PART 1 OF THE HITTING SPECTRUM SERIES

THE CONTACT CLIFF

When Elite Contact Skill Becomes a Liability

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Every contact hitter is climbing the same cliff. Better pitch recognition, sharper hands, higher contact rate. The view from up there looks like progress. Most of them don't realize they've gone over the edge until the fall has already started.

Steven Kwan is having the worst offensive season of his career. Luis Arraez has quietly become one of the most confounding decline stories in baseball. Jeff McNeil just got traded for a lottery ticket and cash. Nico Hoerner's production has flatlined for four straight years despite being one of the hardest hitters to strike out in the sport. On the surface, these look like unrelated problems. They're not.

All four men climbed the same cliff and went over it. The sport's billion-dollar analytics infrastructure hasn't named what happened to them. The only people who seem to sense something is off are a few perplexed posters on Reddit who can't quite articulate what they're seeing.

THE CLIMB

Traditional hitting logic treats contact rate as an unambiguous positive. Make more contact, have more success. It's intuitive, it's widely taught, and for most hitters, it's correct.

But there's a summit. A point where bat-to-ball skill becomes so refined that the next step forward is over the edge. Kwan, Arraez, McNeil, and Hoerner have all reached it to varying degrees, and the cruel thing about the Contact Cliff is that you can't see it coming. The better you get, the closer you are.

Here's the working theory for what's happening. The more games a contact-first hitter plays, the sharper his eye gets and the better his hands become at finding the ball. That sounds like progress. Over time, though, something may shift beneath the surface. The hands may learn they don't need to swing as fast to make contact. The brain may learn it doesn't need to fully commit to a swing path, because the barrel will find a way regardless. That's the theory, not something we can watch happen directly — nobody has a camera inside a hitter's decision-making. What we can see is the downstream signature: the metrics stay flat, the strikeout rate holds, the contact rate climbs, and the swing appears to lose velocity right when it matters. The hitter keeps climbing, and the cliff edge gets closer with every at-bat.

This isn't aging. The sport has largely accepted bat speed decline as a physical inevitability of getting older. But four-year trajectory data tells a different story. Aaron Judge is 34 years old. His bat speed has held at 74.79, 75.68, 74.76, and 74.13 MPH across the 2023, 2024, 2025, and 2026 seasons without meaningful decline. Bryan Reynolds is 29 and his bat speed has climbed from 68.01 in 2023 to 70.60 in 2026. Neither shows the deceleration patterns that define the cliff. Neither shows contact point extension against slow pitches.

The separator is not age. It is contact skill profile. The hitters showing cliff fingerprints are contact-first hitters whose hands learned the wrong lesson over thousands of at-bats. The hitters who remain mechanically healthy are power-committed hitters whose swings stay aggressive regardless of pitch speed. The cliff is behavioral drift, not biological decay.

Now, thanks to batter's box stance data publicly available at Baseball Savant, we can see precisely where each hitter stands, and the measurements confirm what the performance data has been suggesting. A hitter's position in the box is not a preference. It is a variable. And for the first time, we can track it.

THE CASE STUDIES

Kwan is slashing .206/.321/.251 through late June with a wRC+ of 70, a career low. His zone-contact rate is the highest ever recorded in the Statcast era. From 2023 to 2025 he was actually moving progressively forward in the box, from Y=25.86 to Y=24.43 to Y=22.84, his most forward position in four years. Then in 2026 he jumped back to Y=29.49, a 6.65 inch reversal in a single season, the largest positional shift of any hitter in the dataset. In May, feeling chronically late on pitches, he revealed he had moved back in the batter's box to buy more time to read the ball.

The timing lines up too closely to ignore. Whether the box move caused what followed, or simply coincided with a decline already underway, is still the open question — but pulling the pitch-level data apart makes the pattern harder to explain away as coincidence.

The decline isn't general. It's isolated almost entirely to fastballs and sinkers — the two pitch types that used to produce nearly all of his power. Against breaking balls and offspeed, Kwan hasn't declined at all; if anything he's improved, with better hard-hit rates and fewer whiffs across sliders, curveballs, sweepers, and changeups since 2024. On the exact fastball/sinker velocity band that produced his home runs in 2023 and 2024, his hard-hit rate has been cut in roughly half, and his home run rate on those same pitches is now below where it stood in 2023. It isn't a pitch-mix story either: pitchers are throwing him essentially the same share of fastballs and sinkers as ever, if not slightly more, so this isn't a case of the league adjusting to a weakness. And critically, his whiff rate on those pitches hasn't risen — if anything it's fallen. He is making just as much contact as before. The contact has simply stopped being loud.

The clearest mechanical clue sits in the relationship between his swing length and his contact point. Since 2024, his swing has gotten shorter (a swing-length reading of roughly 6.15 down to 5.80), while the point at which he actually meets the ball has moved proportionally further out in front of him. That combination runs against the normal pattern: across his own four years of data, a longer swing is what typically reaches a further-out contact point, not a shorter one. A shorter swing reaching further out is best explained by the bat already having crested and started losing speed by the time it arrives — a decelerating bat meeting the ball later in its arc than a swing that short should still be accelerating toward. That's circumstantial, not a direct measurement; Statcast's public bat-tracking data captures one speed reading per swing, not a full velocity curve

from load to contact, so we can't watch the deceleration happen in real time. But the shape of what we can see is consistent with it.

There is a second finding in the stance data that nobody has discussed: Kwan's foot separation. The average MLB hitter stands with feet roughly 30 inches apart. Kwan's foot separation in 2025 was 7.06 inches, the narrowest single-year reading in the entire four-year dataset. In 2026 it widened slightly to 8.44 inches. The next narrowest hitter in the dataset stands at 15.7 inches. Kwan is in a category by himself, feet almost completely together, a mechanical signature so unusual that it may be contributing to the reaching and extending the contact point data captures. It has received zero analytical attention.

Arraez tells the same story, confirmed by four years of stance data. His out-of-zone contact rate in 2025 hit 92.3% against a league average of 55.3%. The stance data shows he has been standing at Y=33.44, 33.28, 34.31, and 34.34 across 2023 to 2026, consistently among the deepest positions in all of baseball. He has been giving his hands maximum runway for four straight seasons. His contact point against slow pitches has grown from 37.96 inches in 2023 to 40.78 inches in 2026.

McNeil's story requires honest treatment. After winning the NL batting title in 2022, his strikeout rate stayed elite at under 10% while his hard-hit rate fell to the fifth percentile. His stance data shows he drifted back from Y=29.41 in 2023 to Y=32.03 in 2026 as his production cratered.

Hoerner hasn't gone over yet, but he's at the summit. His wRC+ has sat between 103 and 108 for four consecutive seasons. His decel gap has gone progressively more negative each year: 1.11, -0.97, -1.18, -1.23, meaning he is swinging harder on slow pitches but also missing them more. His whiff rate against pitches under 85 MPH is 12.2%, nearly double his 5.3% rate against 95-100 MPH pitches.

THE NINE

The batter's box stance data covers 128 qualified hitters across four seasons. The collective wisdom of every hitting coach in baseball has moved the average hitter 0.25 inches backward over those four years. The league drifted in the wrong direction.

Nine hitters out of 128 moved forward 3 or more inches over that span. That is 7% of the league. Only four moved forward 5 or more inches. That is 3.1%. Thirteen hitters moved forward consistently across all three year-over-year intervals without backsliding. That is 10.2% of the league.

Hitters who moved forward 2 or more inches over four years show a lower average cliff score than those who moved backward. It's a real pattern worth tracking — but worth stating plainly: most of the hitters who moved forward were not Contact Cliff risk cases to begin with, so this is suggestive of a relationship, not proof that the movement itself is doing the protective work. The honest version of this finding is a hypothesis with some supporting texture, not a validated result.

Of those nine significant forward movers, five show the mechanism working exactly as predicted. Chapman, Witt Jr., Gelof, Benintendi, and Taveras all show contact point compression or stability against slow pitches as they moved toward the pitcher. As Chapman moved from Y=30.98 to Y=27.29, his contact point against slow pitches compressed from 35.31 to 33.13 inches. As Witt Jr. moved from Y=28.60 to Y=26.30, his slow-pitch contact point compressed from 37.69 to 34.79 and his exit velocity improved from 83.29 to 85.58 MPH. Gelof's bat speed actually increased from 70.1 to 72.02 MPH as he moved forward, the only forward mover in the dataset to gain bat speed over four years. His cliff score is zero.

Polanco is the most important cautionary finding. He moved forward 6.34 inches, more than anyone in the dataset, yet his cliff score sits at 46.7 and his wOBA is .241. His deceleration gap went negative in 2024 and stayed there despite the positioning change. One read is that the behavioral habit was already too deeply grooved by the time he moved, and the neuromuscular pattern had calcified across thousands of at-bats before positioning could do anything about it. If that's right, the practical implication would be that box position change works best as prevention, not as a rescue operation — but that's a hypothesis built on a single case, not a conclusion the data has established. It's the working theory this piece is built around, and it deserves to be tested on more than one player before it's treated as settled.

Judge, Schwarber, and Gelof did not stumble into their forward movement. Something in their development, whether coaching, instinct, or mechanical necessity, pushed them toward the pitcher while the rest of the league drifted away. Nobody is talking about why. The overlap between moving forward deliberately and maintaining elite bat speed and power metrics across four years is not random.

The answer to the Contact Cliff was hiding in the stance data of 9 hitters out of 128. The sport just was not looking at it.

A FIX WORTH TESTING

Moving up in the batter's box sounds counterintuitive. In fact, over the past several years, the trend across MLB has gone in the exact opposite direction. Hitting coaches have been moving hitters back, arguing that the extra time to read the pitch is always an advantage.

We don't know for certain that moving forward would fix this. Nobody has run it as a deliberate intervention yet, on Kwan or on anyone else in this piece — every case here is incidental movement for unrelated reasons, not a hitter or team trying this on purpose because a framework like this one flagged the risk. That's an important gap to be upfront about. What we have is a coherent theory, a timing pattern in Kwan's own four-year history that's hard to wave away, and two proposed mechanisms worth stating plainly as hypotheses rather than settled explanations.

The first is eliminating the deceleration window. Statcast measures bat speed at the point where the bat intercepts the ball. The theory is that moving up in the box would mean the ball intercepts the bat earlier in the arc, while speed is still building rather than already past its peak. If that's right, the hands would have less room to slow down or steer the barrel — they'd have to commit to the pitch just to reach it.

The second proposed mechanism is bypassing the choice to slow down. If cliff hitters are manipulating or guiding the barrel from a deeper position, the theory holds that standing further up would remove that option: the pitch would get past them before they could make contact unless they committed to a fully aggressive swing immediately upon recognition.

There is also a physics case worth considering against staying deep. A breaking ball with high spin accumulates movement the further it travels; research on ball flight shows a breaking ball can gain several additional inches of break over the last couple feet before the plate. Standing deeper doesn't just cost time, it may mean facing a pitch that has already done more of its moving.

There is real corroborating evidence for this beyond Kwan's case alone. Pulling the same swing-mechanics data for five other hitters who moved forward in the box over this period — Witt Jr., Chapman, Gelof, Benintendi, and Judge — shows a consistent pattern, and it's the mirror image of what happened to Kwan. As these hitters closed the distance to the pitcher, their contact point stayed stable or held in a narrow band rather than eroding, and their bat speed held flat or, in Chapman's and Gelof's cases, actually reached career highs in 2026 at the same time they were standing closer than ever. Chapman's contact point sat within a single inch across all four seasons (26.5 down to 25.8) while his box position moved forward more than any hitter in the piece and his bat speed hit its own four-year peak. Gelof shows the same shape: stable contact point, bat speed climbing to 72.49, the only forward mover besides Chapman to gain bat speed over the span while moving up in the box. Five separate hitters closing the distance to the pitcher without paying a bat-speed or contact-point cost, several of them actually gaining, is a harder pattern to explain away as coincidence than any single case on its own.

One hitter in that group complicates the picture and deserves an honest mention rather than a quiet omission. Schwarber's swing shortened and his contact point moved further out over the same years, the same directional shape as Kwan's decelerating pattern. But his bat speed has stayed almost perfectly flat across all four seasons, where Kwan's dropped by more than two miles an hour on an identical shift. That distinction matters: the swing-shape change on its own isn't the red flag. It's the shape change paired with a falling bat speed that marks the difference between adapting and declining. Schwarber's case suggests either his bat-speed margin is large enough to absorb a shift like this without consequence yet, or that something other than deceleration is behind his numbers. Either way, it's a real exception, not one this piece is going to paper over.

What would make this more than a plausible theory, still, is the actual experiment: a hitter, ideally one already flagged by a framework like this, moving forward on purpose and the bat-speed and contact-point numbers responding the way the theory predicts. Nobody has run that test yet. But five hitters independently showing the healthy version of this pattern, against one hitter showing the unhealthy version in the opposite direction, is a meaningfully stronger case than a single reversal on its own — strong enough that this reads less like a hunch now and more like a theory with real data behind it, even short of a controlled test.

THE ANSWER WAS ALREADY THERE

Baseball already solved this problem. It just forgot.

Babe Ruth, the greatest home run hitter who ever lived, dealt with the same cliff that is breaking Kwan, Arraez, and McNeil today. He just didn't have Statcast to tell him what was happening. He figured it out by feel.

Against breaking balls, Ruth moved to the front of the batter's box. He recognized, without analytics or coaching frameworks, that standing up front took away the late movement that made those pitches dangerous. He was solving the spin problem with positioning a century before anyone had the data to explain why it worked.

When he stood deeper, he didn't wait passively. He used an aggressive, exaggerated stride that physically committed his entire body weight forward into the pitch. That stride was a commitment mechanism. Once his body was moving, he couldn't steer. He couldn't guide. He couldn't decelerate the barrel. His full swing velocity was already loaded and in motion before the ball arrived.

Modern coaching has all but eliminated both of these solutions. The big stride was coached out of hitters because it creates timing vulnerabilities against elite velocity. The front-of-the-box adjustment against breaking balls became a curiosity of a different era.

The answer to the Contact Cliff isn't new. It's a hundred years old. And the fact that nobody in a billion-dollar analytics industry is pointing back to it is either an embarrassment or an opportunity, depending on which dugout you're sitting in.

THE ALGORITHM

Every theory needs a test. So we built one.

Using Baseball Savant's full 2026 hitter dataset calibrated against career Statcast data spanning 837 hitters across the bat-tracking era, we constructed a Contact Cliff Score for every qualified hitter in baseball. The formula pulls four inputs: bat speed deficit relative to career-era league

average, contact skill inversion with low strikeout rate and low whiff rate treated as risk factors, power drain measured through ISO and hard-hit rate, and contact point extension relative to league average. Each component is scored on a 25-point scale.

The score assigns every hitter in this piece a number consistent with the pattern described above — worth naming plainly as an internal-consistency check rather than independent proof, since the score was built using the same theory the case studies are illustrating.

Arraez scored 67.9, the highest in baseball. Kwan scored 62.3. Wilson scored 62.6 despite standing at league average depth, confirming the cliff is behavioral not positional. McNeil scored 53.9. Hoerner scored 52.9. All flagged urgent. Aaron Judge scored 0.0. Bryan Reynolds scored 0.0.

THE MISSING COORDINATE

Baseball has spent a decade building one of the most sophisticated data collection systems in professional sports. It tracks the spin axis of a curveball to the degree. It measures bat speed to the tenth of a mile per hour at the precise millisecond of contact. It maps the trajectory of every pitch in three dimensions from the moment it leaves a pitcher's hand.

And somehow, in all of that, nobody thought to track where the hitter is standing in a 24 square foot box.

The batter's box stance data is publicly available at Baseball Savant. The measurement has existed all along. In golf and tennis, positioning is taught before mechanics on day one. In baseball, this data sits on a public analytics platform and nobody has built a framework for using it to tell a hitter where to stand. The data being tracked does not mean it is being acted on. Stance averages barely move year over year for most hitters, which suggests that if coaches are using this data prescriptively, it is not showing up in where their hitters stand.

There is no public metric that tells a hitting coach where their hitter should optimally stand given their specific deceleration profile, contact point spread across velocity buckets, wOBA versus xwOBA gap, and swing arc length. A batter deserves to know exactly where to put his feet the

same way a golfer deserves a fitting that tells him precisely where to stand relative to the ball, not where it feels comfortable. The Contact Cliff Score is the beginning of that calculation. The stance data now exists to refine it.

The sport measures everything except the one thing that could change all of it.

THE CURVE NOBODY WAS TRACKING

The Contact Cliff is not a single moment. It is a trajectory. And with three years of bat-tracking data now available across 485 qualified MLB hitters, we can see the shape of that trajectory for the first time.

The question this section answers is the most practically useful one the framework has produced: once a hitter crosses the CC threshold, how fast does the production fall, and what predicts the rate and magnitude of that fall?

The answer has three parts.

Part one: The threshold that matters is 50.

Among 812 consecutive-year pairs from the bat-tracking era, hitters with a CC Score of 50 or above in year one see production compress toward a new lower ceiling in subsequent seasons. The compression is not dramatic in a single year. It is steady and directional. The cliff does not drop you off the edge immediately. It tilts the floor.

Part two: Your production level when you cross 50 determines how far you fall.

This is the finding that starting point is a predictor, and the data confirms it without ambiguity.

Among hitters who crossed CC 50 with a wOBA below .310, average next-year change was +10 points and only 40 percent declined. These hitters were already compressed. The cliff had already found their ceiling before the score flagged it.

Among hitters who crossed CC 50 with a wOBA between .310 and .340, average next-year decline was 21 points and 72 percent declined. These are the mid-cliff cases, still producing near

average but with the mechanism already eroding the floor.

Among hitters who crossed CC 50 with a wOBA above .340, average next-year decline was 40 points and 100 percent declined. Every single one. The higher the production at the moment of crossing the threshold, the further there is to fall and the more reliably the fall occurs.

Arraez at .384 wOBA in his first 60+ CC season fell 46 points over two years. That is not a coincidence. That is the curve.

Part three: A rising CC score is the early warning signal.

Among hitters with a CC Score already above 35, those whose score rose 3 or more points in a single year saw average next-year wOBA decline of 18 points with 69 percent declining. Hitters at the same baseline whose score was stable or falling averaged plus four points and only 47 percent declined.

The score rising is more predictive than the score being high. A hitter at CC 45 whose score climbed from 38 is more at risk than a hitter at CC 55 who has been stable for two seasons. The trajectory matters more than the position.

This is the McGonigle finding applied forward in time. His CC Score of 46.6 in year one of his career is not urgent in isolation. But if it rises to 52 or 55 in year two, the curve says the production compression follows in year three with near certainty. The early warning is in the direction, not just the level.

The practical implication:

Three variables together produce the highest predictive signal for Contact Cliff production decline:

CC Score above 50, current wOBA above .340, and a rising CC trajectory over the prior year. When all three are present simultaneously, the data from 485 hitters across three seasons of bat-tracking says the decline is coming. The only question is how much was built up to lose.

The sport has never had a tool that combined these three inputs into a single diagnostic. It does now.

Analysis based on 812 consecutive-year player pairs from the 2023-2025 MLB bat-tracking era. 485 unique players. Three-year window reflects the availability of Hawk-Eye bat-speed and contact-point data beginning in 2023.

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THE STEEPS →

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