Pilot Study Results

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```
data <- read.csv("C:\\Users\\phe\\OneDrive - Daiichi Sankyo\\Desktop\\ov\\pilot.csv")

knitr::kable(data)
```

subject	y	Ovulating	session	z
21760247	0.5068593	1	1	1.1338783
21760247	0.4106252	0	2	-0.2523771
21760247	0.1833707	0	3	0.1226691
21760247	0.5658982	0	4	-0.0069636
21760247	0.5522688	0	5	0.0309430
21760251	-0.1179752	1	1	1.0204856
21760251	0.3619566	0	2	-0.1161344
21760251	0.4024645	0	3	0.3628929
21760251	0.4929621	0	4	0.1790180
21760251	0.3972828	0	5	0.6269427
21760260	0.2556803	1	1	-0.0658680
21760260	0.7163969	0	2	0.1750583
21760260	0.2108674	0	3	0.4154142
21760260	0.6299124	0	4	0.4691685
21760260	0.6160932	0	5	0.1561128
21760260	0.4761491	0	6	0.7150267
21760288	-0.0528226	1	1	0.3368020
21760288	0.5006585	0	2	-0.1581922
21760288	0.7150847	0	3	0.3705552
21760288	0.8744125	0	4	0.0156318
21760288	0.7717046	0	5	0.5522726

```
ov <- data %>% subset(Ovulating == 1) %>% rename(y_ov = y, z_ov=z) %>% select(subject, y_ov, z_ov)

knitr::kable(ov)
```

	subject	y_ov	z_ov
1	21760247	0.5068593	1.133878
6	21760251	-0.1179752	1.020486
11	21760260	0.2556803	-0.065868
17	21760288	-0.0528226	0.336802

```
non_ov <- data %>% subset(Ovulating == 0)

knitr::kable(non_ov)
```

	subject	y	Ovulating	session	z
2	21760247	0.4106252	0	2	-0.2523771
3	21760247	0.1833707	0	3	0.1226691
4	21760247	0.5658982	0	4	-0.0069636
5	21760247	0.5522688	0	5	0.0309430
7	21760251	0.3619566	0	2	-0.1161344
8	21760251	0.4024645	0	3	0.3628929
9	21760251	0.4929621	0	4	0.1790180
10	21760251	0.3972828	0	5	0.6269427
12	21760260	0.7163969	0	2	0.1750583
13	21760260	0.2108674	0	3	0.4154142
14	21760260	0.6299124	0	4	0.4691685
15	21760260	0.6160932	0	5	0.1561128
16	21760260	0.4761491	0	6	0.7150267
18	21760288	0.5006585	0	2	-0.1581922
19	21760288	0.7150847	0	3	0.3705552
20	21760288	0.8744125	0	4	0.0156318
21	21760288	0.7717046	0	5	0.5522726

```
data1 <- merge(non_ov, ov, by="subject") %>% mutate(chg_y = y-y_ov, chg_z = z - z_ov)

data2 <- data1 %>% group_by(subject) %>% mutate(mu_chg_y=mean(chg_y), mu_chg_z = mean(chg_z))

data3 <- data2 %>% mutate(e_chg_y = chg_y - mu_chg_y, e_chg_z = chg_z - mu_chg_z)


knitr::kable(data3[,1:5])
```

subject	y	Ovulating	session	z
21760247	0.4106252	0	2	-0.2523771
21760247	0.1833707	0	3	0.1226691
21760247	0.5658982	0	4	-0.0069636
21760247	0.5522688	0	5	0.0309430
21760251	0.3619566	0	2	-0.1161344
21760251	0.4024645	0	3	0.3628929
21760251	0.4929621	0	4	0.1790180
21760251	0.3972828	0	5	0.6269427
21760260	0.7163969	0	2	0.1750583
21760260	0.2108674	0	3	0.4154142
21760260	0.6299124	0	4	0.4691685
21760260	0.6160932	0	5	0.1561128
21760260	0.4761491	0	6	0.7150267
21760288	0.5006585	0	2	-0.1581922
21760288	0.7150847	0	3	0.3705552
21760288	0.8744125	0	4	0.0156318

subject	y	Ovulating	session	z
21760288	0.7717046	0	5	0.5522726

```
knitr::kable(data3[, c(1, 6:10)])
```

subject	y_ov	z_ov	chg_y	chg_z	mu_chg_y
21760247	0.5068593	1.133878	-0.0962341	-1.3862554	-0.0788186
21760247	0.5068593	1.133878	-0.3234886	-1.0112092	-0.0788186
21760247	0.5068593	1.133878	0.0590389	-1.1408419	-0.0788186
21760247	0.5068593	1.133878	0.0454094	-1.1029353	-0.0788186
21760251	-0.1179752	1.020486	0.4799318	-1.1366201	0.5316417
21760251	-0.1179752	1.020486	0.5204397	-0.6575928	0.5316417
21760251	-0.1179752	1.020486	0.6109373	-0.8414677	0.5316417
21760251	-0.1179752	1.020486	0.5152580	-0.3935430	0.5316417
21760260	0.2556803	-0.065868	0.4607166	0.2409263	0.2742035
21760260	0.2556803	-0.065868	-0.0448129	0.4812822	0.2742035
21760260	0.2556803	-0.065868	0.3742321	0.5350365	0.2742035
21760260	0.2556803	-0.065868	0.3604129	0.2219808	0.2742035
21760260	0.2556803	-0.065868	0.2204687	0.7808947	0.2742035
21760288	-0.0528226	0.336802	0.5534810	-0.4949942	0.7682876
21760288	-0.0528226	0.336802	0.7679072	0.0337532	0.7682876
21760288	-0.0528226	0.336802	0.9272351	-0.3211702	0.7682876
21760288	-0.0528226	0.336802	0.8245272	0.2154706	0.7682876

```
knitr::kable(data3[, c(1, 11:13)])
```

subject	mu_chg_z	e_chg_y	e_chg_z
21760247	-1.1603105	-0.0174155	-0.2259449
21760247	-1.1603105	-0.2446700	0.1491013
21760247	-1.1603105	0.1378575	0.0194685
21760247	-1.1603105	0.1242280	0.0573752
21760251	-0.7573059	-0.0517099	-0.3793142
21760251	-0.7573059	-0.0112020	0.0997131
21760251	-0.7573059	0.0792956	-0.0841618
21760251	-0.7573059	-0.0163837	0.3637629
21760260	0.4520241	0.1865131	-0.2110978
21760260	0.4520241	-0.3190164	0.0292581
21760260	0.4520241	0.1000286	0.0830124
21760260	0.4520241	0.0862094	-0.2300433
21760260	0.4520241	-0.0537347	0.3288706
21760288	-0.1417352	-0.2148066	-0.3532590
21760288	-0.1417352	-0.0003804	0.1754883
21760288	-0.1417352	0.1589475	-0.1794350
21760288	-0.1417352	0.0562395	0.3572058

```
within_sd_chg_y = sd(data3$e_chg_y)
within_sd_chg_z = sd(data3$e_chg_z)
```

```
usubj = unique(data3$subject)
n = length(usubj)

mu_chg_y = c(data3$mu_chg_y[data3$subject==usubj[1]][1],
             data3$mu_chg_y[data3$subject==usubj[2]][1],
             data3$mu_chg_y[data3$subject==usubj[3]][1],
             data3$mu_chg_y[data3$subject==usubj[4]][1])


mu_chg_z = c(data3$mu_chg_z[data3$subject==usubj[1]][1],
             data3$mu_chg_z[data3$subject==usubj[2]][1],
             data3$mu_chg_z[data3$subject==usubj[3]][1],
             data3$mu_chg_z[data3$subject==usubj[4]][1])


knitr::kable(cbind(usubj, mu_chg_y, mu_chg_z))
```

usubj	mu_chg_y	mu_chg_z
21760247	-0.0788186	-1.1603105
21760251	0.5316417	-0.7573059
21760260	0.2742035	0.4520241
21760288	0.7682876	-0.1417352

```
between_sd_chg_y = sd(mu_chg_y)
between_sd_chg_z = sd(mu_chg_z)

between_sd_chg_y
```

```
## [1] 0.3630048
```

```
between_sd_chg_z
```

```
## [1] 0.7067229
```

```
grand_mean_chg_y = mean(mu_chg_y)
grand_mean_chg_z = mean(mu_chg_z)


knitr::kable(cbind(between_sd_chg_y, within_sd_chg_y))
```

between_sd_chg_y	within_sd_chg_y
0.3630048	0.1447871

```
knitr::kable(cbind(between_sd_chg_z, within_sd_chg_z))
```

between_sd_chg_z	within_sd_chg_z
0.7067229	0.2370322

```
knitr::kable(cbind(grand_mean_chg_y, grand_mean_chg_z))
```

grand_mean_chg_y	grand_mean_chg_z
0.3738286	-0.4018318