Study: Baseball and basketball players who peak early, die early

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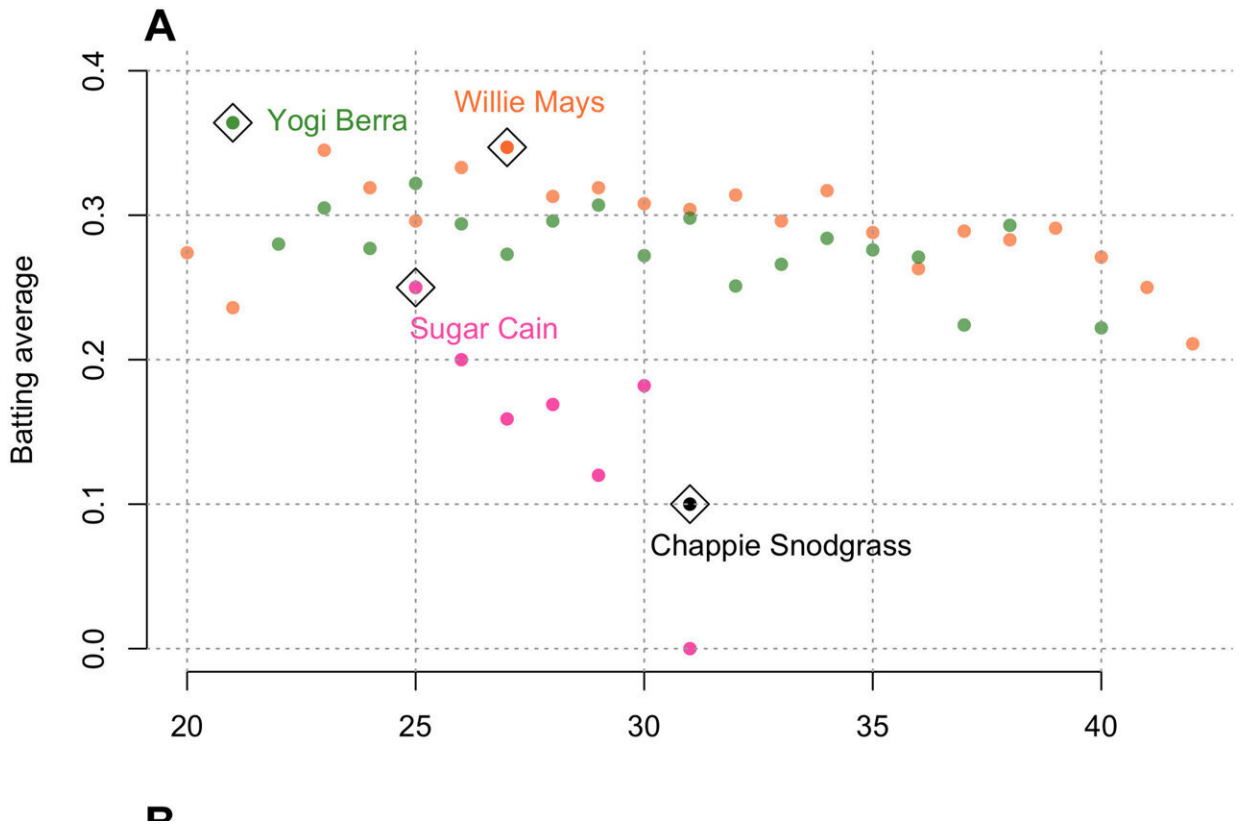

Capturing early-life peaks and rates of decline in athletic performance. Many elite sports involve highly stereotyped interactions that capture changes in athletic capacity with age, reported in carefully curated metrics such as (**A**) seasonal batting averages. For each metric, the age at peak performance (APP) (black diamonds) can be calculated independent of skill level including, for example, players such as Chappie Snodgrass (single black point) where their APP occurs at their only major-league appearance. The subsequent rate of decline in skill (**B**) can then be estimated, for any players with data observed

after the APP, by rescaling each metric [*y* axis in (B)] anchoring a linear regression to pass through the APP (black diamonds) and measuring the resulting rate of decline using slope of the regression (colored lines). For example, Willie Mays (orange), Yogi Berra (green), and Sugar Cain (pink) have different ages at peak athletic performance, respectively, at 27, 21, and 25 years of age. Yogi Berra and Willie Mays have the same rate of decline in batting average, 2% of peak capacity per year, while Sugar Cain's batting average decays at 12% per year [slopes of regressions in (B)]. Credit: *Science Advances* (2023). DOI: 10.1126/sciadv.adf1294

Baseball and basketball players, whose athletic skills peaked earlier or declined faster, had significantly shorter lifespans, according to an innovative study by Dr. Saul Newman from Oxford's Leverhulme Center for Demographic Science published in *Science Advances*.

Dr. Newman probed data on athlete's height, weight and performance and studied the data on all-time great baseball players, such as Willie Mays, Yogi Berra and Sugar Cain.

He found, those who peaked earlier had a 1.2-year shorter adult life expectancy while those who maintained athletic performance for longer had an 0.8-year higher life expectancy.

These differences had surprising and complex links to aging. Athletes who peaked at different ages, or whose skills declined at different rates, also seemed to age at different rates. Those who peaked later had mortality rates that doubled every 7.6 years of age. Athletes that peaked early had mortality rates double every 8.4 years of age with their odds of death increased with age more slowly, potentially indicating slower rates of aging despite a shorter lifespan.

Athletes who peaked at an earlier age and maintained athletic

performance for a shorter period than their counterparts had a significantly shorter lifespan than those who peaked later and maintained athletic performance for longer. Also, the study found, athletes whose athletic skill declined at different rates also had very different mortality rates. This gap in mortality rates persisted for at least 40 years post-retirement.

An unexpected finding was a positive association between height and late-life mortality rates in baseball and basketball players, meaning taller athletes were more likely to die earlier.

The study figure above, for example, shows how the batting averages for Willie Mays, Yogi Berra, and Sugar Cain peaked at different ages and subsequently declined with age. This and other findings from the study suggest athletes have a single peak in overall performance instead of having different peaks at different ages.

The figure captures early-life peaks and rates of decline in athletic performance for batting average. Yogi Berra and Willie Mays have the same rate of decline in batting average, 2% of peak capacity per year, while Sugar Cain's batting average decays at 12% per year. Sugar Cain passed away at 67 and Yogi Berra at 90 while Willie Mays is still alive at the age of 92.

Dr. Newman explains, "We know reaction times, motor functions, aerobic and anaerobic performance all decline with the onset of aging. However, little is known about the effect of early-life physiological decline on mortality. With this study, I hoped to gain insights on this link by examining unique and rich historical data from elite athletes, which capture the early-life physical capacity of a unique group of people."

He concludes, "This study finds that data on early-life athletic performance can be used to predict late-life mortality and aging in elite

male athletes. A rise in wearable technologies provides an exciting opportunity to test this link in wider populations who now have activity data like that of elite athletes at their fingertips."

According to the study, "the long-term predictive value of early life athletic patterns remains an exciting result drawn from a unique large cohort with an extraordinary follow-up time, extensive standardized physical measurements, and a high level of data accuracy and completeness. Early-life declines in athletic performance allow late-life mortality to be predicted better than age alone and have comparable predictive power to early-life BMI and height."

The study used data spanning 150 years from 24,000 U.S. male baseball and basketball players to calculate age at peak athleticism and rates of decline in athletic performance to predict late-life mortality patterns.

Data on the athletes' height, body mass index (BMI), and performance metrics such as the batting average for baseball players, and number of points scored by a basketball player per game, were used to calculate age at peak performance and the rate of decline for each athletic skill.

Analysis of these results ruled out some potential causes for these mortality rate differences. As almost half of the baseball sample size pre-dated 1947, when non-white players were excluded from major league baseball, the study was able to explore whether race and racism shortened players careers and lifespans. While racism likely plays a role in shortening careers and lives, effects observed in the study could not be explained by racism alone: considerable effect sizes were observed in both segregated and non-segregated leagues.

While this study highlights the capacity of athletic data to predict late-life mortality in male elite athletes in the United States, more research is needed to explore this link in female elite athletes, and to determine

whether this link is translatable to the wider population.

More information: Saul Justin Newman, Early-life physical performance predicts the aging and death of elite athletes, *Science Advances* (2023). DOI: 10.1126/sciadv.adf1294

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