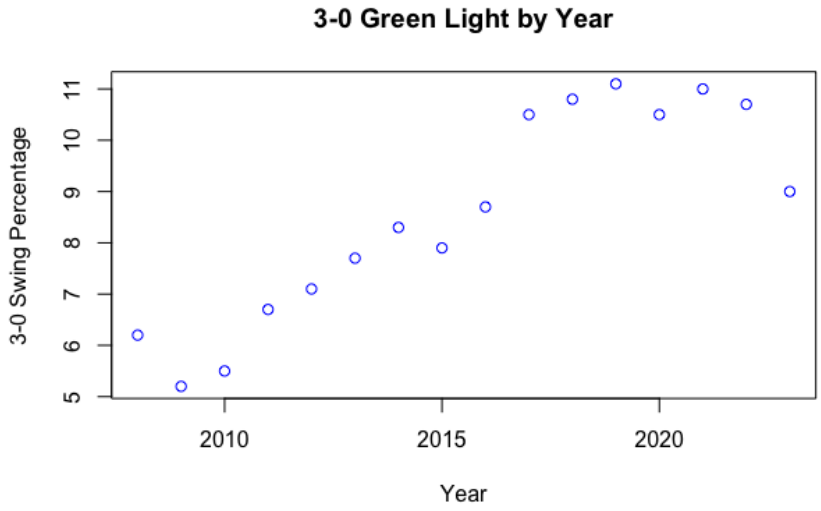
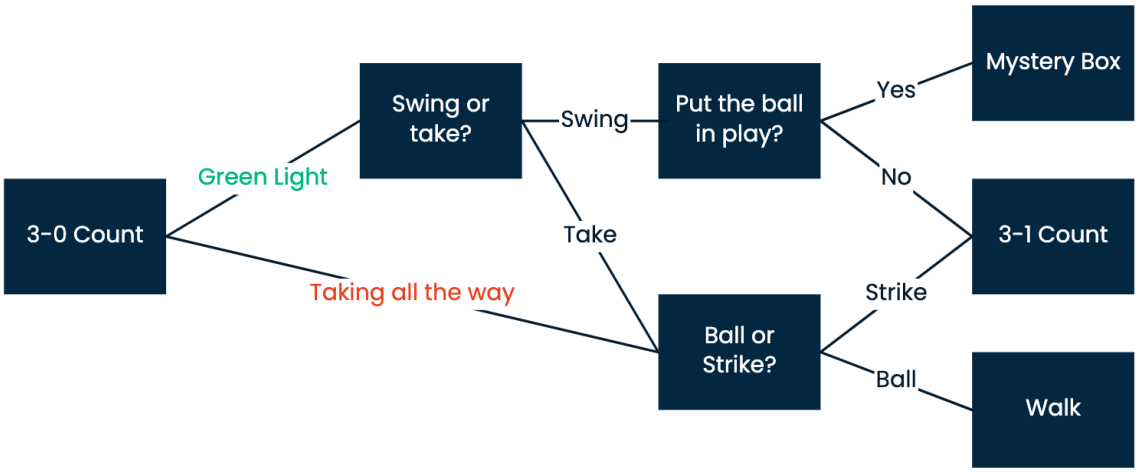
Who Turned that (Green) Light On?
By Johnny Nienstedt

The 3-0 count: for decades, the most boring count in baseball, home to lobbed in fastballs and batters not even thinking of swinging, lest they run afoul of the dreaded *unwritten rules*. But it's not the '80s anymore, and it's no longer such a shock to see a batter swing away on 3-0. Why, though? Clearly a lot of it has to do with the relaxation of those unwritten rules and the (gradual) adoption of the "let the kids play" movement. However, this spike in 3-0 green lights has also coincided with the analytical revolution of major league baseball. Could it be partially the result of savvy front offices sniffing out a competitive advantage?



Well, there's one easy way to potentially disprove that: does the opportunity to swing 3-0 give hitters an advantage over their take-only brethren? Let's find out.

There are obviously tons of potential outcomes for any pitch, but from the single decision we want to examine, there are three main consequences. Here's a handy flowchart to illustrate them:



All we have to do now is determine how often each of those outcomes occur, and how valuable each is to the hitter. However, this chart is unfortunately a bit misleading; taking when you have the green light is not really equivalent to taking all the way, because when you have the green light, you're more likely to swing at strikes and therefore take more balls. We'll touch on that later, but first…

Let's consider the simpler option: taking all the way. Here, there really are only two outcomes: ball four, or strike one. If it's ball four, that's the end of the plate appearance, and you can head on over to first base (after removing your elbow guard, shin guard, and ankle guard, and exchanging your batting gloves for oven mitts). For this analysis, I'll be using wOBA to evaluate outcomes, and a walk has a wOBA of .692. For context, league average wOBA is about .320, and the highest single season wOBA ever was Babe Ruth with a .597 in 1920.

On the other hand, if the pitch is called a strike, the batter now has a 3-1 count to work with. I've been trying to research if there's any difference in 3-1 counts that come about via 2-1 balls versus 3-0 strikes, because I have a hunch that batters may be more inclined to take 3-1 after they have seemingly already expressed their desire for a walk by taking 3-0. But as of yet I have not been able to finagle the right data to answer that question, so I'll consider all 3-1 counts, through which batters have a .476 wOBA over the last five years. That is, if every at bat started 3-1, the league would put up a .476 wOBA. (What's that? Do I smell another rule change coming?)

Jokes aside, these are pretty good numbers; since 3-0 pitches wind up outside the zone 39% of the time and inside it the other 61%, the average wOBA for a batter taking all the way comes out to a robust .560. But how do the green lighters compare?

Well, that depends – are they swinging or taking? Obviously, having the green light on doesn't mean that the hitter *will* swing, only that they can choose to. This is an important distinction, and merits some consideration; how often do hitters swing 3-0 *when they have the green light?* I searched high and low, but nowhere on Fangraphs or Baseball Savant is there a filter for "green light on." However, I think I've come up with a good approximation. I propose that batters who have a 3-0 green light will treat their swing decision basically the same as they would in a 3-1 count. In 3-1 counts, batters are still very selective, but are very rarely taking all the way, which should be a good analog for green lit 3-0 hitters. If we accept this substitution, that means that batters swing about 55% of the time when they have the green light.

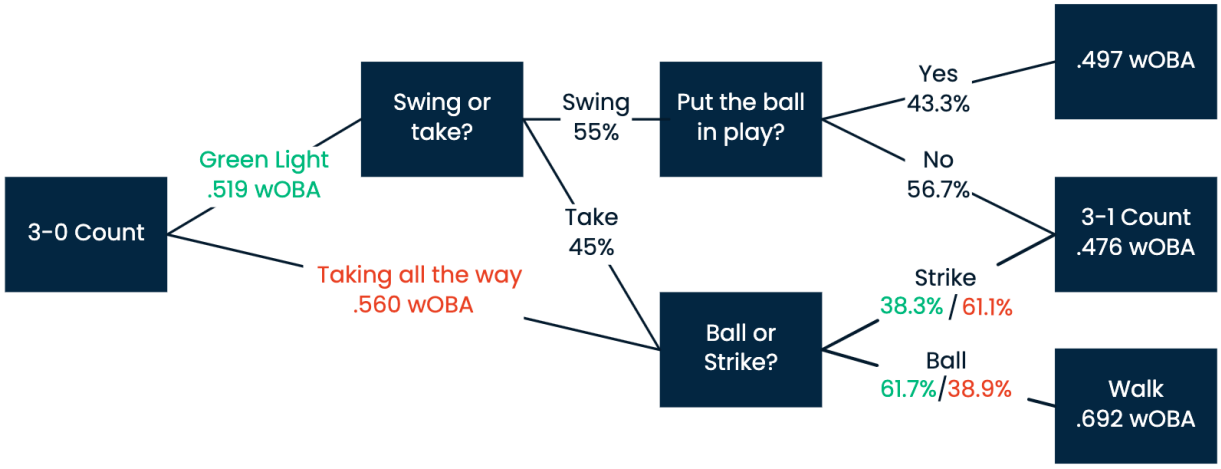
Of course, that means they take the other 45% of the time. Before, I simply looked up how many 3-0 pitches were in the zone, but that won't work here; since batters swing at strikes more than balls (especially on 3-0), clearly the pitches they take are much more likely to be balls. So I went back to my trusty 3-1 count, free of the dreaded take sign, and borrowed my stats from there: 62% of pitches taken in 3-1 counts are called balls, compared to the 39% of all 3-0 pitches that are balls – almost a perfect mirror. This is important, because it means that hitters with the green light who choose not to swing are much more likely to take ball four than strike one, earning them a .609 wOBA.

But enough about taking, let's get to the swings! Batters who take a hack at the 3-0 pitch obviously have a much wider range of possible outcomes, from hitting a grand slam (see: Tatís Jr, Fernando) to grounding into a double play in the playoffs. (There's only been one of those since 2008 – sorry 2019 Howie Kendrick. But hey, you won the world series!)

Anyway, the crux of the matter is that if you swing 3-0, you either put the ball in play, or you end up in a 3-1 count. We already saw that the average major leaguer in a 3-1 count can expect a .476 wOBA. Of the 1273 balls put in play in 3-0 counts since 2019, the average wOBA was .497, which *is* marginally better than taking a strike or fouling one off. Since those 3-0 hacks result in balls in play just 43% of the time, the total wOBA for batters who swing 3-0 comes out to .485.

Remember, though, even with the green light on, there's a 45% chance that the hitter won't swing. Combining the two outcomes, the aggregate expected wOBA for a hitter with the green light on comes out to .519, about 7% less than hitters who have absolutely no intention of swinging.

Before I break down what it all means, here's the completed flowchart for your viewing pleasure:

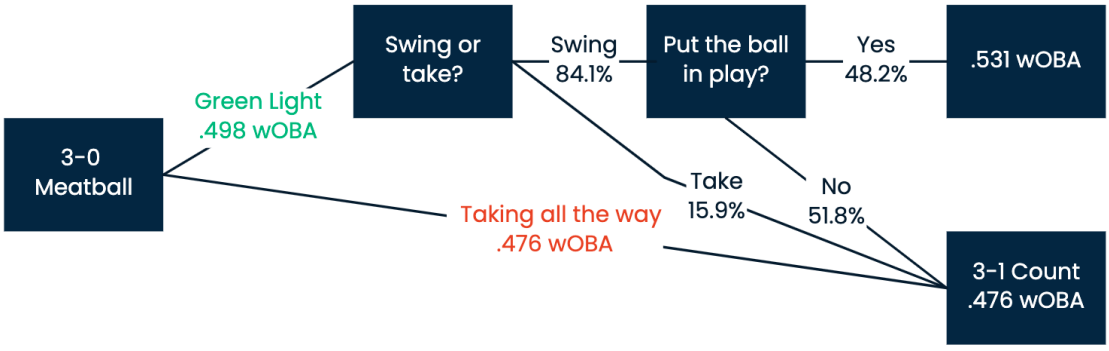


So is that it? Long live the 3-0 red light? Well, first of all, 7% is not a huge difference, especially when considering how rare 3-0 counts are; only about 1% of all pitches come in 3-0 counts, which breaks down to about two pitches per team per game. Still, front offices have invested a lot of time and energy into scraping out miniscule advantages. A seven percent advantage on one percent of all pitches isn't a lot, but it is *something*.

Before we go any further, I'd like to check the error bars on my 3-1 count assumption. I wouldn't be too shocked if the actual green light swing rate was closer to 50% than 55%, and if a small tweak like that throws off the results, my conclusion is probably invalid. As it turns out, though, batters would have to tone their swing rate all the way down to 40% before the green light would have the same wOBA as the auto-take, which is far enough away from my assumption that I believe the conclusion is safe.

Now that that's out of the way, there are a few more things we can look at to try to better understand the 3-0 count. The first thing anyone usually says when debating the status of the green light has to be: "well, if it's right in your wheelhouse, go for it." So, how about the juiciest of pitches, those get-me-over fastballs that sail right over the middle of the plate, practically begging to be clobbered? They're certainly way more common on 3-0; normally, there's just a 14.3% chance of getting a fastball (2-seam or 4-seam) in the heart of the plate, but on 3-0, that jumps all the way up to 32.5%. So, is that enough to tip the scales?

Well, I re-ran the calculations from above, and here are the results: if you take a meatball, clearly you're headed straight for a 3-1 count, where we have already established that you'll find a .476 wOBA. If you swing at it, which happens about 85% of the time (again using data from 3-1 counts) you actually only have about a 50/50 chance of putting it in play, which results in… drumroll please… a .531 wOBA. Accounting for the times that you foul it off or swing and miss, plus the 15% of the time you don't swing at all, the total wOBA is .498. That *is* better – by a bit – than letting your meatball go by, but of course if it were that easy to distinguish the good pitches from the bad ones, we'd hardly have ourselves a game.



The next logical question is then: how often do 3-0 swingers go after bad pitches? That's a bit harder to quantify, because different hitters look for different pitches, but we can make some generalizations. I'll look at the extreme first; pitches outside the zone. How often do hitters swing at ball four in a 3-0 count? That's a pretty inexcusable sin, both in principle and in practice, and the data bears that out: only 3.5% of 3-0 swings come on pitches in the "chase" or "waste" zones, as defined by Statcast. Moving inward, we have 41.3% in the "shadow" zone, and 55.2% in the heart of the plate. For comparison, in all other counts the distribution is more like 12/48/40. So, it seems that hitters are actually making decent decisions when they choose to swing 3-0. Obviously no one (well, maybe Javy Baez) goes into a 3-0 count looking to swing at anything close, but I was a bit surprised there weren't more chases. The shadow zone does encompass some off-the-plate area, and as I said above, not every strike is one that the batter is looking for. That probably raises the bad pitch swing rate a few ticks, but it's clear that poor swing decisions are not the root of the 3-0 conundrum; most guys, when they swing 3-0, really are swinging at their pitch.

If that's true, then the real reason why the green light is proving less effective than its boring red brother is simply because… hitting the ball is *hard*, even under ideal circumstances. I was frankly astonished that, even after whittling the sample down to middle-middle fastballs in 3-0 counts, less than half of the swings resulted in balls in play. When half of your swings are so far off that they don't even produce a fair ball, it's a good bet that the other half aren't all going to be line drives and barrels; in fact, only 28% of such balls put in play resulted in a barrel or other solid contact. The vast majority were popped up, rolled over, or hit weakly. And then, of course, even if you do hit the ball hard, there are eight fielders out there trying to catch it! How rude!

Of course, there are plenty of other factors involved in the decision to grant or withhold the 3-0 green light. I haven't even mentioned the scenario that our hypothetical 3-0 hitter is in; is he a veteran hitter? Is it a close game? Is he batting with his off-hand against Brett Phillips? Who knows? And honestly, I don't think it matters for the purposes of this article. Obviously, if you've got a raw rookie at the dish in a tie game with the bases loaded in the 9th inning, he's getting the take sign. This is for the 'normal' 3-0 counts, where it's usually up to the hitter to give himself the green light.

We've strayed a bit from our original purpose, but that's okay. Baseball is cool! And, in the course of our journey, I think we've definitively proven that your team's general manager is not calling down to the dugout to turn on the 3-0 green light. Well, they're probably not calling down to the dugout at all. But, if they did, they'd be much more likely to shout: "DON"T SWING!" at the top of their lungs. Boring.

Luckily for the fans, players have conveniently ignored that message and decided to swing for the fences, at least sometimes, and every once in a while they're rewarded with a home run or a big hit. More often, though, they end up popping up or grounding out, and your grandpa yells at the TV: "He ought to be benched for swinging at a 3-0 pitch like that!"

Ah, well. Maybe he's right after all.