Publication-ready ANOVA (Analysis of Variance) tables
Cheatsheet

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Introduction

Generating a typical **ANOVA table** for *publication* is quite often a manual process — even with the help of R — due to formatting considerations (font, spacing, lines and design). This cheatsheet shows you the end results of three formatted ANOVA tables — where predictors are all *categorical* and the response is *normally distributed* — all "ready" for publication. Use these as guides for your *own* tables.

Data are based on the penguins dataset from `palmerpenguins`, and the possum dataset from `openintro`.

ANOVA with *one* categorical predictor

What it would have looked like from R, without formatting:

```
Anova Table (Type II tests)

Response: skull_w
        Sum Sq  Df F value Pr(>F)
sex       6.39   1  0.6572 0.4194
Residuals 992.03 102
```

The **residuals** term is *always* included, unless a *different* sums of squares calculation is used (your statistical software will automatically remove this when applicable).

This term show how much total variation **isn't explained** by the predictors above it.

Table 1: One-way Analysis of Variance summary table examining the effects of sex on the skull width of possums.

	Sum sq	*df*	F-val	*p*
Sex	6.39	1	0.657	0.4194
Residuals	992.03	102		

Interactions can either be specified as A×B or A:B

ANOVA with *two* categorical predictors

A **table caption** should appropriately describe the elements within. In this case, the **predictor** and **response** variables, including **interactions**, are described, and custom **highlights** (e.g. bold) are explained.

Table 2: Two-way Analysis of Variance summary table examining the effects of sex and species on body mass of penguins, including interactions. Significant effects (P < 0.05) are highlighted in bold.

	Sum sq	*df*	F-val	*p*
Species	143,401,584	2	749.016	**< 0.001**
Sex	37,090,262	1	387.460	**< 0.001**
Species × Sex	1,676,557	2	8.757	**< 0.001**
Residuals	31,302,628	327		

These should be **included** in the ANOVA table:

- **Terms** (including interactions)
- **Sum of squares** (SS or Sum Sq)
- **Degrees of freedom** (df)
- **F value** (F or F-val)
- **P value** (p or p-val)

More than one ANOVA table

Table 3: Two-way Analysis of Variance summary tables examining the effects of sex and species on (a) body mass and (b) flipper length of penguins, including interactions. Significant effects (P < 0.05) are highlighted in bold.

	(a) Body mass				(b) Flipper length			
	Sum sq	*df*	F-val	*p*	Sum sq	*df*	F-val	*p*
Species	143,401,584	2	749.016	**< 0.001**	50185	2	784.582	**< 0.001**
Sex	37,090,262	1	387.460	**< 0.001**	3906	1	122.119	**< 0.001**
Species × Sex	1,676,557	2	8.757	**< 0.001**	329	2	5.144	**0.006**
Residuals	31,302,628	327			10458	327		

Sometimes there is opportunity to **combine** tables. In this case the predictor variables are shared between the tables, and both the **caption** and **column headings** clearly indicate the response variable that represents the data below.

It is common for *F-value* and *p-value* calculations to be **absent** from the **residuals** term, since they are not applicable.

Resources

If you are not well-versed in R, use document processors to manually template and create your tables:

- **MS Word (or equivalent)** is useful if your document is already written using similar software. Use **Insert > Table** to begin.
- Use MS Excel (or equivalent) if you intend to export your table as an image (or screenshot). In this case you may need to go to **View** and uncheck **Gridlines** to start with an empty canvas.

If you want to use **R**, then the `gt`, `gtsummary` and `rstatix` packages may be useful for creating tables with custom formatting.