Statistics Terminology for Hypothesis Testing

p-value $\leq \alpha$ $\Leftrightarrow$ statistically significant $\Leftrightarrow$ reject H_o (i.e., accept H_1) [***possible*** Type I error]
p-value $> \alpha$ $\Leftrightarrow$ not statistically significant $\Leftrightarrow$ fail to reject H_o (i.e., accept H_o) [***possible*** Type II error]

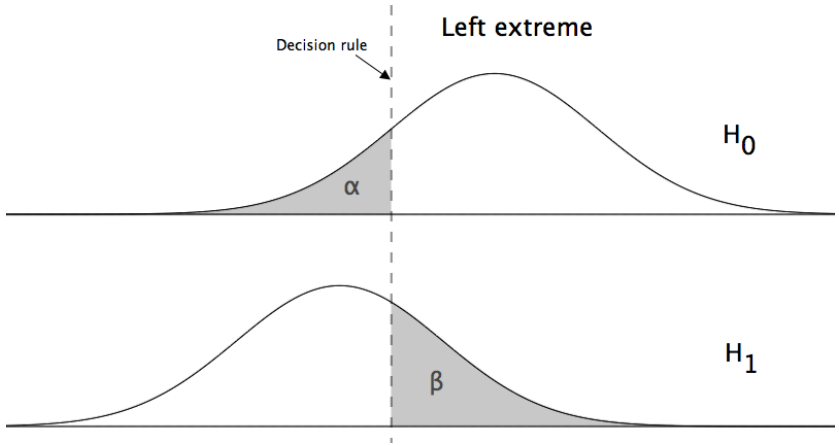
α = probability of a type I error = significance level
α is measured on the H_o distribution (or frequency plot) from the critical value (the decision rule cutoff value) in the direction of extreme (see the other side of this page).

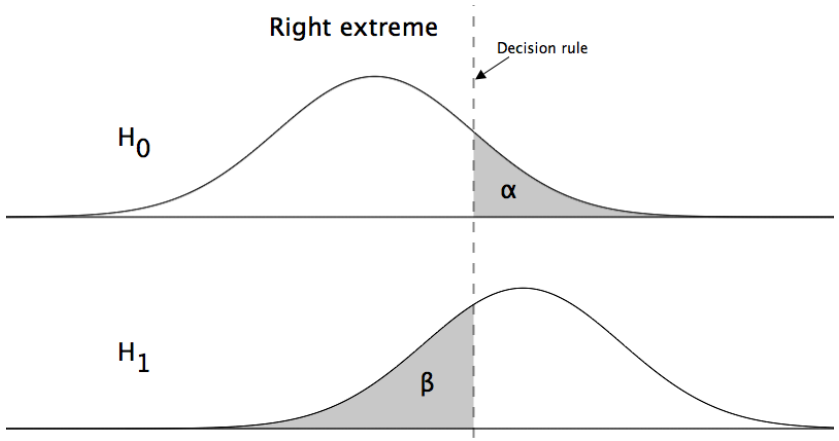
β = probability of a type II error
β is measured on the H_1 distribution (or frequency plot) from the critical value (the decision rule cutoff value) in the opposite direction from the direction of extreme (see the other side of this page).

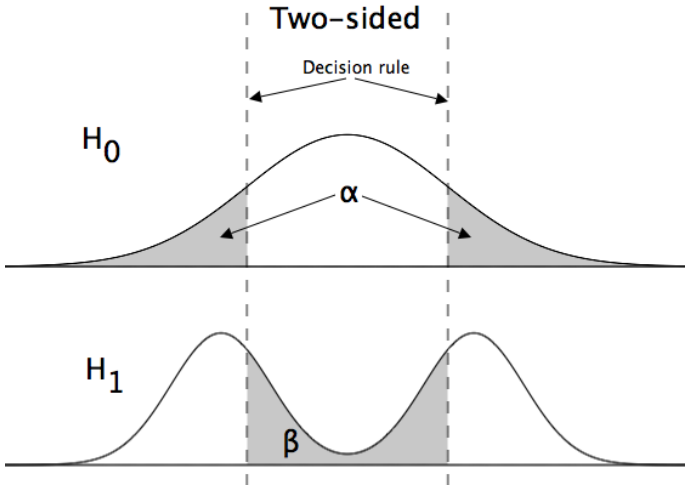
p-value = probability of the given observation or one more extreme, ***assuming H_o is true.***
p-value is measured on the H_o distribution (or frequency plot) from the observed value in the direction of extreme.
A larger p-value supports H_o; a smaller p-value supports H_1 (as compared with α).
(Remember that you must have made an observation – taken a sample, etc. – before you can have a p-value.)

Type I error means rejecting H_o (i.e., accepting H_1) when H_o is actually true.
Type II error means failing to reject H_o (i.e., accepting H_o) when H_o is actually false.

		----- reality -----	
		H_o is true	**H_1 is true**
your conclusion	**Accept H_o ("fail to reject H_o")**	No error	Type II error
	Accept H_1 ("reject H_o")	Type I error	No error







The horizontal scales of the H_0 and H_1 distributions must align.

p-value is measured similarly to α, but starting from the observation instead of from the decision rule. In the two-sided case, you must also include the equivalently extreme value on the opposite side from the observation (or just double the p-value from one side).