

Is there gender bias in graduate admissions?

P. J. Bickel, E. A. Hammel, W. J. O'Connell, *Science* (187), 1975

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Department-specific admissions data

| Departments | Social Warfare | | Machismatics | |
|------------------|----------------|-----|--------------|-----|
| Applicant gender | Women | Men | Women | Men |
| Admitted | 20 | 1 | 19 | 100 |
| Rejected | 180 | 19 | 1 | 100 |

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Cumulative admissions data

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| Total admissions | 39 | 101 |
| Total rejected | 181 | 119 |
| Admission odds | $39 / 220 \approx .18$ | $101 / 220 \approx .46$ |

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Gender bias? Simpson's paradox

E. H. Simpson, *Journal of the Royal Statistical Society* (13), 1951

- ❖ *Sample space*: population of 440 applicants, 220 men and 220 women.
- ❖ *Combinatorial setting*: a randomly selected applicant from the population.
- ❖ *Events*:
 - ❖ A := applicant is admitted; A^c := applicant is rejected.
 - ❖ W := applicant is a woman; W^c := applicant is a man.
 - ❖ S := applicant applies to Department of Social Warfare;
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Department-specific admissions data:

$$\mathbf{P}(A \mid W \cap S) > \mathbf{P}(A \mid W^c \cap S)$$

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Slogan: Conditioning provides information that can effect event probabilities in unexpected ways.