SUPPLEMENT FOR DAY 3

(Insert for p. 34) Another Common Mistake Involving Power:

8. ***Using the same sample size as a previous study to calculate power for a replication.***

Assume we do a new study with the same sample size as the previous study. What can we say about the power of the new study?

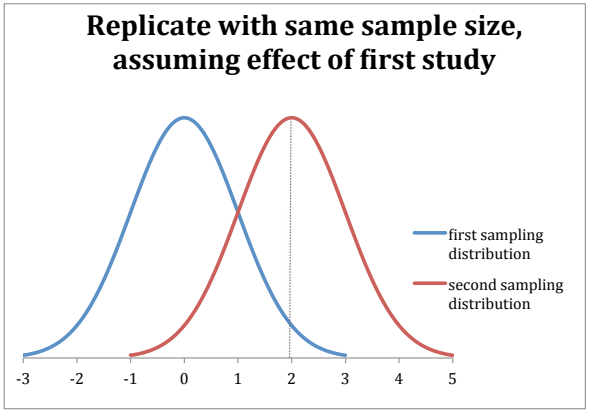
The picture below shows:

1. The sampling distribution for the previous study (blue)
2. The test statistic obtained from the sample used in the previous study (dashed line)

   Note: Since the second study has the same size as the first, then the *blue* curve is *also* the sampling distribution for the *second* study (assuming the null hypothesis of no effect)

3. The sampling distribution for the second study, assuming the specific alternate "effect is the estimate from the first study" (red)

Note: The red sampling distribution is centered at the test statistic from the previous study, because that is the test statistic resulting from that effect.



The graph shows that the power of the second study against the specific alternate hypothesis is about _____,

because _____.

In fact, an even smaller sample size could give a non-significant result, if the first hypothesis test happened to be a Type M error.

Real Example: Psychologists Brian Nosek and Matt Motyl obtained a statistically significant result with sample size (p = .01) with sample size N = 1,979. However, before publishing their findings, they decided to do a replication study. They did a power analysis and determined that a sample size of 1300 would give power .995 to detect the effect size found in the original study at significance level .05. The replication study gave p = .59. (Nosek et al, 2012, *Persp. Psych Sci.*, *vol. 7 no. 6,* http://pps.sagepub.com/content/7/6/615.full)