

Analyzing Numerical Data: Indices Using Weighted Sums and Averages

I.C Student Activity Sheet 7: Slugging Averages

One example of a weighted average in sports is a batter's slugging average (or percentage) in baseball.

1. What is the purpose of a slugging average (SLG)? (i.e. what is it used for, how is it used, etc.)

- Measures the productivity of a hitter. Helps measure a player's offensive production alongside on-base percentage.
- gives weight to extra base hits. ex. doubles have a weight of 2.

2. How do you calculate the slugging average for a player?

$$SLG = \frac{(1B) + (2 \times 2B) + (3 \times 3B) + (4 \times HR)}{AB}$$

1B = singles
 2B = doubles
 3B = triples
 HR = home runs
 AB = at bats

walks not included $SLG = \frac{1S + 2D + 3T + 4HR}{AB}$ *OR*

3. Who are some notable players throughout history that have some of the highest slugging averages to date?

Babe Ruth = 0.6897

Hank Greenberg = 0.6050

Ted Williams = 0.6338

Lou Gehrig = 0.6324

Jimmie Foxx = 0.6093

Barry Bonds = 0.6069

4. Research the slugging averages of some current-day professional baseball players. Then research the slugging averages of some college players. Based on your findings, which college players should professional scouts be watching? Support your answer with statistics.

MLB

1. Mike Trout = 0.5667
2. Albert Pujols = 0.5629
3. Giancarlo Stanton = 0.5548
4. Miguel Cabrera = 0.5537
5. Ryan Braun = 0.5409

college

1. Alex Faedo
 2. Jeren Kendall
 3. JB Bukauskas
 4. Brendan McKay
 5. Kyle Wright
- } Looked at for more than just SLG

5. Find the slugging average for a player with the following statistics:

- S = 68
- D = 40
- T = 4
- HR = 16
- AB = 320

$$SLG = \frac{68 + 2(40) + 3(4) + 4(16)}{320} = \frac{224}{320} = 0.700$$

6. **REFLECTION** Is it possible to have a slugging average of more than 1? Theoretically, what is the highest possible value for the slugging average? Could a player ever achieve this value during a baseball season? Give an example or explain why none exist.

yes, the highest possible SLG is 4. For example, if a player hit a homerun for their first at bat for the season, their SLG would be 4.00. However, this normally doesn't last as the season progresses.

→ possible but not probable

EXTENSION A slugging average of .500 or higher is considered a sign of an excellent player. Using 400 at-bats, what is the maximum number of singles a player could have with a slugging average between .500 and .700? Justify your answer.

$$0.500 \leq \frac{S}{400} \leq 0.700$$

$$0.500 \leq \frac{S}{400}$$

$$S \geq 200$$

$$\frac{S}{400} \leq 0.700$$

$$S \leq 280$$

The maximum # of singles would be anywhere between 200 and 280 assuming they're only hitting singles.

EXTENSION Suppose a player had 4 triples and a batting average of .300 in 400 at-bats (batting average = hits/at-bats). Determine one combination of singles, doubles, and home runs that gives this player a slugging average higher than .500. (Multiple Correct Answers)

• What problem(s) are you trying to solve? find one combination of singles, doubles, HR's that gives a player a SLG higher than 0.500

• What do you know?

• player hits 4 triples • batting average of 0.300

• 400 at bats

$$\text{b.a.} = \frac{\text{hits}}{\text{at-bats}}$$

$$SLG = \frac{1S + 2D + 3T + 4H}{AB}$$

• What do you need to know?

• # hits

• Solution (work shown)?

$$120 - 4 \text{ triples} = 116 \text{ hits for singles, doubles, HR}$$

$$0.300 = \frac{\text{hits}}{400}$$

$$\frac{1S + 2D + 3(4) + 4HR}{400} > 0.500$$

$$\text{hits} = 0.300(400) = \boxed{120 \text{ total hits}}$$

$$1S + 2D + 12 + 4HR > 200$$

→ turn over

$$1S + 2D + 4HR > 100$$

$$S + D + HR = 116$$

- { 50 singles
- { 50 doubles
- { 16 HR

$$1(50) + 2(50) + 4(16) \stackrel{?}{>} 100$$

$$50 + 100 + 64 \stackrel{?}{>} 100$$

$$214 > 100 \checkmark$$

one possible
combination