

# Revolution in golf statistics: Study puts a number on extraordinary dominance of Tiger Woods

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When Tiger Woods tees off Thursday at the first major tournament of the year it will mark his return to golf after months of accusations, apologies and absence from the sport. The Masters Tournament is the first step in answering the question of whether he can and will return to his dominant position atop the weekend leaderboards.

At PGA Tour events, as soon as a shot lands its lie is noted, the distance traveled measured by laser and input into a computer as part of a sophisticated statistical effort called ShotLink that promises unmatched opportunities to measure and compare golfers' performances.

"I think the research is limited by my imagination," said Roland Minton, a [mathematician](#) at Roanoke College in Salem, Va. "Asking the right questions is the real trick right now."

Minton was a competitive golfer in high school and college, and gained access to the ShotLink data while working on a book about the mathematics of golf.

Golf revolves around a single, easy to understand statistic: total shots. Other details have been collected for years, such as total putts, driving distance and accuracy, as well slightly more advanced statistics such as how often golfers reach greens with a chance to putt for birdie. But who is the top performer from 100 yards? How many strokes does the

average golfer on tour save by landing an approach shot 10 feet from the hole instead of 25? The data can answer these questions, and offers a new way to compare other golfers to [Tiger Woods](#).

The tour began designing and implementing ShotLink in 1999. Roughly 10,000 volunteers per year help collect and input the data to an analysis-friendly structure, including details about the lie of the ball in the grass or sand and describing any challenges of playing the ball from that location.

It's as if [Major League Baseball](#) had previously only recorded a player's number of runs scored and then suddenly began recording the result of each at bat: the number of singles, doubles, triples, home runs and outs. It instantly magnifies the ability to analyze a player's effectiveness.

Several years ago another researcher, economist Stephen Shmanske from California State University East Bay in Hayward, made an attempt to measure the correlation of golfers' earnings to their skills as part of his book, "Golfonomics". The only data available to him were the traditional statistics like year-to-date putting average, driving distance, and driving accuracy.

Shmanske developed several interesting findings, including that for players on tour each hour spent practicing putting improves future earnings by \$600.

After writing the book Shmanske said that he used a painstaking process to "mathematically back out the most recent week's performance." He took the updated year-to-date driving distance or putting averages and calculated how well each golfer had performed in that tournament.

"I didn't have hole-by-hole or shot-by-shot statistics, but I had week-by-week statistics, which was 52 times more than anybody else had,"

Shmanske said.

The ShotLink data makes such complicated processes unnecessary.

"For every shot that the players take, I can know what the average shot for the tour is from whatever position they're in and compare their shot to the average shot and give it a number in terms of strokes better or worse than average," said Minton.

For example, using data from all tour events from 2004 to 2008 -- excluding the Masters and the three other major tournaments, which the tour does not run -- Minton found that when the ball was on the green, 22 feet from the hole, tour players took an average number of 1.9 putts to finish the hole. If a player takes 2 putts to finish, his performance was 0.1 strokes worse than average. Adding those differences for every shot over the course of a round and the entire season allowed him to compute some interesting statistics.

"You can be real precise about strengths and weaknesses," said Minton. "I can say, his strength is in long irons and he saves himself half a stroke per round with those, but he gives back 0.2 strokes with worse than average putting."

Using this analysis on each shot, Minton was able to show how much better Woods has been than other golfers in recent years.

Minton found that Woods was slightly better than average in driving and well above average on par 3 tee shots. As a putter, Woods finished with high rankings every year from 2004 to 2008, not lower than 17th overall and in the top 10 four of the five years.

But Woods really excelled in his approach shots that were between 100 and 200 yards from the hole. Minton ranked performance every 25

yards. Woods was considerably above average in every division, and for three of the divisions (shots between 100 - 125 yards, 150 - 175 yards, and 175 - 200 yards) he ranked number 1 on tour three out of five years.

"There just aren't very many aspects of the game that he doesn't dominate," said Minton.

Minton also developed an overall rating combining performance in every category of shot. For 2008, Woods was rated 2.65 shots better than average per round. He rated almost 1.5 strokes better than any other golfer. In each of the five years Minton analyzed, Woods rated at two or more shots better than average per round. No other player on tour reached a rating above 2.0 in any year.

"[It's] just outrageous, as good as those players are," said Minton.

This may be just the beginning of a revolution in [golf](#) statistics. Others have used the data to make their own ratings, such as the group from MIT [recently mentioned](#) in the Wall Street Journal. With new data comes an opportunity for analysis and new insights. ShotLink data could have a real impact on how golfers practice, play, and perform if the results in any way resemble the advanced statistical analysis of baseball that exploded in recent decades.

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