How Batters Guess At The Plate

By Dan Peterson

It's not getting any easier being a big league hitter. Consider that in 2003, only three pitchers lit up the radar gun at 95 mph or more on at least 700 of their pitches, according to the Wall Street Journal's Matthew Futterman. Last season, 17 pitchers were able to bring that speed consistently. In 2003, only Billy Wagner threw at least 25 pitches at or above 100 mph compared to seven pitchers last year.

Has the added heat affected the hitters? You bet. Strikeouts in the MLB totalled 36,426 last season, an 18.3% increase over 2003. "It's pretty simple," said Rick Peterson, director of pitching development for the Baltimore Orioles, in the WSJ article. "The harder you throw, the less time the batter has to swing and the harder it is to make contact.

Let's crunch some numbers on the hitter's dilemma. At 100 mph, the ball will leave the pitcher's hand and travel the 60' 6" to the plate in under a half second (.412 to be exact). For those facing a pitcher throwing "only" 80 mph, you get an additional 1/10 of a second. Now, factor in that it takes 100 milliseconds for the image of the ball hitting your eyes to be delivered to and acknowledged by your brain. Again at 100 mph, that lag means your brain is contemplating a ball's location that has already travelled an additional 12.5 feet.

How then are players able to get around on a pitch at that speed, let alone make contact? According to vision scientists at UC Berkeley, our brains make guesses. Using the perceived speed and path of the ball actually seen, our visual cortex fast forwards it to a future location. It is at that estimated point that we direct our muscles to make contact with the bat.

"For the first time, we can see this sophisticated prediction

mechanism at work in the human brain," said Gerrit Maus, postdoctoral psychology fellow and lead author of new research published this week in the journal, Neuron.

Maus and his fellow UC Berkeley researchers, Jason Fischer and David Whitney, were able to discover this prediction ability by actually fooling the brains of volunteers. They asked six volunteers to watch a computer screen showing an optical illusion while their brains were being watched by an fMRI machine, which records and displays brain activity.

Called the "flash-drag effect", the illusion (see video below) flashes stationary objects on the screen against a moving background. The objects seem to move in the direction of the background motion, even though their location is fixed. "The brain interprets the flashes as part of the moving background, and therefore engages its prediction mechanism to compensate for processing delays," Maus said.

From the fMRI images, they observed activity in the V5 region of the visual cortex, pinpointing where this prediction model gets built in our brain. "The image that hits the eye and then is processed by the brain is not in sync with the real world, but the brain is clever enough to compensate for that," Maus said. "What we perceive doesn't necessarily have that much to do with the real world, but it is what we need to know to interact with the real world."

So, what can a hitter do to fine tune this predictive mechanism? In a talk at last year's Sloan Sports Analytics Conference, Peter Fadde, professor at Southern Illinois University, presented what he calls the "sixth tool", aka pitch recognition. By watching videos of a pitcher's windup and release, but occluding the flight of the ball at different points in its path, a batter can exercise his or her visual cortex to make better models of ball flight and speed.

This training method is at the foundation of Axon Sports' pitch recognition app. Download for free at the iTunes store and give it a try.

Strikeouts still matter at the next level. Keith Hernandez, the former MVP and batting champ, told the WSJ, "Guys don't seem to care about striking out anymore, but when you strike out, you're not putting the ball in play, and when you don't do that, nothing can happen."

Tags:Baseball, Dan Peterson, David Whitney, Gerrit Maus, perception, pitch recognition, Visual Cortex

Contact: info@axonpotential.com
Axon Sports