Which test should I use?

With fancy computer programs like R at our disposal, often the biggest challenge we have is actually picking the right statistical test. Here is a table to help you on your statistical journey.

*If you have a **single variable** you are comparing to a constant or to a probability distribution:*

Data type	**Goal**	**Test**
Categorical		Binomial test
	comparing a proportion to a hypothesized value	χ^2 Goodness-of-fit test (if sample size too larger for binomial test)
	comparing frequency data to a probability distribution	χ^2 Goodness-of-fit test
Numerical	Comparing mean to a hypothesized value (data approx. normal)	One-sample *t*-test
	Comparing mean to a hypothesized value (data not normal)	sign test
	Comparing frequency data to a discrete probability distribution	χ^2 Goodness-of-fit test
	Comparing frequency data to the normal distribution	Shapiro-Wilk test

*Tests of association between **two variables***

		Type of explanatory variable	
		Categorical	**Numerical**
Type of response variable	**Categorical**	Contingency analysis	Logistic regression
	Numerical	*t*-tests, ANOVA, Mann-Whitney *U*-tests	Linear and nonlinear regression Linear correlation Spearman's rank

Test differences between group means

Number of treatments	**Assume Normal Distribution**	**Not Assume Normal Distribution**
two treatments	*t*-test Welch's *t*-test (when unequal variance in two groups)	Mann-Whitney *U*-test
two treatments (paired data)	paired *t*-test	sign test
more than two treatments	ANOVA	Kruskal-Wallis test