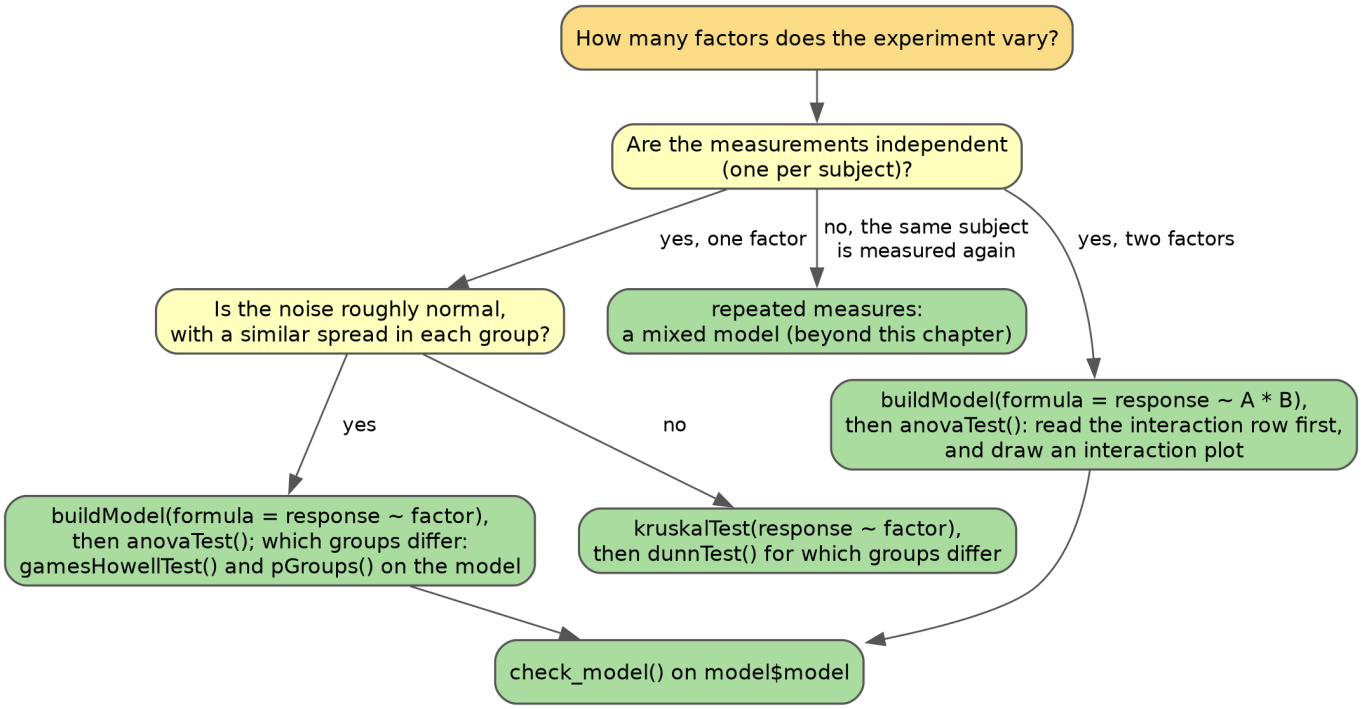
analysis of variance: summary



An ANOVA splits the spread in a response (its sum of squares) into the part each term explains and the part left over, the noise. **Build the model, then ask it questions:** fit it once with a formula (response on the left, factors on the right, ∗ for an interaction), read the ANOVA table, then, for a single factor, use the Games-Howell test on the same model to find which groups differ. **Read the table row by row:** each row's free values are what is left once the values the model fixes are spoken for (the grand mean speaks for one measurement, a factor with *k* groups keeps *k* – 1, an interaction multiplies its terms', and the noise gets the rest). A row's variance is its sum of squares per free value, F is that variance over the noise variance, so it is evidence that a term matters, and `share` is how much: the row's share of the variation explained, with every row's share adding up to 1. **With two factors, read the interaction row first:** if it is real, a main effect alone can mislead, and an interaction plot shows how. **Check the model** before trusting it: noise roughly normal with a similar spread in every group, and measurements independent (repeated measurements of one subject need a mixed model). For a single factor with non-normal data, use the Kruskal test, then the Dunn test.

Function	What it is for	How it is used in this chapter
`buildModel(formula = )`	fitting the model the ANOVA is read from	`response ~ factor`, or `response ~ factor_1 * factor_2` for an interaction, with `model_type = "linear_regression"`
`anovaTest()`	the ANOVA table: a row per term, then noise and total, with `sum_of_squares`, `free_values`, `variance`, `F`, `p` and `share`	piped after the model
`gamesHowellTest()`, `pGroups()`	which groups differ, as letters, using each group's own spread	piped after the same one-factor model
`kruskalTest(abundance ~ aquifer_code)`	rank-based test of any difference, one factor	on the data, followed by `dunnTest()`
`check_model()`	diagnostic panels for the noise (residuals)	given `model$model`