

# Shooting balloons



- $N$  trial subjects,  $i = 1, 2, \dots, N$
- Each shot  $n_i$  times, trying to hit balloons.
- Count hits  $y_i$ .
- Explanatory variables:
  - Experienced / non-experienced gunman
  - Wind speed

# Shooting balloons, data



|              |      |      |      |     |
|--------------|------|------|------|-----|
| Trail person | 1    | 2    | 3    | ... |
| Experiences  | 1    | 0    | 0    | ... |
| Wind speed   | 2.13 | 0.59 | 1.03 | ... |
| $n_i$        | 6    | 3    | 5    | ... |
| $y_i$        | 2    | 1    | 1    | ... |

# Shooting balloons, model



- $Y_i \sim \text{bin}(n_i, \pi_i)$ ,  $i = 1, 2, \dots, N$
- $\eta_i = \text{logit}(\pi_i)$
- - 1  $\eta_1 = \beta_0 \Rightarrow Y_i \sim \text{bin}(n_1, \pi)$
  - 2  $\eta_i = \beta_0 + \beta_1 x_1$
  - 3  $\eta_i = \beta_0 + \beta_2 x_2$
  - 4  $\eta_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2$

Where  $x_1 = 1$  for experienced gunman, otherwise  $x_1 = 0$  and  $x_2$  is wind speed.

# Hight of male students

- In population:  $Y \sim (179.8, 6.5^2)$
- Mean of 79 male students: 183.1
- NTNU students higher then Norwegian?