Discrete Response Model
Lecture 1

datascience@berkeley

Introduction to Multiple Binary Variables

Introduction to Contingency Table

This section extends the methods from Section 1.1 to a heterogeneous setting where individual items come from one of two groups. Because there is still a binary response, we can summarize the sample in a 2×2 contingency table.

Free throws are typically shot in pairs. Below is a contingency table summarizing Larry Bird's first and second free throw attempts during the 1980–1981 and 1981–1982 NBA seasons.

		Second		
		Made	Missed	Total
First	Made	251	34	285
	Missed	48	5	53
	Total	299	39	338

Contingency Table

		Second		
		Made	Missed	Total
First	Made	251	34	285
	Missed	48	5	53
	Total	299	39	338

- 251 first and second free throw attempts were both made.
- 34 first free throw attempts were made, and the second were missed.
- 48 first throw attempts were missed, and the second free throw were made.
- 5 first and second free throw attempts were both missed,
- 285 first free throws were made regardless what happened on the second attempt,
- 299 second free throws were made regardless what happened on the first attempt,
- 338 free throw pairs were shot during these seasons,

Example 1

What types of questions would be of interest for this data?

In the clinical trials for the polio vaccine developed by Jonas Salk, two large groups were involved in the placebo-control phase of the study. The first group, which received the vaccination, consisted of 200,745 individuals. The second group, which received a placebo, consisted of 201,229 individuals. There were 57 cases of polio in the first group and 142 cases of polio in the second group.

	Polio	Polio free	Total
Vaccine	57	200,688	200,745
Placebo	142	201,087	201,229
Total	199	401,775	401,974

Polio vaccine clinical trials (data source: Francis et al., *American Journal of Public Health*, 1955)

Example 2

Clinical trials have been performed to evaluate the effectiveness of a number of HIV vaccines. The results of one trial in particular were discussed a lot in the media in 2009. Below is a contingency table summarizing the data used in the "modified intent-to-treat analysis" of the paper.

	HIV	HIV free	
Vaccine	51	8,146	8,197
Placebo	74	8,124	8,198
	125	16,270	16,395

(Vaccine, HIV)

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