✦ IDEA · CHEAT CARD · MATHEMATICS

Simpson's paradox

The statistical pattern in which a comparison that holds in every group of data reverses or disappears when the groups are combined.

How it works

1. A third factor, such as stone size, influences which treatment a case gets.
2. The same factor also changes the chance of success with any treatment.
3. So the two treatment groups contain different mixes of easy and hard cases.
4. So the overall rates can reverse the result of every group.

Example

Charig's kidney stone study, Britain, 1986

- Small stones: open surgery succeeded in 93% of patients, keyhole surgery in 87%.
- Large stones: open surgery succeeded in 73% of patients, keyhole surgery in 69%.

→ Large stones made up 263 of 350 open operations but 80 of 350 keyhole ones.

→ Overall, keyhole surgery succeeded in 83% of patients and open surgery in 78%.

Use it for

✓ Checking bias claims such as Berkeley's 1973 admission gap between men and women

✓ Reading hospital rankings that ignore how sick the patients are

✓ Comparing two study methods when you used one mostly for hard courses

Watch out

✗ Split figures are fair only when the treatment does not itself change the third factor.

✗ A further split can reverse a result again, so split only for a causal reason.

Remember Before comparing two overall rates, ask what differs between the groups being compared.