNew(ppsENETw)
ppsENETwo <- idx2infoNew(ppsENETwo)
ppsGBM <- idx2infoNew(ppsGBM)

# in ANOVA sample will be the ID; but all samples run from 1:100 in all simulated
#   conditions that represent independent samples (between factors); identical sample
#   names suggest within factor in ANOVA!
#   -> introduce additional ID variable to indicate independent samples
# independent observations for samples {1:100} in different simulated conditions
#   that all have the same sample numbers
ppsENETw$ID <- seq_len(dim(ppsENETw)[1])
ppsENETwo$ID <- seq_len(dim(ppsENETwo)[1])
ppsGBM$ID <- seq_len(dim(ppsGBM)[1])

# check
all(colnames(ppsENETw) == colnames(ppsENETwo))

## [1] TRUE
all(colnames(ppsGBM) == colnames(ppsENETw))

## [1] TRUE
# # merge ENET_w, ENET_wo and GBM data; concatenate data for all models
rSquaredTest <- rbind(ppsENETw, ppsENETwo, ppsGBM)

str(rSquaredTest)

## 'data.frame': 486000 obs. of 14 variables:
## $ RMSE_train: chr "1.0762868097211" "0.944199711599255" "1.19074121751267" "0.565548255901517" ...
## $ Rsq_train : chr "0.244321623953515" "0.389836759488636" "0" "0.819047727860495" ...

```

```

## $ MAE_train : chr "0.851742314160487" "0.762822943070873" "0.976218144379516" "0.425090465248187"
## $ RMSE_test : chr "1.0770851035444" "1.08721344883611" "1.10157972935689" "1.21969776807236" ...
## $ Rsq_test : chr "0.0525088830387214" "0.0263305168898596" "0" "0.0132852815441839" ...
## $ MAE_test : chr "0.850118832766745" "0.863529271452376" "0.865979943731728" "0.967202688678839"
## $ sample : chr "1" "2" "3" "4" ...
## $ model : chr "ENETw" "ENETw" "ENETw" "ENETw" ...
## $ N : chr "100" "100" "100" "100" ...
## $ pTrash : chr "10" "10" "10" "10" ...
## $ rel : chr "0.6" "0.6" "0.6" "0.6" ...
## $ R2 : chr "0.2" "0.2" "0.2" "0.2" ...
## $ lin_inter : chr "0.5_0.5" "0.5_0.5" "0.5_0.5" "0.5_0.5" ...
## $ ID : int 1 2 3 4 5 6 7 8 9 10 ...

# change variables to factors
col2fac <- c("N", "pTrash", "R2", "rel", "lin_inter", "model")
rSquaredTest[col2fac] <- lapply(rSquaredTest[col2fac], factor)
# change variables to numeric
chr2num <- c("RMSE_train", "Rsq_train", "MAE_train", "RMSE_test", "Rsq_test", "MAE_test")
rSquaredTest[chr2num] <- lapply(rSquaredTest[chr2num], as.numeric)

# mixed ANOVA with ...
# ... id = sample but ID (independent samples between simulated conditions)
# ... dv = {R^2}
# ... between: 3 x 2 x 3 x 3 x 3
#   N (3) {100, 300, 1000}
#   pTrash (2) {10, 50}
#   R2 (3) {0.2, 0.5, 0.8}
#   rel (3) {0.6, 0.8, 1}
#   lin_inter (3) {0.2_0.8, 0.5_0.5, 0.8_0.2}
# ... within:
#   model {Enet - mit; Enet - ohne, GBM}

# ANOVA:
## mit ENET - ohne
anovaTestR2 <- aov_ez(id = "ID",
                        dv = "Rsq_test",
                        data = rSquaredTest,
                        between = c("N", "pTrash", "R2", "rel", "lin_inter"),
                        within = "model")

## Contrasts set to contr.sum for the following variables: N, pTrash, R2, rel, lin_inter
# summary(anovaTestR2)
# nice(anovaTestR2)

eta2TestR2 <- eta_squared(
  anovaTestR2, # fitted model
  partial = FALSE, # not partial!
  generalized = TRUE, # generalized eta squared
  ci = 0.95,
  verbose = TRUE)

# sort generalized eta-squared results
# which higher order interactions do we need to illustrate to report simulation results?
(eta2TestR2.ordered <- eta2TestR2[order(eta2TestR2$Eta2_generalized, decreasing = T),])

```

## Parameter	Eta2 (generalized)	95% CI
## R2	0.96	[0.97, 1.00]
## lin_inter	0.81	[0.81, 1.00]
## rel	0.72	[0.72, 1.00]
## N	0.64	[0.64, 1.00]
## model	0.64	[0.64, 1.00]
## R2:model	0.50	[0.50, 1.00]
## lin_inter:model	0.49	[0.49, 1.00]
## R2:lin_inter	0.48	[0.48, 1.00]
## R2:rel	0.44	[0.44, 1.00]
## R2:lin_inter:model	0.24	[0.24, 1.00]
## N:model	0.24	[0.24, 1.00]
## rel:model	0.22	[0.21, 1.00]
## N:R2	0.11	[0.11, 1.00]
## R2:rel:model	0.10	[0.10, 1.00]
## N:R2:model	0.09	[0.09, 1.00]
## pTrash	0.09	[0.09, 1.00]
## N:R2:lin_inter	0.08	[0.08, 1.00]
## rel:lin_inter:model	0.06	[0.06, 1.00]
## N:pTrash	0.06	[0.06, 1.00]
## N:lin_inter	0.04	[0.04, 1.00]
## pTrash:lin_inter	0.04	[0.04, 1.00]
## N:pTrash:R2	0.03	[0.03, 1.00]
## pTrash:R2:lin_inter	0.03	[0.03, 1.00]
## R2:rel:lin_inter:model	0.03	[0.03, 1.00]
## N:pTrash:R2:lin_inter	0.03	[0.02, 1.00]
## N:lin_inter:model	0.02	[0.02, 1.00]
## N:pTrash:lin_inter	0.02	[0.02, 1.00]
## N:pTrash:model	0.02	[0.02, 1.00]
## N:R2:rel:model	0.02	[0.02, 1.00]
## N:rel:model	0.02	[0.02, 1.00]
## N:R2:lin_inter:model	0.01	[0.01, 1.00]
## pTrash:R2	0.01	[0.01, 1.00]
## N:pTrash:rel	0.01	[0.01, 1.00]
## pTrash:model	9.84e-03	[0.01, 1.00]
## N:pTrash:R2:model	9.32e-03	[0.01, 1.00]
## N:R2:rel	8.37e-03	[0.01, 1.00]
## R2:rel:lin_inter	7.53e-03	[0.01, 1.00]
## N:R2:rel:lin_inter	6.64e-03	[0.01, 1.00]
## N:R2:rel:lin_inter:model	6.43e-03	[0.01, 1.00]
## rel:lin_inter	5.66e-03	[0.01, 1.00]
## N:pTrash:R2:rel:lin_inter	5.54e-03	[0.00, 1.00]
## N:rel:lin_inter	5.49e-03	[0.00, 1.00]
## N:pTrash:R2:lin_inter:model	4.60e-03	[0.00, 1.00]
## pTrash:R2:lin_inter:model	4.52e-03	[0.00, 1.00]
## N:rel:lin_inter:model	4.13e-03	[0.00, 1.00]
## N:pTrash:lin_inter:model	3.83e-03	[0.00, 1.00]
## N:pTrash:rel:lin_inter	3.07e-03	[0.00, 1.00]
## N:pTrash:R2:rel:lin_inter:model	2.30e-03	[0.00, 1.00]
## N:pTrash:R2:rel	2.23e-03	[0.00, 1.00]
## pTrash:R2:rel	2.23e-03	[0.00, 1.00]

```

## pTrash:R2:rel:lin_inter | 2.05e-03 | [0.00, 1.00]
## pTrash:R2:model | 1.79e-03 | [0.00, 1.00]
## pTrash:lin_inter:model | 1.55e-03 | [0.00, 1.00]
## pTrash:rel:model | 1.22e-03 | [0.00, 1.00]
## pTrash:rel | 1.12e-03 | [0.00, 1.00]
## N:pTrash:rel:model | 9.79e-04 | [0.00, 1.00]
## pTrash:R2:rel:model | 8.37e-04 | [0.00, 1.00]
## N:pTrash:R2:rel:model | 8.35e-04 | [0.00, 1.00]
## N:rel | 8.05e-04 | [0.00, 1.00]
## pTrash:rel:lin_inter | 7.92e-04 | [0.00, 1.00]
## pTrash:R2:rel:lin_inter:model | 6.98e-04 | [0.00, 1.00]
## pTrash:rel:lin_inter:model | 5.80e-04 | [0.00, 1.00]
## N:pTrash:rel:lin_inter:model | 5.44e-04 | [0.00, 1.00]
##
## - Observed variables: All
## - One-sided CIs: upper bound fixed at [1.00].
# pEta2TestR2.ordered <- print_html(
#   eta2TestR2.ordered[eta2TestR2.ordered$Eta2_generalized >= 0.01,],
#   digits = 2)

# pEtaFormat <- format(
#   eta2TestR2.ordered,
#   digits = 2,
#   output = c("text", "markdown", "html"))

## ohne ENET - ohne
anovaTestR2sub <- aov_ez(id = "ID",
                           dv = "Rsq_test",
                           data = rSquaredTest[rSquaredTest$model != "ENETtwo",],
                           between = c("N" , "pTrash" , "R2" , "rel" , "lin_inter"),
                           within = "model")

## Contrasts set to contr.sum for the following variables: N, pTrash, R2, rel, lin_inter
# summary(anovaTestR2)
# nice(anovaTestR2)

eta2TestR2sub <- eta_squared(
  anovaTestR2sub, # fitted model
  partial = FALSE, # not partial!
  generalized = TRUE, # generalized eta squared
  ci = 0.95,
  verbose = TRUE)

# sort generalized eta-squared results
# which higher order interactions do we need to illustrate to report simulation results?
(eta2TestR2sub.ordered <- eta2TestR2sub[order(eta2TestR2sub$Eta2_generalized, decreasing = T),])

## # Effect Size for ANOVA (Type III)
##
## Parameter | Eta2 (generalized) | 95% CI
## -----
## R2 | 0.97 | [0.97, 1.00]

```

## rel		0.76 [0.76, 1.00]
## N		0.72 [0.72, 1.00]
## lin_inter		0.63 [0.63, 1.00]
## R2:rel		0.52 [0.51, 1.00]
## model		0.38 [0.37, 1.00]
## R2:lin_inter		0.23 [0.23, 1.00]
## R2:model		0.22 [0.22, 1.00]
## N:R2		0.19 [0.18, 1.00]
## lin_inter:model		0.17 [0.16, 1.00]
## pTrash		0.11 [0.11, 1.00]
## N:R2:lin_inter		0.09 [0.09, 1.00]
## N:pTrash		0.07 [0.06, 1.00]
## N:lin_inter		0.06 [0.06, 1.00]
## rel:model		0.05 [0.05, 1.00]
## R2:lin_inter:model		0.05 [0.05, 1.00]
## pTrash:lin_inter		0.05 [0.04, 1.00]
## N:R2:model		0.04 [0.04, 1.00]
## pTrash:R2:lin_inter		0.03 [0.03, 1.00]
## R2:rel:lin_inter		0.03 [0.03, 1.00]
## N:pTrash:R2		0.02 [0.02, 1.00]
## N:pTrash:R2:lin_inter		0.02 [0.02, 1.00]
## N:model		0.02 [0.02, 1.00]
## N:pTrash:model		0.02 [0.02, 1.00]
## N:R2:rel:model		0.02 [0.02, 1.00]
## N:rel:model		0.02 [0.02, 1.00]
## N:pTrash:lin_inter		0.02 [0.01, 1.00]
## R2:rel:model		0.01 [0.01, 1.00]
## rel:lin_inter		0.01 [0.01, 1.00]
## rel:lin_inter:model		0.01 [0.01, 1.00]
## N:pTrash:rel		0.01 [0.01, 1.00]
## N:R2:rel		0.01 [0.01, 1.00]
## pTrash:R2		0.01 [0.01, 1.00]
## N:lin_inter:model		9.48e-03 [0.01, 1.00]
## N:R2:rel:lin_inter		8.74e-03 [0.01, 1.00]
## N:pTrash:R2:model		8.51e-03 [0.01, 1.00]
## N:R2:lin_inter:model		7.15e-03 [0.01, 1.00]
## N:rel:lin_inter		7.14e-03 [0.01, 1.00]
## N:R2:rel:lin_inter:model		6.84e-03 [0.01, 1.00]
## N:pTrash:R2:rel:lin_inter		5.95e-03 [0.01, 1.00]
## N:rel:lin_inter:model		4.51e-03 [0.00, 1.00]
## N:pTrash:lin_inter:model		4.36e-03 [0.00, 1.00]
## N:pTrash:R2:lin_inter:model		3.83e-03 [0.00, 1.00]
## N:pTrash:rel:lin_inter		3.59e-03 [0.00, 1.00]
## R2:rel:lin_inter:model		3.52e-03 [0.00, 1.00]
## pTrash:R2:rel		3.11e-03 [0.00, 1.00]
## pTrash:R2:rel:lin_inter		2.87e-03 [0.00, 1.00]
## N:pTrash:R2:rel:lin_inter:model		2.55e-03 [0.00, 1.00]
## pTrash:rel		2.41e-03 [0.00, 1.00]
## N:rel		2.04e-03 [0.00, 1.00]
## pTrash:model		1.87e-03 [0.00, 1.00]
## N:pTrash:R2:rel		1.63e-03 [0.00, 1.00]
## pTrash:R2:model		1.16e-03 [0.00, 1.00]
## pTrash:rel:lin_inter		1.07e-03 [0.00, 1.00]
## N:pTrash:R2:rel:model		7.05e-04 [0.00, 1.00]

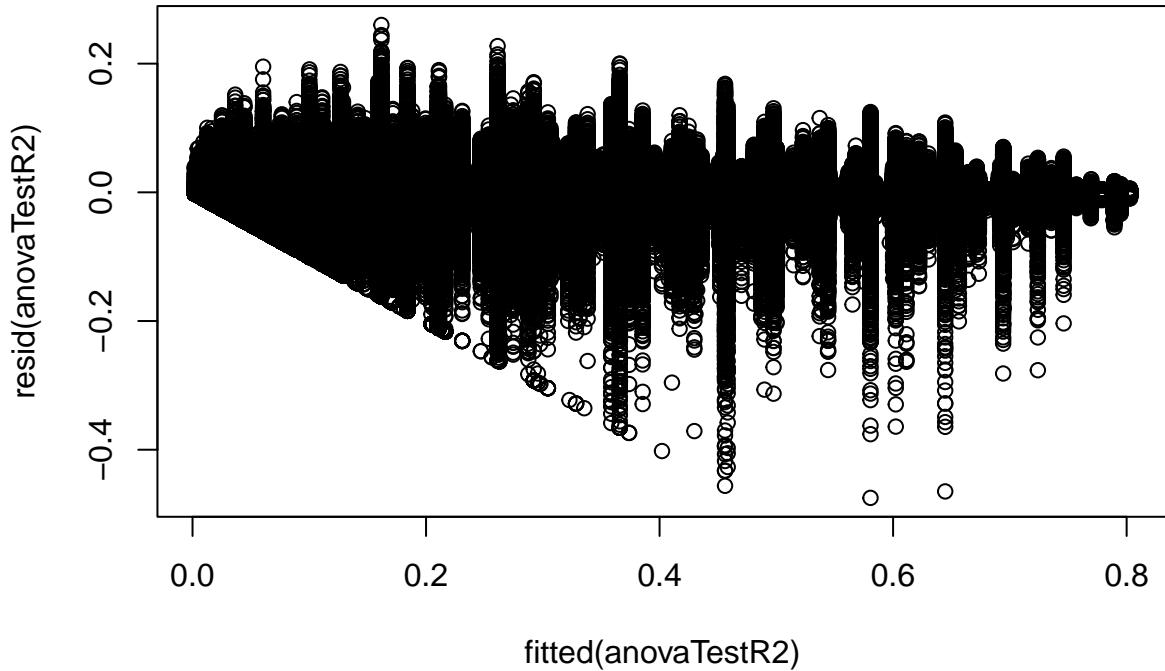
```

## pTrash:rel:lin_inter:model | 5.28e-04 | [0.00, 1.00]
## pTrash:R2:rel:model | 5.18e-04 | [0.00, 1.00]
## pTrash:rel:model | 5.11e-04 | [0.00, 1.00]
## N:pTrash:rel:model | 4.06e-04 | [0.00, 1.00]
## pTrash:R2:rel:lin_inter:model | 3.14e-04 | [0.00, 1.00]
## pTrash:lin_inter:model | 1.89e-04 | [0.00, 1.00]
## N:pTrash:rel:lin_inter:model | 1.74e-04 | [0.00, 1.00]
## pTrash:R2:lin_inter:model | 1.30e-04 | [0.00, 1.00]
##
## - Observed variables: All
## - One-sided CIs: upper bound fixed at [1.00].
##### Voraussetzungsprüfungen #####
# residual vs fitted plot (Punkte sollten sich vertikal unsystematisch und
# über die gesamte x-Achse gleich streuend um die 0 verteilen)
plot(x = fitted(anovaTestR2), y = resid(anovaTestR2))

## Data was changed during ANOVA calculation. Thus, fitted values cannot be added to original data.
## fitted(..., append = TRUE) will return data and fitted values.

## Data was changed during ANOVA calculation. Thus, residuals cannot be added to original data.
## residuals(..., append = TRUE) will return data and residuals.

```

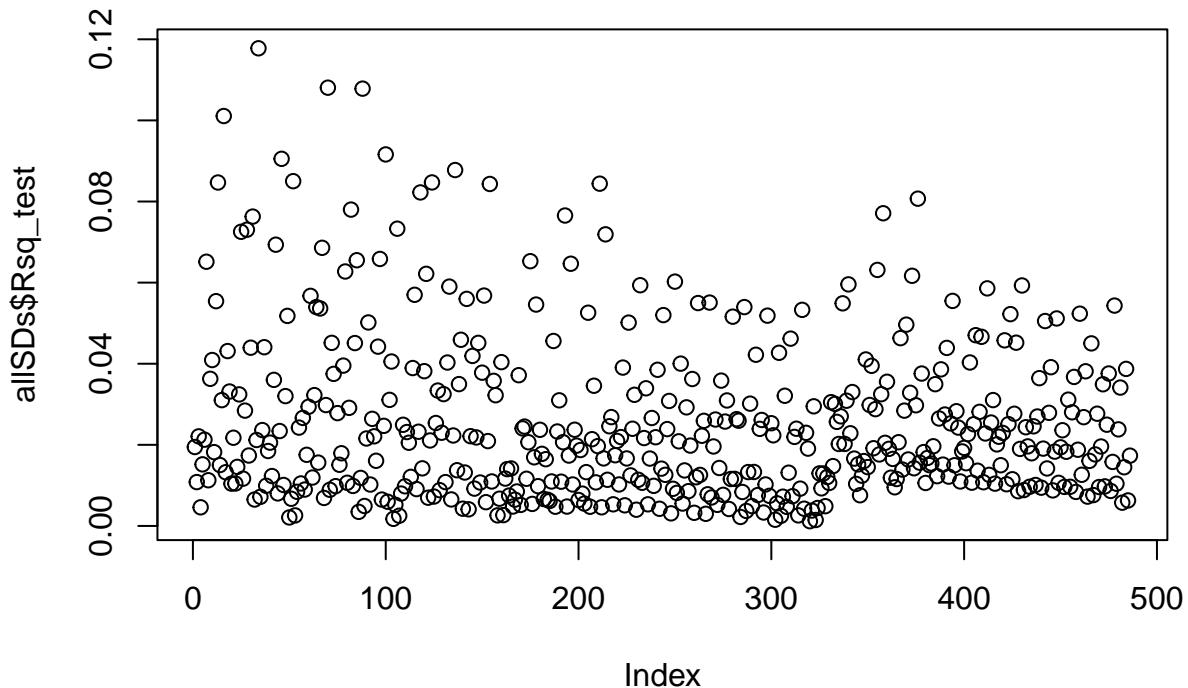


```

## Heteroskedastizität prüfen
# standardabweichungen pro Zelle deskriptiv prüfen
allSDs <- aggregate(Rsq_test ~ N * pTrash * R2 * rel * lin_inter * model,
                      rSquaredTest,
                      function(x) sd(x))

```

```
plot(allSDs$Rsq_test)
```



```
allSDs[which(allSDs$Rsq_test > 0.07),]
```

##	N	pTrash	R2	rel	lin_inter	model	Rsq_test
## 13	100	10	0.8	0.6	0.2_0.8	ENETw	0.08468688
## 16	100	50	0.8	0.6	0.2_0.8	ENETw	0.10107888
## 25	100	10	0.5	0.8	0.2_0.8	ENETw	0.07253708
## 28	100	50	0.5	0.8	0.2_0.8	ENETw	0.07304049
## 31	100	10	0.8	0.8	0.2_0.8	ENETw	0.07628556
## 34	100	50	0.8	0.8	0.2_0.8	ENETw	0.11777875
## 46	100	50	0.5	1	0.2_0.8	ENETw	0.09052624
## 52	100	50	0.8	1	0.2_0.8	ENETw	0.08501269
## 70	100	50	0.8	0.6	0.5_0.5	ENETw	0.10806679
## 82	100	50	0.5	0.8	0.5_0.5	ENETw	0.07800225
## 88	100	50	0.8	0.8	0.5_0.5	ENETw	0.10783505
## 100	100	50	0.5	1	0.5_0.5	ENETw	0.09161309
## 106	100	50	0.8	1	0.5_0.5	ENETw	0.07329433
## 118	100	50	0.5	0.6	0.8_0.2	ENETw	0.08224283
## 124	100	50	0.8	0.6	0.8_0.2	ENETw	0.08470366
## 136	100	50	0.5	0.8	0.8_0.2	ENETw	0.08775966
## 154	100	50	0.5	1	0.8_0.2	ENETw	0.08432211
## 193	100	10	0.8	0.8	0.2_0.8	ENETwo	0.07654665
## 211	100	10	0.8	1	0.2_0.8	ENETwo	0.08439859
## 214	100	50	0.8	1	0.2_0.8	ENETwo	0.07190465
## 358	100	50	0.8	0.8	0.2_0.8	GBM	0.07710214

```

## 376 100      50 0.8   1   0.2_0.8     GBM 0.08070456
#####
# ANOVA - overfit (ENET vs. GBM)
#####
rSquaredTest$Rsq_overfit <- rSquaredTest$Rsq_train - rSquaredTest$Rsq_test

anovaTestoverfit <- aov_ez(id = "ID",
                             dv = "Rsq_overfit",
                             data = rSquaredTest,
                             between = c("N" , "pTrash" , "R2" , "rel" , "lin_inter"),
                             within = "model")

## Contrasts set to contr.sum for the following variables: N, pTrash, R2, rel, lin_inter
# summary(anovaTestR2)
# nice(anovaTestR2)

eta2Testoverfit <- eta_squared(
  anovaTestoverfit, # fitted model
  partial = FALSE, # not partial!
  generalized = TRUE, # generalized eta squared
  ci = 0.95,
  verbose = TRUE)

# sort generalized eta-squared results
# which higher order interactions do we need to illustrate to report simulation results?
(eta2Testoverfit.ordered <- eta2Testoverfit[order(eta2Testoverfit$Eta2_generalized,
                                                 decreasing = T),])

## # Effect Size for ANOVA (Type III)
##
## Parameter | Eta2 (generalized) | 95% CI
## -----
## N          | 0.47 | [0.47, 1.00]
## model      | 0.37 | [0.37, 1.00]
## N:model    | 0.10 | [0.10, 1.00]
## pTrash     | 0.09 | [0.09, 1.00]
## R2         | 0.07 | [0.07, 1.00]
## N:pTrash   | 0.05 | [0.04, 1.00]
## N:R2       | 0.03 | [0.03, 1.00]
## R2:model   | 0.03 | [0.03, 1.00]
## lin_inter  | 0.03 | [0.02, 1.00]
## rel        | 0.02 | [0.02, 1.00]
## N:R2:model | 0.02 | [0.02, 1.00]
## R2:lin_inter | 0.02 | [0.02, 1.00]
## N:R2:lin_inter | 0.01 | [0.01, 1.00]
## lin_inter:model | 0.01 | [0.01, 1.00]
## R2:rel     | 0.01 | [0.01, 1.00]
## pTrash:R2   | 7.37e-03 | [0.01, 1.00]
## N:R2:rel:model | 6.80e-03 | [0.01, 1.00]
## N:R2:rel   | 6.65e-03 | [0.01, 1.00]
## pTrash:model | 6.31e-03 | [0.01, 1.00]
## rel:model  | 5.90e-03 | [0.01, 1.00]
## pTrash:lin_inter | 5.61e-03 | [0.01, 1.00]
## N:lin_inter | 5.33e-03 | [0.00, 1.00]

```

```

## pTrash:R2:model | 4.58e-03 | [0.00, 1.00]
## R2:rel:model | 4.58e-03 | [0.00, 1.00]
## pTrash:R2:lin_inter | 3.80e-03 | [0.00, 1.00]
## N:rel | 3.63e-03 | [0.00, 1.00]
## N:pTrash:R2:lin_inter | 2.97e-03 | [0.00, 1.00]
## N:R2:lin_inter:model | 2.64e-03 | [0.00, 1.00]
## N:R2:rel:lin_inter:model | 2.43e-03 | [0.00, 1.00]
## N:lin_inter:model | 2.14e-03 | [0.00, 1.00]
## N:pTrash:R2 | 2.12e-03 | [0.00, 1.00]
## N:pTrash:lin_inter | 2.11e-03 | [0.00, 1.00]
## N:pTrash:model | 2.11e-03 | [0.00, 1.00]
## pTrash:rel | 1.92e-03 | [0.00, 1.00]
## rel:lin_inter:model | 1.88e-03 | [0.00, 1.00]
## N:pTrash:R2:model | 1.81e-03 | [0.00, 1.00]
## N:R2:rel:lin_inter | 1.78e-03 | [0.00, 1.00]
## R2:rel:lin_inter:model | 1.63e-03 | [0.00, 1.00]
## N:rel:model | 1.32e-03 | [0.00, 1.00]
## R2:rel:lin_inter | 1.30e-03 | [0.00, 1.00]
## R2:lin_inter:model | 1.15e-03 | [0.00, 1.00]
## N:pTrash:R2:rel:lin_inter | 9.56e-04 | [0.00, 1.00]
## pTrash:R2:lin_inter:model | 8.51e-04 | [0.00, 1.00]
## N:pTrash:R2:lin_inter:model | 6.46e-04 | [0.00, 1.00]
## pTrash:R2:rel | 6.06e-04 | [0.00, 1.00]
## pTrash:rel:model | 6.02e-04 | [0.00, 1.00]
## N:rel:lin_inter | 5.70e-04 | [0.00, 1.00]
## N:pTrash:R2:rel:model | 5.28e-04 | [0.00, 1.00]
## pTrash:lin_inter:model | 5.05e-04 | [0.00, 1.00]
## N:pTrash:R2:rel:lin_inter:model | 4.79e-04 | [0.00, 1.00]
## N:pTrash:rel:lin_inter | 3.68e-04 | [0.00, 1.00]
## pTrash:R2:rel:lin_inter | 3.56e-04 | [0.00, 1.00]
## N:rel:lin_inter:model | 3.41e-04 | [0.00, 1.00]
## rel:lin_inter | 3.20e-04 | [0.00, 1.00]
## N:pTrash:rel | 3.02e-04 | [0.00, 1.00]
## pTrash:R2:rel:model | 2.23e-04 | [0.00, 1.00]
## N:pTrash:R2:rel | 2.19e-04 | [0.00, 1.00]
## pTrash:rel:lin_inter:model | 1.77e-04 | [0.00, 1.00]
## N:pTrash:lin_inter:model | 1.60e-04 | [0.00, 1.00]
## pTrash:R2:rel:lin_inter:model | 1.50e-04 | [0.00, 1.00]
## pTrash:rel:lin_inter | 9.60e-05 | [0.00, 1.00]
## N:pTrash:rel:model | 6.59e-05 | [0.00, 1.00]
## N:pTrash:rel:lin_inter:model | 6.12e-05 | [0.00, 1.00]
##
## - Observed variables: All
## - One-sided CIs: upper bound fixed at [1.00].
# -> depending on N and model the overfit varies

##### post-tests #####
# for model
# averaged over the levels of: N, pTrash, R2, rel, lin_inter
library(emmeans)

## Welcome to emmeans.
## Caution: You lose important information if you filter this package's results.
## See '? untidy'

```

```

(postOverfitModel <- emmeans(anovaTestoverfit, specs = "model"))

##   model    emmean       SE     df lower.CL upper.CL
##   ENETw  0.16511 0.0003926 161838  0.16434  0.16588
##   ENETwo 0.06881 0.0002016 161838  0.06842  0.06921
##   GBM    0.28980 0.0002458 161838  0.28931  0.29028
##
## Results are averaged over the levels of: N, pTrash, R2, rel, lin_inter
## Confidence level used: 0.95

# most overfit in GBM > ENET - mit > ENET - ohne

# # pairwise comparison for model + Bonferroni-Holm-correction for these 3 comparissons
# pairs(postOverfitModel, adjust="holm")

#####
# ANOVA - permutation variable importance (GBM)
#####
# do not compare with ENET as different measures for variable selection are used
#   -> comparison becomes interesting as soon as we apply permutation variable
#       importance for the ENET as well
# id = sample
# dv = {pvi}
# between: N {100, 300, 1000}, pTrash {10, 50}, R2 {0.2, 0.5, 0.8}, rel {0.6, 0.8, 1}, lin_inter {0.2_0

```