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Lecture 3b: Practice Problem Solutions

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Practice Problems

1. Let's employ Stata to experiment with power and sample size calculations:
   - For the O.C.-B.P. experiment, suppose researchers were interested in looking at finer differences in B.P. between the O.C.-users and non-users
   - Suppose a pilot study estimated the mean B.P. in O.C. users to be 130.1 units and 127.4 units in the non-users
   - This difference is considered scientifically interesting but was not found to be statistically significant in the pilot study
   - Recall that the estimated standard deviation for O.C. users is 15.3 units for non-O.C. users it is 18.3
   - What would the necessary group sizes be to conduct a study with α = .05 and 80% power to detect a difference of this size? (assume equal numbers of O.C. users and non-users)

Solutions

```
. sampsi 130.1 127.4, alpha(.05) power(.8) sd1(15.3) sd2(18.3)

Estimated sample size for two-sample comparison of means

Test Ho: m1 = m2, where m1 is the mean in population 1
                  and m2 is the mean in population 2
Assumptions:

         alpha =   0.0500  (two-sided)
         power =   0.8000
            m1 =    130.1
            m2 =    127.4
           sd1 =     15.3
           sd2 =     18.3
         n2/n1 =     1.00

Estimated required sample sizes:

            n1 =      613
            n2 =      613
```

Solutions

2. What would the necessary group sample sizes be to do the same study as in question one, but with three times the number of non-O.C. users as compared to O.C. users?
   - How does the total sample size (both groups together) compare in this scenario relative to the situation with equal group sizes?

Solutions

```
. sampsi 130.1 127.4, alpha(.05) power(.8) sd1(15.3) sd2(18.3) ratio(3)

Estimated sample size for two-sample comparison of means

Test Ho: m1 = m2, where m1 is the mean in population 1
                  and m2 is the mean in population 2
Assumptions:

         alpha =   0.0500  (two-sided)
         power =   0.8000
            m1 =    130.1
            m2 =    127.4
           sd1 =     15.3
           sd2 =     18.3
         n2/n1 =     3.00

Estimated required sample sizes:

            n1 =      373
            n2 =     1119
```