

Simpson's Paradox

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1 Introduction

Simpson's Paradox is the idea that associations between variables that are found between two variables in the sample as a whole, can be *very different* (or even *reversed*) when a third variable is introduced.

2 Some Hypothetical Data

These data are based on the hypothetical data provided by Simpson (1951).

count	treatment	status	group
4	untreated	alive	A
3	untreated	dead	A
8	treated	alive	A
5	treated	dead	A
2	untreated	alive	B
3	untreated	dead	B
12	treated	alive	B
15	treated	dead	B

3 Sample As A Whole

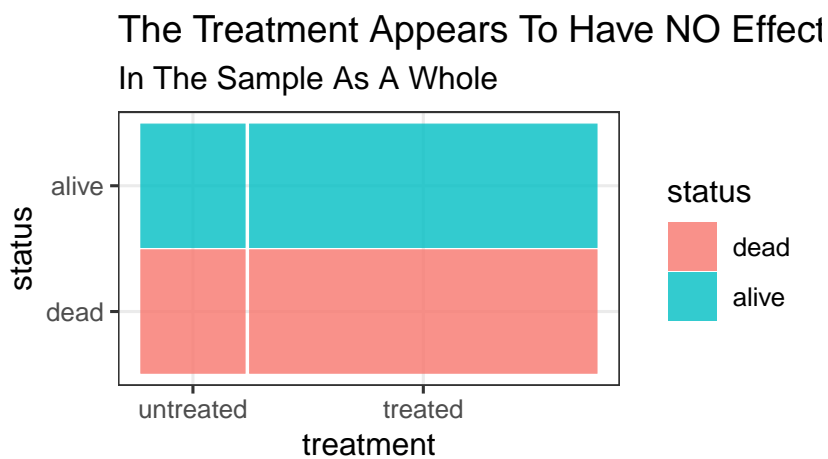
The treatment appears to have no effect.

3.1 Cross Tabulation

	dead	alive
untreated	6	6
treated	20	20

3.2 Mosaic Plot

Mosaic Plots are a little bit counterintuitive at first. However, I believe they provide the best visual representation of these relationships.



those Receiving And Not Receiving Treatment Are Alive

3.3 Pie Chart

The Treatment Appears To Have NO Effect
In The Sample As A Whole



Those Receiving And Not Receiving Treatment Are Alive

4 Sample Divided By Groups

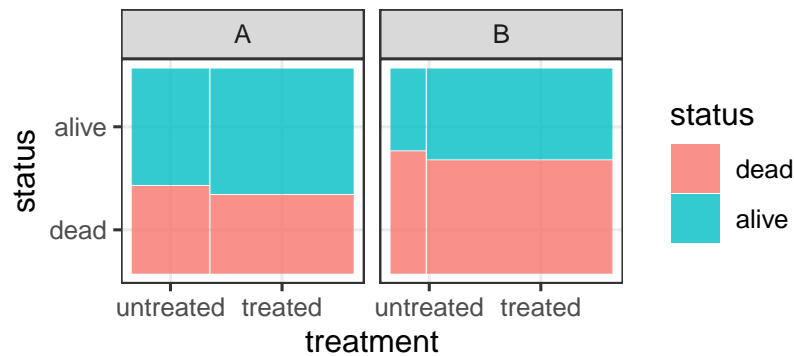
The treatment appears to have an effect.

4.1 Cross Tabulation

		A	B
untreated	dead	3	3
	alive	4	2
treated	dead	5	15
	alive	8	12

4.2 Mosaic Plot

The Treatment DOES Appear To Have An Effect When Examined By Group



A Greater % Of Those Recieving Treatment Are Alive

4.3 Pie Chart

The Treatment DOES Appear To Have An Effect When Examined By Group



A Greater % Of Those Recieving Treatment Are Alive

5 Reference

Simpson, E. (1951). The Interpretation of Interaction in Contingency Tables. *Journal of the Royal Statistical Society. Series B (Methodological)*, 13(2), 238-241. Retrieved February 2, 2021, from <http://www.jstor.org/stable/2984065>