Neuendorf

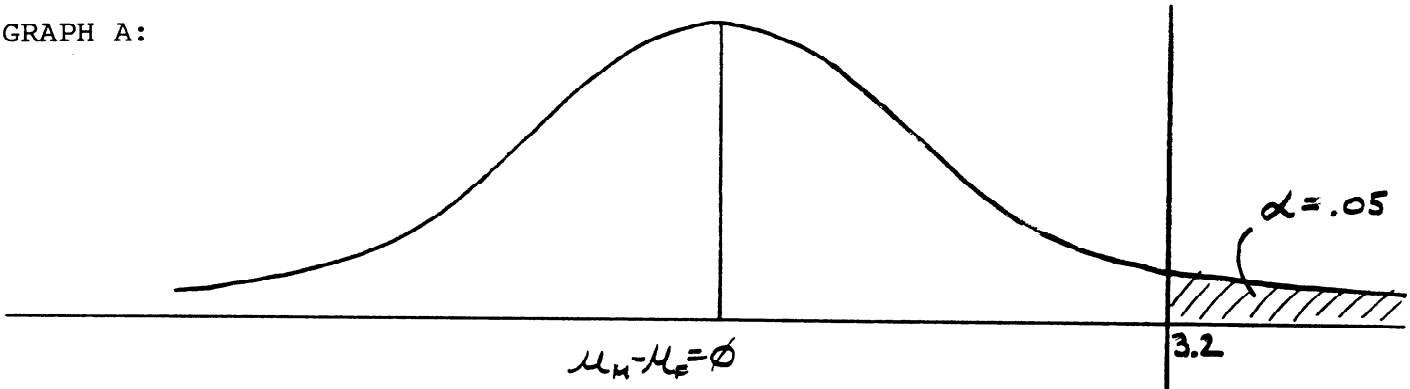
**Power, Type I and Type II Error**

Let's imagine that we are comparing male and female knowledge about the continent of Africa. The DV (Africa knowledge) has been measured using a 20-item quiz, so scores on the DV range from 0 to 20. Our hypothesis, that males are more knowledgable than are females, will be looking for a large positive ($mean_M$ - $mean_F$) value. The null, of course, is that ($mean_M$ - $mean_F$) = 0.

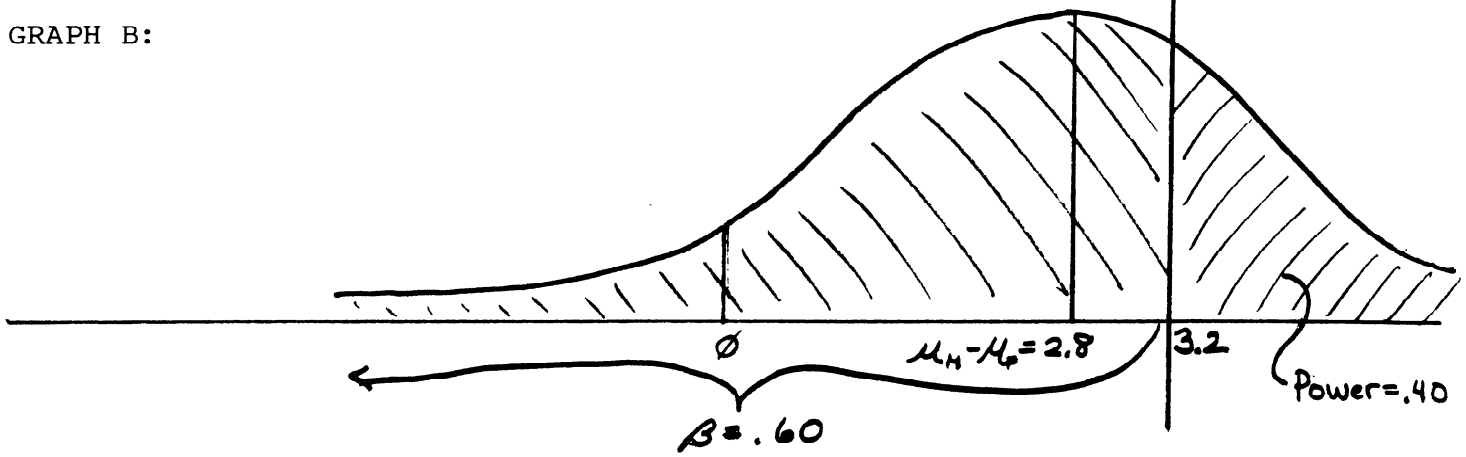
If the null is true, the sampling distribution for the ($mean_M$ - $mean_F$) difference (dist. of all sample outcomes) will look like GRAPH A.

Let's imagine, though, that the true population difference is 2.8 pts. on the quiz. Then, the sampling distribution for the ($mean_M$ - $mean_F$) difference (dist. of all sample outcomes) will look like GRAPH B.

GRAPH A:




GRAPH B:




$\alpha$ = Type I error = the probability of rejecting the null when it should be "accepted"

$\beta$ = Type II error = the probability of "accepting" the null when it should be rejected

Power = the probability of rejecting the null when it should be rejected

NOTICE that Power + $\beta$ = 1.0