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)
```

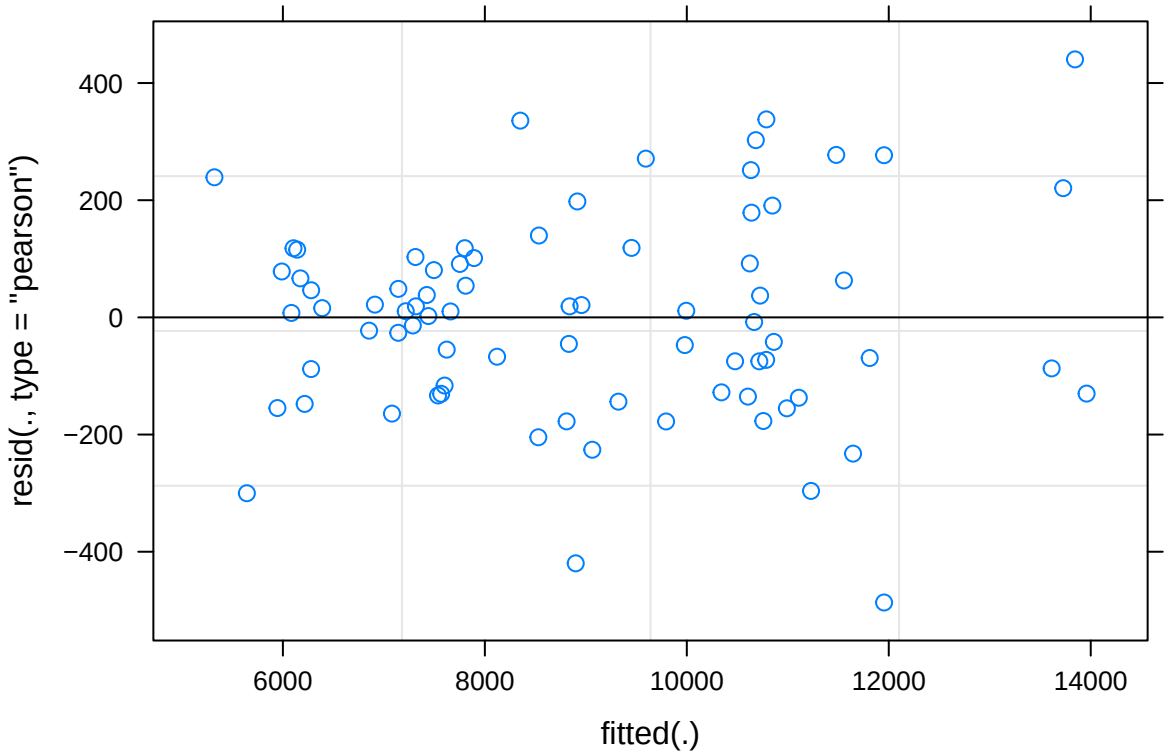
```
## Warning: Some predictor variables are on very different scales: consider
## rescaling
```

```
## 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
```

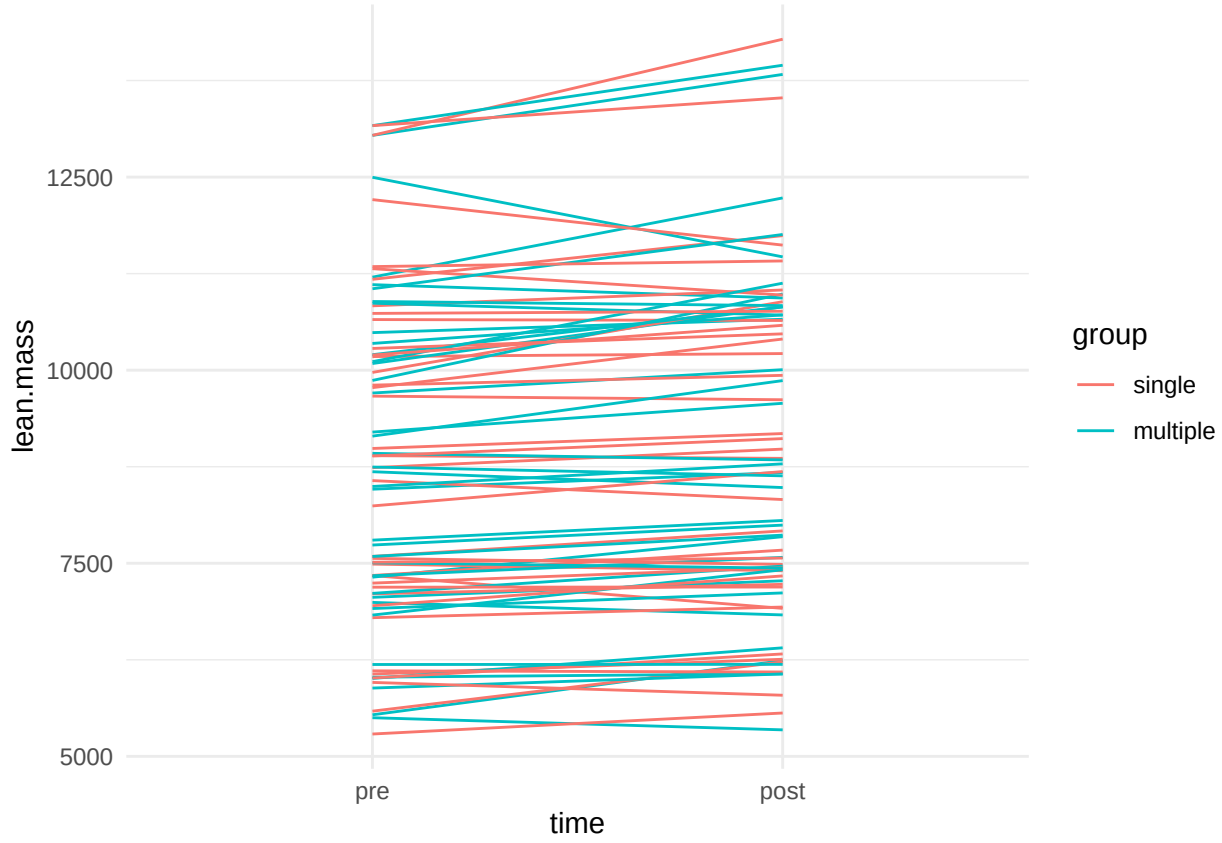
```
modeldat <- dxadata %>%
  select(participant:include, lean.left_leg, lean.right_leg) %>%
  pivot_longer(names_to = "leg",
               values_to = "lean.mass",
               cols = lean.left_leg:lean.right_leg) %>%
   mutate(leg = if_else(leg == "lean.left_leg", "L", "R"),
          sets = if_else(multiple == leg, "multiple", "single")) %>%
  select(participant, time, sets, sex, leg, lean.mass) %>%
  group_by(participant) %>%
  mutate(n = n(), group = factor(sets, levels = c("single", "multiple")), time = factor(time, levels = c

  print()
```

```
## # A tibble: 160 x 8
## # Groups:   participant [41]
##    participant time  sets     sex    leg   lean.mass     n group
##    <chr>       <fct> <chr>    <chr>  <chr>     <dbl> <int> <fct>
##  1 FP28        pre   multiple female L          7059     4 multiple
##  2 FP28        pre   single   female R          7104     4 single
##  3 FP40        pre   single   female L          7190     4 single
##  4 FP40        pre   multiple female R          7506     4 multiple
##  5 FP21        pre   single   male   L         10281     4 single
##  6 FP21        pre   multiple male   R         10200     4 multiple
##  7 FP34        pre   single   female L          6014     4 single
##  8 FP34        pre   multiple female R          6009     4 multiple
```

```
##  9 FP23        pre   single   male   L          8242     4 single
## 10 FP23        pre   multiple male   R          8685     4 multiple
## # ... with 150 more rows
```

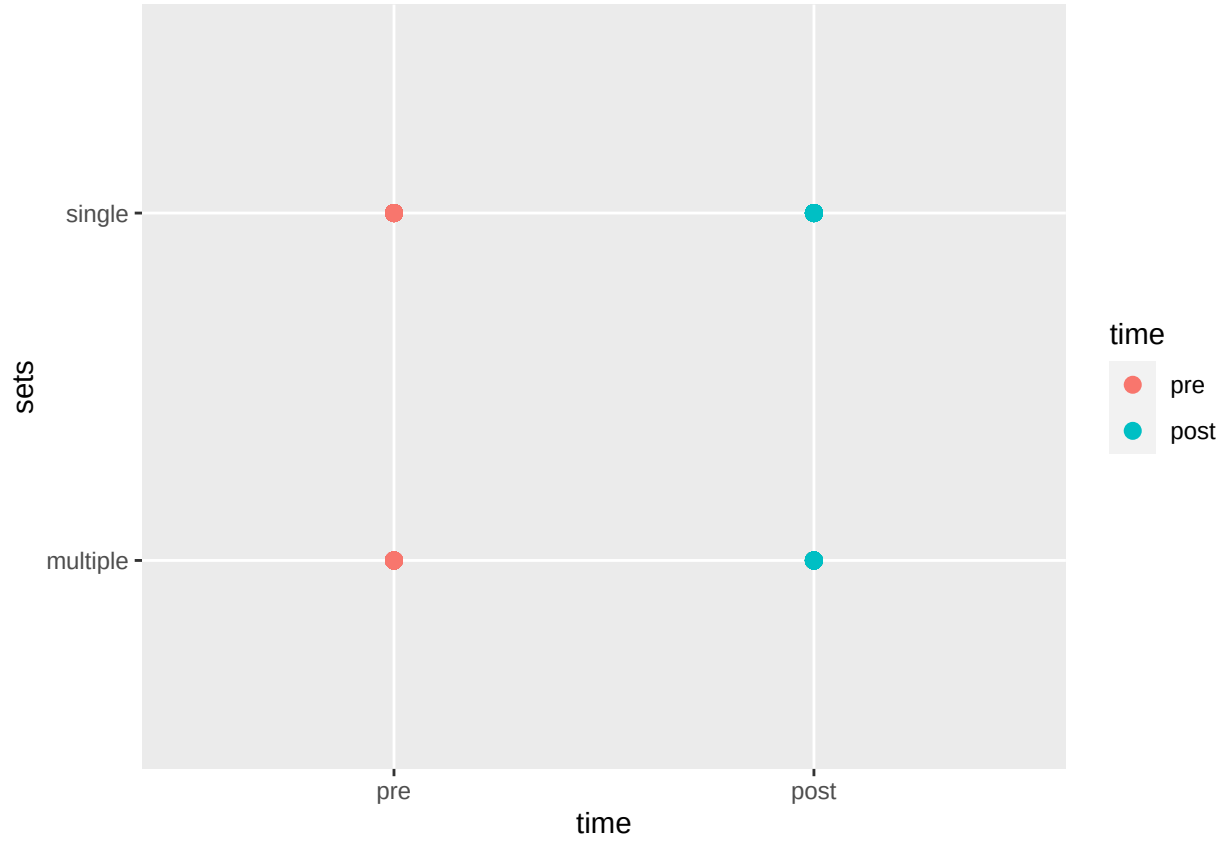
```
modeldat %>%
 ggplot(aes(time, lean.mass, group = paste(participant, group), color = group)) + geom_line() + theme_mi
```




```
modeldat %>%
  select(participant, group, time, sets) %>%
  ggplot(aes(time, sets, color = time, sets)) + geom_point(size = 2.5) +
  geom_abline(intercept = 0, slope = 1) %>%

print()
```

```
## mapping: intercept = ~intercept, slope = ~slope
## geom_abline: na.rm = FALSE
## stat_identity: na.rm = FALSE
## position_identity
```




```
styrke1 <- 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
```

```
## # 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
```

```r
styrke1 %>%
  filter(!is.na(combined.load), time == factor(time, levels = c("pre", "post"))) %>%
  mutate(time = factor(time, levels = c("pre", "post")),
         group = factor(sets, levels = c("single", "multiple"))) %>%
 ggplot(aes(time, combined.load, group = paste(participant, sets), color = sets)) + geom_line() + theme_
```