

Batting Average by Count: Fact and Fallacy

J. ERIC BICKEL, PH.D

Competitive Edge Decision Systems
 6 Valleybrook Place
 The Woodlands, TX 77382

DEAN STOTZ

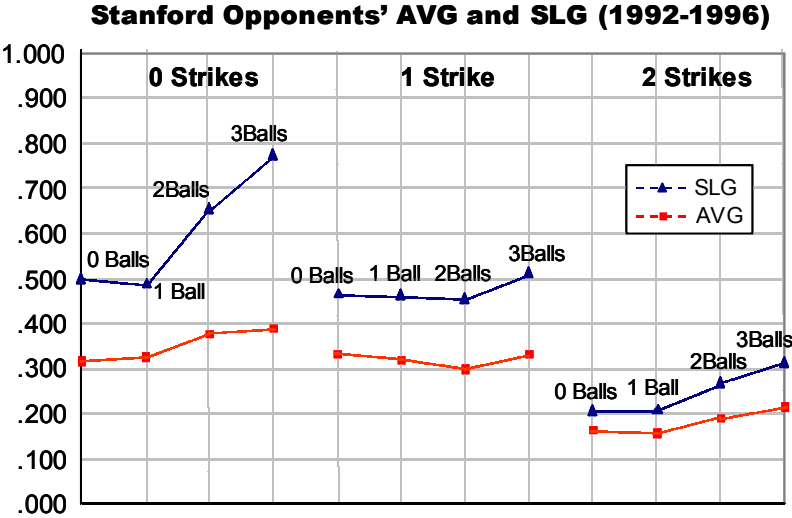
Stanford University Baseball
 641 East Campus Drive
 Stanford, CA 94305

The Facts

Many baseball coaches, sportswriters, and television announcers have commented on the fact that batting averages are low with two strikes or high with less than two strikes. For example, Thomas Boswell, in an article he wrote criticizing Ted Williams' theory that you should take the first pitch, noted that "an analysis of nearly 100 of the top hitters in baseball suggests that the best [hitters] bat about 70 points higher and slug 130 points higher" on 0-0.¹ From this, Boswell concludes that batters "should be swinging at a lot more first pitches" and that Ted Williams was a "dumbo."

Thomas Boswell is not alone. During the 2000 World Series, Tim McCarver, broadcasting for Fox, used a graphic showing Major League hitters bat almost 100 points lower with two strikes. Mr. McCarver was surprised by the poor performance of major league hitters in two-strike situations.

We recently tested whether this same trend holds in college baseball by calculating the batting average (AVG) and slugging percentage (SLG) for Stanford opponents from 1992 through 1996. These results are illustrated below.



¹ Thomas Boswell, "And the First Shall be Best--The numbers prove Ted Williams Wrong: You should swing at the first pitch," *Inside Sports*, 15, August 1993, 58-65.

As you can see, both SLG and AVG are much lower with two strikes. With less than two strikes, AVG and SLG are around .336 and .541, respectively.² With two strikes, AVG and SLG drop to .182 and .251, respectively. In other words, Stanford’s opponents hit 154 points lower and slugged 290 points lower with two strikes. That is amazing! Or, is it?

The Fallacy

What is going on? Could it be that batters simply “lose it” with two strikes, as Boswell and McCarver conclude? Alternatively, could something else cause batting averages to be 154 points lower with two strikes?

The answer to this dilemma lies in the definition of batting average and the fact that it was not created to be used within a plate appearance. Batting average is the number of hits divided by the number of at-bats. There are **three** ways to have an at-bat with less than two strikes: hit, error, or batted out. However, there are **four** ways to have an at-bat with two strikes: hit, error, batted out, and strikeout. Given that it is impossible to strikeout with less than two strikes, many more at-bats occur with two strikes. In general, dividing by a larger number of at-bats will produce lower AVG and SLG. Let’s look at an example (based on Stanford data) consisting of 1000 pitches. Assume the 1000 pitches break out as shown below.

Strikes	308	<u>Less Than Two Strikes</u>
Fouls	36	ABs = Hits + Errors + Batted Outs
Balls	405	= 79 + 8 + 165 = 252
Hits	79	AVG = Hits/ABs = 79/252 = .315
Errors	8	<u>Two Strikes</u>
Batted Outs	165	ABs = Hits + Errors + Batted Outs + Strikes
<i>Total</i>	1000	= 79 + 8 + 165 + 308 = 560
		AVG = Hits/ABs = 79/560 = .141

As shown above, if these 1000 pitches were thrown with less than two strikes, they would have produced 252 at-bats and a batting average of .315 (79/252). Conversely, if these pitches were thrown with two strikes they would have produced 560 at-bats because the 308 strikes result in strikeouts! The corresponding batting average is only .141—a difference of 174 points. A SLG example would produce similar results.³

In both cases, batters got 79 hits out of 1000 pitches. **Although batters are performing just as well with two strikes, their batting average is much lower.** They look great with less than two strikes and terrible with two strikes. Therefore, it is a fallacy to conclude that batters perform poorly with two strikes because their batting average is low. Likewise, one cannot conclude, as Boswell did, that batters “should be swinging at a lot more first pitches.”

The bottom line is that batting average by count is highly misleading and relying on it as a coach will adversely affect your decision making.

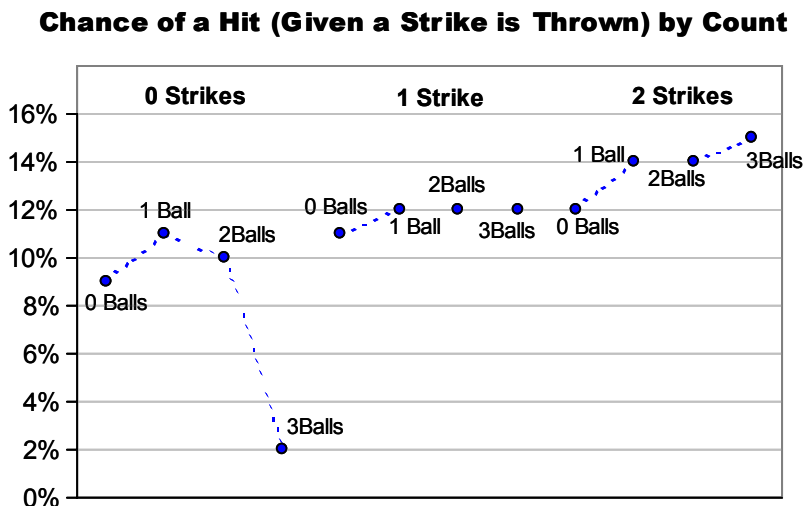
² SLG on the 2-0 and 3-0 counts is high because if batters put the ball in play on these counts it tends to be an extra base hit.

³ Although, SLG percentage with two strikes will be slightly lower than other counts because batters average fewer bases per hit with two strikes.

The Reality

Given that batting average by count is misleading, how should we measure batters' performance by count? How does the chance of getting a hit vary by count?

To answer this question, Competitive Edge Decision Systems created a new statistic called HandleIT™. HandleIT looks at every pitch thrown for a **strike** and measures how well batters handled those pitches. For example, based on Stanford's database⁴ of nearly 55,000 pitches thrown over three seasons, batters took 48% of all 0-0 pitches thrown for strikes. They swung and missed 11%, fouled off 17%, put 15% in play for an out and 9% in play for a hit. The following chart displays the chance of a hit for every count.



As you can see, the chance of getting a hit with two strikes is higher than every other count (3-1 and 0-2 are the same). **Batters are more likely to get a hit (off of a pitch thrown for strike) with two strikes than any other count.** This is exactly the opposite relationship as suggested by AVG and SLG.

We should also point out that breaking down batting average by pitch type is also misleading because fewer fastballs and more off-speed pitches are thrown with two strikes. Therefore, batters will have a higher batting average off fastballs than off-speed pitches—even if they are just as likely to get a hit off of either pitch type.

Conclusion

Batting average and slugging percentage by count are highly misleading. The low AVG and SLG numbers for two strikes are simply a defect of these statistics, which were not designed to be used by count. Unfortunately, this defect is not widely appreciated and many within baseball have been misled. The defects of AVG and SLG by count are corrected by Competitive Edge Decision Systems' HandleIT statistic, which demonstrates that batters are more likely to get a hit with two strikes than other counts.

Competitive Edge Decision Systems provides electronic pitch charting and data mining software to amateur and professional baseball teams. For more information please visit www.edgedec.com or call (888) 329-0722.

⁴ Since 1998, Stanford has used Competitive Edge Decision Systems' ChartMine™ software.