**HOW TO HANDLE ‘MODERATING’ VARIABLE IN RESEARCH**

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It is common to have research question where there is a causal relationship between two variables and we are hypothesizing that the relationship is conditional on another variable usually called *“moderating”* variable. In this case, the moderation is assumed to moderate the impact of independent variable on the dependent variable and such model is depicted in the following figure:

Y

X

M

where X is the independent variable and Y is the dependent variable, and M is the moderating variable.

***Categorical Moderating Variable***

Suppose M is a binary variable indicating two category, eg., Male or Female. Then statistically, the above model can be formulated by introducing dummy variable *D* as follows:

Where

*XD* is a interaction variable having value of multiplication of *X* and *D.*

To test whether there are actually two regressions, one for Male and one for Female, there are six cases to be considered. But first let us assume that by rejecting of the following alternative test: or not, i.e., .

***Case #1:*** *, ,*

When , it means the impact of moderating variable, represented by dummy *D*, is significant. It means that equation (1), for male, i.e., *D=1,* become:

Or

And for female (*D=0),*

Or the slope for male is different by and the intercept is different by from female.

***Case #2:*** *, ,*

The impact of moderating variable and the X is significant, while the impact of interaction *XD* is not significant. Equation (1) then for **male** become:

Or

And for female become:

So, the slopes are the same while the intercept are different by .

***Case #3: , ,***

Equation (1) for male (*D=*1) become :

And for female (*D=0*),

***Case #4: , ,***

Equation (1) for male become :

And for female become:

***Case #5: , ,***

Equation (1) for male become :

And for female become:

***Case #6: , ,***

Equation (1) for male (*D=1*) become:

And for female (*D=0*):

In the case where you have *k* category of moderating variable, then you would need *(k-1)* dummy variables to represent them.

***Variable with Non-Categorical Moderating Variable***

Let *X1 be* the independent variable of interest having effect on the dependent variable Y and let *X2* be the moderating variable having real number (or ratio) value. The model, equation (1) then can be written as follows:

Here, the effect of moderating variable can be tested by testing the following Hypothesis:

or . If is rejected, the impact of the independent variable on Y is moderated by the moderating variable. The new slope would be , that is dependent on the level of .