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

It's difficult to compare the two players because the counts are quite different.
To make comparison easier we should convert the counts to percents

A

B

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Averages:

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

A

B

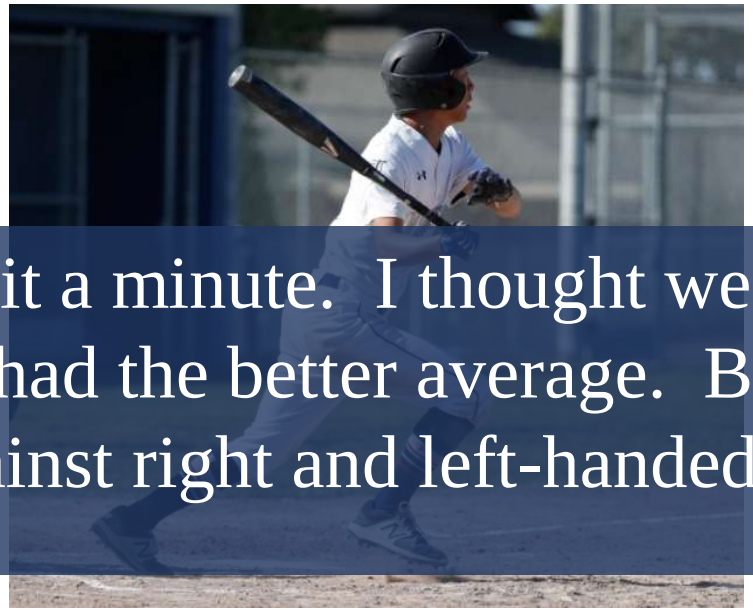
But what about their performance vs. right and left-handed pitchers?

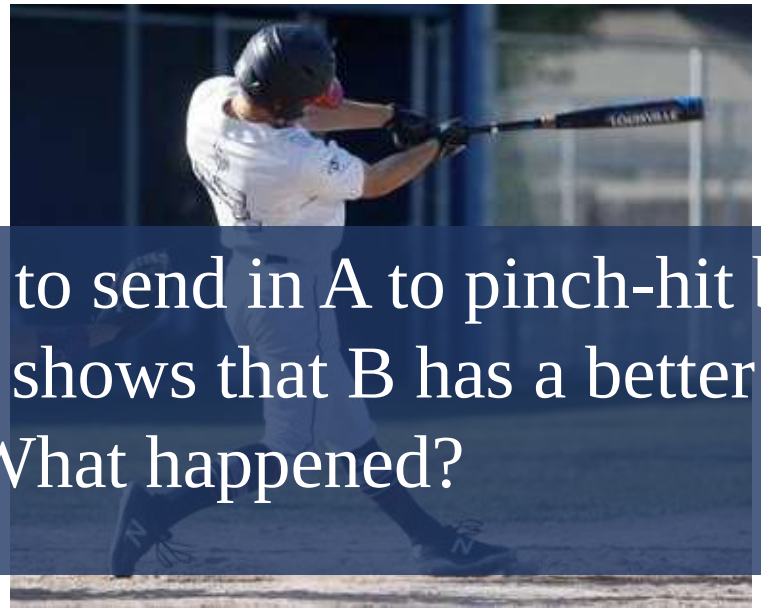
But what about their performance vs. right and left-handed pitchers?

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

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)

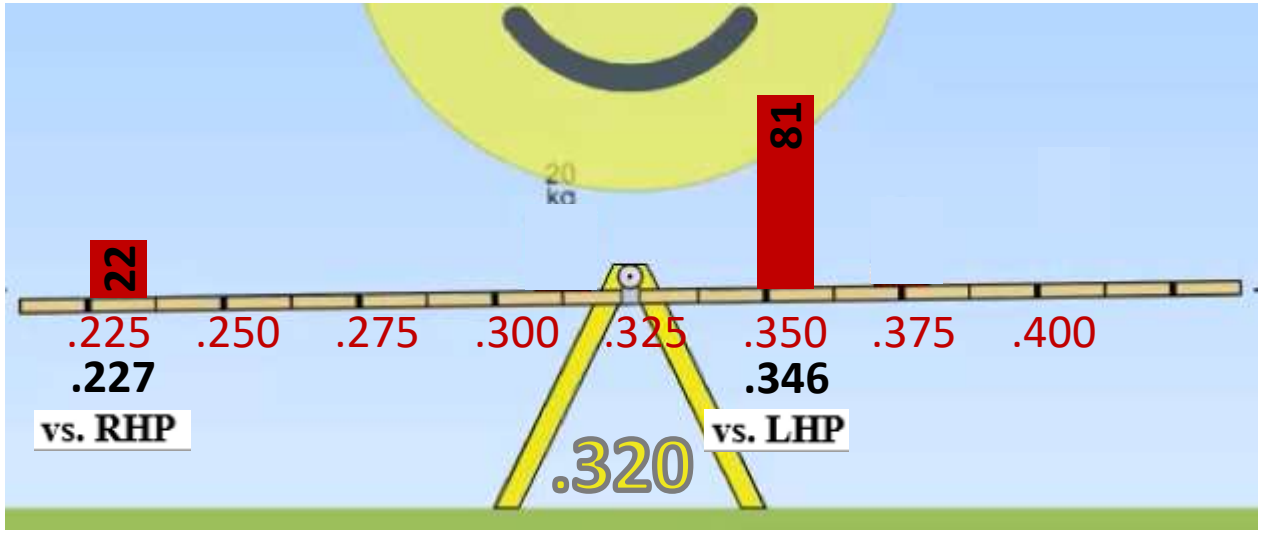
Since the __average___ is also the balance point, we can use the Law of Levers in our explanation.

A

Mathematically

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

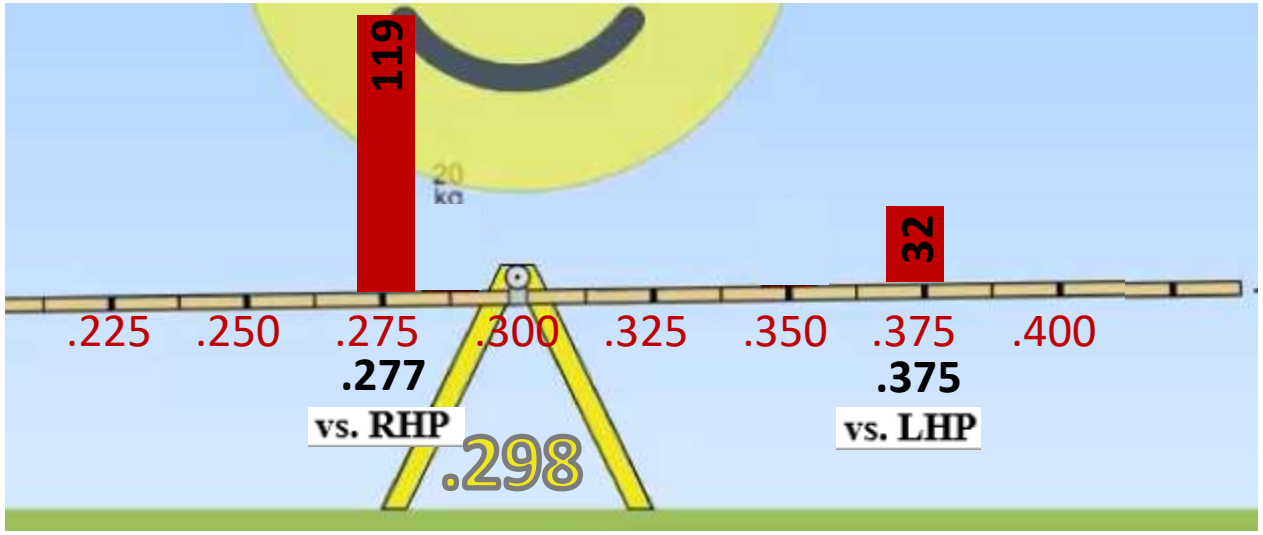
.320



B

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

.298



Simpson's paradox	When averages are taken across different groups, they can appear to contradict the overall averages