Ozzie Albies Switch-Hitting Analysis

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Introduction

The Atlanta Braves are the 2021 World Series Champions. Much of their success can be attributed to a rebuilt outfield at the trade deadline, strong starting and relief pitching in the playoffs, and a powerful infield that had each starter hit at least 25 home runs during the regular season. One of those infielders, Braves star second baseman Ozzie Albies, contributed to the team's success on both sides of the plate as the team's only switch-hitter. However, his contributions as a lefty and as a righty may not be equal.

In baseball, batters often gain an advantage if their handedness is different from the pitcher whom they face (often referred to as the "platoon advantage"). Thus, hitters who can hit well as a righty and as a lefty theoretically have an added advantage everytime that they bat, regardless of whom they face on the mound. This advantage is why some hitters, such as Ozzie Albies, will switch their handedness depending on the handedness of the pitcher.

In this analysis, I test my hypothesis that Ozzie Albies would be a more productive hitter if he hit exclusively as a right-handed hitter regardless of the handedness of the pitcher whom he faces. I examine Albies' offensive effectiveness vs. right-handed pitchers (RHP) as a left-handed hitter (LHH) compared to his effectiveness vs. LHP as a RHH. I also estimate from which side Albies is more productive, while accounting for the loss of the platoon advantage. If the Braves want to find ways to improve going into 2022, this analysis provides an opportunity to easily enhance the performance of one of the Braves' most important players.

Calculation #1: Career OPS Splits

The first calculation to perform is the difference between Albies' career splits (2017-2021): his on-base plus slugging (OPS) vs. RHP as a LHH and his OPS vs. LHP as a RHH. OPS is a helpful baseball metric that combines, "how well a hitter can reach base with how well he can hit for average and for power."[1] The null hypothesis is that Albies hits no differently vs. RHP as a LHH than he does vs. LHP as a RHH. The alternative hypothesis is that Albies *does* hit differently vs. RHP as a LHH than he does vs. LHP as a RHH. To address this question, I ran a Two-Proportion Z-Test using Albies' OPS and plate appearances (PA). The Two-Proportion Z-Test allows me to compare two proportions (OPS, in this case) to see if they are the same:

OPS vs RHP as LHH	OPS vs LHP as RHH	PA vs RHP as LHH	PA vs LHP as RHH
0.750	0.948	1815	616

[1] https://www.mlb.com/glossary/standard-stats/on-base-plus-slugging

$$Z = \frac{\hat{p}_1 - \hat{p}_2}{se(\hat{p}_1 - \hat{p}_2)}, \text{ where}$$

$$se(\hat{p}_1 - \hat{p}_2) = \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

$Z = (\hat{p}_1 - \hat{p}_2 - d) / \sqrt{(((\hat{p}_1*(1-\hat{p}_1))/n_1 + ((\hat{p}_2*(1-\hat{p}_2))/n_2)}$

$Z = (0.750 - 0.948) / \sqrt{(((0.750*(1-0.750))/1815 + ((0.948*(1-0.948))/616)}$

$Z = -0.198 / \sqrt{} (0.00010330578 + 0.00008002597)$

$Z = -14.6233$

Conclusion: Because -14.6233 < -1.96, we can reject the null hypothesis and conclude that, at an alpha level of 0.05, Albies hits worse vs. RHP as a LHH than he does vs. LHP as a RHH.

Calculation #2: 2021 OPS vs. 2017-2020 OPS

The second calculation to perform is the difference between Albies' 2021 OPS vs. his 2017-2020 OPS (for both sides of the plate) to determine if Albies continues to hit worse vs. RHP as a LHH than he does vs. LHP as a RHH or if his left-handed struggles are something that he has recently fixed. The null hypothesis is that Albies' platoon numbers have *not* changed from 2021 compared to the previous 4 years. The alternative hypothesis is that Albies' platoon numbers *have* changed from 2021 compared to his previous 4 years. To address this question, I calculate a confidence interval to determine whether Albies' OPS from the 2021 season is statistically significantly different from his career numbers, doing so for both sides of the plate. A 95% confidence interval (CI) provides a range of values that I am 95% certain contains the true population mean (in this case, Albies' true OPS).

vs RHP as a LHH:

2021 OPS vs. RHP as LHH	2021 PA vs. RHP as LHH
0.743490264	506

$$\hat{p} \pm Z_{\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

$$\hat{p} \pm Z_{a/2} * \sqrt{(\hat{p}(1-\hat{p}) / n)}$$

$$0.7435 \pm 1.96 * \sqrt{(0.7435(1-0.7435) / 506)} = [0.7054, 0.7815]$$

Conclusion: Because Albies' 2017-2020 OPS of 0.752 (calculated using FanGraphs data) is within the 95% CI range that was used for Albies' 2021 OPS, we cannot conclude that Albies hit any differently in 2021 vs. RHP as a LHH than he did from 2017-2020.

vs LHP as a RHH:

2021 OPS vs. LHP as RHH	2021 PA vs. LHP as RHH
0.939651568	175

$$\hat{p} \pm Z_{\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

$$\hat{p} \pm Z_{a/2} * \sqrt{(\hat{p}(1-\hat{p}) / n)}$$

$$0.9397 \pm 1.96 * \sqrt{(0.9397(1-0.9397) / 175)} = [0.9044, 0.9749]$$

Conclusion: Because the 2017-2020 OPS of 0.952 (calculated using FanGraphs data) is within the 95% CI range that we used for Albies' 2021 OPS, we cannot conclude that Albies hit any differently in 2021 vs. LHP as a RHH than he did from 2017-2020.

Calculation #3: Career OPS Splits, Factoring in Loss of Platoon Advantage

The final calculation to perform is the difference between Albies' career numbers (2017-2021): OPS vs. RHP as a LHH and OPS vs. LHP as a RHH, *while accounting for the expected dip in production from losing the platoon advantage*. The null hypothesis is that Albies hits no differently vs. RHP as a LHH than he does vs. LHP as a RHH when accounting for the expected dip in production from losing the platoon advantage. The alternative hypothesis is that Albies *does* hit differently vs. RHP as a LHH than he does vs. LHP as a RHH, even when accounting for the expected dip in production from losing the platoon advantage. To address this question, I ran another Two-Proportion Z-Test between his career OPS vs. LHP as a RHH compared to his career OPS vs. RHP as a LHH, this time accounting for the expected dip in production from losing the platoon advantage.

According to the sports analytics website fivethirtyeight.com, “When a batter hits with the platoon advantage, his on-base plus slugging percentage is more than 80 points higher than when he faces a same-handed pitcher.” Based on this information, I will use 80 points as the expected difference in performance that a batter will have based on his platoon advantage. However, because Albies does not only face right-handed pitchers, I will multiply the 80 points by the percentage of right-handed pitchers that he has historically faced to estimate the true difference in OPS needed (because if he were facing a LHP, he would not lose his platoon advantage).

Percent of PAs vs. LHP, 2017-2021 (the percentage of plate appearances in which he would maintain a platoon advantage): 617/2440 = 25.29%

Percent of PAs vs. RHP, 2017-2021 (the percentage of plate appearances in which he would *not* have a platoon advantage): 1823/2440 = 74.71%

Expected OPS difference without platoon advantage: (1823/2440)*0.08 = 0.0598

Now that the expected OPS difference has been calculated, I will redo the first calculation while accounting for approximately a 60-point decrease in OPS from losing the platoon advantage.

OPS vs RHP as LHH	OPS vs LHP as RHH	PA vs RHP as LHH	PA vs LHP as RHH
0.750	0.948	1815	616

$$Z = \frac{\hat{p}_1 - \hat{p}_2}{se(\hat{p}_1 - \hat{p}_2)}, \text{ where}$$

$$se(\hat{p}_1 - \hat{p}_2) = \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

$$Z = (\hat{p}_1 - \hat{p}_2 - d) / \sqrt{(((\hat{p}_1*(1-\hat{p}_1))/n_1 + ((\hat{p}_2*(1-\hat{p}_2))/n_2)}$$

$$Z = (0.750 - 0.948 + 0.0598) / \sqrt{((0.750*(1-0.750))/1815 + (0.948*(1-0.948))/616)}$$

$$Z = -0.1382 / \sqrt{(0.00010330578 + 0.00008002597)}$$

$$Z = -10.2068$$

Conclusion: Because -10.2068 < -1.96, we can reject the null hypothesis and conclude that, at an alpha level of 0.05, Albies hits worse vs. RHP as a LHH than he does vs. LHP as a RHH,

even when accounting for the loss of the platoon advantage that he will experience if he bats vs. RHP as a RHH.

To summarize, I compared Ozzie Albies' OPS vs. RHP as a LHH and vs. LHP as a RHH to determine if he performs better from one side of the plate. After determining that he bats better as a righty at a statistically significant level, I evaluated his recent performance to determine if this trend still held true in 2021. The confidence intervals that I calculated determined that his 2021 OPS from both sides of the plate was not significantly different from his career OPS. Lastly, I performed another Two-Proportion Z-Test, this time accounting for Albies' dip in production after losing the platoon advantage, and concluded that he still hit worse as a lefty at a statistically significant level. These results indicate that, beginning in 2022, Ozzie Albies should hit as a full-time RHH.

Constraints & Notes

- The statistics used in this analysis only account for the regular season.
- The quality of RHP that Albies faced likely differs from the quality of LHP that he faced. In a perfect experiment, the quality of pitchers would be equal for both RHP and LHP. The difference in quality between RHP and LHP may be reflected in Albies' OPS splits.
- The 80-point value used to estimate the dip in production from losing the platoon advantage is an estimate, and Albies may be affected differently by the loss of platoon advantage.
- If there were a large enough sample of instances in which Albies batted as a RHH vs. RHP or as a LHH vs. LHP, I would have run another Two Proportion Z-Test to determine if there is a statistically significant difference between his OPS without the platoon advantage compared to his OPS with the platoon advantage for each side of the plate. I did not do this in my analysis of Albies because there were too few cases (only 9 such PAs over 5 seasons).

Resources

- https://www.fangraphs.com/players/ozzie-albies/16556/
- https://fivethirtyeight.com/features/what-really-gives-left-handed-pitchers-their-edge/
- https://en.wikipedia.org/wiki/On-base_plus_slugging
- https://www.mlb.com/glossary/standard-stats/on-base-plus-slugging