



Exercise:

Comparing Two Proportions

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The following table gives the records of accidents in 1998 compiled by the Department of Highway Safety and Motor Vehicles in Florida.

Safety Equipment in Use	Injury	
	Fatal	Nonfatal
None	1601	162,527
Seat belt	510	412,368

Denote the number of accidents and fatalities when no safety equipment was in use by n_N and y_N , respectively. Similarly, let n_S and y_S denote the number of accidents and fatalities when a seat belt was in use. Assume that y_N and y_S are independent with y_N distributed as $\text{binomial}(n_N, p_N)$ and y_S distributed as $\text{binomial}(n_S, p_S)$. Assume a uniform prior is placed on the vector of probabilities (p_N, p_S) .

Comparing two Proportions



- a) Show that p_N and p_S have independent beta posterior distributions.
- b) Use the function `rbeta` to simulate 1000 values from the joint posterior distribution of (p_N, p_S) .
- c) Using your sample, construct a histogram of the relative risk p_N/p_S . Find a 95% interval estimate of this relative risk.
- d) Construct a histogram of the difference in risks $p_N - p_S$.
- e) Compute the posterior probability that the difference in risks exceeds 0.