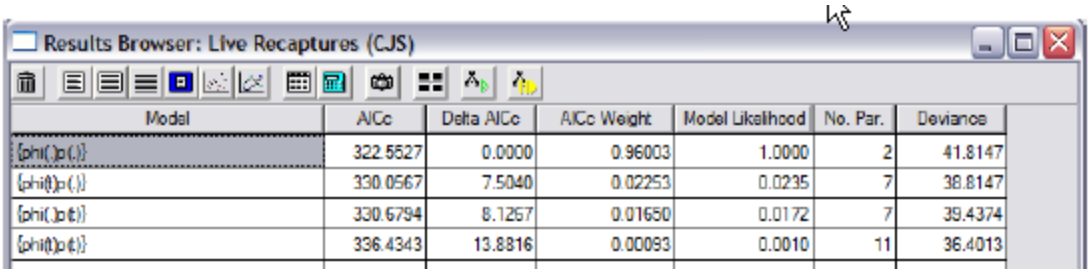
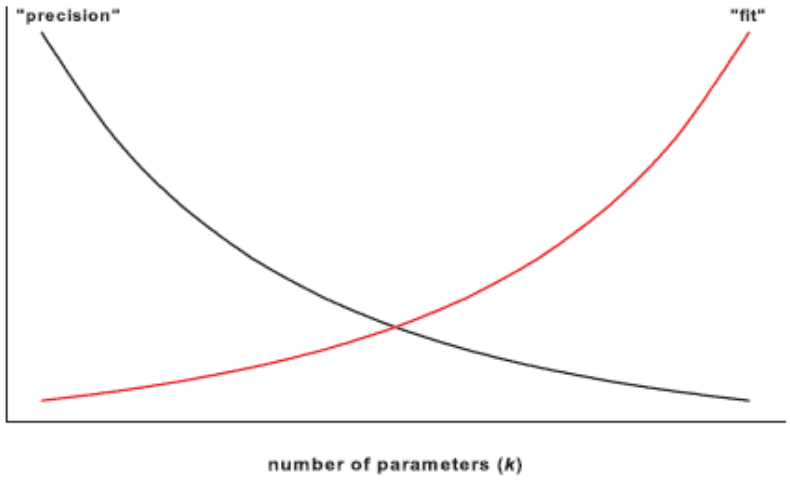
Multi-model inference (*built from Chapter 4 of Cooch & White*)



Model	AICc	Delta AICc	AICc Weight	Model Likelihood	No. Par.	Deviance
{phi(.)p(.)}	322.5527	0.0000	0.96003	1.0000	2	41.8147
{phi(t)p(.)}	330.0567	7.5040	0.02253	0.0235	7	38.8147
{phi(.)p(t)}	330.6794	8.1267	0.01650	0.0172	7	39.4374
{phi(t)p(t)}	336.4343	13.8816	0.00093	0.0010	11	36.4013



$$\mathrm{AIC} = -2\log(\mathcal{L}(\hat{\theta}|data)) + 2K$$

$$\mathrm{AIC}_c = -2\log(\mathcal{L}(\hat{\theta})) + 2K\left(\frac{n}{n-K-1}\right)$$

$$w_i = \frac{\exp\left(\frac{-\Delta\mathrm{AIC}}{2}\right)}{\sum\left\{\exp\left(\frac{-\Delta\mathrm{AIC}}{2}\right)\right\}}$$

Model	ΔAIC	Akaike weight (w_i)
1	1.6	0.278
2	0.0	0.619
3	7.0	0.084
4	13.5	0.001
5	4.0	0.084
total		1.000

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Support statements based on AIC weights

42.6 times as much support for top model as for 2nd best model (given the model set and the data)

42.6 = 0.96003/0.02253

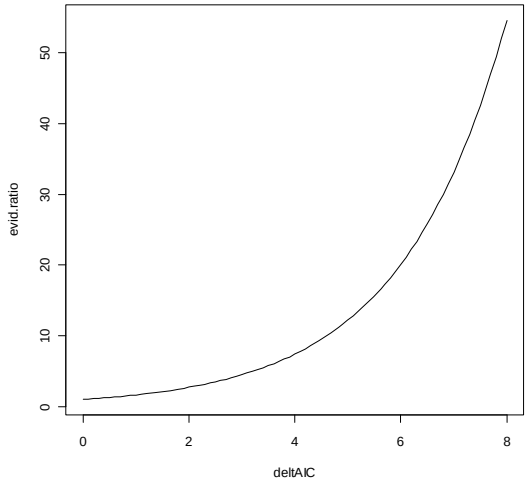
Or … the 2nd best model has ~43 times less support than does the best model.

Model likelihood = $w_i/w_{best\ model}$ e.g., 0.02253/0.96003 = 0.0235 = relative likelihood of 2nd best model relative to that of best model. **Note**: 1/0.0235 = 42.6

Evidence ratios = relative likelihood of model pairs (or ratio of AIC weights or 1/(Model Likelihood))

$$\frac{w_1}{w_j} \equiv \frac{1}{e^{-1/2\Delta_j}} \equiv e^{1/2\Delta_j}$$

Δ_j	evidence ratio	model likelihood
2	2.7	0.3704
4	7.4	0.1352
8	54.6	0.0183
10	148.4	0.0067
15	1808.0	0.0006



Note the non-linear nature of the relationship between ΔAIC and the relative likelihood of the best model compared to another model, i.e., the evidence gets stronger faster as ΔAIC increases. This rapid rise led to rules of thumb for interpreting a set of ΔAIC values.

ΔAIC rules-of-thumb

When the difference in AIC between 2 models (ΔAIC) is < 2, then we are reasonably safe is saying that both models have approximately equal weight in the data. If 2 < ΔAIC < 7, then there is considerable support for a real difference between the models, and if ΔAIC > 7, then there is strong evidence to support the conclusion of differences between the models. Of course, as the graph shows, this is all on a continuum. NOTE: you can learn more about information-theoretic methods in several books and recent articles on the topic.