Who to send in to try and win the game?

It's the last inning of an important game. Your team is a run down with the bases loaded and two outs. The pitcher is due up, so you'll be sending in a pinch-hitter. There are 2 batters available on the bench. Who should you send in to bat?

Player	Overall
A	33 for 103
B	45 for 151

Averages:

Player	Overall
A	33 for 103 (.320)
B	45 for 151 (.298)

A

B

But what about their performance vs. right and left-handed pitchers?

Player	Overall	vs. LHP	vs. RHP
A	33 for 103	28 for 81	5 for 22
B	45 for 151	12 for 32	33 for 119

And the averages:

Player	Overall	vs. LHP	vs. RHP
A	33 for 103 (.320)	28 for 81 (.346)	5 for 22 (.227)
B	45 for 151 (.298)	12 for 32 (.375)	33 for 119 (.277)

Wait a minute. I thought we were going to send in A to pinch-hit because he had the better average. But this table shows that B has a better average against right and left-handed pitchers! What happened?

A

B

From page 35 of our book, "What's going on here is a problem known as Simpson's paradox…. the problem is *unfair averaging* over different groups…. The moral of Simpson's paradox is to be careful when you average across different levels of a second variable. It's always better to compare percentages or other averages *within* each level of the other variable. The overall average may be misleading."

I have found that a visual explanation is most effective in helping students understand Simpson's paradox:

Player	Overall	vs. LHP	vs. RHP
A	33 for 103 (.320)	28 for 81 (.346)	5 for 22 (.227)
B	45 for 151 (.298)	12 for 32 (.375)	33 for 119 (.277)

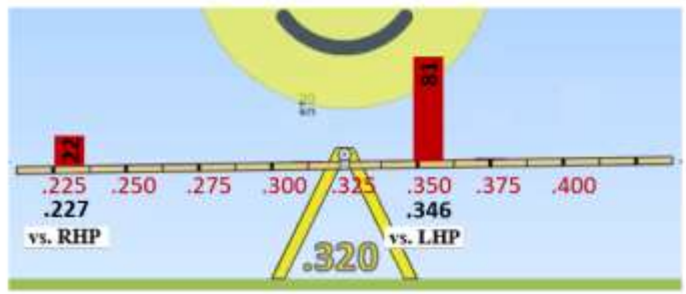
Since the average is also the balance point, we can use the Law of Levers in our explanation.

A

Mathematically

$$\frac{22(.227) + 81(.346)}{103}$$

.320



B

$$\frac{119(.277) + 32(.375)}{151}$$

.298