Significance of dummies: test statistic

$$H_o : B_i - B_j = 0$$

$$t = (b_i - b_j) / STDERR(b_i, b_j)$$

$$STDERR(b_i, b_j) = \sqrt{COVB_{ii} + COVB_{jj} - 2[COVB_{ij}]}$$

Significance of dummies: test statistic (example)

$$STDERR(b_i, b_j) =$$

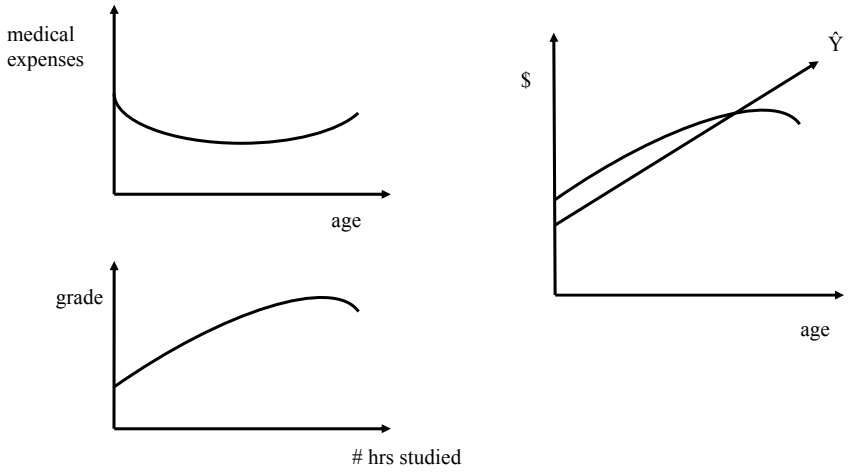
$$\sqrt{96564.81 + 76726.81 - 2[17921.37]}$$

$$STDERR(b_i, b_j) = 370.74$$

$$t = [-1534.03 - (-1584.64)] / 370.74$$

$$t = .137(n.s.)$$

Polynomials



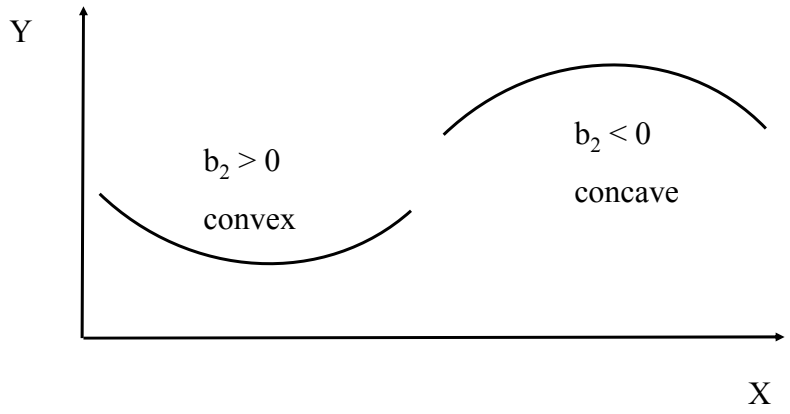
Polynomials

$$\hat{Y} = a + b_1 X + b_2 X^2 + ... b_k X^k$$

Quadratic function:

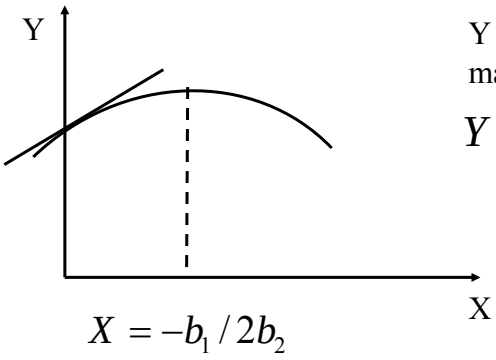
$$\hat{Y} = a + b_1 X + b_2 X^2$$

Polynomials



Polynomials

$$\hat{Y} = a + b_1 X + b_2 X^2$$



$X = -b_1 / 2b_2$

Y value at maximum point:

$$Y = a - (b_1^2 / 4b_2)$$

Interactions: cross-product terms in 3-var case

$$\hat{Y} = a + b_1 X_1 + b_2 X_2 + b_3 X_1 * X_2$$

Null hypothesis: $b_3=0$

If b_3 is significant, there is an interaction between X_1 and X_2

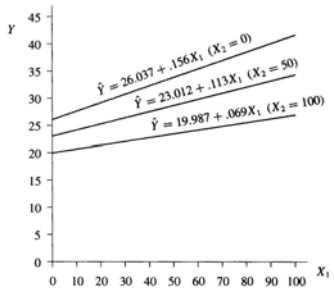
Interactions: interpretation

Statistical interaction exists when the slope of the relationship between the dependent variable and an explanatory variable changes as the levels of the other variables change.

In the three variable case: the relationship between X_1 and Y varies within levels of X_2.

Interaction: illustration

$$\hat{Y} = 26.037 + .156X_1 - .060X_2 - .00087X_1X_2$$



Source: Agresti and Finlay, p. 405-6

Where,

Y=mental impairment

X_1=life events

X_2=SES

[interaction: not significant]