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

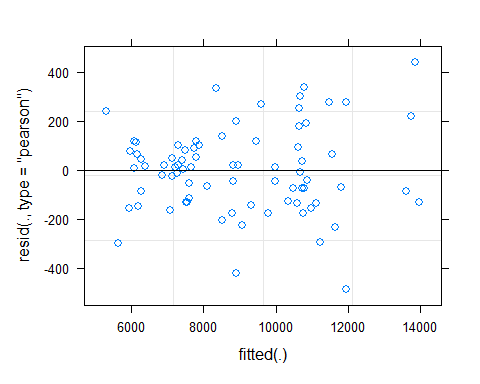
m0 <- lm(post ~ pre + sex + sets, data = dat)  
m1 <- lmerTest::lmer(post ~ pre + sets + (1|participant), data = dat)

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

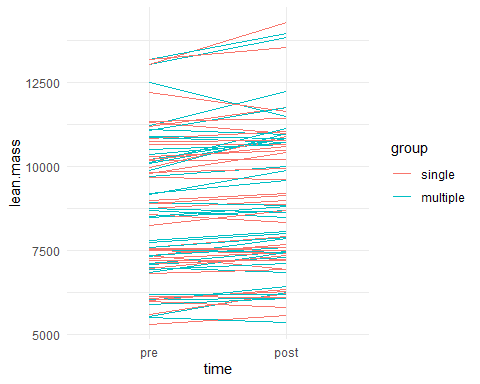
## Computing profile confidence intervals ...

## 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("pre", "post"))) %>%  
   
 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\_minimal()



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` 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

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\_minimal()

