Discrete Response Model
Lecture 1

datascience@berkeley

Odd Ratios

Notion of Odds

Odds are the probability of success divided by the probability of a failure.

		Response		
		1 = success	2 = failure	
Group	1	π_1	$1 - \pi_1$	1
	2	π_2	$1 - \pi_2$	1

- For Row 1, the "odds of a success" are $\text{odds}_1 = \pi_1/(1-\pi_1)$.
- For Row 2, the "odds of a success" are $\text{odds}_2 = \pi_2/(1-\pi_2)$.

Odds are a rescaling of the probability of success.

- If P(success) = 0.75, then the odds are 3 or "3 to 1 odds," that is, the probability of a success are three times as large as the probability of a failure.

Defining Odd-Ratio

$$\text{odds}_1 = \frac{\hat{\pi}_1}{1-\hat{\pi}_1} = \frac{w_1/n_1}{1-w_1/n_1} = \frac{w_1}{n_1-w_1}$$

$$\text{odds}_2 = \frac{\hat{\pi}_2}{1-\hat{\pi}_2} = \frac{w_2/n_2}{1-w_2/n_2} = \frac{w_2}{n_2-w_2}$$

		Response	
		1 = success	2 = failure
Group	1	w_1	$n_1 - w_1$
	2	w_2	$n_2 - w_2$

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