Bayes class 7

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# Model comparison

In a constructed experiment it may be feasible to have a single model that perfectly captures all relevant aspects of the data generating process and answers the research question. However, this is extremely rare, and even in the best-case scenario people may still need to be convinced that there isn’t a better way. In almost all real experiments the process of answering the research question involves comparing multiple feasible models.

More importantly, most data that is analysed is not from a constructed experiment. Exploring the data generating process properly requires looking at a problem from multiple angles using multiple models.

Summarise the reasons for comparing models in your own words:

## Parsimony as a substitute for generalisation

What does generalisation mean to you?

How does applying the principle of parsimony help with generalisation?

What approaches are available to help us apply the principle of parsimony objectively?

## Information criteria

List some useful information criteria that can be used with Bayes models and give the formula for at least one that is designed to work with Bayes models.

How are Bayes information criteria different to the kind used in frequentist models?

How does one interpret the value of an information criterion?

What are the assumptions of information criteria in general?

Now try to apply some of these approaches to a simulated problem and see whether they give the expected results.

Once you’ve learned about mixed effects models, come back to this worksheet and explain why there are special formulas for comparing mixed effects models: