Modeling

```
# create model
mod_full <- aov(Glucose ~ (Gender+NutritionBar+Minutes)^2 + Error(Participant), data = nb)
tab_full <- summary(mod_full)
kable(tab_full$`Error: Participant`[[1]], caption = "Error: Participant")
```

Error: Participant

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Gender	1	110.25000	110.25000	1.905120	0.2167281
NutritionBar	2	1405.81389	702.90694	12.146232	0.0077705
Gender:NutritionBar	2	55.68611	27.84306	0.481128	0.6400351
Residuals	6	347.22222	57.87037	NA	NA

```
kable(tab_full$`Error: Within`[[1]], caption = "Error: Within")
```

Error: Within

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Minutes	2	696.22222	348.11111	22.635239	0.0000216
Gender:Minutes	2	60.66667	30.33333	1.972365	0.1715278
NutritionBar:Minutes	4	355.71111	88.92778	5.782354	0.0044771
Residuals	16	246.06667	15.37917	NA	NA

```r
# reduce model
mod_red <- aov(Glucose ~ NutritionBar*Minutes + Error(Participant), data = nb)
tab_red <- summary(mod_red)
kable(tab_red$`Error: Participant`[[1]], caption = "Error: Participant")
```

Error: Participant

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
NutritionBar	2	1503.3889	751.69444	16.27893	0.0010237
Residuals	9	415.5833	46.17593	NA	NA

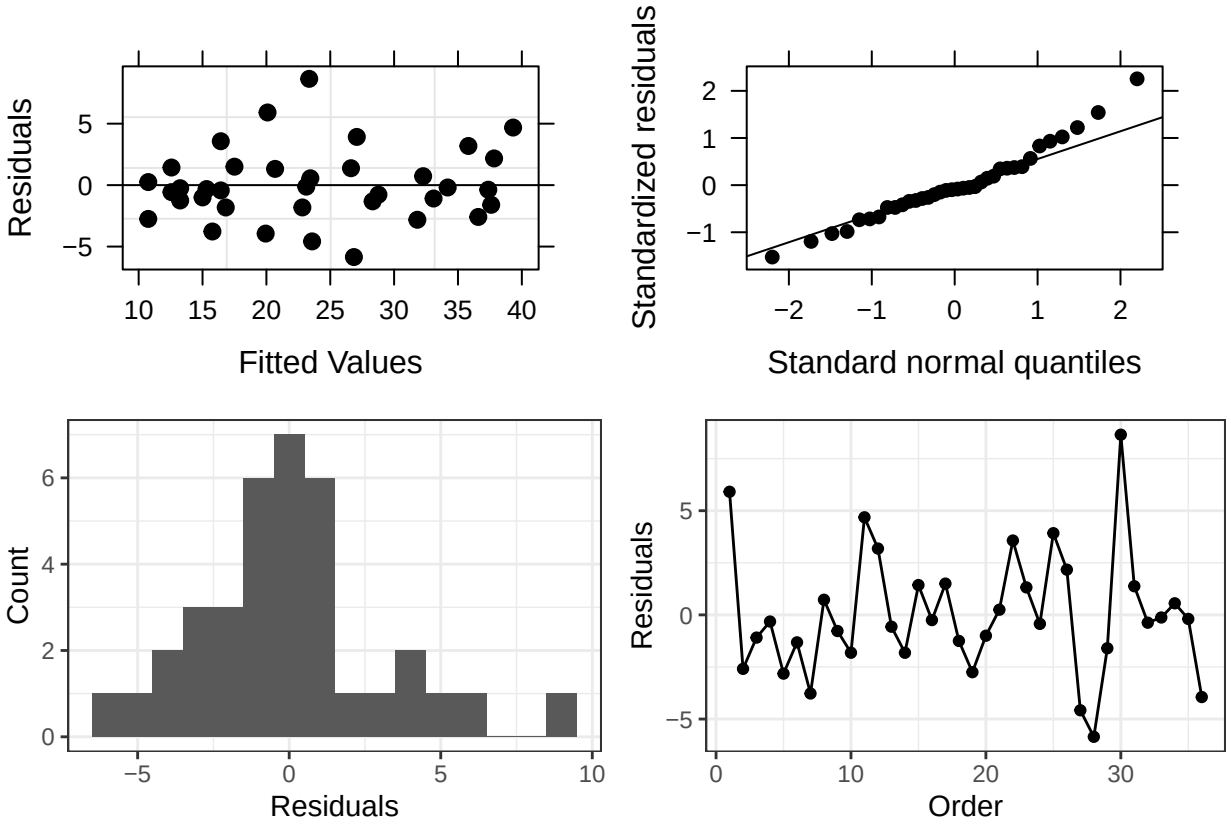
```r
kable(tab_red$`Error: Within`[[1]], caption = "Error: Within")
```

Error: Within

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Minutes	2	696.2222	348.11111	23.675063	0.0000091
NutritionBar:Minutes	4	397.7778	99.44444	6.763224	0.0016612
Residuals	18	264.6667	14.70370	NA	NA

```r
# create model/objects for residual plots
mod_plot <- lmer(Glucose ~ NutritionBar*Minutes + (1 | NutritionBar:Participant), data = nb)
mod_resid <- resid(mod_plot)
mod_fitted <- fitted(mod_plot)
nb1 <- nb %>% mutate(res = mod_resid,
                     index = 1:n())

# generate plots
r1 <- plot(mod_plot, xlab = "Fitted Values", ylab = "Residuals", pch = 19, col = "black")
r2 <- qqmath(mod_plot, pch = 19, col = "black")
r3 <- ggplot(nb1, aes(res)) +
  geom_histogram(binwidth = 1) +
  xlab("Residuals") +
  ylab("Count")
r4 <- ggplot(nb1, aes(index, res)) +
  geom_point() +
  geom_line() +
  xlab("Order") +
  ylab("Residuals")
grid.arrange(r1, r2, r3, r4, nrow = 2)
```




```
# save model
saveRDS(mod_plot, "reduced_model.RDS")

# residual checks
# resid_test <- nb$Glucose - mod_fitted
# round(mod_resid, 3) == round(resid_test, 3)
```

```
# create 15 to 45 change model
mod_2 <- lm(Change ~ NutritionBar, data = nb_cond) %>% summary()
kable(mod_2$coefficients)
```

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	16.50	2.226732	7.409964	0.0000406
NutritionBarBrandY	-12.25	3.149074	-3.890032	0.0036748
NutritionBarBrandZ	-5.75	3.149074	-1.825934	0.1011465