Mediation Analysis - Another Example

> rm(list=ls())
> AGG = read.csv("http://ww2.coastal.edu/kingw/psyc480/data/aggression.csv")
> source("http://ww2.coastal.edu/kingw/psyc480/functions/rcrit.R")
> ls()
[1] "AGG" "r.crit"

Leigh Ann Waslien's aggression data, described previously.

> summary(AGG)
physag    verbag     anger    hostil
Min.   :10.00   Min.   : 5.00   Min.   : 7.00   Min.   : 8.0
1st Qu.:14.00   1st Qu.:11.00   1st Qu.:10.50   1st Qu.:11.0
Median :18.00   Median :14.00   Median :13.00   Median :16.0
Mean   :19.89   Mean   :15.14   Mean   :14.83   Mean   :16.4
3rd Qu.:22.50   3rd Qu.:17.50   3rd Qu.:16.50   3rd Qu.:20.5
Max.   :45.00   Max.   :28.00   Max.   :33.00   Max.   :32.0
> dim(AGG)
[1] 35  4

How many subjects are there in the sample?
Is this enough for mediation analysis?

Small samples make the Sobel z test suspect for reasons that will be discussed in tomorrow's lab. Therefore, we will consider this a pilot study. (Leigh Ann's purpose had nothing to do with the hypothesis we will be testing.)

I hypothesize the following mediation relationship.
hostility -> anger -> verbal aggression

How would you fill in the boxes on the attached mediation diagram?

> cor(AGG)
physag    verbag     anger    hostil
physag 1.000000 0.3937911 0.7510095 0.3211264
verbag 0.3937911 1.0000000 0.5004802 0.3901603
anger  0.7510095 0.5004802 1.0000000 0.4544861
hostil 0.3211264 0.3901603 0.4544861 1.0000000
> r.crit(df=33)
df alpha  1-tail  2-tail
33.0000  0.0500  0.2826  0.3338

What is the correlation between hostility and anger?
What is the correlation between hostility and verbal aggression?
What is the correlation between anger and verbal aggression?

Are we clear to proceed with the mediation analysis? (What's the requirement?)

What regressions do we need to test for the proposed mediation?

> x = AGG$hostil    # a trick
> y = AGG$verbag
> m = AGG$anger
> ls()
[1] "AGG" "m" "r.crit" "x" "y"

> model1 = lm(y ~ x)    # DV ~ IV
> model2 = lm(m ~ x)    # mediator ~ IV
> model3 = lm(y ~ x + m)     # DV ~ IV + mediator
> summary(model1)  # I will show only the relevant output on this handout
Call:
  lm(formula = y ~ x)
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  9.6569     2.4050   4.015 0.000322 ***
x             0.3345     0.1374   2.434 0.020500 *
> summary(model2)
Call:
  lm(formula = m ~ x)
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  7.5174     2.6619   2.824  0.00798 **
x             0.4458     0.1521   2.931  0.00609 **
> summary(model3)
Call:
  lm(formula = y ~ x + m)
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  6.9808     2.5013   2.791  0.00879 **
x             0.1758     0.1440   1.221  0.23102
m             0.3560     0.1468   2.425  0.02113 *

**From these regressions, how would you label the lines on the attached mediation diagram?**

**What is the magnitude of the indirect (mediated) effect?**
**What is its standard error?**
**What is the value of Sobel's z?**
**Is the indirect effect significantly different from zero?**

**Is this result consistent with (check one):**
   ____complete mediation?  ____partial mediation?
   ____no mediation?        ____none of the above?