

4. $n=500$ college students

$x=0, x=1$
(decreased stress)

a. $X_{1:n} | \theta \stackrel{iid}{\sim} \text{Bernoulli}(\theta_i)$

b. It's reasonable to assume the students are iid. The observed event of decreased stress is a Bernoulli event w/ prob θ_i where θ_i is the prob that stress is reduced for a student. (It's not reasonable to believe that all students have the same θ).

c. The pilot study is our prior study. Thus roughly 50% had a reduction in stress.

$$\theta \sim \text{Beta}(a, b)$$

$n=4$
2 success

If we want our prior to include our hyp. sample, the prior is $\theta \sim \text{Beta}(2, 2)$.



$$d.) \theta | x_{1:n} \sim \text{Beta}(a + \sum x_i, n - \sum x_i + b)$$

$$= \text{Beta}(2 + \sum x_i, n - \sum x_i + 2)$$

e.) Benefit: Conjugacy = Computationally Easy

Drawback: May not model the data well
may be sensitive to hyper-parameters