

Let X be the grade on a mid-term and Y the grade on a final exam
 Suppose the correlation between X and Y is 0.7

$$\hat{Y} = a + bX$$

$$\hat{X} = a' + b'Y$$

The mean and SD on both the mid-term and final exam are 75 and 10 , respectively.
 Suppose the relationship is linear.

$$\hat{Z}_Y = r Z_X$$

$$\hat{Z}_X = r Z_Y$$

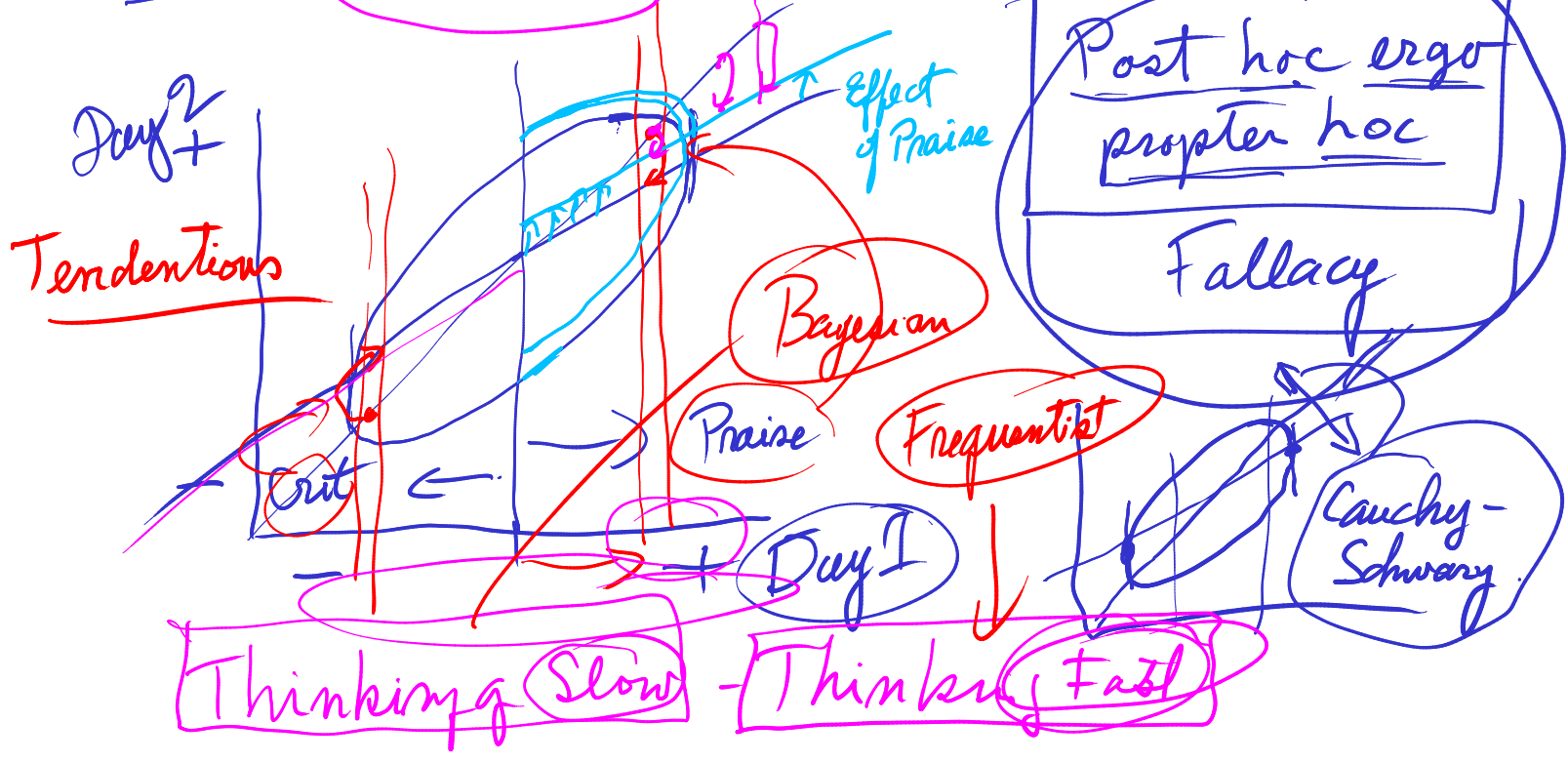
$$\hat{Z}_Y = 0.7$$

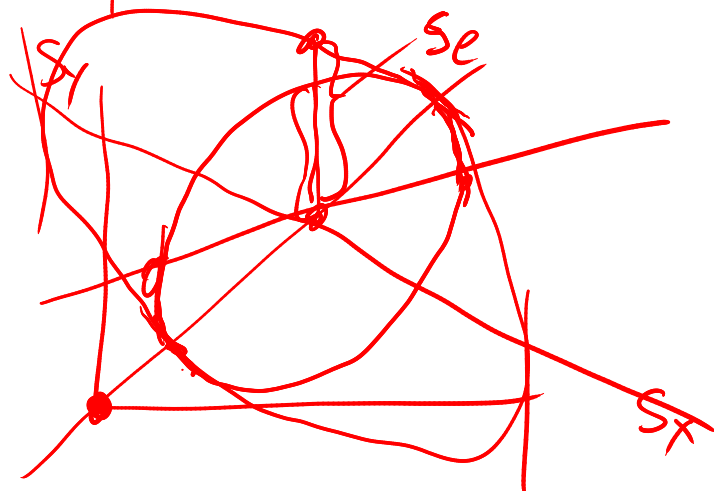
$$\hat{Y} = 82 \quad | \quad X = 85$$

$$\hat{Y} = 68 \quad | \quad X = 65$$

- a) what is the predicted value of Y if $X = 85$?
- b) what is the predicted value of Y if $X = 65$?
- c) Does this mean that students who do well on the mid-term tend to get lazy and don't do as well, on average, on the final, and students who do poorly on the mid-term "buckle up" and work harder preparing for the final? Explain why or why not?

Daniel Kahneman - Amos Tversky





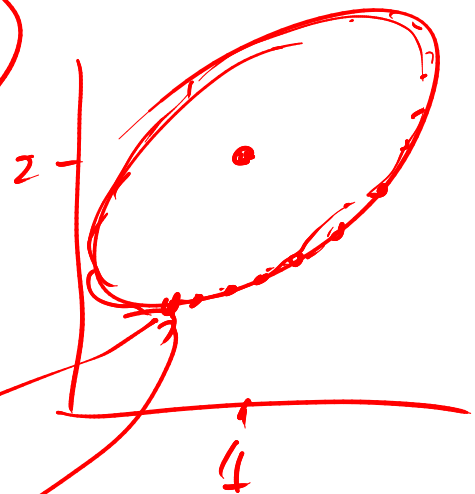
$$\propto \frac{1}{\sqrt{n}} \frac{s_e}{s_x}$$

`plot(ell(c(1,2)), type='l')`

`bind(c(2,1), c(1,4))`



$$I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$$



`> ell(c(1,2), diag(2)) %>% plot(type='l')`
`mat <- $\begin{pmatrix} 1 & 1 \\ 3 & 3 \end{pmatrix}$`

> plot(mat)
> lines(dell(mat))

data ellipse

