EcoleInt_IDC2018

Checking data
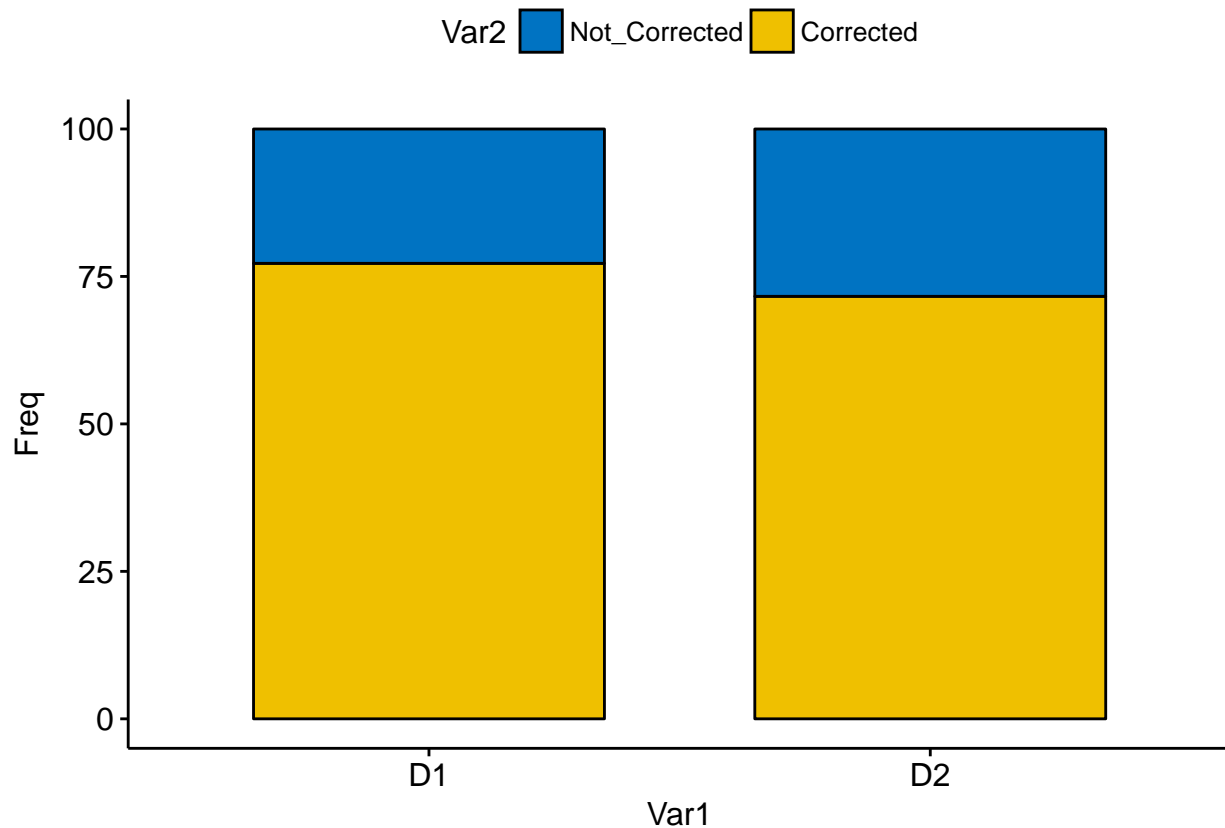
Correct per day

```
res = table(df$Exp_Day, df$Correction_Status)
res = prop.table(res,1)*100
res
```

```
##
##      Corrected Not_Corrected
##   D1  77.22222      22.77778
##   D2  71.63121      28.36879
```

```
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 0.5537, df = 1, p-value = 0.4568
```

```
res = data.frame(res)
res$Var2 <- as.character(res$Var2)
res$Var2 <- factor(res$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
p
```

There is an effect of the day on the correction with higher number of corrections in D1! :(

Correct per type

```
res = table(df$Mistake_Type, df$Correction_Status)
res = prop.table(res,1)*100
res
```
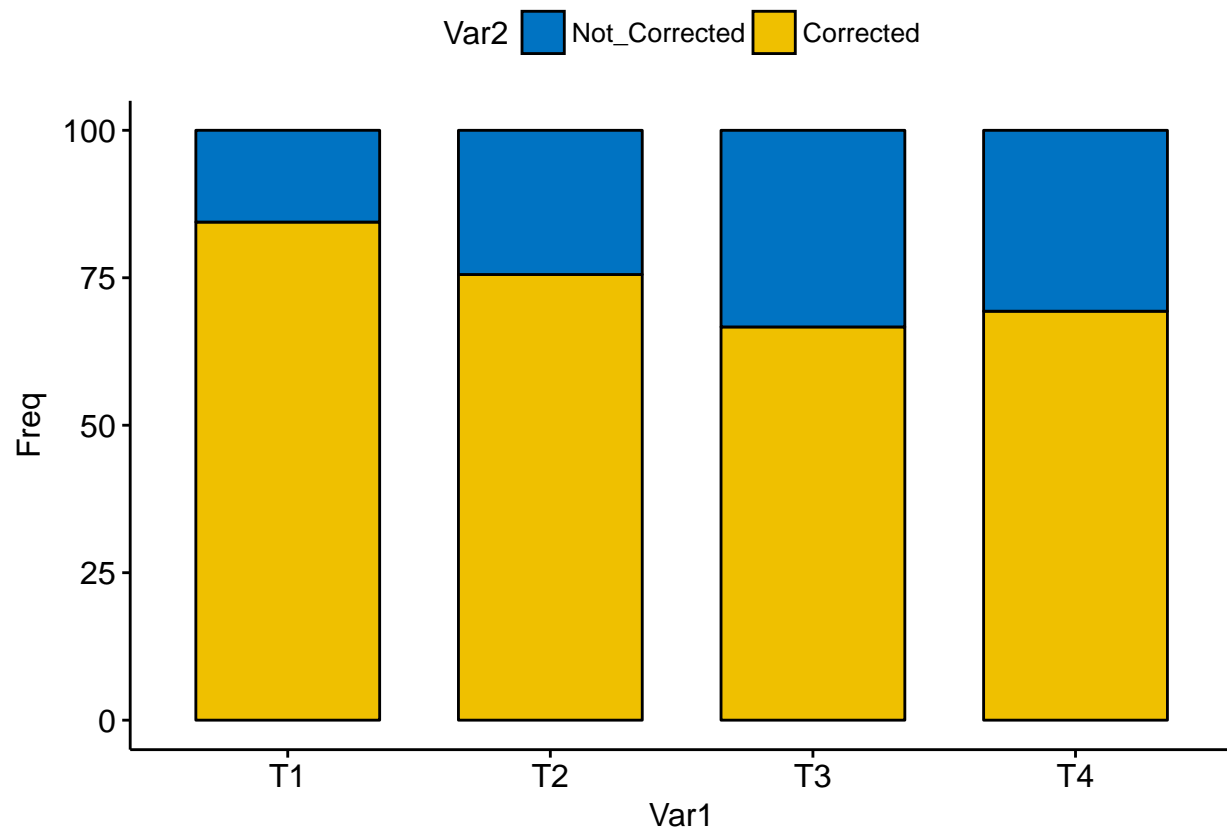
```
##
##       Corrected Not_Corrected
##   T1  84.44444       15.55556
##   T2  75.55556       24.44444
##   T3  66.66667       33.33333
##   T4  69.33333       30.66667
```

```
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test
##
## data:  res
## X-squared = 9.7225, df = 3, p-value = 0.02108
```

```
res = data.frame(res)
res$Var2 <- as.character(res$Var2)
res$Var2 <- factor(res$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
```
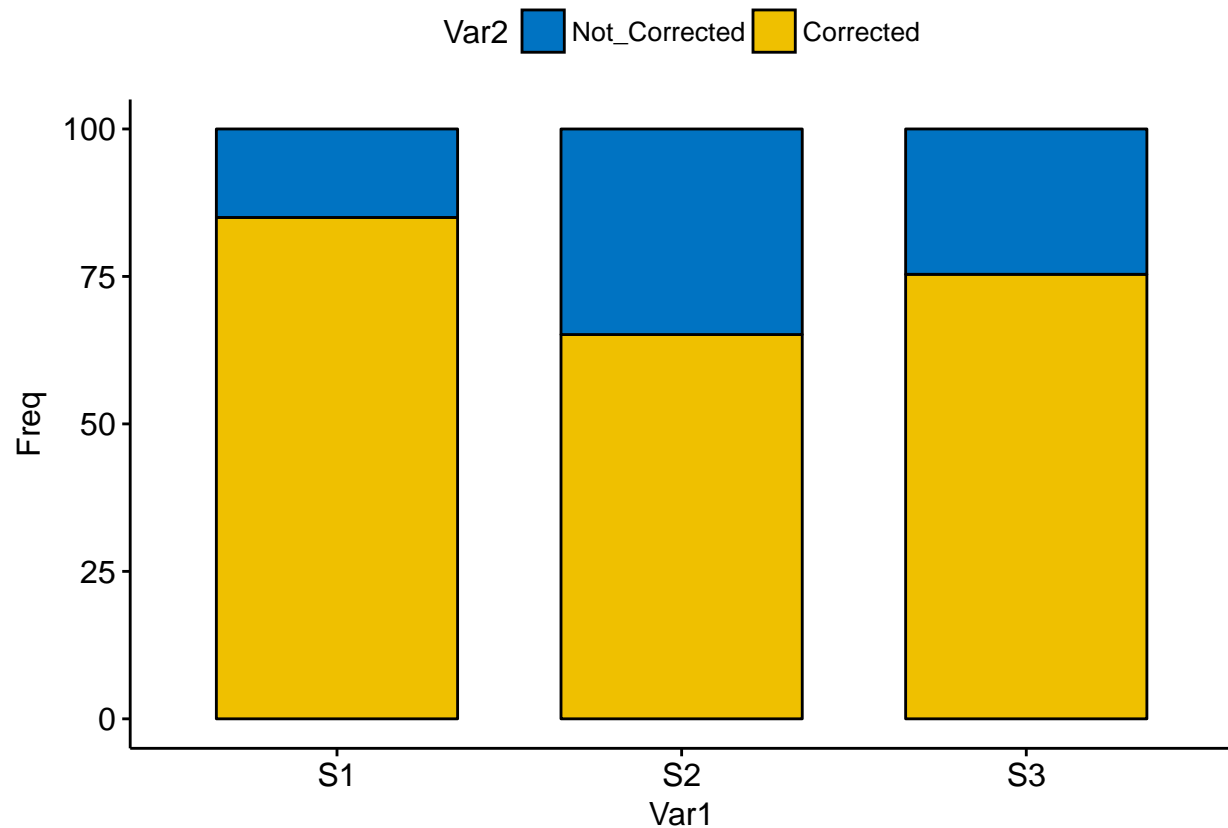
p


```
res = table(df$Mistake_Type_2, df$Correction_Status)
res = prop.table(res,1)*100
res
```

```
##
##      Corrected Not_Corrected
##   S1  85.00000      15.00000
##   S2  65.15152      34.84848
##   S3  75.36232      24.63768
```

```
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test
##
## data:  res
## X-squared = 10.557, df = 2, p-value = 0.0051
```

```
res = data.frame(res)
res$Var2 <- as.character(res$Var2)
res$Var2 <- factor(res$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
p
```

```
df_point = subset(df,df$Robot_Hand_Condition == "Pointing")
res = table(df_point$Mistake_Type_2, df_point$Correction_Status)
res = prop.table(res,1)*100
res
```

```
##
##      Corrected Not_Corrected
##   S1 94.642857      5.357143
##   S2 67.213115     32.786885
##   S3 68.965517     31.034483
```

```
df_not = subset(df,df$Robot_Hand_Condition == "Not_Pointing")
res2 = table(df_not$Mistake_Type_2, df_not$Correction_Status)
res2 = prop.table(res2,1)*100

chisq.test(res)
```
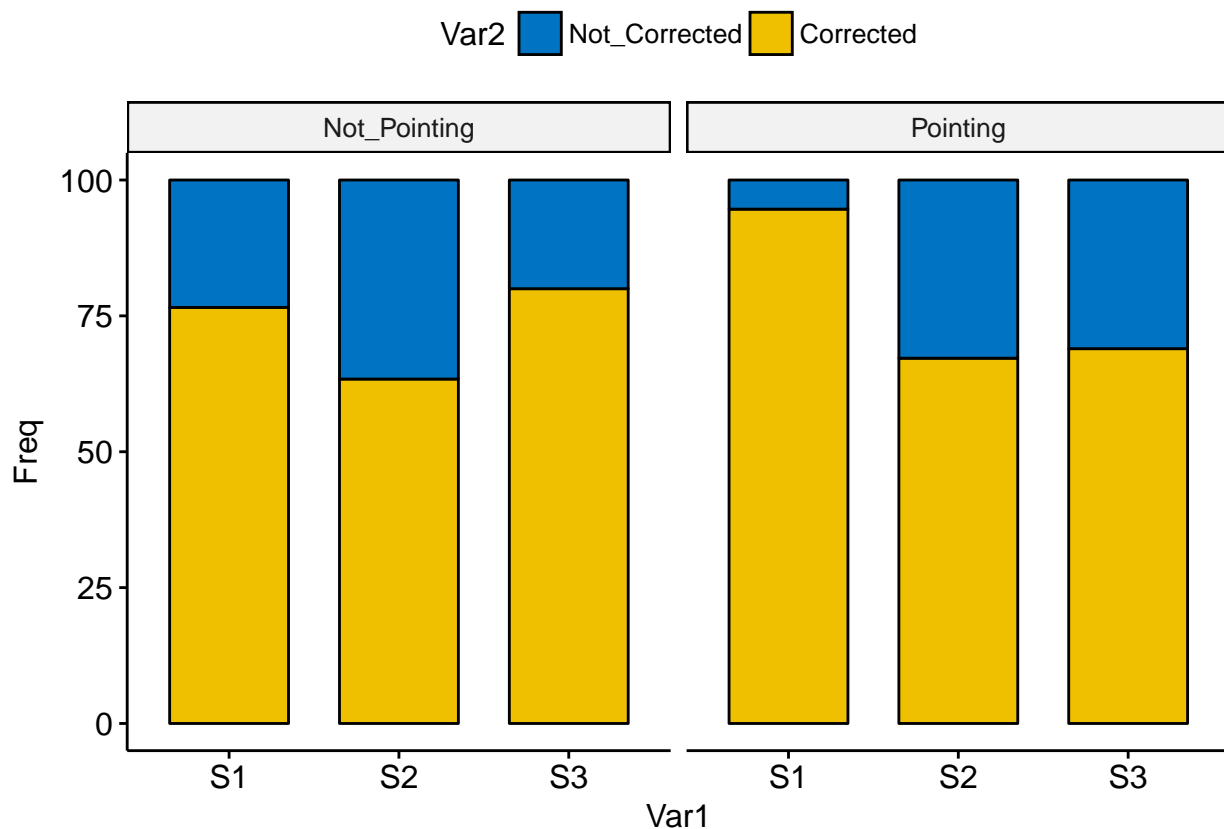
```
##
##  Pearson's Chi-squared test
##
## data:  res
## X-squared = 26.581, df = 2, p-value = 1.691e-06
```

```
chisq.test(res2)
```

```
##
##  Pearson's Chi-squared test
##
```

```
## data:  res2
## X-squared = 7.8681, df = 2, p-value = 0.01956
```

```
res = data.frame(res)
res["Hand"] <- "Pointing"
res2 = data.frame(res2)
res2["Hand"] <- "Not_Pointing"
res3 <- rbind(res,res2)
res3$Var2 <- as.character(res3$Var2)
res3$Var2 <- factor(res3$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res3, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
facet(p, facet.by="Hand")
```



```
df_low = subset(df,df$Book_Level == "Low")
df_point = subset(df_low,df$Robot_Hand_Condition == "Pointing")
```

```
## Warning: Length of logical index must be 1 or 132, not 321
```

```
res = table(df_point$Mistake_Type_2, df_point$Correction_Status)
res = prop.table(res,1)*100
res
```

```
##
##      Corrected Not_Corrected
##   S1  73.91304      26.08696
##   S2  60.71429      39.28571
##   S3  66.66667      33.33333
```

```
df_not = subset(df,df$Robot_Hand_Condition == "Not_Pointing")
res2 = table(df_not$Mistake_Type_2, df_not$Correction_Status)
res2 = prop.table(res2,1)*100

chisq.test(res)
```
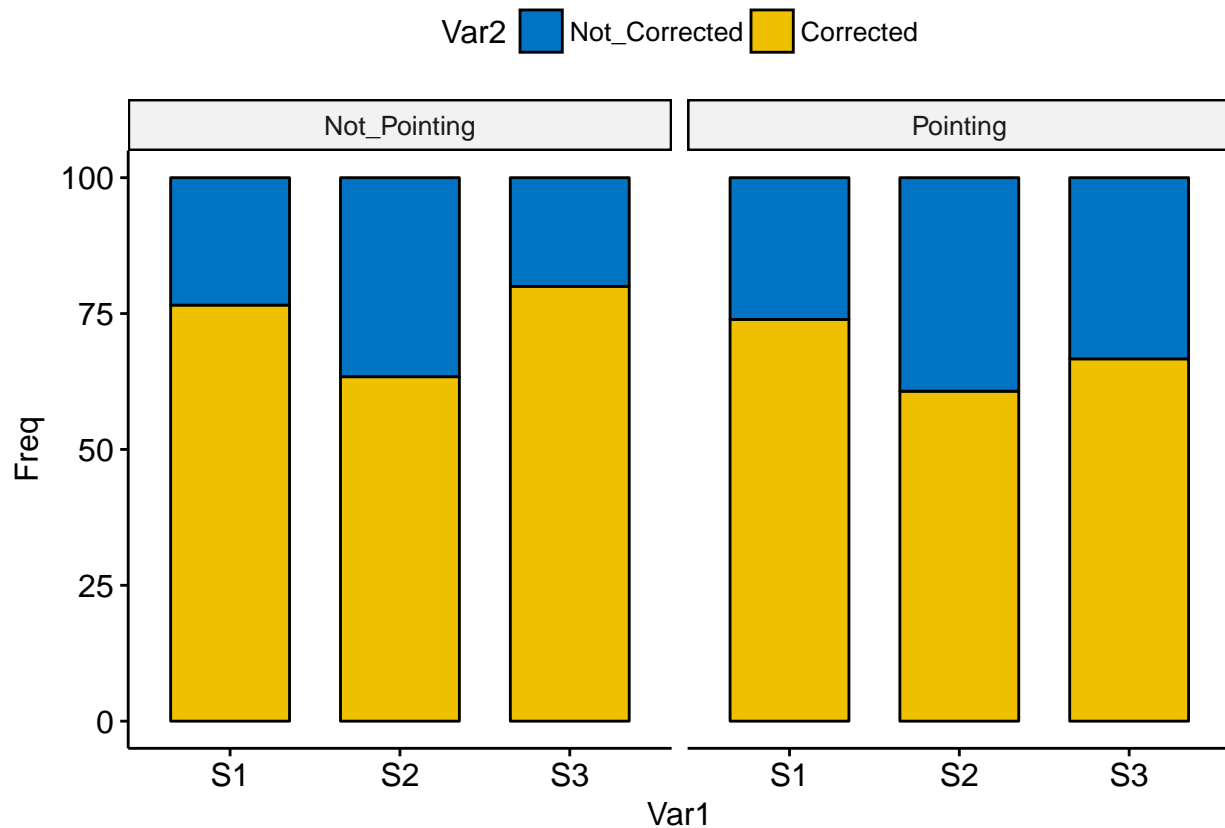
```
##
##  Pearson's Chi-squared test
##
## data:  res
## X-squared = 3.9582, df = 2, p-value = 0.1382
```

```
chisq.test(res2)
```

```
##
##  Pearson's Chi-squared test
##
## data:  res2
## X-squared = 7.8681, df = 2, p-value = 0.01956
```

```
res = data.frame(res)
res["Hand"] <- "Pointing"
res2 = data.frame(res2)
res2["Hand"] <- "Not_Pointing"
res3 <- rbind(res,res2)
res3$Var2 <- as.character(res3$Var2)
res3$Var2 <- factor(res3$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res3, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
facet(p, facet.by="Hand")
```

```
df_high = subset(df,df$Book_Level == "High")
df_point = subset(df_high,df$Robot_Hand_Condition == "Pointing")
```

```
## Warning: Length of logical index must be 1 or 189, not 321
```

```
res = table(df_point$Mistake_Type_2, df_point$Correction_Status)
res = prop.table(res,1)*100
res
```

```
##
##      Corrected Not_Corrected
##   S1  89.28571      10.71429
##   S2  71.42857      28.57143
##   S3  81.25000      18.75000
```

```
df_not = subset(df,df$Robot_Hand_Condition == "Not_Pointing")
res2 = table(df_not$Mistake_Type_2, df_not$Correction_Status)
res2 = prop.table(res2,1)*100
```
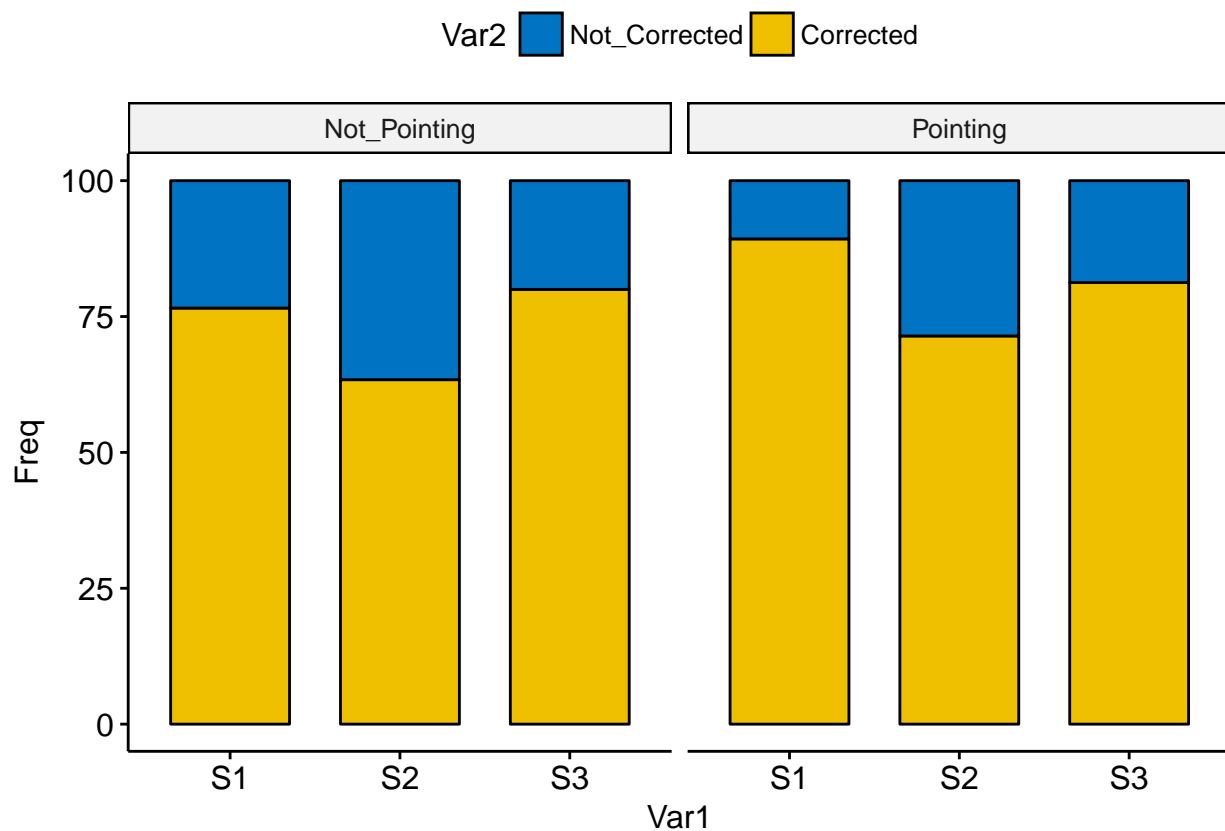
```
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test
##
## data:  res
## X-squared = 10.253, df = 2, p-value = 0.005938
```

```
chisq.test(res2)
```

```
##
##  Pearson's Chi-squared test
##
## data:  res2
## X-squared = 7.8681, df = 2, p-value = 0.01956
```

```
res = data.frame(res)
res["Hand"] <- "Pointing"
res2 = data.frame(res2)
res2["Hand"] <- "Not_Pointing"
res3 <- rbind(res,res2)
res3$Var2 <- as.character(res3$Var2)
res3$Var2 <- factor(res3$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res3, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
facet(p, facet.by="Hand")
```



```
df_low = subset(df,df$Book_Level == "Low")
res = table(df_low$Mistake_Type_2, df_low$Correction_Status)
res = prop.table(res,1)*100
res
```

```
##
##       Corrected Not_Corrected
##   S1  83.33333      16.66667
##   S2  56.66667      43.33333
```
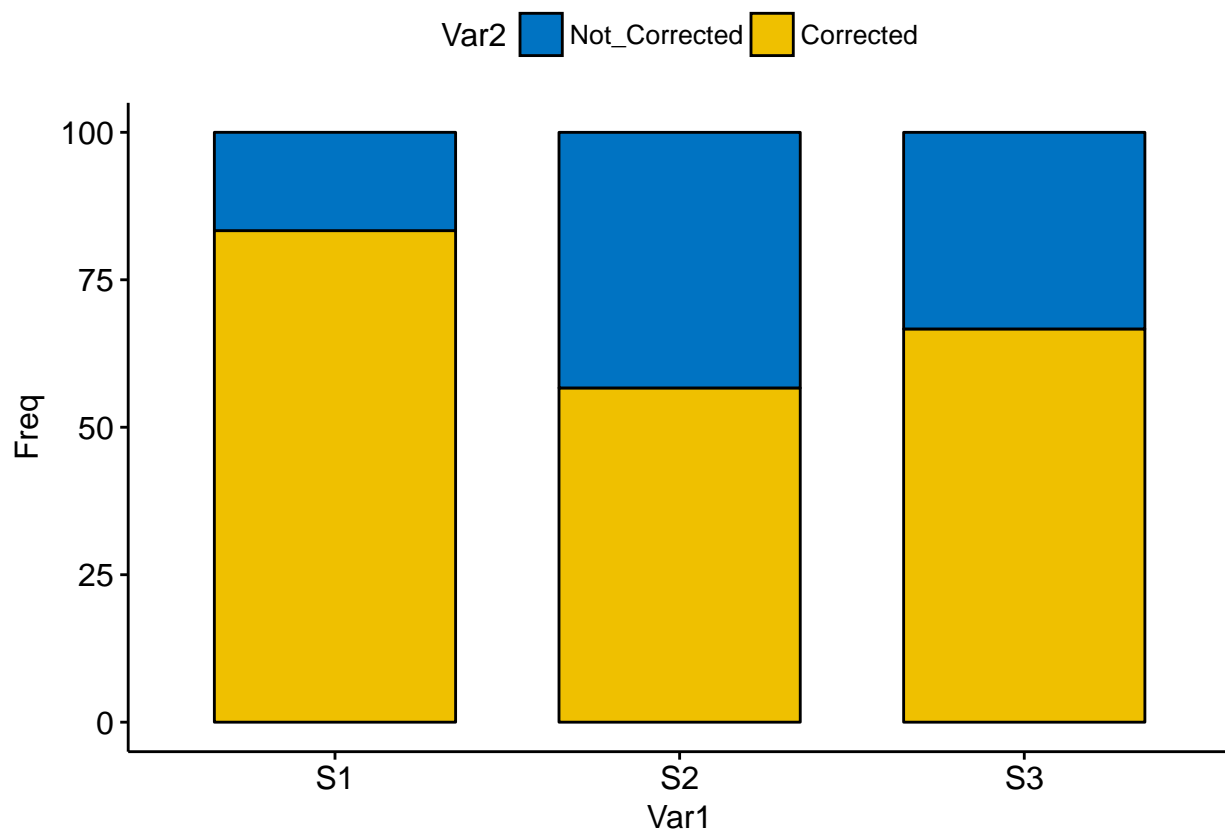
```
## S3 66.66667       33.33333
```

```
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test
##
## data:  res
## X-squared = 16.935, df = 2, p-value = 0.0002101
```

```
res = data.frame(res)
res$Var2 <- as.character(res$Var2)
res$Var2 <- factor(res$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
p
```



```
df_low = subset(df,df$Book_Level == "High")
res = table(df_low$Mistake_Type_2, df_low$Correction_Status)
res = prop.table(res,1)*100
res
```

```
##
##     Corrected Not_Corrected
##  S1  86.11111      13.88889
##  S2  72.22222      27.77778
##  S3  80.00000      20.00000
```

```
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test
##
## data:  res
## X-squared = 5.9346, df = 2, p-value = 0.05144
```

```
res = data.frame(res)
res$Var2 <- as.character(res$Var2)
res$Var2 <- factor(res$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
p
```
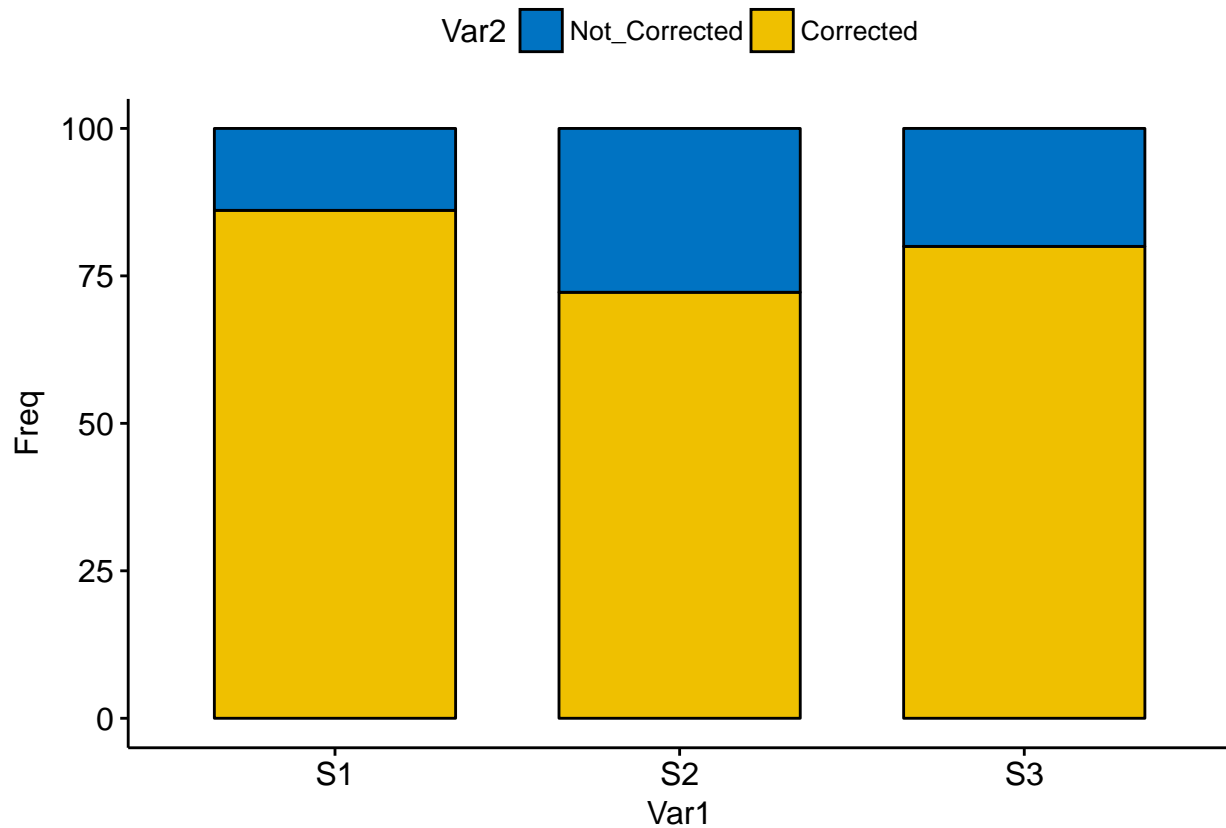

Correct per mistake order

```
res = table(df$Mistake_Order, df$Correction_Status)
res = prop.table(res,1)*100
res
```

```
##
##      Corrected Not_Corrected
## 1    83.33333      16.66667
## 2    90.00000      10.00000
## 3    80.95238      19.04762
## 4    76.19048      23.80952
## 5    76.66667      23.33333
## 6    70.00000      30.00000
```

```
##   7   60.00000       40.00000
##   8   83.33333       16.66667
##   9   80.00000       20.00000
##  10   76.66667       23.33333
##  11   56.66667       43.33333
##  12   54.16667       45.83333
```

```r
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test
##
## data:  res
## X-squared = 74.808, df = 11, p-value = 1.475e-11
```

```r
res = data.frame(res)
res$Var2 <- as.character(res$Var2)
res$Var2 <- factor(res$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
p
```
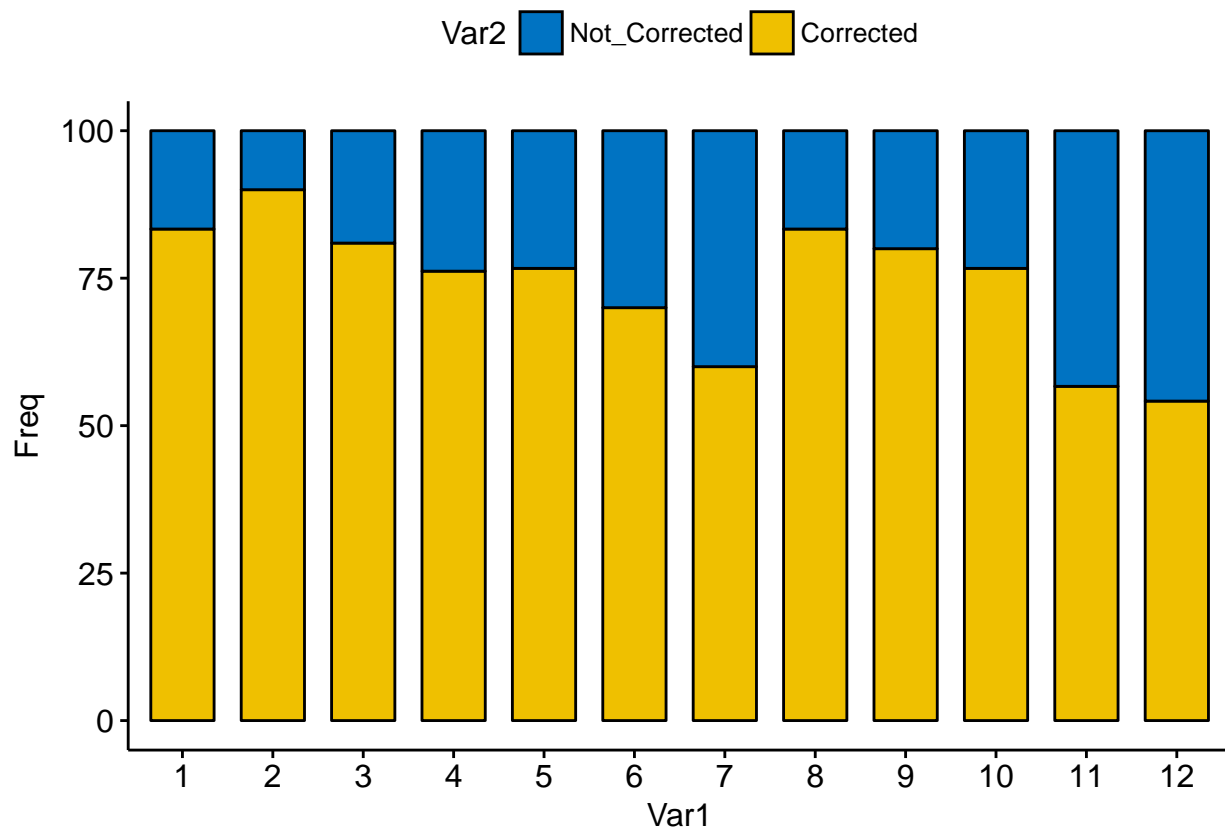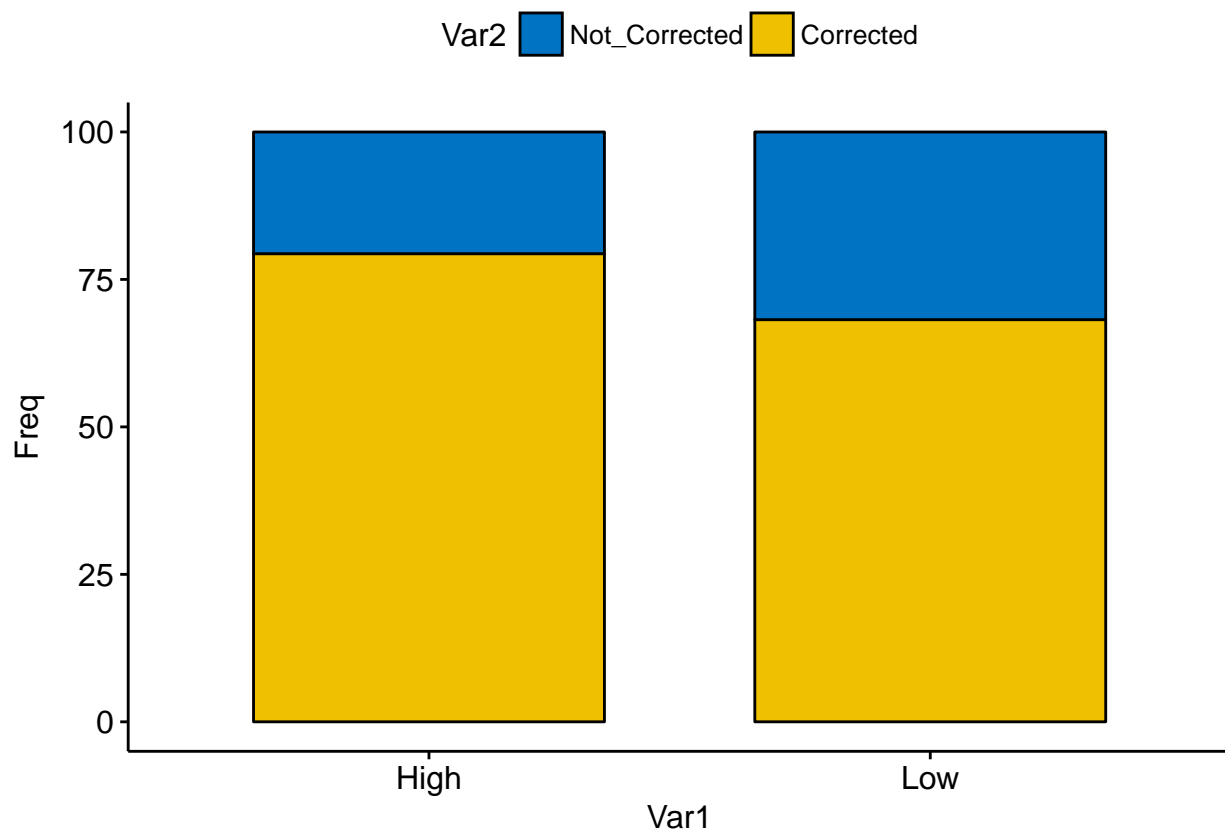

Correct per book

```r
res = table(df$Book_Level, df$Correction_Status)
res = prop.table(res,1)*100
res
```

```
## 
##        Corrected Not_Corrected
##   High  79.36508       20.63492
##   Low   68.18182       31.81818
```

```
chisq.test(res)
```

```
## 
##  Pearson's Chi-squared test with Yates' continuity correction
## 
## data:  res
## X-squared = 2.6798, df = 1, p-value = 0.1016
```

```
res = data.frame(res)
res$Var2 <- as.character(res$Var2)
res$Var2 <- factor(res$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
p
```


STAT TEST

Test pointing effect on all children

```
res = table(df$Robot_Hand_Condition, df$Correction_Status)
res = prop.table(res,1)*100
```
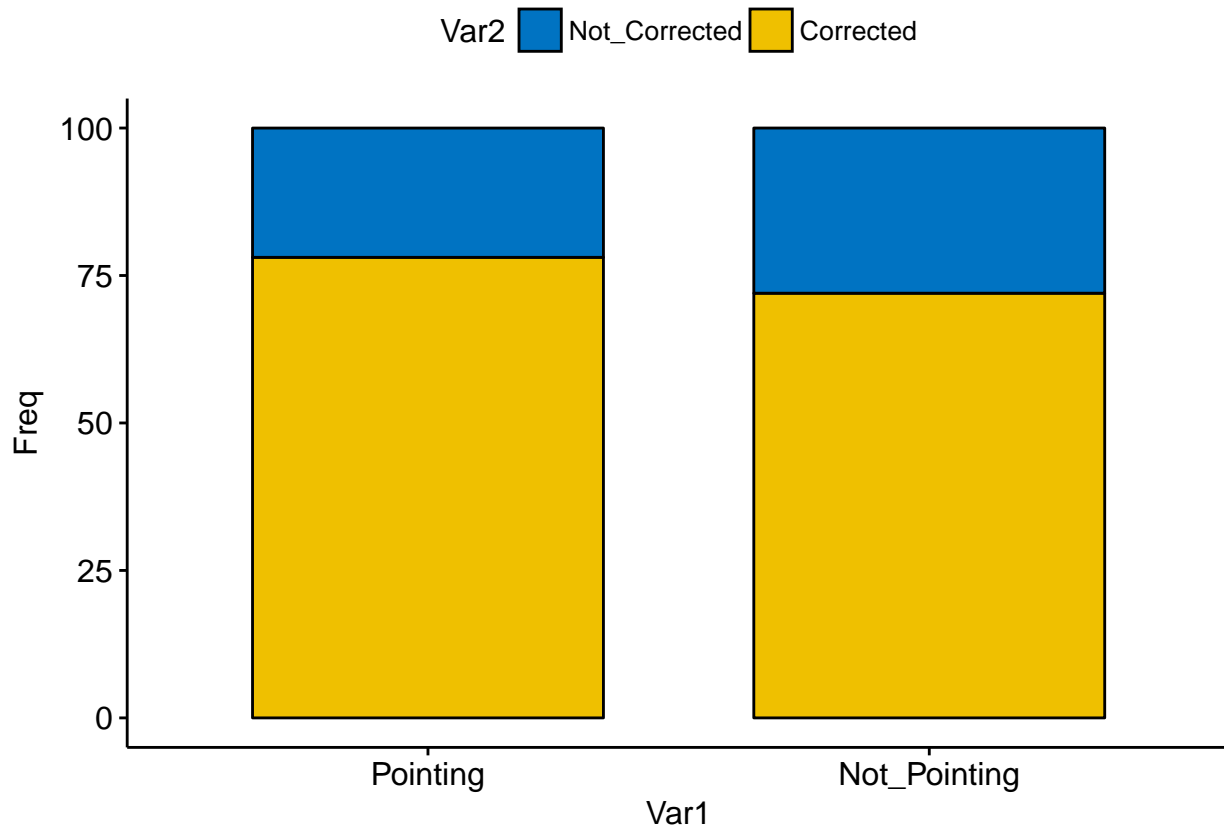
```
res
```

```
##
##               Corrected Not_Corrected
##    Pointing      78.08219      21.91781
##    Not_Pointing  72.00000      28.00000
```

```
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 0.68952, df = 1, p-value = 0.4063
```

```
res = data.frame(res)
res$Var2 <- as.character(res$Var2)
res$Var2 <- factor(res$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
p
```


Test pointing effect on low level kids

```
df_low = subset(df,df$Book_Level == "Low")
res = table(df_low$Robot_Hand_Condition, df_low$Correction_Status)
res = prop.table(res,1)*100
res
```
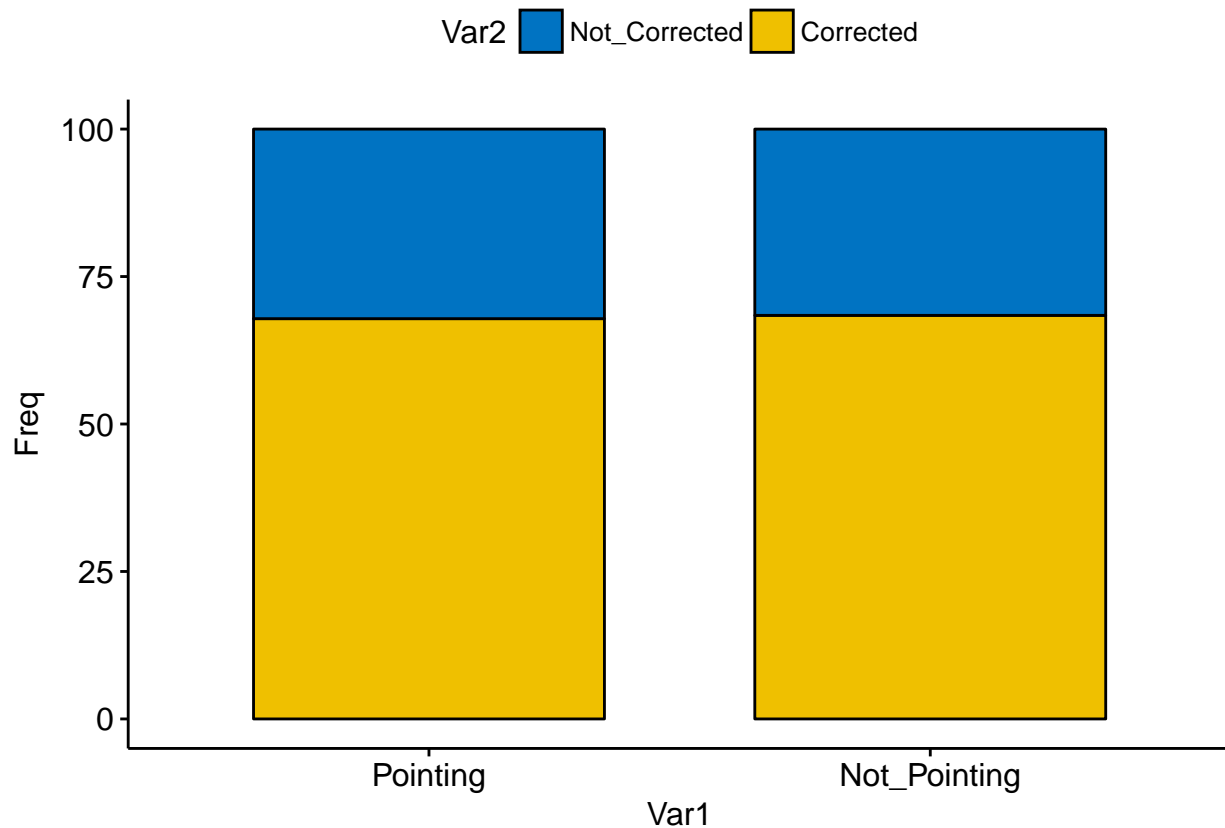
```
##
```

```
##              Corrected Not_Corrected
##   Pointing      67.85714     32.14286
##   Not_Pointing  68.42105     31.57895
```

```r
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 1.2868e-29, df = 1, p-value = 1
```

```r
res = data.frame(res)
res$Var2 <- as.character(res$Var2)
res$Var2 <- factor(res$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
p
```


Test pointing effect on high level kids

```r
df_high = subset(df,df$Book_Level == "High")
res = table(df_high$Robot_Hand_Condition, df_high$Correction_Status)
res = prop.table(res,1)*100
res
```
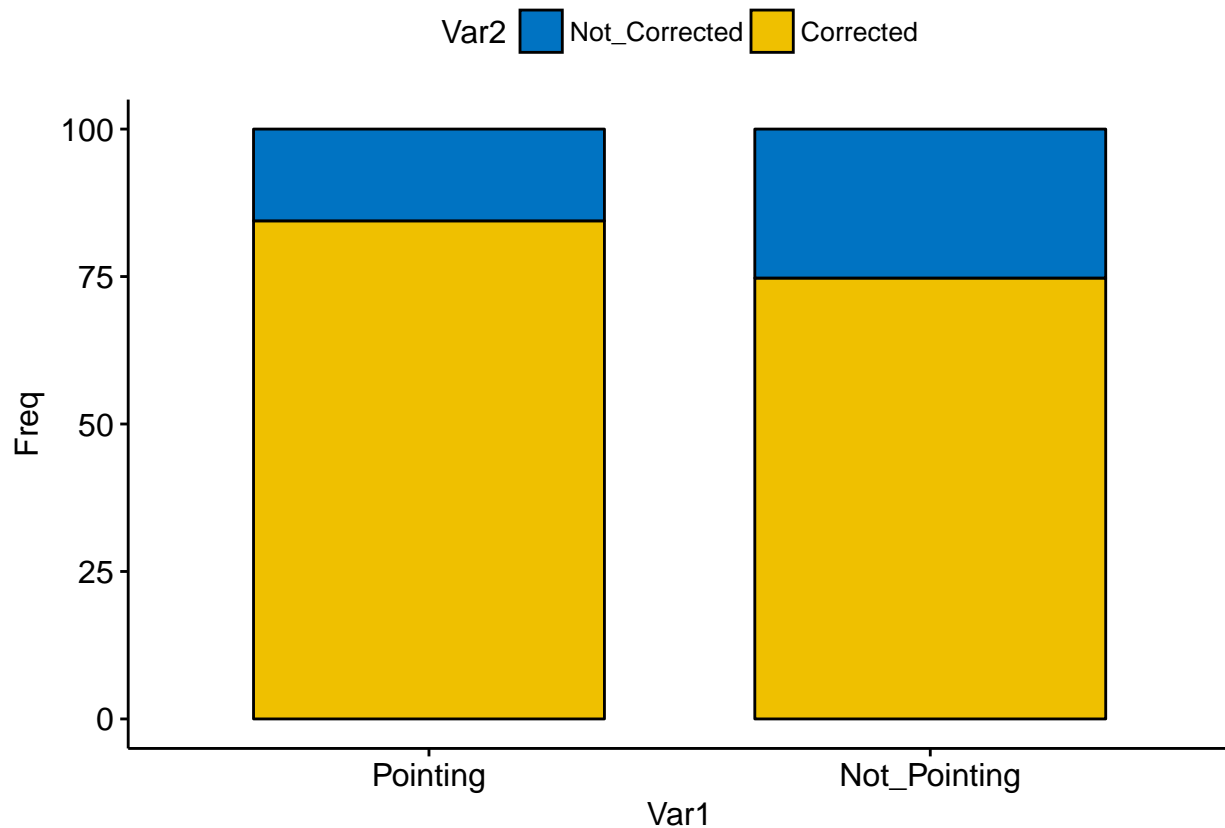
```
##
```

```
##              Corrected Not_Corrected
##   Pointing      84.44444      15.55556
##   Not_Pointing  74.74747      25.25253
```

```r
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 2.3286, df = 1, p-value = 0.127
```

```r
res = data.frame(res)
res$Var2 <- as.character(res$Var2)
res$Var2 <- factor(res$Var2, levels=c("Not_Corrected", "Corrected"))
p = ggbarplot(res, x = "Var1", y = "Freq", fill = "Var2", palette = "jco")
p
```


Test pointing effect for each type of mistakes ###### T1

```r
df_t1 = subset(df,df$Mistake_Type == "T1")
res = table(df_t1$Robot_Hand_Condition, df_t1$Correction_Status)
res
```

```
##
##              Corrected Not_Corrected
##   Pointing           39              3
##   Not_Pointing       37             11
```

T2

15

```r
df_t2 = subset(df,df$Mistake_Type == "T2")
res = table(df_t2$Robot_Hand_Condition, df_t2$Correction_Status)
res
```

```
##
##                 Corrected Not_Corrected
##    Pointing            33             9
##    Not_Pointing        35            13
```

```r
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 0.14208, df = 1, p-value = 0.7062
```

T3

```r
df_t3 = subset(df,df$Mistake_Type == "T3")
res = table(df_t3$Robot_Hand_Condition, df_t3$Correction_Status)
res
```

```
##
##                 Corrected Not_Corrected
##    Pointing            19             9
##    Not_Pointing        25            13
```

```r
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 5.872e-31, df = 1, p-value = 1
```

T4

```r
df_t4 = subset(df,df$Mistake_Type == "T4")
res = table(df_t4$Robot_Hand_Condition, df_t4$Correction_Status)
res
```

```
##
##                 Corrected Not_Corrected
##    Pointing            23            11
##    Not_Pointing        29            12
```

```r
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 0.0013608, df = 1, p-value = 0.9706
```

Test pointing effect according to Mistake_Type_2

S1

```
df_s1 = subset(df,df$Mistake_Type_2 == "S1")
res = table(df_s1$Robot_Hand_Condition, df_s1$Correction_Status)
res = prop.table(res,1)*100
res
```

```
##
##               Corrected Not_Corrected
##   Pointing     94.642857      5.357143
##   Not_Pointing 76.562500     23.437500
```

```
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 11.836, df = 1, p-value = 0.0005811
```

S2

```
df_s2 = subset(df,df$Mistake_Type_2 == "S2")
res = table(df_s2$Robot_Hand_Condition, df_s2$Correction_Status)
res = prop.table(res,1)*100
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 0.17707, df = 1, p-value = 0.6739
```

S3

```
df_s3 = subset(df,df$Mistake_Type_2 == "S3")
res = table(df_s3$Robot_Hand_Condition, df_s3$Correction_Status)
res = prop.table(res,1)*100
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 2.6489, df = 1, p-value = 0.1036
```

Test pointing effect according to Mistake_Type_2

Low

S1 and Low

```
df_s1 = subset(df,df$Mistake_Type_2 == "S1" & df$Book_Level == "Low")
res = table(df_s1$Robot_Hand_Condition, df_s1$Correction_Status)
res = prop.table(res,1)*100
res
```

```
##
```

```
##           Corrected Not_Corrected
##   Pointing     100.00000      0.00000
##   Not_Pointing  71.42857     28.57143
```
```
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 31.041, df = 1, p-value = 2.527e-08
```

S2 and Low

```
df_s2 = subset(df,df$Mistake_Type_2 == "S2" & df$Book_Level == "Low")
res = table(df_s2$Robot_Hand_Condition, df_s2$Correction_Status)
res = prop.table(res,1)*100
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 0.99432, df = 1, p-value = 0.3187
```

S3 and Low

```
df_s3 = subset(df,df$Mistake_Type_2 == "S3" & df$Book_Level == "Low")
res = table(df_s3$Robot_Hand_Condition, df_s3$Correction_Status)
res = prop.table(res,1)*100
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 32.02, df = 1, p-value = 1.526e-08
```

High

S1 and High

```
df_s1 = subset(df,df$Mistake_Type_2 == "S1" & df$Book_Level == "High")
res = table(df_s1$Robot_Hand_Condition, df_s1$Correction_Status)
res = prop.table(res,1)*100
res
```

```
##
##             Corrected Not_Corrected
##   Pointing     91.666667      8.333333
##   Not_Pointing 80.555556     19.444444
```

```
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 4.2741, df = 1, p-value = 0.0387
```

S2 and High

```
df_s2 = subset(df,df$Mistake_Type_2 == "S2" & df$Book_Level == "High")
res = table(df_s2$Robot_Hand_Condition, df_s2$Correction_Status)
res = prop.table(res,1)*100
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 2.548, df = 1, p-value = 0.1104
```

S3 and High

```
df_s3 = subset(df,df$Mistake_Type_2 == "S3" & df$Book_Level == "High")
res = table(df_s3$Robot_Hand_Condition, df_s3$Correction_Status)
res = prop.table(res,1)*100
chisq.test(res)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  res
## X-squared = 0.66246, df = 1, p-value = 0.4157
```