

# Arbeidskrav 5

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```
library(tidyverse)

dat <- dxadata %>%
  select(participant:include, lean.left_leg, lean.right_leg) %>%
  pivot_longer(names_to = "leg",
               values_to = "lean.mass",
               cols = lean.left_leg:lean.right_leg) %>%
  mutate(leg = if_else(leg == "lean.left_leg", "L", "R"),
         sets = if_else(multiple == leg, "multiple", "single")) %>%
  select(participant, time, sets, sex, leg, lean.mass) %>%

  pivot_wider(names_from = time,
              values_from = lean.mass) %>%
  mutate((lbm.change = post - pre),
         pre.mc = pre - mean(pre)) %>%
  print()

## # A tibble: 82 x 8
##   participant sets      sex leg      pre post '(lbm.change = post - ~ pre.mc
##   <chr>      <chr>    <chr> <chr> <dbl> <dbl> <dbl>    <dbl>
## 1 FP28      multiple female L      7059 7273      214 -1658.
## 2 FP28      single  female R      7104 7227      123 -1613.
## 3 FP40      single  female L      7190 7192        2 -1527.
## 4 FP40      multiple female R      7506 7437     -69 -1211.
## 5 FP21      single   male  L     10281 10470     189 1564.
## 6 FP21      multiple male   R     10200 10819     619 1483.
## 7 FP34      single  female L      6014 6326     312 -2703.
## 8 FP34      multiple female R      6009 6405     396 -2708.
## 9 FP23      single   male  L      8242 8687     445 -475.
## 10 FP23     multiple male   R      8685 8480    -205 -32.4
## # ... with 72 more rows
```

```
library(lme4)
```

```
## Loading required package: Matrix
```

```
##
```

```
## Attaching package: 'Matrix'
```

```
## The following objects are masked from 'package:tidyr':  
##  
##   expand, pack, unpack
```

```
library(lmerTest)
```

```
##  
## Attaching package: 'lmerTest'
```

```
## The following object is masked from 'package:lme4':  
##  
##   lmer
```

```
## The following object is masked from 'package:stats':  
##  
##   step
```

```
m0 <- lm(post ~ pre + sex + sets, data = dat)  
m1 <- lmerTest::lmer(post ~ pre + sets + (1|participant), data = dat)
```

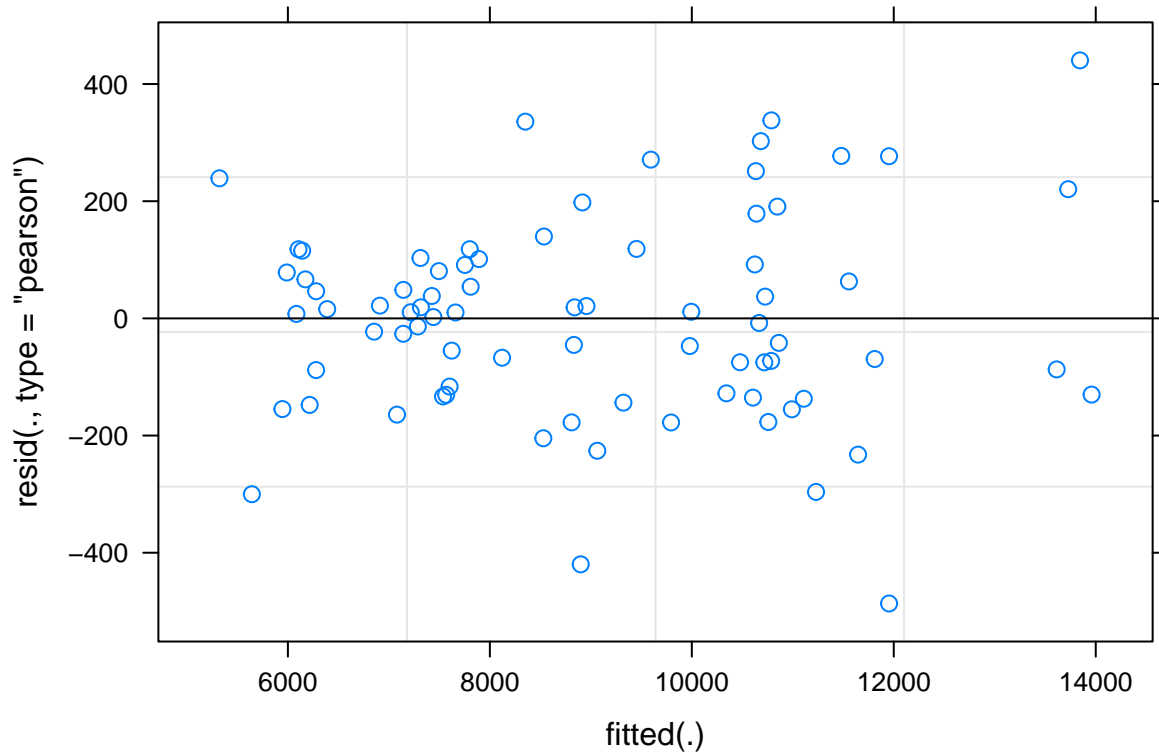
```
## Warning: Some predictor variables are on very different scales: consider  
## rescaling
```

```
## Warning: Some predictor variables are on very different scales: consider  
## rescaling
```

```
m2 <- lme4::lmer(post ~ pre + sex + sets + (1|participant), data = dat)
```

```
## Warning: Some predictor variables are on very different scales: consider  
## rescaling
```

```
plot(m2)
```



```
summary(m0)
```

```
##
## Call:
## lm(formula = post ~ pre + sex + sets, data = dat)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1383.20  -206.33    3.24   208.48  1004.52
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   210.05961   277.25343    0.758   0.451
## pre             1.00339    0.03768   26.629 <2e-16 ***
## sexmale       100.78105   156.25812    0.645   0.521
## setssingle  -114.55410    87.29173   -1.312   0.193
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 385.5 on 74 degrees of freedom
## (4 observations deleted due to missingness)
## Multiple R-squared:  0.9697, Adjusted R-squared:  0.9684
## F-statistic: 788.3 on 3 and 74 DF,  p-value: < 2.2e-16
```

```
summary(m1)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: post ~ pre + sets + (1 | participant)
## Data: dat
##
## REML criterion at convergence: 1111.5
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -2.24819 -0.56823  0.01947  0.41175  1.91556
##
## Random effects:
## Groups      Name      Variance Std.Dev.
## participant (Intercept) 97224    311.8
## Residual          51703    227.4
## Number of obs: 78, groups: participant, 39
##
## Fixed effects:
##              Estimate Std. Error      df t value Pr(>|t|)
## (Intercept)  145.40330   244.28568   38.43366   0.595   0.5552
## pre           1.01638    0.02698   37.63886  37.669 <2e-16 ***
## setssingle  -114.61404    51.49202   37.77695  -2.226  0.0321 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##              (Intr) pre
## pre          -0.967
## setssingle -0.103 -0.002
## fit warnings:
## Some predictor variables are on very different scales: consider rescaling
```

```
summary(m2)
```

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: post ~ pre + sex + sets + (1 | participant)
## Data: dat
##
## REML criterion at convergence: 1098.3
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -2.16463 -0.57619  0.03941  0.44008  1.95883
##
## Random effects:
## Groups      Name      Variance Std.Dev.
## participant (Intercept) 101459    318.5
## Residual          50542    224.8
## Number of obs: 78, groups: participant, 39
##
```

```
## Fixed effects:
##           Estimate Std. Error t value
## (Intercept) 375.74770 353.43714 1.063
## pre          0.98000  0.04848 20.215
## sexmale      181.21652 201.99100 0.897
## setssingle  -114.44615  50.91098 -2.248
##
## Correlation of Fixed Effects:
##           (Intr) pre    sexmal
## pre        -0.972
## sexmale     0.713 -0.825
## setssingle -0.068 -0.004 0.004
## fit warnings:
## Some predictor variables are on very different scales: consider rescaling
```

```
confint(m2)
```

```
## Computing profile confidence intervals ...
```

```
##           2.5 %    97.5 %
## .sig01      223.4660349 407.611102
## .sigma      180.0741108 282.474938
## (Intercept) -309.7456948 1079.032810
## pre          0.8833748  1.074071
## sexmale     -209.2788314 580.751493
## setssingle  -215.4777151 -13.452514
```

```
strengthvolume %>%
  group_by(exercise) %>%
  mutate(scaled.load = load / max(load, na.rm = TRUE)) %>%
  group_by(participant, time, sex, sets) %>%
  summarise(combined.load = mean(scaled.load, na.rm = TRUE)) %>%
  ungroup() %>%
  print()
```

```
## 'summarise()' has grouped output by 'participant', 'time', 'sex'. You can override using the '.groups' argument.
```

```
## # A tibble: 468 x 5
##   participant time    sex  sets    combined.load
##   <chr>      <chr>  <chr> <chr>      <dbl>
## 1 FP1      post   male  multiple  0.696
## 2 FP1      post   male  single    0.687
## 3 FP1      pre    male  multiple  0.560
## 4 FP1      pre    male  single    0.603
## 5 FP1      session1 male multiple  0.541
## 6 FP1      session1 male single    0.628
## 7 FP1      week2   male multiple  0.572
## 8 FP1      week2   male single    0.674
## 9 FP1      week5   male multiple  0.626
## 10 FP1     week5   male single    0.693
## # ... with 458 more rows
```