

Running a 1-way between participants ANOVA (and ignoring the covariate)...

```
> model1 <- aov_4(Ability ~ Condition + (1 | Participant), data = cond)
Contrasts set to contr.sum for the following variables: Condition
> anova(model1)
Anova Table (Type 3 tests)
```

Response: Ability

	num	Df	den	Df	MSE	F	ges	Pr(>F)
Condition	2		42		1.2422	53.432	0.71786	2.882e-12 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The factor Condition is significant with an $F = 53.432$. We would erroneously conclude that our manipulation has had an effect...

But now let's control for the effect of our co-variate (which we first need to scale and centre)...

```
> cond$Gaming <- scale(cond$Gaming)
> model_ancova <- aov_4(Ability ~ Gaming + Condition + (1 | Participant),
data = cond, factorize = FALSE)
Contrasts set to contr.sum for the following variables: Condition
> anova(model_ancova)
Anova Table (Type 3 tests)
```

Response: Ability

	num	Df	den	Df	MSE	F	ges	Pr(>F)	
Gaming		1		41	0.55171	53.5636	0.56643	5.87e-09	***
Condition		2		41	0.55171	0.8771	0.04103	0.4236	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The factor Condition is now not significant with an $F < 1$. However, our covariate *Gaming Frequency* is significant. Adding it means a lot of the variance we previously attributed to our experimental factor is actually explained by our covariate. Note, the F values are calculated using Type III Sum of Squares by the `aov_4()` function - more on that in a bit...