

## Read About It: Information Criteria Penalty Components

Beyond significance level, there are several statistics, referred to as information criteria, that can be used to evaluate competing models as well as direct the selection process within the GLMSELECT procedure. Each criterion searches for a model that will minimize the unexplained variability using as few effects within the model as possible. The model with as few effects as possible is referred to as the most parsimonious model.

The calculation for each information criterion begins with

$$n \log\left(\frac{SSE}{n}\right)$$

It then invokes a penalty representing the complexity of the model. The table below shows the penalty for each criterion, where  $n$  is the number of observations,  $p$  is the number of parameters including the intercept, and

$$\hat{\sigma}^2$$

is the estimate of pure error variance from fitting the full model. For each information criterion, smaller is better.

Note: In the BIC penalty,

$$q = \frac{n\hat{\sigma}^2}{SSE}$$

Information Criterion	Penalty Component
AIC	$2p + n + 2$
AICC	$\frac{n(n + p)}{n - p - 2}$
BIC	$2(p + 2)q - 2q^2$
SBC	$p \log(n)$

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*Statistics 1: Introduction to ANOVA, Regression, and Logistic Regression*

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