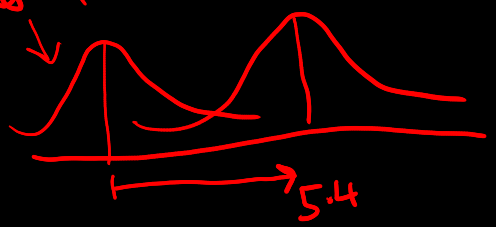
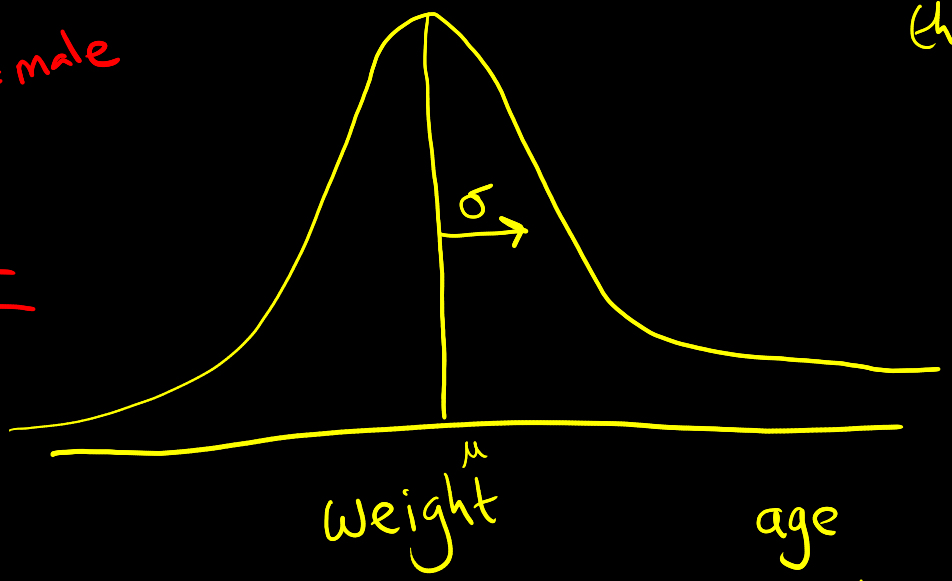
people

170cm
35 age
gender = female

→

170 cm
35 age
gender = male





if height increases by 1cm
then μ increases
by ≈ 0.96

people
170cm 170 cm
35age 35 age

people
170cm 171 cm
36age 35 age

$y_1 \; y_2 \; y_3 \cdots y_n$ each $y_i \in \{0, 1\}$

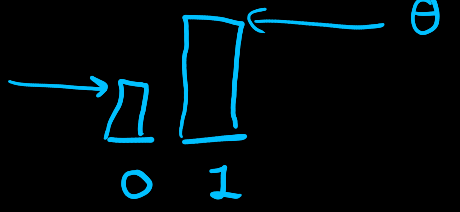
normal linear

for each i in $1 \ldots n$

$$y_i \sim N(\mu_i, \sigma^2)$$

$$\mu_i = \beta_0 + \sum_{k=1}^{K} \beta_k x_{ki}$$

Bernoulli



$$y_i \sim \text{Bernoulli}(\theta_i)$$

$$\theta_i = \beta_0 + \sum_{k=1}^{K} \beta_k x_{ki}$$

$P(x=1) = \theta$

$P(x=0) = 1-\theta$

$\theta_i \in (0, 1)$

$\phi_i \in (-\infty, \infty)$

logit (log odds)

$$\phi = \log\left(\frac{\theta}{1-\theta}\right)$$

$$\theta = \frac{1}{1+e^{-\phi}}$$

inverse logit

ilogit

link

ilink

$\log\left(\frac{\theta}{1-\theta}\right)$ ϕ_i $\quad \phi_i = \beta_0 + \sum_{k=1}^{k=K} \beta_k x_{ki}$

log odds $\longrightarrow$ P

$\log(\text{odds})$

$e^{?} = \text{odds}$

e euler's number

$e \approx 2.71\ldots$

$2^{10} = 1024$

$\log_2(1024) = 10$

$10^6 = 1000000$

$\log_{10}(1000000) = 6$