

# A method for the unbiased comparison of MLB and NBA career statistics across era

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## Abstract

Career statistics are commonly used to compare players from different eras, however cross-era comparison is biased due to significant changes in success factors underlying sports achievement (i.e. performance enhancing drugs). The comparison of athletes is more than simply a topic of casual discussion among fans, it is also an issue of critical importance to the history of each major professional sport and the institution (Hall of Fame) in charge of preserving the sport's history. Here we develop and test an objective statistical method for normalizing career success metrics across time dependent factors. This method preserves the overall functional form of the probability distribution of career achievement, both at the season and career level. We re-rank the top-50 all-time records in MLB and the NBA and find that certain achievements (home runs, strikeouts, rebounds) are more sensitive to time-dependent success factors than others (hits, wins).

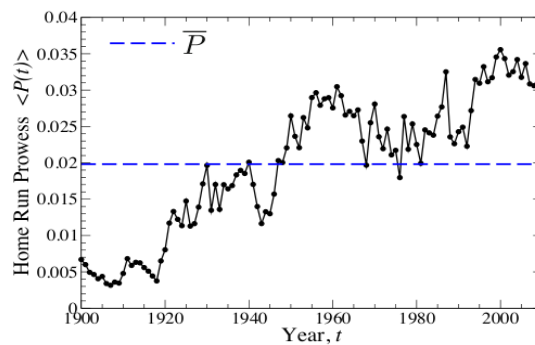
## 1 Introduction

Individual success in competitive endeavors, such as professional sports [1,2,3] and academia [2,4], depends on many factors: some factors are time dependent whereas others are time independent. These factors range from the inevitable (rule changes, improved nutrition and training techniques, talent dilution of players from league expansion) to the controversial (performance enhancing drugs). In order to compare human achievements from different time periods, success metrics should be normalized to a common index so that the time dependent factors do not bias the comparison of the statistical measures. In order to address the problem of time dependent factors, we develop a novel approach which removes the time-dependent factors by normalizing a player's annual achievement by a unbiased ability average. The output of our approach are 'detrended' success measures that are more appropriate for comparing and evaluating the relative merits of players from different historical eras. In this paper we demonstrate the utility of our detrending method by analyzing distributions of individual success in two professional sports leagues, Major League Baseball (MLB) and the National

Basketball Association (NBA). We use comprehensive data comprising more than 21,000 individual player careers (data from Sean Lahman’s Baseball Archive: <http://baseball1.com/index.php> and the Database Sports Basketball Archive: <http://www.databasebasketball.com/>.)

In order to make our statistical analysis accessible, we use the most natural measures for accomplishment, the statistics that are listed in every box-score and on every baseball and basketball card, so that the results are tangible to historians and casual fans interested in reviewing and discussing the “all-time greats.” In particular, this study addresses two relevant cultural questions:

- (i) How to quantitatively account for economic, technological, and social factors that influence the rate of success in competitive professions.
- (ii) How to use career statistics in an unbiased fashion to help in the both the standard, as well as, retroactive induction of athletes into a Hall of Fame. This is particularly important given the recent ‘inflation’ observed for home runs in Major League Baseball, a phenomena that is believed to be related to the widespread use of Performance Enhancing Drugs (PED).



**Fig. 1:** The seasonal prowess  $\langle P(t) \rangle$  measures the relative success rate per opportunity using appropriate measures for a given sport. The home-run prowess demonstrates a significant increasing trend since 1920, reflecting the emergence of the modern “slugger” in MLB. Physiological, technological, economic, and social factors play a strong historical role in the evolution of home-run prowess. By normalizing accomplishments with respect to  $\langle P(t) \rangle$ , we blindly account for seasonal variations due to all such factors.

## 2 Methods

We define prowess as an individual player’s ability to achieve a success  $x$  (e.g. a home run, point scored) in any given opportunity  $y$  (e.g. an AB in MLB or minute played in the NBA). In Fig. 1 we plot the average number of home runs over the 110-year period 1900-2009 in order to demonstrate the non-stationary evolution of home-run ability in MLB. Clearly, the occurrence of a home-run in 1920 was relatively more significant (rare) than the occurrence of a home-run in 1998.

The average prowess serves as an index for comparing accomplishments in distinct years. We conjecture that the changes in the average prowess are related to league-wide factors which can be quantitatively removed (detrended) by normalizing accomplishments by the average prowess for a given season. We first calculate the prowess  $P_i(t)$  of an individual player  $i$  as  $P_i(t) \equiv x_i(t) / y_i(t)$ , where

$x_i(t)$  is an individual's total number of successes out of his/her total number  $y_i(t)$  of opportunities in a given year  $t$ .

To compute the league-wide average prowess, we then compute

$$\langle P(t) \rangle \equiv \sum_i x_i(t) / \sum_i y_i(t) \quad (1)$$

The summation index  $i$  runs over all players with at least  $y_c$  opportunities during year  $t$ , so that  $\sum_i y_i(t)$  is the total number of opportunities of all  $N(t)$  players during year  $t$ . We use a cutoff  $y_c \equiv 100$  AB (batters), 100 IPO (pitchers), and 0 Min. (basketball players) which eliminates statistical fluctuations that arise from players with very short seasons.

We now introduce the detrended metric for the accomplishment of player  $i$  in year  $t$ ,

$$x_i^D(t) \equiv x_i(t) \times \bar{P} / \langle P(t) \rangle \quad (2)$$

where  $\bar{P}$  is the average value of  $\langle P(t) \rangle$  over the entire period analyzed. The choice of discounting the achievement  $x_i(t)$  with respect to  $\bar{P}$  is arbitrary, and we could just as well normalize with respect to  $\langle P(2000) \rangle$ , placing all values in terms of current "2000 US dollars," as they do in economics.

Using this method, we calculate detrended metrics for both single season ( $x_i^D(t)$ ) corresponding to Eq. (3) and total career accomplishments  $X_i^D$  corresponding to the sum of seasonal detrended metrics

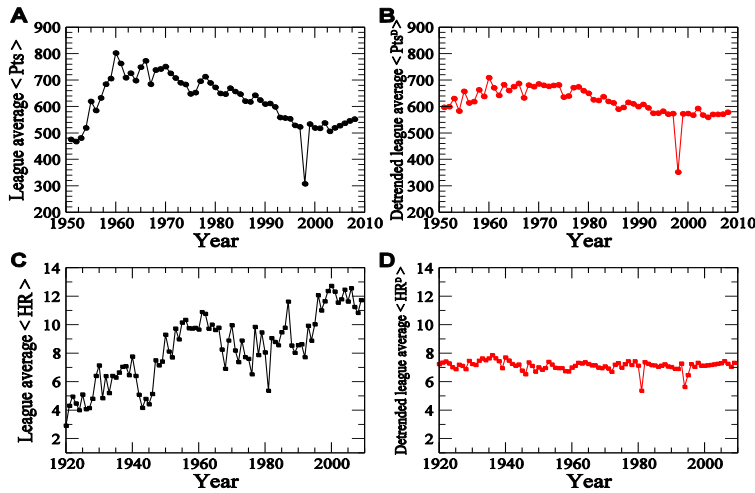
$$X_i^D \equiv \sum_{s=1}^L x_i^D(s) \quad (3)$$

where  $s$  is the season index and  $L$  is the player's career length measured in seasons.

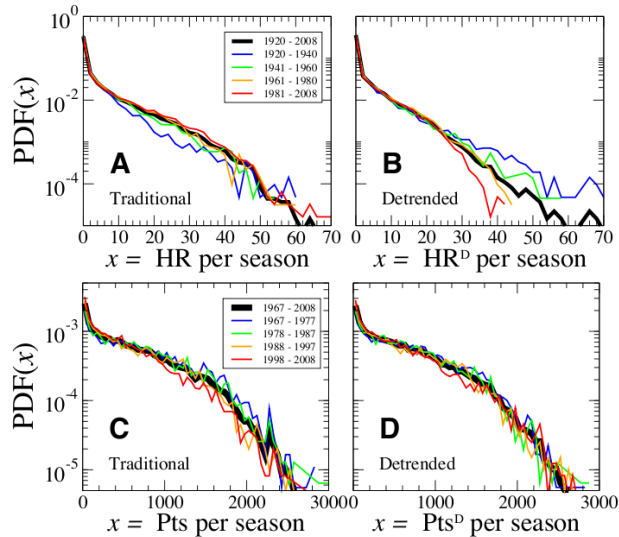
In Fig. 2 we plot the league averages

$$\langle x \rangle \equiv \frac{1}{N(t)} \sum_{i=1}^{N(t)} x_i(t) \quad \text{and} \quad \langle x^D \rangle \equiv \frac{1}{N(t)} \sum_{i=1}^{N(t)} x_i^D(t) \quad (4)$$

for points and home runs, calculated using all  $N(t)$  players in a given year  $t$ . The left column shows the traditional metrics, while the right column shows the average for detrended metrics. The detrended average is nearly constant across era, especially in the case of HR, demonstrating the utility of our normalization methods to standardize achievement. See ref. [3] for additional development and discussion of the methods.



**Fig. 2:** The annual league average for Pts (NBA) and Home runs (MLB) given in Eq. (6) and calculated before (A,C) and after (B,D) detrending. This method normalizes each season statistic to a baseline prowess  $\langle P(t) \rangle$  calculated using all players in a given season. Significant dips are due to league strikes resulting in game cancellations.



**Fig. 3:** Probability density function (PDF) of traditional and detrended statistics plotted on log-linear axes, separated by eras indicated in the legend. The detrended measures in panels (B,D) show increased data collapse towards a universal distribution  $P(x)$  for smaller values of  $x$  confirming that our method normalizes with respect to the bulk of the league's player achievement. However, in the case of HR, this method in fact pronounces some outlier seasonal performances, such as Babe Ruth's career years during the 1920's, which tips the balance in the all-time rankings (see the Appendix Table S1).

### 3 Results

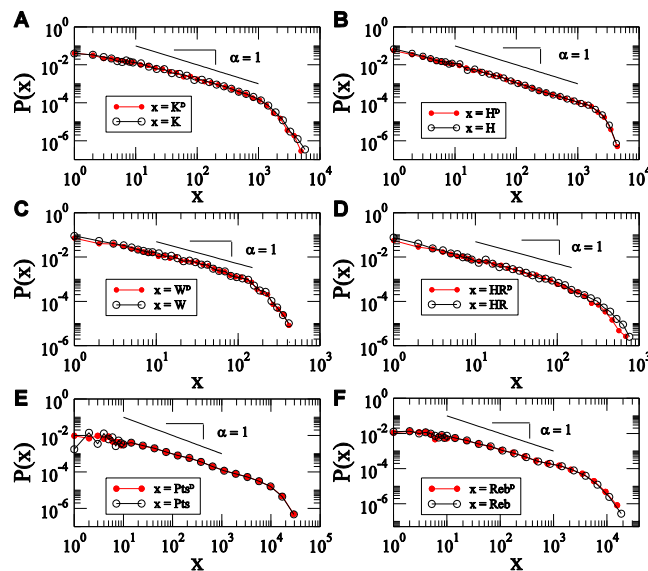
The goal of this method is to define a statistic that is more suitable for the across-era comparison of season and career achievement measures. We define our detrended statistics by normalizing achievement with respect to annual player averages which serves as a proxy for the underlying era-dependent trends in physiological, technological, and economic factors. We find that certain statistics (home runs, strikeouts, rebounds) are more affected by the detrending method (and underlying success factors) than others (wins, hits).

Fig. 3 shows the probability density function (pdf) of seasonal statistics, HR in MLB and points scored in the NBA, before and after we apply the detrending method. We separate the statistics according to arbitrarily chosen non-overlapping eras, and demonstrate that detrending method normalizes the statistical measures on the aggregate, so that the pdfs in panels (B,D) approximately collapse onto a universal function, except for the right tails. This enhancement effect is pronounced for HR statistics, indicating that extreme home-run achievements can be significantly deflated or inflated by time-dependent factors. As a result, the significant HR seasons for  $x^D > 30$  in panel (B) are either significantly above or below the all-time distribution (thick black curve), which causes a significant re-ranking of the all-time home run list at the season (see extensive Tables in [3]) and the career level (see Table S1).

Fig. 4 show the pdfs of career statistics which are stationary under detrending, indicating that the extremely right-skewed (heavy-tailed) distributions for human success result from intrinsic properties underlying achievement and not inflationary factors that influence success rates. This fact

suggests that Babe Ruth and Karl Malone were not “born on another planet,” but rather, follow naturally from a universal success distribution with statistically regular extreme value statistics. See [2,4] for further discussion of the analytic properties of  $P(x)$  as predicted by a theoretical career progress model [2]. Among the numerous storylines in the re-ranked tables, Babe Ruth becomes the undisputed home-run king ( $HR^D = 1215$ ) with Mel Ott, Lou Gehrig, and Jimmie Foxx, the 3 runners up, tallying merely half as many detrended HR, a result that signifies the significant lead Babe Ruth had over his cohort when it came to home-run prowess.

For NBA careers, we provide 6 extensive tables in the Supplementary Information Appendix which list the top-50 all-time achievements according (i) traditional rankings and (ii) our detrended rankings, for the statistical categories of points (Pts), rebounds (Reb) and assists (Asst.) at both the season and career level; we also provide a top-20 ranking for career home runs, and refer the curious reader to ref. [3] for additional tables listing MLB top-50 all-time achievements.



**Fig. 4:** Probability distributions  $P(x)$  plotted on log-log axes for traditional and detrended career statistics: strikeouts (A), hits (B), wins (C), home runs (D), points (E) and rebounds (F). The solid line corresponding to a Pareto (power) -law distribution with scaling exponent  $\alpha = 1$  is shown for visual comparison. For MLB, we use careers belonging to the 90-year period 1920-2009 and for the NBA we use careers belonging to the 56-year period 1951-2006.

## 4 Conclusions

Concepts and methods from statistical physics [1,2,3] and network science [5,6] applied to professional sports data have uncovered statistical laws that describe the underlying nature of competition. Surprisingly, academia also exhibits analogous statistical patterns that conceivably emerge from the general principles of competitive systems, such as the Matthew “rich-get-richer” effect [2,4,7] and the extremely high barriers to entry which results in many “sudden-death” careers [2,8].

In order to account for changes in relative player ability over time, we have developed a detrending method that accounts for inflationary and deflationary factors (PEDs, changes in the physical construction of bats and balls, sizes of ballparks, talent dilution of players from expansion, etc.) and allows for an objective comparison of players across time. Remarkably, we find using our detrending method, that the distributions of career success are invariant after we normalize accomplishments to local ability averages quantified by  $\langle P(t) \rangle$ . By analyzing the distribution of success across the *entire* set of players (an entire labor force), we can calculate universal benchmarks that can be used for the identification of extraordinary careers. Also, since these benchmarks are calculated using detrended metrics, the benchmarks are robust and stable with respect to the time-dependent factors (see refs. [2,3] for methods to calculate the benchmarks based on the extreme value statistics of the Gamma distribution that is used to model the longevity and success distribution  $P(x)$ ). Specifically, these statistical laws can be used by the Baseball Hall of Fame to address issue (ii), raised above, in the context of induction criteria.

Another surprising observation in this comprehensive study is the large numbers of "one-hit wonders", along with much smaller, but statistically significant and theoretically predictable, number of stellar "iron-horse" careers. In MLB, we find that roughly 3% of non-pitchers (pitchers) have a career lasting only one at-bat (lasting an inning or less) and 5% of non-pitchers complete their in-and-out career with only one hit! Yet, the same profession also sustains careers that span more than 2,000 games, 10,000 at bats and 4,000 innings pitched [3]. The same story can be told for the NBA, where 3% of careers end with careers that span between 1-12 minutes played, and 2% of careers last only 1 game! Yet, the average career length is roughly 273 games (roughly 3 seasons), while the maximum career length is owed to Robert Parish with 1,611 games, almost six times the average! For a higher resolution of in-game opportunities, Kareem Abdul-Jabbar's career spanned 57,446 minutes played, roughly 9 times the average career length in minutes! Similar results have also been observed for professional tennis careers [6]. We quantify this surprising finding with a statistical law which "bridges the gap" between the large number of players with very few career accomplishments and the few players with legendary career accomplishments.

## 5 References

- [1] A. M. Petersen *et al.*, "[On the Distribution of Career Longevity and the Evolution of Home-run Prowess in Professional Baseball](#)," Europhys. Lett., vol. 83, art. 50010, 2008.
- [2] A. M. Petersen *et al.*, "[Quantitative and Empirical Demonstration of the Matthew Effect in a Study of Career Longevity](#)," Proceedings of the National Academy of Sciences USA, vol. 108, pp. 18-23, 2011.
- [3] A. M. Petersen *et al.*, "[Methods for Detrending Success Metrics to Account for Inflationary and Deflationary Factors](#)," Eur. Phys. J. B, vol. 79, pp. 67-78, 2011.
- [4] A. M. Petersen *et al.*, "[Methods for Measuring the Citations and Productivity of Scientists Across Time and Discipline](#)," Phys. Rev. E, vol. 81, art. 036114, 2010.
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- [7] A. M. Petersen *et al.*, "[Statistical Regularities in the Rank-citation Profile of Scientists](#)," (Nature) Scientific Reports, vol. 1, art. 181, 2011.
- [8] A. M. Petersen *et al.*, "[Persistence and Uncertainty in the Academic Career](#)," (Under Review) Proceedings of the National Academy of Sciences USA, 2012.

## Supplementary Information Appendix:

### A method for the unbiased comparison of MLB and NBA career statistics across era

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In Table S1 we list top-20 rankings for MLB home runs (see the Online Supplementary Information for A. M. Petersen, O. Penner, H. E. Stanley, Methods for detrending success metrics to account for inflationary and deflationary factors. Eur. Phys. J. B 79, 67-78 (2011). DOI: 10.1140/epjb/e2010-10647-1) for additional top-50 rankings. In Tables S2-S7 we list top-50 rankings for points, assists and rebounds over the career and for individual seasons. For the two types of rankings, career and season, the columns are organized as follows:

**Career Tables S1–S4:** The 4 columns on the left of each table list information for the “traditional rank” of career statistics, where the top 50 players are ranked along with their final season (career length in seasons listed in parenthesis) and their career metric tally. The 5 columns on the right of each table list information for the “detrended rank” ( $Rank^*$ ) of career statistics, where the corresponding traditional rank (Rank) of the player is denoted in parenthesis.  $L$  denotes the career length of the player. The relative percent change  $\%Change = (Rank^* - Rank)/Rank$ .

**Season Tables S5–S7:** The 4 columns on the left list the traditional ranking of season statistics, where the top 50 players are ranked along with the year. The right columns list the detrended ranking of season statistics  $Rank^*$ .  $Y\#$  denotes the number of years into the career. The relative percent change  $\%Change = (Rank^* - Rank)/Rank$ .

| Rank | Name             | Traditional Rank |               | Rank*(Rank) | Name             | Detrended Rank   |               |
|------|------------------|------------------|---------------|-------------|------------------|------------------|---------------|
|      |                  | Final Season (L) | Career Metric |             |                  | Final Season (L) | Career Metric |
| 1    | Barry Bonds      | 2007 (22)        | 762           | 1(3)        | Babe Ruth        | 1935 (22)        | 1215          |
| 2    | Hank Aaron       | 1976 (23)        | 755           | 2(23)       | Mel Ott          | 1947 (22)        | 637           |
| 3    | Babe Ruth        | 1935 (22)        | 714           | 3(26)       | Lou Gehrig       | 1939 (17)        | 635           |
| 4    | Willie Mays      | 1973 (22)        | 660           | 3(17)       | Jimmie Foxx      | 1945 (20)        | 635           |
| 5    | Ken Griffey Jr.  | 2009 (21)        | 630           | 5(2)        | Hank Aaron       | 1976 (23)        | 582           |
| 6    | Sammy Sosa       | 2007 (18)        | 609           | 6(124)      | Rogers Hornsby   | 1937 (23)        | 528           |
| 7    | Frank Robinson   | 1976 (21)        | 586           | 7(192)      | Cy Williams      | 1930 (19)        | 527           |
| 8    | Alex Rodriguez   | 2009 (16)        | 583           | 8(1)        | Barry Bonds      | 2007 (22)        | 502           |
| 8    | Mark McGwire     | 2001 (16)        | 583           | 9(4)        | Willie Mays      | 1973 (22)        | 490           |
| 10   | Harmon Killebrew | 1975 (22)        | 573           | 10(18)      | Ted Williams     | 1960 (19)        | 482           |
| 11   | Rafael Palmeiro  | 2005 (20)        | 569           | 11(13)      | Reggie Jackson   | 1987 (21)        | 478           |
| 12   | Jim Thome        | 2009 (19)        | 564           | 12(14)      | Mike Schmidt     | 1989 (18)        | 463           |
| 13   | Reggie Jackson   | 1987 (21)        | 563           | 13(7)       | Frank Robinson   | 1976 (21)        | 444           |
| 14   | Mike Schmidt     | 1989 (18)        | 548           | 14(10)      | Harmon Killebrew | 1975 (22)        | 437           |
| 15   | Manny Ramirez    | 2009 (17)        | 546           | 15(577)     | Gavvy Cravath    | 1920 (11)        | 433           |
| 16   | Mickey Mantle    | 1968 (18)        | 536           | 16(718)     | Honus Wagner     | 1917 (21)        | 420           |
| 17   | Jimmie Foxx      | 1945 (20)        | 534           | 17(18)      | Willie McCovey   | 1980 (22)        | 417           |
| 18   | Ted Williams     | 1960 (19)        | 521           | 18(557)     | Harry Stovey     | 1893 (14)        | 413           |
| 18   | Frank Thomas     | 2008 (19)        | 521           | 19(5)       | Ken Griffey Jr.  | 2009 (21)        | 411           |
| 18   | Willie McCovey   | 1980 (22)        | 521           | 20(28)      | Stan Musial      | 1963 (22)        | 410           |

TABLE S1: Ranking of Career Home Runs (1871 - 2009).

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| Rank | Name                | Traditional Rank |               | Rank*(Rank) | % Change | Detrended Rank      |                  | Career Metric |
|------|---------------------|------------------|---------------|-------------|----------|---------------------|------------------|---------------|
|      |                     | Final Season (L) | Career Metric |             |          | Name                | Final Season (L) |               |
| 1    | Kareem Abdul-jabbar | 1988 (20)        | 38387         | 1(2)        | 50       | Karl Malone         | 2003 (19)        | 38033         |
| 2    | Karl Malone         | 2003 (19)        | 36928         | 2(1)        | -100     | Kareem Abdul-jabbar | 1988 (20)        | 36687         |
| 3    | Michael Jordan      | 2002 (15)        | 32292         | 3(3)        | 0        | Michael Jordan      | 2002 (15)        | 32511         |
| 4    | Wilt Chamberlain    | 1972 (14)        | 31419         | 4(7)        | 42       | Shaquille O'neal    | 2008 (17)        | 29575         |
| 5    | Julius Erving       | 1986 (16)        | 30026         | 5(5)        | 0        | Julius Erving       | 1986 (16)        | 28934         |
| 6    | Moses Malone        | 1994 (21)        | 29580         | 6(4)        | -50      | Wilt Chamberlain    | 1972 (14)        | 28615         |
| 7    | Shaquille O'neal    | 2008 (17)        | 27619         | 7(6)        | -16      | Moses Malone        | 1994 (21)        | 28532         |
| 8    | Dan Issel           | 1984 (15)        | 27482         | 8(10)       | 20       | Hakeem Olajuwon     | 2001 (18)        | 27177         |
| 9    | Elvin Hayes         | 1983 (16)        | 27313         | 9(8)        | -12      | Dan Issel           | 1984 (15)        | 26362         |
| 10   | Hakeem Olajuwon     | 2001 (18)        | 26946         | 10(16)      | 37       | Reggie Miller       | 2004 (18)        | 26361         |
| 11   | Oscar Robertson     | 1973 (14)        | 26710         | 11(12)      | 8        | Dominique Wilkins   | 1998 (15)        | 26110         |
| 12   | Dominique Wilkins   | 1998 (15)        | 26668         | 12(21)      | 42       | Allen Iverson       | 2008 (13)        | 26040         |
| 13   | George Gervin       | 1985 (14)        | 26595         | 13(9)       | -44      | Elvin Hayes         | 1983 (16)        | 26035         |
| 14   | John Havlicek       | 1977 (16)        | 26395         | 14(22)      | 36       | Kobe Bryant         | 2008 (13)        | 25797         |
| 15   | Alex English        | 1990 (15)        | 25613         | 15(13)      | -15      | George Gervin       | 1985 (14)        | 25666         |
| 16   | Reggie Miller       | 2004 (18)        | 25279         | 16(20)      | 20       | Patrick Ewing       | 2001 (17)        | 25129         |
| 16   | Rick Barry          | 1979 (14)        | 25279         | 17(14)      | -21      | John Havlicek       | 1977 (16)        | 24796         |
| 18   | Jerry West          | 1973 (14)        | 25192         | 18(15)      | -20      | Alex English        | 1990 (15)        | 24551         |
| 19   | Artis Gilmore       | 1987 (17)        | 24941         | 19(11)      | -72      | Oscar Robertson     | 1973 (14)        | 24459         |
| 20   | Patrick Ewing       | 2001 (17)        | 24815         | 20(19)      | -5       | Artis Gilmore       | 1987 (17)        | 24023         |
| 21   | Allen Iverson       | 2008 (13)        | 23983         | 21(16)      | -31      | Rick Barry          | 1979 (14)        | 23893         |
| 22   | Kobe Bryant         | 2008 (13)        | 23820         | 22(23)      | 4        | Charles Barkley     | 1999 (16)        | 23748         |
| 23   | Charles Barkley     | 1999 (16)        | 23757         | 23(28)      | 17       | Gary Payton         | 2006 (17)        | 23374         |
| 24   | Robert Parish       | 1996 (21)        | 23334         | 24(18)      | -33      | Jerry West          | 1973 (14)        | 23115         |
| 25   | Adrian Dantley      | 1990 (15)        | 23177         | 25(31)      | 19       | Kevin Garnett       | 2008 (14)        | 23111         |
| 26   | Elgin Baylor        | 1971 (14)        | 23149         | 26(24)      | -8       | Robert Parish       | 1996 (21)        | 22615         |
| 27   | Clyde Drexler       | 1997 (15)        | 22195         | 27(25)      | -8       | Adrian Dantley      | 1990 (15)        | 22230         |
| 28   | Gary Payton         | 2006 (17)        | 21813         | 28(27)      | -3       | Clyde Drexler       | 1997 (15)        | 22035         |
| 29   | Larry Bird          | 1991 (13)        | 21791         | 29(34)      | 14       | David Robinson      | 2002 (14)        | 21578         |
| 30   | Hal Greer           | 1972 (15)        | 21586         | 30(38)      | 21       | Ray Allen           | 2008 (13)        | 21338         |
| 31   | Kevin Garnett       | 2008 (14)        | 21277         | 31(35)      | 11       | Mitch Richmond      | 2001 (14)        | 21192         |
| 32   | Walt Bellamy        | 1974 (14)        | 20941         | 32(26)      | -23      | Elgin Baylor        | 1971 (14)        | 21163         |
| 33   | Bob Pettit          | 1964 (11)        | 20880         | 33(29)      | -13      | Larry Bird          | 1991 (13)        | 20946         |
| 34   | David Robinson      | 2002 (14)        | 20790         | 34(44)      | 22       | Tim Duncan          | 2008 (12)        | 20921         |
| 35   | Mitch Richmond      | 2001 (14)        | 20497         | 35(40)      | 12       | Clifford Robinson   | 2006 (18)        | 20726         |
| 36   | Tom Chambers        | 1997 (16)        | 20049         | 36(47)      | 23       | Dirk Nowitzki       | 2008 (11)        | 20641         |
| 37   | John Stockton       | 2002 (19)        | 19711         | 37(54)      | 31       | Paul Pierce         | 2008 (11)        | 20204         |
| 38   | Ray Allen           | 2008 (13)        | 19661         | 38(37)      | -2       | John Stockton       | 2002 (19)        | 20203         |
| 39   | Bernard King        | 1992 (14)        | 19655         | 39(33)      | -18      | Bob Pettit          | 1964 (11)        | 20033         |
| 40   | Clifford Robinson   | 2006 (18)        | 19591         | 40(58)      | 31       | Vince Carter        | 2008 (11)        | 19768         |
| 41   | Walter Davis        | 1991 (15)        | 19521         | 41(30)      | -36      | Hal Greer           | 1972 (15)        | 19734         |
| 42   | Terry Cummings      | 1999 (18)        | 19460         | 42(50)      | 16       | Scottie Pippen      | 2003 (17)        | 19595         |
| 43   | Bob Lanier          | 1983 (14)        | 19248         | 43(36)      | -19      | Tom Chambers        | 1997 (16)        | 19433         |
| 44   | Tim Duncan          | 2008 (12)        | 19246         | 44(32)      | -37      | Walt Bellamy        | 1974 (14)        | 19277         |
| 45   | Eddie Johnson       | 1998 (17)        | 19202         | 45(56)      | 19       | Glen Rice           | 2003 (15)        | 19146         |
| 46   | Gail Goodrich       | 1978 (14)        | 19181         | 46(42)      | -9       | Terry Cummings      | 1999 (18)        | 19051         |
| 47   | Dirk Nowitzki       | 2008 (11)        | 19084         | 47(49)      | 4        | Dale Ellis          | 1999 (17)        | 18999         |
| 48   | Reggie Theus        | 1990 (13)        | 19015         | 48(39)      | -23      | Bernard King        | 1992 (14)        | 18914         |
| 49   | Dale Ellis          | 1999 (17)        | 19002         | 49(71)      | 30       | Tracy Mcgrady       | 2008 (12)        | 18808         |
| 50   | Scottie Pippen      | 2003 (17)        | 18940         | 50(41)      | -21      | Walter Davis        | 1991 (15)        | 18748         |

TABLE S2: Ranking of Career Points (1951 - 2006). The left columns lists the traditional ranking of career statistics, where the top 50 players are ranked along with their final season (career length in seasons listed in parenthesis) and their career metric tally. The right columns list the detrended ranking of career statistics  $Rank^*$ , where the corresponding traditional ranking of the player is denoted in parenthesis.  $L$  denotes the career length of the player. The relative percent change  $\%Change = (Rank^* - Rank)/Rank$ .



| Rank | Name                | Traditional Rank |               | Rank*(Rank) | % Change | Name                | Detrended Rank   |               |
|------|---------------------|------------------|---------------|-------------|----------|---------------------|------------------|---------------|
|      |                     | Final Season (L) | Career Metric |             |          |                     | Final Season (L) | Career Metric |
| 1    | Wilt Chamberlain    | 1972 (14)        | 23924         | 1(1)        | 0        | Wilt Chamberlain    | 1972 (14)        | 19896         |
| 2    | Bill Russell        | 1968 (13)        | 21620         | 2(3)        | 33       | Moses Malone        | 1994 (21)        | 19323         |
| 3    | Moses Malone        | 1994 (21)        | 17834         | 3(4)        | 25       | Kareem Abdul-jabbar | 1988 (20)        | 17782         |
| 4    | Kareem Abdul-jabbar | 1988 (20)        | 17440         | 4(2)        | -100     | Bill Russell        | 1968 (13)        | 17424         |
| 5    | Artis Gilmore       | 1987 (17)        | 16330         | 5(5)        | 0        | Artis Gilmore       | 1987 (17)        | 16924         |
| 6    | Elvin Hayes         | 1983 (16)        | 16279         | 6(7)        | 14       | Karl Malone         | 2003 (19)        | 16907         |
| 7    | Karl Malone         | 2003 (19)        | 14967         | 7(8)        | 12       | Robert Parish       | 1996 (21)        | 16178         |
| 8    | Robert Parish       | 1996 (21)        | 14715         | 8(6)        | -33      | Elvin Hayes         | 1983 (16)        | 16136         |
| 9    | Nate Thurmond       | 1976 (14)        | 14464         | 9(12)       | 25       | Hakeem Olajuwon     | 2001 (18)        | 15463         |
| 10   | Walt Bellamy        | 1974 (14)        | 14241         | 10(13)      | 23       | Buck Williams       | 1997 (17)        | 14522         |
| 11   | Wes Unseld          | 1980 (13)        | 13769         | 11(16)      | 31       | Shaquille O'neal    | 2008 (17)        | 14414         |
| 12   | Hakeem Olajuwon     | 2001 (18)        | 13747         | 12(18)      | 33       | Dikembe Mutombo     | 2008 (18)        | 14148         |
| 13   | Buck Williams       | 1997 (17)        | 13018         | 13(17)      | 23       | Charles Barkley     | 1999 (16)        | 14120         |
| 14   | Jerry Lucas         | 1973 (11)        | 12942         | 14(20)      | 30       | Charles Oakley      | 2003 (19)        | 13740         |
| 15   | Bob Pettit          | 1964 (11)        | 12849         | 15(21)      | 28       | Dennis Rodman       | 1999 (14)        | 13515         |
| 16   | Shaquille O'neal    | 2008 (17)        | 12566         | 16(23)      | 30       | Kevin Garnett       | 2008 (14)        | 13479         |
| 17   | Charles Barkley     | 1999 (16)        | 12546         | 17(11)      | -54      | Wes Unseld          | 1980 (13)        | 13439         |
| 18   | Dikembe Mutombo     | 2008 (18)        | 12359         | 18(22)      | 18       | Kevin Willis        | 2006 (21)        | 13424         |
| 19   | Paul Silas          | 1979 (16)        | 12357         | 19(24)      | 20       | Patrick Ewing       | 2001 (17)        | 13099         |
| 20   | Charles Oakley      | 2003 (19)        | 12205         | 20(9)       | -122     | Nate Thurmond       | 1976 (14)        | 12891         |
| 21   | Dennis Rodman       | 1999 (14)        | 11954         | 21(10)      | -110     | Walt Bellamy        | 1974 (14)        | 12219         |
| 22   | Kevin Willis        | 2006 (21)        | 11901         | 22(30)      | 26       | Tim Duncan          | 2008 (12)        | 12151         |
| 23   | Kevin Garnett       | 2008 (14)        | 11682         | 23(32)      | 28       | David Robinson      | 2002 (14)        | 11915         |
| 24   | Patrick Ewing       | 2001 (17)        | 11606         | 24(28)      | 14       | Jack Sikma          | 1990 (14)        | 11839         |
| 25   | Elgin Baylor        | 1971 (14)        | 11463         | 25(35)      | 28       | Otis Thorpe         | 2000 (17)        | 11667         |
| 26   | Dan Issel           | 1984 (15)        | 11133         | 26(19)      | -36      | Paul Silas          | 1979 (16)        | 11657         |
| 27   | Bill Bridges        | 1974 (13)        | 11054         | 27(34)      | 20       | Bill Laimbeer       | 1993 (14)        | 11513         |
| 28   | Jack Sikma          | 1990 (14)        | 10816         | 28(26)      | -7       | Dan Issel           | 1984 (15)        | 11361         |
| 29   | Caldwell Jones      | 1989 (17)        | 10685         | 29(29)      | 0        | Caldwell Jones      | 1989 (17)        | 11347         |
| 30   | Tim Duncan          | 2008 (12)        | 10546         | 30(14)      | -114     | Jerry Lucas         | 1973 (11)        | 11112         |
| 31   | Julius Erving       | 1986 (16)        | 10525         | 31(31)      | 0        | Julius Erving       | 1986 (16)        | 10873         |
| 32   | David Robinson      | 2002 (14)        | 10497         | 32(43)      | 25       | Horace Grant        | 2003 (17)        | 10697         |
| 33   | Dave Cowens         | 1982 (11)        | 10444         | 33(42)      | 21       | A.c. Green          | 2000 (16)        | 10685         |
| 34   | Bill Laimbeer       | 1993 (14)        | 10400         | 34(47)      | 27       | Ben Wallace         | 2008 (13)        | 10643         |
| 35   | Otis Thorpe         | 2000 (17)        | 10370         | 35(45)      | 22       | Vlade Divac         | 2004 (16)        | 10637         |
| 36   | Johnny Kerr         | 1965 (12)        | 10092         | 36(15)      | -140     | Bob Pettit          | 1964 (11)        | 10436         |
| 37   | Bob Lanier          | 1983 (14)        | 9698          | 37(33)      | -12      | Dave Cowens         | 1982 (11)        | 10351         |
| 38   | Sam Lacey           | 1982 (13)        | 9687          | 38(52)      | 26       | Shawn Kemp          | 2002 (14)        | 10074         |
| 39   | Zelmo Beaty         | 1974 (12)        | 9665          | 39(46)      | 15       | Maurice Lucas       | 1987 (14)        | 9945          |
| 40   | Dave Debusschere    | 1973 (12)        | 9618          | 40(50)      | 20       | Larry Bird          | 1991 (13)        | 9908          |
| 41   | Mel Daniels         | 1976 (9)         | 9528          | 41(57)      | 28       | Dale Davis          | 2006 (16)        | 9851          |
| 42   | A.c. Green          | 2000 (16)        | 9473          | 42(37)      | -13      | Bob Lanier          | 1983 (14)        | 9790          |
| 43   | Horace Grant        | 2003 (17)        | 9443          | 43(38)      | -13      | Sam Lacey           | 1982 (13)        | 9732          |
| 44   | Bailey Howell       | 1970 (12)        | 9383          | 44(55)      | 20       | Michael Cage        | 1999 (15)        | 9698          |
| 45   | Vlade Divac         | 2004 (16)        | 9326          | 45(27)      | -66      | Bill Bridges        | 1974 (13)        | 9682          |
| 46   | Maurice Lucas       | 1987 (14)        | 9306          | 46(59)      | 22       | P.j. Brown          | 2007 (15)        | 9679          |
| 47   | Ben Wallace         | 2008 (13)        | 9243          | 47(56)      | 16       | Terry Cummings      | 1999 (18)        | 9642          |
| 48   | George McGinnis     | 1981 (11)        | 9233          | 48(48)      | 0        | George McGinnis     | 1981 (11)        | 9413          |
| 49   | Johnny Green        | 1972 (14)        | 9083          | 49(61)      | 19       | Chris Webber        | 2007 (15)        | 9356          |
| 50   | Larry Bird          | 1991 (13)        | 8974          | 50(25)      | -100     | Elgin Baylor        | 1971 (14)        | 9280          |

TABLE S3: Ranking of Career Rebounds (1951 - 2006). The left columns lists the traditional ranking of career statistics, where the top 50 players are ranked along with their final season (career length in seasons listed in parenthesis) and their career metric tally. The right columns list the detrended ranking of career statistics  $Rank^*$ , where the corresponding traditional ranking of the player is denoted in parenthesis.  $L$  denotes the career length of the player. The relative percent change  $\%Change = (Rank^* - Rank)/Rank$ .

| Rank | Name                | Traditional Rank |               | Rank*(Rank) | % Change | Detrended Rank      |                  |               |
|------|---------------------|------------------|---------------|-------------|----------|---------------------|------------------|---------------|
|      |                     | Final Season (L) | Career Metric |             |          | Name                | Final Season (L) | Career Metric |
| 1    | John Stockton       | 2002 (19)        | 15806         | 1(1)        | 0        | John Stockton       | 2002 (19)        | 15289         |
| 2    | Mark Jackson        | 2003 (17)        | 10323         | 2(3)        | 33       | Jason Kidd          | 2008 (15)        | 10841         |
| 3    | Jason Kidd          | 2008 (15)        | 10199         | 3(2)        | -50      | Mark Jackson        | 2003 (17)        | 10222         |
| 4    | Magic Johnson       | 1995 (13)        | 10141         | 4(5)        | 20       | Oscar Robertson     | 1973 (14)        | 10144         |
| 5    | Oscar Robertson     | 1973 (14)        | 9887          | 5(7)        | 28       | Gary Payton         | 2006 (17)        | 9229          |
| 6    | Isiah Thomas        | 1993 (13)        | 9061          | 6(4)        | -50      | Magic Johnson       | 1995 (13)        | 9145          |
| 7    | Gary Payton         | 2006 (17)        | 8964          | 7(6)        | -16      | Isiah Thomas        | 1993 (13)        | 8190          |
| 8    | Rod Strickland      | 2004 (17)        | 7987          | 8(9)        | 11       | Steve Nash          | 2008 (13)        | 8090          |
| 9    | Steve Nash          | 2008 (13)        | 7504          | 9(8)        | -12      | Rod Strickland      | 2004 (17)        | 8005          |
| 10   | Maurice Cheeks      | 1992 (15)        | 7392          | 10(11)      | 9        | Lenny Wilkens       | 1974 (15)        | 7407          |
| 11   | Lenny Wilkens       | 1974 (15)        | 7211          | 11(14)      | 21       | Guy Rodgers         | 1969 (12)        | 7183          |
| 12   | Terry Porter        | 2001 (17)        | 7160          | 12(13)      | 7        | Tim Hardaway        | 2002 (13)        | 7064          |
| 13   | Tim Hardaway        | 2002 (13)        | 7095          | 13(19)      | 31       | Stephon Marbury     | 2008 (13)        | 6920          |
| 14   | Guy Rodgers         | 1969 (12)        | 6917          | 14(12)      | -16      | Terry Porter        | 2001 (17)        | 6800          |
| 15   | Muggsy Bogues       | 2000 (14)        | 6726          | 15(10)      | -50      | Maurice Cheeks      | 1992 (15)        | 6653          |
| 16   | Kevin Johnson       | 1999 (12)        | 6711          | 16(27)      | 40       | Andre Miller        | 2008 (10)        | 6469          |
| 17   | Derek Harper        | 1998 (16)        | 6571          | 17(15)      | -13      | Muggsy Bogues       | 2000 (14)        | 6435          |
| 18   | Nate Archibald      | 1983 (13)        | 6476          | 18(16)      | -12      | Kevin Johnson       | 1999 (12)        | 6390          |
| 19   | Stephon Marbury     | 2008 (13)        | 6471          | 19(23)      | 17       | Jerry West          | 1973 (14)        | 6340          |
| 20   | John Lucas          | 1989 (14)        | 6454          | 20(29)      | 31       | Sam Cassell         | 2008 (16)        | 6260          |
| 21   | Reggie Theus        | 1990 (13)        | 6453          | 21(26)      | 19       | John Havlicek       | 1977 (16)        | 6164          |
| 22   | Norm Nixon          | 1988 (10)        | 6386          | 22(17)      | -29      | Derek Harper        | 1998 (16)        | 6162          |
| 23   | Jerry West          | 1973 (14)        | 6238          | 23(18)      | -27      | Nate Archibald      | 1983 (13)        | 6088          |
| 24   | Scottie Pippen      | 2003 (17)        | 6135          | 24(24)      | 0        | Scottie Pippen      | 2003 (17)        | 6079          |
| 25   | Clyde Drexler       | 1997 (15)        | 6125          | 25(31)      | 19       | Nick Vanexel        | 2005 (13)        | 6002          |
| 26   | John Havlicek       | 1977 (16)        | 6114          | 26(28)      | 7        | Mookie Blaylock     | 2001 (13)        | 5934          |
| 27   | Andre Miller        | 2008 (10)        | 6020          | 27(35)      | 22       | Allen Iverson       | 2008 (13)        | 5911          |
| 28   | Mookie Blaylock     | 2001 (13)        | 5972          | 28(30)      | 6        | Avery Johnson       | 2003 (16)        | 5891          |
| 29   | Sam Cassell         | 2008 (16)        | 5939          | 29(20)      | -45      | John Lucas          | 1989 (14)        | 5831          |
| 30   | Avery Johnson       | 2003 (16)        | 5846          | 30(21)      | -42      | Reggie Theus        | 1990 (13)        | 5787          |
| 31   | Nick Vanexel        | 2005 (13)        | 5777          | 31(25)      | -24      | Clyde Drexler       | 1997 (15)        | 5731          |
| 32   | Larry Bird          | 1991 (13)        | 5695          | 32(22)      | -45      | Norm Nixon          | 1988 (10)        | 5719          |
| 33   | Kareem Abdul-jabbar | 1988 (20)        | 5660          | 33(38)      | 13       | Damon Stoudamire    | 2007 (13)        | 5689          |
| 34   | Michael Jordan      | 2002 (15)        | 5633          | 34(37)      | 8        | Dave Bing           | 1977 (12)        | 5428          |
| 35   | Allen Iverson       | 2008 (13)        | 5512          | 35(34)      | -2       | Michael Jordan      | 2002 (15)        | 5359          |
| 36   | Dennis Johnson      | 1989 (14)        | 5499          | 36(33)      | -9       | Kareem Abdul-jabbar | 1988 (20)        | 5290          |
| 37   | Dave Bing           | 1977 (12)        | 5397          | 37(49)      | 24       | Baron Davis         | 2008 (10)        | 5266          |
| 38   | Damon Stoudamire    | 2007 (13)        | 5371          | 38(44)      | 13       | Kenny Anderson      | 2004 (14)        | 5252          |
| 39   | Kevin Porter        | 1982 (10)        | 5314          | 39(53)      | 26       | Mike Bibby          | 2008 (11)        | 5226          |
| 40   | Jeff Hornacek       | 1999 (14)        | 5281          | 40(41)      | 2        | Karl Malone         | 2003 (19)        | 5220          |
| 41   | Karl Malone         | 2003 (19)        | 5248          | 41(32)      | -28      | Larry Bird          | 1991 (13)        | 5132          |
| 42   | Rickey Green        | 1991 (14)        | 5221          | 42(40)      | -5       | Jeff Hornacek       | 1999 (14)        | 5064          |
| 43   | Norm Vanlier        | 1978 (10)        | 5217          | 43(47)      | 8        | Walt Frazier        | 1979 (13)        | 5050          |
| 44   | Kenny Anderson      | 2004 (14)        | 5196          | 44(43)      | -2       | Norm Vanlier        | 1978 (10)        | 5049          |
| 45   | Julius Erving       | 1986 (16)        | 5176          | 45(58)      | 22       | Chauncey Billups    | 2008 (12)        | 5048          |
| 46   | Sleepy Floyd        | 1994 (13)        | 5175          | 46(36)      | -27      | Dennis Johnson      | 1989 (14)        | 4940          |
| 47   | Walt Frazier        | 1979 (13)        | 5040          | 47(39)      | -20      | Kevin Porter        | 1982 (10)        | 4928          |
| 48   | Rick Barry          | 1979 (14)        | 4952          | 48(59)      | 18       | Wilt Chamberlain    | 1972 (14)        | 4848          |
| 49   | Baron Davis         | 2008 (10)        | 4902          | 49(64)      | 23       | Kevin Garnett       | 2008 (14)        | 4847          |
| 50   | Nate Mcmillan       | 1997 (12)        | 4893          | 50(66)      | 24       | Brevin Knight       | 2008 (12)        | 4815          |

TABLE S4: Ranking of Career Assists (1951 - 2006). The left columns lists the traditional ranking of career statistics, where the top 50 players are ranked along with their final season (career length in seasons listed in parenthesis) and their career metric tally. The right columns list the detrended ranking of career statistics  $Rank^*$ , where the corresponding traditional ranking of the player is denoted in parenthesis.  $L$  denotes the career length of the player. The relative percent change  $\%Change = (Rank^* - Rank)/Rank$ .

| Rank | Name                | Traditional Rank |               | Rank*(Rank) | % Change | Detrended Rank      |             |               |
|------|---------------------|------------------|---------------|-------------|----------|---------------------|-------------|---------------|
|      |                     | Season (Y#)      | Season Metric |             |          | Name                | Season (Y#) | Season Metric |
| 1    | Wilt Chamberlain    | 1961 (3)         | 4029          | 1(1)        | 0        | Wilt Chamberlain    | 1961 (3)    | 3543          |
| 2    | Wilt Chamberlain    | 1962 (4)         | 3586          | 2(2)        | 0        | Wilt Chamberlain    | 1962 (4)    | 3248          |
| 3    | Michael Jordan      | 1986 (3)         | 3041          | 3(7)        | 57       | Kobe Bryant         | 2005 (10)   | 3060          |
| 4    | Wilt Chamberlain    | 1960 (2)         | 3033          | 4(3)        | -33      | Michael Jordan      | 1986 (3)    | 2892          |
| 5    | Wilt Chamberlain    | 1963 (5)         | 2948          | 5(8)        | 37       | Bob Mcadoo          | 1974 (3)    | 2823          |
| 6    | Michael Jordan      | 1987 (4)         | 2868          | 6(5)        | -20      | Wilt Chamberlain    | 1963 (5)    | 2771          |
| 7    | Kobe Bryant         | 2005 (10)        | 2832          | 7(6)        | -16      | Michael Jordan      | 1987 (4)    | 2769          |
| 8    | Bob Mcadoo          | 1974 (3)         | 2831          | 8(37)       | 78       | Kobe Bryant         | 2002 (7)    | 2711          |
| 9    | Kareem Abdul-jabbar | 1971 (3)         | 2822          | 9(11)       | 18       | Michael Jordan      | 1989 (6)    | 2690          |
| 10   | Rick Barry          | 1966 (2)         | 2775          | 10(4)       | -150     | Wilt Chamberlain    | 1960 (2)    | 2681          |
| 11   | Michael Jordan      | 1989 (6)         | 2753          | 11(34)      | 67       | LeBron James        | 2005 (3)    | 2677          |
| 12   | Elgin Baylor        | 1962 (5)         | 2719          | 12(49)      | 75       | Tracy Mcgrady       | 2002 (6)    | 2651          |
| 12   | Nate Archibald      | 1972 (3)         | 2719          | 13(9)       | -44      | Kareem Abdul-jabbar | 1971 (3)    | 2646          |
| 14   | Wilt Chamberlain    | 1959 (1)         | 2707          | 14(55)      | 74       | Jerry Stackhouse    | 2000 (6)    | 2629          |
| 15   | Wilt Chamberlain    | 1965 (7)         | 2649          | 15(42)      | 64       | Michael Jordan      | 1996 (12)   | 2625          |
| 16   | Charlie Scott       | 1971 (2)         | 2637          | 16(31)      | 48       | Michael Jordan      | 1995 (11)   | 2618          |
| 17   | Michael Jordan      | 1988 (5)         | 2633          | 17(12)      | -41      | Nate Archibald      | 1972 (3)    | 2598          |
| 18   | Kareem Abdul-jabbar | 1970 (2)         | 2596          | 18(62)      | 70       | Michael Jordan      | 1997 (13)   | 2582          |
| 19   | George Gervin       | 1979 (8)         | 2585          | 19(43)      | 55       | Kobe Bryant         | 2006 (11)   | 2580          |
| 20   | Michael Jordan      | 1990 (7)         | 2580          | 20(57)      | 64       | Allen Iverson       | 2005 (10)   | 2568          |
| 21   | George Gervin       | 1981 (10)        | 2551          | 21(20)      | -5       | Michael Jordan      | 1990 (7)    | 2540          |
| 22   | Michael Jordan      | 1992 (9)         | 2541          | 22(66)      | 66       | Gilbert Arenas      | 2005 (5)    | 2535          |
| 23   | Karl Malone         | 1989 (5)         | 2540          | 23(22)      | -4       | Michael Jordan      | 1992 (9)    | 2525          |
| 24   | Dan Issel           | 1971 (2)         | 2538          | 24(17)      | -41      | Michael Jordan      | 1988 (5)    | 2522          |
| 24   | Elgin Baylor        | 1960 (3)         | 2538          | 25(68)      | 63       | Shaquille O'neal    | 1999 (8)    | 2514          |
| 26   | Wilt Chamberlain    | 1964 (6)         | 2534          | 26(52)      | 50       | Dwyane Wade         | 2008 (6)    | 2498          |
| 27   | Moses Malone        | 1981 (8)         | 2520          | 27(105)     | 74       | Allen Iverson       | 2002 (7)    | 2492          |
| 28   | Spencer Haywood     | 1969 (1)         | 2519          | 28(23)      | -21      | Karl Malone         | 1989 (5)    | 2482          |
| 29   | Rick Barry          | 1971 (6)         | 2518          | 29(84)      | 65       | Allen Iverson       | 2004 (9)    | 2479          |
| 30   | Walt Bellamy        | 1961 (1)         | 2495          | 30(19)      | -57      | George Gervin       | 1979 (8)    | 2475          |
| 31   | Michael Jordan      | 1995 (11)        | 2491          | 31(16)      | -93      | Charlie Scott       | 1971 (2)    | 2472          |
| 32   | Oscar Robertson     | 1963 (4)         | 2480          | 32(10)      | -220     | Rick Barry          | 1966 (2)    | 2468          |
| 32   | Dan Issel           | 1970 (1)         | 2480          | 33(12)      | -175     | Elgin Baylor        | 1962 (5)    | 2463          |
| 34   | LeBron James        | 2005 (3)         | 2478          | 34(21)      | -61      | George Gervin       | 1981 (10)   | 2457          |
| 35   | Jerry West          | 1965 (6)         | 2476          | 35(53)      | 33       | David Robinson      | 1993 (5)    | 2450          |
| 36   | Julius Erving       | 1975 (5)         | 2462          | 36(14)      | -157     | Wilt Chamberlain    | 1959 (1)    | 2448          |
| 37   | Kobe Bryant         | 2002 (7)         | 2461          | 37(57)      | 35       | Shaquille O'neal    | 1993 (2)    | 2444          |
| 38   | Adrian Dantley      | 1981 (6)         | 2457          | 38(40)      | 5        | Rick Barry          | 1974 (9)    | 2443          |
| 39   | Adrian Dantley      | 1980 (5)         | 2452          | 39(126)     | 69       | Allen Iverson       | 2000 (5)    | 2438          |
| 40   | Rick Barry          | 1974 (9)         | 2450          | 40(76)      | 47       | Kobe Bryant         | 2007 (12)   | 2431          |
| 41   | Oscar Robertson     | 1961 (2)         | 2432          | 41(115)     | 64       | Karl Malone         | 1996 (12)   | 2428          |
| 42   | Michael Jordan      | 1996 (12)        | 2431          | 42(27)      | -55      | Moses Malone        | 1981 (8)    | 2427          |
| 43   | Kobe Bryant         | 2006 (11)        | 2430          | 43(36)      | -19      | Julius Erving       | 1975 (5)    | 2414          |
| 44   | Bob Pettit          | 1961 (8)         | 2429          | 44(82)      | 46       | LeBron James        | 2008 (6)    | 2412          |
| 45   | Bob Mcadoo          | 1975 (4)         | 2427          | 45(131)     | 65       | Karl Malone         | 1997 (13)   | 2399          |
| 46   | Adrian Dantley      | 1983 (8)         | 2418          | 46(26)      | -76      | Wilt Chamberlain    | 1964 (6)    | 2396          |
| 47   | Alex English        | 1985 (10)        | 2414          | 47(77)      | 38       | Shaquille O'neal    | 1994 (3)    | 2390          |
| 48   | Oscar Robertson     | 1966 (7)         | 2412          | 48(50)      | 4        | Michael Jordan      | 1991 (8)    | 2389          |
| 49   | Tracy Mcgrady       | 2002 (6)         | 2407          | 49(15)      | -226     | Wilt Chamberlain    | 1965 (7)    | 2388          |
| 50   | Michael Jordan      | 1991 (8)         | 2404          | 50(45)      | -11      | Bob Mcadoo          | 1975 (4)    | 2379          |

TABLE S5: Ranking of Season Points (1951 - 2008). The left columns list the traditional ranking of season statistics, where the top 50 players are ranked along with the year. The right columns list the detrended ranking of season statistics  $Rank^*$ .  $Y\#$  denotes the number of years into the career.

| Rank | Name                | Traditional Rank |               | Rank*(Rank) | % Change | Detrended Rank      |             |               |
|------|---------------------|------------------|---------------|-------------|----------|---------------------|-------------|---------------|
|      |                     | Season (Y#)      | Season Metric |             |          | Name                | Season (Y#) | Season Metric |
| 1    | Wilt Chamberlain    | 1960 (2)         | 2149          | 1(28)       | 96       | Dennis Rodman       | 1991 (6)    | 1691          |
| 2    | Wilt Chamberlain    | 1961 (3)         | 2052          | 2(4)        | 50       | Wilt Chamberlain    | 1967 (9)    | 1666          |
| 3    | Wilt Chamberlain    | 1966 (8)         | 1957          | 3(5)        | 40       | Wilt Chamberlain    | 1962 (4)    | 1628          |
| 4    | Wilt Chamberlain    | 1967 (9)         | 1952          | 4(1)        | -300     | Wilt Chamberlain    | 1960 (2)    | 1605          |
| 5    | Wilt Chamberlain    | 1962 (4)         | 1946          | 5(2)        | -150     | Wilt Chamberlain    | 1961 (3)    | 1600          |
| 6    | Wilt Chamberlain    | 1965 (7)         | 1943          | 6(8)        | 25       | Bill Russell        | 1963 (8)    | 1595          |
| 7    | Wilt Chamberlain    | 1959 (1)         | 1941          | 7(3)        | -133     | Wilt Chamberlain    | 1966 (8)    | 1587          |
| 8    | Bill Russell        | 1963 (8)         | 1930          | 8(6)        | -33      | Wilt Chamberlain    | 1965 (7)    | 1552          |
| 9    | Bill Russell        | 1964 (9)         | 1878          | 9(11)       | 18       | Bill Russell        | 1962 (7)    | 1542          |
| 10   | Bill Russell        | 1960 (5)         | 1868          | 10(43)      | 76       | Moses Malone        | 1978 (5)    | 1537          |
| 11   | Bill Russell        | 1962 (7)         | 1843          | 11(27)      | 59       | Artis Gilmore       | 1973 (3)    | 1532          |
| 12   | Bill Russell        | 1961 (6)         | 1790          | 11(9)       | -22      | Bill Russell        | 1964 (9)    | 1532          |
| 13   | Wilt Chamberlain    | 1963 (5)         | 1787          | 13(52)      | 75       | Dennis Rodman       | 1993 (8)    | 1530          |
| 14   | Bill Russell        | 1965 (10)        | 1779          | 14(16)      | 12       | Wilt Chamberlain    | 1968 (10)   | 1479          |
| 15   | Bill Russell        | 1959 (4)         | 1778          | 15(20)      | 25       | Spencer Haywood     | 1969 (1)    | 1478          |
| 16   | Wilt Chamberlain    | 1968 (10)        | 1712          | 16(13)      | -23      | Wilt Chamberlain    | 1963 (5)    | 1477          |
| 17   | Bill Russell        | 1966 (11)        | 1700          | 17(29)      | 41       | Wilt Chamberlain    | 1972 (14)   | 1468          |
| 18   | Wilt Chamberlain    | 1964 (6)         | 1673          | 18(22)      | 18       | Wilt Chamberlain    | 1971 (13)   | 1467          |
| 19   | Jerry Lucas         | 1965 (3)         | 1668          | 19(37)      | 48       | Elvin Hayes         | 1973 (6)    | 1458          |
| 20   | Spencer Haywood     | 1969 (1)         | 1637          | 20(7)       | -185     | Wilt Chamberlain    | 1959 (1)    | 1456          |
| 21   | Bill Russell        | 1958 (3)         | 1612          | 21(14)      | -50      | Bill Russell        | 1965 (10)   | 1421          |
| 22   | Wilt Chamberlain    | 1971 (13)        | 1572          | 22(35)      | 37       | Artis Gilmore       | 1972 (2)    | 1420          |
| 23   | Bill Russell        | 1957 (2)         | 1564          | 23(12)      | -91      | Bill Russell        | 1961 (6)    | 1396          |
| 24   | Jerry Lucas         | 1967 (5)         | 1560          | 24(96)      | 75       | Dennis Rodman       | 1997 (12)   | 1395          |
| 25   | Jerry Lucas         | 1966 (4)         | 1547          | 24(10)      | -140     | Bill Russell        | 1960 (5)    | 1395          |
| 26   | Bob Pettit          | 1960 (7)         | 1540          | 26(32)      | 18       | Artis Gilmore       | 1971 (1)    | 1391          |
| 27   | Artis Gilmore       | 1973 (3)         | 1538          | 27(73)      | 63       | Kevin Willis        | 1991 (7)    | 1390          |
| 28   | Dennis Rodman       | 1991 (6)         | 1530          | 28(54)      | 48       | Artis Gilmore       | 1974 (4)    | 1385          |
| 29   | Wilt Chamberlain    | 1972 (14)        | 1526          | 29(48)      | 39       | Kareem Abdul-jabbar | 1975 (7)    | 1384          |
| 30   | Walt Bellamy        | 1961 (1)         | 1500          | 30(17)      | -76      | Bill Russell        | 1966 (11)   | 1379          |
| 31   | Wilt Chamberlain    | 1970 (12)        | 1493          | 31(18)      | -72      | Wilt Chamberlain    | 1964 (6)    | 1365          |
| 32   | Wes Unseld          | 1968 (1)         | 1491          | 32(31)      | -3       | Wilt Chamberlain    | 1970 (12)   | 1341          |
| 32   | Artis Gilmore       | 1971 (1)         | 1491          | 33(15)      | -120     | Bill Russell        | 1959 (4)    | 1333          |
| 34   | Bill Russell        | 1968 (13)        | 1484          | 33(119)     | 72       | Dwight Howard       | 2007 (4)    | 1333          |
| 35   | Artis Gilmore       | 1972 (2)         | 1476          | 35(19)      | -84      | Jerry Lucas         | 1965 (3)    | 1332          |
| 36   | Mel Daniels         | 1970 (4)         | 1475          | 35(24)      | -45      | Jerry Lucas         | 1967 (5)    | 1332          |
| 37   | Elvin Hayes         | 1973 (6)         | 1463          | 37(36)      | -2       | Mel Daniels         | 1970 (4)    | 1325          |
| 38   | Mel Daniels         | 1969 (3)         | 1462          | 38(38)      | 0        | Mel Daniels         | 1969 (3)    | 1320          |
| 39   | Bob Pettit          | 1961 (8)         | 1459          | 39(69)      | 43       | Truck Robinson      | 1977 (4)    | 1319          |
| 40   | Julius Keye         | 1970 (2)         | 1454          | 40(106)     | 62       | Moses Malone        | 1981 (8)    | 1318          |
| 41   | Bill Russell        | 1967 (12)        | 1451          | 41(111)     | 63       | Moses Malone        | 1980 (7)    | 1307          |
| 42   | Elgin Baylor        | 1960 (3)         | 1447          | 42(87)      | 51       | Swen Nater          | 1979 (7)    | 1306          |
| 43   | Moses Malone        | 1978 (5)         | 1444          | 42(40)      | -5       | Julius Keye         | 1970 (2)    | 1306          |
| 44   | Elvin Hayes         | 1968 (1)         | 1406          | 44(67)      | 34       | Artis Gilmore       | 1975 (5)    | 1304          |
| 45   | Nate Thurmond       | 1968 (6)         | 1402          | 45(128)     | 64       | Kevin Garnett       | 2003 (9)    | 1302          |
| 46   | Nate Thurmond       | 1964 (2)         | 1395          | 45(70)      | 35       | Swen Nater          | 1974 (2)    | 1302          |
| 47   | Elvin Hayes         | 1969 (2)         | 1386          | 47(120)     | 60       | Dikembe Mutombo     | 1999 (9)    | 1299          |
| 48   | Kareem Abdul-jabbar | 1975 (7)         | 1383          | 48(57)      | 15       | Nate Thurmond       | 1972 (10)   | 1297          |
| 49   | Nate Thurmond       | 1966 (4)         | 1382          | 49(99)      | 50       | Moses Malone        | 1982 (9)    | 1293          |
| 50   | Jerry Lucas         | 1963 (1)         | 1375          | 50(21)      | -138     | Bill Russell        | 1958 (3)    | 1290          |

TABLE S6: Ranking of Season Rebounds (1951 - 2008). The left columns list the traditional ranking of season statistics, where the top 50 players are ranked along with the year. The right columns list the detrended ranking of season statistics  $Rank^*$ .  $Y\#$  denotes the number of years into the career.

| Rank | Name                  | Traditional Rank |               | Rank* (Rank) | % Change | Detrended Rank   |             | Season Metric |
|------|-----------------------|------------------|---------------|--------------|----------|------------------|-------------|---------------|
|      |                       | Season (Y#)      | Season Metric |              |          | Name             | Season (Y#) |               |
| 1    | John Stockton         | 1990 (7)         | 1164          | 1(1)         | 0        | John Stockton    | 1990 (7)    | 1085          |
| 2    | John Stockton         | 1989 (6)         | 1134          | 2(4)         | 50       | John Stockton    | 1991 (8)    | 1061          |
| 3    | John Stockton         | 1987 (4)         | 1128          | 3(2)         | -50      | John Stockton    | 1989 (6)    | 1052          |
| 4    | John Stockton         | 1991 (8)         | 1126          | 4(3)         | -33      | John Stockton    | 1987 (4)    | 1007          |
| 5    | Isiah Thomas          | 1984 (4)         | 1123          | 4(6)         | 33       | John Stockton    | 1988 (5)    | 1007          |
| 6    | John Stockton         | 1988 (5)         | 1118          | 6(9)         | 33       | John Stockton    | 1994 (11)   | 998           |
| 7    | Kevin Porter          | 1978 (7)         | 1099          | 7(5)         | -40      | Isiah Thomas     | 1984 (4)    | 985           |
| 8    | John Stockton         | 1993 (10)        | 1031          | 8(7)         | -14      | Kevin Porter     | 1978 (7)    | 982           |
| 9    | John Stockton         | 1994 (11)        | 1011          | 9(16)        | 43       | Mark Jackson     | 1996 (10)   | 979           |
| 10   | Kevin Johnson         | 1988 (2)         | 991           | 9(17)        | 47       | Chris Paul       | 2007 (3)    | 979           |
| 11   | Magic Johnson         | 1990 (12)        | 989           | 11(8)        | -37      | John Stockton    | 1993 (10)   | 972           |
| 12   | Magic Johnson         | 1988 (10)        | 988           | 12(27)       | 55       | Steve Nash       | 2006 (11)   | 959           |
| 13   | John Stockton         | 1992 (9)         | 987           | 13(26)       | 50       | Steve Nash       | 2007 (12)   | 949           |
| 14   | Magic Johnson         | 1986 (8)         | 977           | 14(34)       | 58       | Oscar Robertson  | 1964 (5)    | 947           |
| 15   | Magic Johnson         | 1984 (6)         | 968           | 15(34)       | 55       | Chris Paul       | 2008 (4)    | 945           |
| 16   | Mark Jackson          | 1996 (10)        | 935           | 16(34)       | 52       | Steve Nash       | 2004 (9)    | 933           |
| 17   | Chris Paul            | 2007 (3)         | 925           | 17(30)       | 43       | Oscar Robertson  | 1963 (4)    | 932           |
| 18   | John Stockton         | 1995 (12)        | 916           | 17(22)       | 22       | Guy Rodgers      | 1966 (9)    | 932           |
| 19   | Isiah Thomas          | 1983 (3)         | 914           | 19(18)       | -5       | John Stockton    | 1995 (12)   | 930           |
| 19   | Norm Nixon            | 1983 (7)         | 914           | 20(28)       | 28       | Andre Miller     | 2001 (3)    | 928           |
| 21   | Nate Archibald        | 1972 (3)         | 910           | 21(51)       | 58       | Steve Nash       | 2005 (10)   | 925           |
| 22   | Guy Rodgers           | 1966 (9)         | 908           | 22(11)       | -100     | Magic Johnson    | 1990 (12)   | 922           |
| 23   | Magic Johnson         | 1989 (11)        | 907           | 23(13)       | -76      | John Stockton    | 1992 (9)    | 921           |
| 23   | Magic Johnson         | 1985 (7)         | 907           | 24(33)       | 27       | Deron Williams   | 2007 (3)    | 912           |
| 25   | Oscar Robertson       | 1961 (2)         | 899           | 25(37)       | 32       | John Stockton    | 1996 (13)   | 901           |
| 26   | Steve Nash            | 2007 (12)        | 897           | 26(10)       | -160     | Kevin Johnson    | 1988 (2)    | 893           |
| 27   | Steve Nash            | 2006 (11)        | 884           | 27(12)       | -125     | Magic Johnson    | 1988 (10)   | 890           |
| 28   | Andre Miller          | 2001 (3)         | 882           | 28(43)       | 34       | Oscar Robertson  | 1966 (7)    | 867           |
| 29   | Magic Johnson         | 1983 (5)         | 875           | 29(14)       | -107     | Magic Johnson    | 1986 (8)    | 866           |
| 30   | Oscar Robertson       | 1963 (4)         | 868           | 30(25)       | -20      | Oscar Robertson  | 1961 (2)    | 865           |
| 30   | Mark Jackson          | 1987 (1)         | 868           | 31(58)       | 46       | Jason Kidd       | 2007 (14)   | 853           |
| 32   | Muggsy Bogues         | 1989 (3)         | 867           | 32(56)       | 42       | Jason Kidd       | 2001 (8)    | 850           |
| 33   | Deron Williams        | 2007 (3)         | 862           | 32(40)       | 20       | Oscar Robertson  | 1965 (6)    | 850           |
| 34   | Oscar Robertson       | 1964 (5)         | 861           | 32(21)       | -52      | Nate Archibald   | 1972 (3)    | 850           |
| 34   | Chris Paul            | 2008 (4)         | 861           | 35(15)       | -133     | Magic Johnson    | 1984 (6)    | 849           |
| 34   | Steve Nash            | 2004 (9)         | 861           | 35(41)       | 14       | Guy Rodgers      | 1965 (8)    | 849           |
| 37   | John Stockton         | 1996 (13)        | 860           | 37(68)       | 45       | Oscar Robertson  | 1968 (9)    | 844           |
| 38   | Magic Johnson         | 1987 (9)         | 858           | 38(23)       | -65      | Magic Johnson    | 1989 (11)   | 841           |
| 39   | Sleepy Floyd          | 1986 (5)         | 848           | 39(59)       | 33       | Rod Strickland   | 1997 (10)   | 839           |
| 40   | Oscar Robertson       | 1965 (6)         | 847           | 40(52)       | 23       | Guy Rodgers      | 1962 (5)    | 836           |
| 41   | Guy Rodgers           | 1965 (8)         | 846           | 41(114)      | 64       | Wilt Chamberlain | 1967 (9)    | 835           |
| 41   | Kevin Johnson         | 1989 (3)         | 846           | 42(46)       | 8        | Norm Vanlier     | 1970 (2)    | 816           |
| 43   | Oscar Robertson       | 1966 (7)         | 845           | 43(83)       | 48       | Deron Williams   | 2006 (2)    | 808           |
| 44   | Kevin Porter          | 1977 (6)         | 837           | 43(141)      | 69       | Lenny Wilkens    | 1967 (8)    | 808           |
| 45   | Kevin Johnson         | 1991 (5)         | 836           | 45(19)       | -136     | Isiah Thomas     | 1983 (3)    | 806           |
| 46   | Norm Vanlier          | 1970 (2)         | 832           | 45(19)       | -136     | Norm Nixon       | 1983 (7)    | 806           |
| 46   | Michealray Richardson | 1979 (2)         | 832           | 47(23)       | -104     | Magic Johnson    | 1985 (7)    | 804           |
| 48   | Terry Porter          | 1987 (3)         | 831           | 47(32)       | -46      | Muggsy Bogues    | 1989 (3)    | 804           |
| 49   | Isiah Thomas          | 1985 (5)         | 830           | 49(61)       | 19       | Avery Johnson    | 1995 (8)    | 801           |
| 50   | Magic Johnson         | 1982 (4)         | 829           | 50(90)       | 44       | Jason Kidd       | 2006 (13)   | 799           |

TABLE S7: Ranking of Season Assists (1951 - 2008). The left columns list the traditional ranking of season statistics, where the top 50 players are ranked along with the year. The right columns list the detrended ranking of season statistics  $Rank^*$ .  $Y\#$  denotes the number of years into the career.

## Electronic-only supplementary information

In Tables S1–S10, we list top-50 tables for 5 career statistics and for 4 season statistics. For the two types of rankings, the columns are organized as follows:

**Career Tables S1–S5:** The 4 columns on the left of each table list information for the “traditional rank” of career statistics, where the top 50 players are ranked along with their final season (career length in seasons listed in parenthesis) and their career metric tally. The 5 columns on the right of each table list information for the “detrended rank” ( $Rank^*$ ) of career statistics, where the corresponding traditional rank ( $Rank$ ) of the player is denoted in parenthesis.  $L$  denotes the career length of the player. The relative percent change  $\%Change = (Rank^* - Rank)/Rank$ .

**Season Tables S6–S10:** The 4 columns on the left list the traditional ranking of season statistics, where the top 50 players are ranked along with the year. The right columns list the detrended ranking of season statistics  $Rank^*$ .  $Y\#$  denotes the number of years into the career. The relative percent change  $\%Change = (Rank^* - Rank)/Rank$ .

**Table S1.** Ranking of career home runs (1871–2009).

| Rank | Name              | Traditional Rank |               | Rank* (Rank) | % Change | Name             | Detrended Rank   |               |
|------|-------------------|------------------|---------------|--------------|----------|------------------|------------------|---------------|
|      |                   | Final Season (L) | Career Metric |              |          |                  | Final Season (L) | Career Metric |
| 1    | Barry Bonds       | 2007 (22)        | 762           | 1(3)         | 66       | Babe Ruth        | 1935 (22)        | 1215          |
| 2    | Hank Aaron        | 1976 (23)        | 755           | 2(23)        | 91       | Mel Ott          | 1947 (22)        | 637           |
| 3    | Babe Ruth         | 1935 (22)        | 714           | 3(26)        | 88       | Lou Gehrig       | 1939 (17)        | 635           |
| 4    | Willie Mays       | 1973 (22)        | 660           | 3(17)        | 82       | Jimmie Foxx      | 1945 (20)        | 635           |
| 5    | Ken Griffey       | 2009 (21)        | 630           | 5(2)         | -150     | Hank Aaron       | 1976 (23)        | 582           |
| 6    | Sammy Sosa        | 2007 (18)        | 609           | 6(124)       | 95       | Rogers Hornsby   | 1937 (23)        | 528           |
| 7    | Frank Robinson    | 1976 (21)        | 586           | 7(192)       | 96       | Cy Williams      | 1930 (19)        | 527           |
| 8    | Alex Rodriguez    | 2009 (16)        | 583           | 8(1)         | -700     | Barry Bonds      | 2007 (22)        | 502           |
| 8    | Mark McGwire      | 2001 (16)        | 583           | 9(4)         | -125     | Willie Mays      | 1973 (22)        | 490           |
| 10   | Harmon Killebrew  | 1975 (22)        | 573           | 10(18)       | 44       | Ted Williams     | 1960 (19)        | 482           |
| 11   | Rafael Palmeiro   | 2005 (20)        | 569           | 11(13)       | 15       | Reggie Jackson   | 1987 (21)        | 478           |
| 12   | Jim Thome         | 2009 (19)        | 564           | 12(14)       | 14       | Mike Schmidt     | 1989 (18)        | 463           |
| 13   | Reggie Jackson    | 1987 (21)        | 563           | 13(7)        | -85      | Frank Robinson   | 1976 (21)        | 444           |
| 14   | Mike Schmidt      | 1989 (18)        | 548           | 14(10)       | -40      | Harmon Killebrew | 1975 (22)        | 437           |
| 15   | Manny Ramirez     | 2009 (17)        | 546           | 15(577)      | 97       | Gavvy Cravath    | 1920 (11)        | 433           |
| 16   | Mickey Mantle     | 1968 (18)        | 536           | 16(718)      | 97       | Honus Wagner     | 1917 (21)        | 420           |
| 17   | Jimmie Foxx       | 1945 (20)        | 534           | 17(18)       | 5        | Willie McCovey   | 1980 (22)        | 417           |
| 18   | Ted Williams      | 1960 (19)        | 521           | 18(557)      | 96       | Harry Stovey     | 1893 (14)        | 413           |
| 18   | Frank Thomas      | 2008 (19)        | 521           | 19(5)        | -280     | Ken Griffey      | 2009 (21)        | 411           |
| 18   | Willie McCovey    | 1980 (22)        | 521           | 20(28)       | 28       | Stan Musial      | 1963 (22)        | 410           |
| 21   | Eddie Mathews     | 1968 (17)        | 512           | 21(28)       | 25       | Willie Stargell  | 1982 (21)        | 399           |
| 21   | Ernie Banks       | 1971 (19)        | 512           | 22(25)       | 12       | Eddie Murray     | 1997 (21)        | 397           |
| 23   | Mel Ott           | 1947 (22)        | 511           | 22(8)        | -175     | Mark McGwire     | 2001 (16)        | 397           |
| 24   | Gary Sheffield    | 2009 (22)        | 509           | 24(16)       | -50      | Mickey Mantle    | 1968 (18)        | 394           |
| 25   | Eddie Murray      | 1997 (21)        | 504           | 24(113)      | 78       | Al Simmons       | 1944 (20)        | 394           |
| 26   | Fred McGriff      | 2004 (19)        | 493           | 26(470)      | 94       | Roger Connor     | 1897 (18)        | 389           |
| 26   | Lou Gehrig        | 1939 (17)        | 493           | 27(752)      | 96       | Sam Crawford     | 1917 (19)        | 386           |
| 28   | Willie Stargell   | 1982 (21)        | 475           | 28(70)       | 60       | Joe DiMaggio     | 1951 (13)        | 382           |
| 28   | Stan Musial       | 1963 (22)        | 475           | 29(6)        | -383     | Sammy Sosa       | 2007 (18)        | 381           |
| 30   | Carlos Delgado    | 2009 (17)        | 473           | 30(35)       | 14       | Dave Kingman     | 1986 (16)        | 380           |
| 31   | Dave Winfield     | 1995 (22)        | 465           | 30(31)       | 3        | Dave Winfield    | 1995 (22)        | 380           |
| 32   | Jose Canseco      | 2001 (17)        | 462           | 32(21)       | -52      | Ernie Banks      | 1971 (19)        | 377           |
| 33   | Carl Yastrzemski  | 1983 (23)        | 452           | 33(91)       | 63       | Hank Greenberg   | 1947 (13)        | 376           |
| 34   | Jeff Bagwell      | 2005 (15)        | 449           | 34(72)       | 52       | Johnny Mize      | 1953 (15)        | 375           |
| 35   | Dave Kingman      | 1986 (16)        | 442           | 34(21)       | -61      | Eddie Mathews    | 1968 (17)        | 375           |
| 36   | Andre Dawson      | 1996 (21)        | 438           | 36(33)       | -9       | Carl Yastrzemski | 1983 (23)        | 373           |
| 37   | Juan Gonzalez     | 2005 (17)        | 434           | 36(594)      | 93       | Ty Cobb          | 1928 (24)        | 373           |
| 38   | Cal Ripken        | 2001 (21)        | 431           | 38(11)       | -245     | Rafael Palmeiro  | 2005 (20)        | 368           |
| 39   | Mike Piazza       | 2007 (16)        | 427           | 39(125)      | 68       | Chuck Klein      | 1944 (17)        | 361           |
| 40   | Billy Williams    | 1976 (18)        | 426           | 40(999)      | 95       | Harry Davis      | 1917 (22)        | 360           |
| 40   | Chipper Jones     | 2009 (16)        | 426           | 41(667)      | 93       | Dan Brouthers    | 1904 (19)        | 356           |
| 42   | Darrell Evans     | 1989 (21)        | 414           | 42(8)        | -425     | Alex Rodriguez   | 2009 (16)        | 355           |
| 43   | Jason Giambi      | 2009 (15)        | 409           | 43(802)      | 94       | Frank Schulte    | 1918 (15)        | 351           |
| 44   | Duke Snider       | 1964 (18)        | 407           | 44(135)      | 67       | Bob Johnson      | 1945 (13)        | 348           |
| 44   | Vladimir Guerrero | 2009 (14)        | 407           | 44(36)       | -22      | Andre Dawson     | 1996 (21)        | 348           |
| 46   | Al Kaline         | 1974 (22)        | 399           | 46(12)       | -283     | Jim Thome        | 2009 (19)        | 345           |
| 46   | Andres Galarraga  | 2004 (19)        | 399           | 46(26)       | -76      | Fred McGriff     | 2004 (19)        | 345           |
| 48   | Dale Murphy       | 1993 (18)        | 398           | 46(40)       | -15      | Billy Williams   | 1976 (18)        | 345           |
| 49   | Joe Carter        | 1998 (16)        | 396           | 49(153)      | 67       | Rudy York        | 1948 (13)        | 343           |
| 50   | Graig Nettles     | 1988 (22)        | 390           | 50(42)       | -19      | Darrell Evans    | 1989 (21)        | 342           |

Table S2. Ranking of career hits (1871–2009).

| Rank | Name              | Traditional Rank |               | Rank*(Rank) | % Change | Detrended Rank   |                  |               |
|------|-------------------|------------------|---------------|-------------|----------|------------------|------------------|---------------|
|      |                   | Final Season (L) | Career Metric |             |          | Name             | Final Season (L) | Career Metric |
| 1    | Pete Rose         | 1986 (24)        | 4256          | 1(1)        | 0        | Pete Rose        | 1986 (24)        | 4409          |
| 2    | Ty Cobb           | 1928 (24)        | 4189          | 2(2)        | 0        | Ty Cobb          | 1928 (24)        | 4166          |
| 3    | Hank Aaron        | 1976 (23)        | 3771          | 3(3)        | 0        | Hank Aaron       | 1976 (23)        | 3890          |
| 4    | Stan Musial       | 1963 (22)        | 3630          | 4(4)        | 0        | Stan Musial      | 1963 (22)        | 3661          |
| 5    | Tris Speaker      | 1928 (22)        | 3514          | 5(6)        | 16       | Carl Yastrzemski | 1983 (23)        | 3537          |
| 6    | Carl Yastrzemski  | 1983 (23)        | 3419          | 6(8)        | 25       | Honus Wagner     | 1917 (21)        | 3484          |
| 7    | Cap Anson         | 1897 (27)        | 3418          | 7(7)        | 0        | Cap Anson        | 1897 (27)        | 3464          |
| 8    | Honus Wagner      | 1917 (21)        | 3415          | 8(5)        | -60      | Tris Speaker     | 1928 (22)        | 3449          |
| 9    | Paul Molitor      | 1998 (21)        | 3319          | 9(11)       | 18       | Willie Mays      | 1973 (22)        | 3375          |
| 10   | Eddie Collins     | 1930 (25)        | 3315          | 10(9)       | -11      | Paul Molitor     | 1998 (21)        | 3361          |
| 11   | Willie Mays       | 1973 (22)        | 3283          | 11(12)      | 8        | Eddie Murray     | 1997 (21)        | 3303          |
| 12   | Eddie Murray      | 1997 (21)        | 3255          | 12(13)      | 7        | Nap Lajoie       | 1916 (21)        | 3291          |
| 13   | Nap Lajoie        | 1916 (21)        | 3242          | 13(10)      | -30      | Eddie Collins    | 1930 (25)        | 3266          |
| 14   | Cal Ripken        | 2001 (21)        | 3184          | 14(15)      | 6        | George Brett     | 1993 (21)        | 3222          |
| 15   | George Brett      | 1993 (21)        | 3154          | 15(14)      | -7       | Cal Ripken       | 2001 (21)        | 3219          |
| 16   | Paul Waner        | 1945 (20)        | 3152          | 16(17)      | 5        | Robin Yount      | 1993 (20)        | 3209          |
| 17   | Robin Yount       | 1993 (20)        | 3142          | 17(18)      | 5        | Tony Gwynn       | 2001 (20)        | 3175          |
| 18   | Tony Gwynn        | 2001 (20)        | 3141          | 18(19)      | 5        | Dave Winfield    | 1995 (22)        | 3171          |
| 19   | Dave Winfield     | 1995 (22)        | 3110          | 19(23)      | 17       | Lou Brock        | 1979 (19)        | 3150          |
| 20   | Craig Biggio      | 2007 (20)        | 3060          | 20(22)      | 9        | Rod Carew        | 1985 (19)        | 3149          |
| 21   | Rickey Henderson  | 2003 (25)        | 3055          | 21(27)      | 22       | Roberto Clemente | 1972 (18)        | 3107          |
| 22   | Rod Carew         | 1985 (19)        | 3053          | 22(26)      | 15       | Al Kaline        | 1974 (22)        | 3094          |
| 23   | Lou Brock         | 1979 (19)        | 3023          | 23(21)      | -9       | Rickey Henderson | 2003 (25)        | 3089          |
| 24   | Rafael Palmeiro   | 2005 (20)        | 3020          | 24(20)      | -20      | Craig Biggio     | 2007 (20)        | 3060          |
| 25   | Wade Boggs        | 1999 (18)        | 3010          | 25(25)      | 0        | Wade Boggs       | 1999 (18)        | 3053          |
| 26   | Al Kaline         | 1974 (22)        | 3007          | 26(29)      | 10       | Sam Crawford     | 1917 (19)        | 3046          |
| 27   | Roberto Clemente  | 1972 (18)        | 3000          | 27(30)      | 10       | Frank Robinson   | 1976 (21)        | 3040          |
| 28   | Sam Rice          | 1934 (20)        | 2987          | 28(24)      | -16      | Rafael Palmeiro  | 2005 (20)        | 3034          |
| 29   | Sam Crawford      | 1917 (19)        | 2961          | 29(16)      | -81      | Paul Waner       | 1945 (20)        | 2968          |
| 30   | Frank Robinson    | 1976 (21)        | 2943          | 30(42)      | 28       | Brooks Robinson  | 1977 (23)        | 2955          |
| 31   | Barry Bonds       | 2007 (22)        | 2935          | 31(31)      | 0        | Barry Bonds      | 2007 (22)        | 2948          |
| 32   | Willie Keeler     | 1910 (19)        | 2932          | 32(33)      | 3        | Jake Beckley     | 1907 (20)        | 2905          |
| 33   | Rogers Hornsby    | 1937 (23)        | 2930          | 33(40)      | 17       | Harold Baines    | 2001 (22)        | 2900          |
| 33   | Jake Beckley      | 1907 (20)        | 2930          | 34(32)      | -6       | Willie Keeler    | 1910 (19)        | 2872          |
| 35   | Al Simmons        | 1944 (20)        | 2927          | 35(47)      | 25       | Vada Pinson      | 1975 (18)        | 2863          |
| 36   | Zack Wheat        | 1927 (19)        | 2884          | 36(52)      | 30       | Tony Perez       | 1986 (23)        | 2831          |
| 37   | Frankie Frisch    | 1937 (19)        | 2880          | 37(58)      | 36       | Billy Williams   | 1976 (18)        | 2830          |
| 38   | Mel Ott           | 1947 (22)        | 2876          | 38(45)      | 15       | Andre Dawson     | 1996 (21)        | 2823          |
| 39   | Babe Ruth         | 1935 (22)        | 2873          | 39(55)      | 29       | Rusty Staub      | 1985 (23)        | 2821          |
| 40   | Harold Baines     | 2001 (22)        | 2866          | 40(50)      | 20       | Al Oliver        | 1985 (18)        | 2813          |
| 41   | Jesse Burkett     | 1905 (16)        | 2850          | 41(36)      | -13      | Zack Wheat       | 1927 (19)        | 2809          |
| 42   | Brooks Robinson   | 1977 (23)        | 2848          | 42(28)      | -50      | Sam Rice         | 1934 (20)        | 2794          |
| 43   | Charlie Gehringer | 1942 (19)        | 2839          | 43(56)      | 23       | Bill Buckner     | 1990 (22)        | 2779          |
| 44   | George Sisler     | 1930 (15)        | 2812          | 44(63)      | 30       | Luis Aparicio    | 1973 (18)        | 2771          |
| 45   | Andre Dawson      | 1996 (21)        | 2774          | 45(57)      | 21       | Dave Parker      | 1991 (19)        | 2770          |
| 46   | Ken Griffey       | 2009 (21)        | 2763          | 46(41)      | -12      | Jesse Burkett    | 1905 (16)        | 2768          |
| 47   | Vada Pinson       | 1975 (18)        | 2757          | 47(33)      | -42      | Rogers Hornsby   | 1937 (23)        | 2766          |
| 48   | Luke Appling      | 1950 (20)        | 2749          | 47(46)      | -2       | Ken Griffey      | 2009 (21)        | 2766          |
| 49   | Derek Jeter       | 2009 (15)        | 2747          | 49(38)      | -28      | Mel Ott          | 1947 (22)        | 2745          |
| 50   | Al Oliver         | 1985 (18)        | 2743          | 50(53)      | 5        | Roberto Alomar   | 2004 (17)        | 2738          |

Table S3. Ranking of career runs batted in (1871–2009).

| Rank | Name             | Traditional Rank |               | Rank*(Rank) | % Change | Detrended Rank   |                  |               |
|------|------------------|------------------|---------------|-------------|----------|------------------|------------------|---------------|
|      |                  | Final Season (L) | Career Metric |             |          | Name             | Final Season (L) | Career Metric |
| 1    | Hank Aaron       | 1976 (23)        | 2297          | 1(1)        | 0        | Hank Aaron       | 1976 (23)        | 2362          |
| 2    | Babe Ruth        | 1935 (22)        | 2217          | 2(3)        | 33       | Cap Anson        | 1897 (27)        | 2295          |
| 3    | Cap Anson        | 1897 (27)        | 2076          | 3(7)        | 57       | Ty Cobb          | 1928 (24)        | 2176          |
| 4    | Barry Bonds      | 2007 (22)        | 1996          | 4(2)        | -100     | Babe Ruth        | 1935 (22)        | 2120          |
| 5    | Lou Gehrig       | 1939 (17)        | 1995          | 5(20)       | 75       | Honus Wagner     | 1917 (21)        | 1986          |
| 6    | Stan Musial      | 1963 (22)        | 1951          | 6(12)       | 50       | Carl Yastrzemski | 1983 (23)        | 1933          |
| 7    | Ty Cobb          | 1928 (24)        | 1937          | 7(10)       | 30       | Willie Mays      | 1973 (22)        | 1930          |
| 8    | Jimmie Foxx      | 1945 (20)        | 1922          | 8(6)        | -33      | Stan Musial      | 1963 (22)        | 1911          |
| 9    | Eddie Murray     | 1997 (21)        | 1917          | 9(9)        | 0        | Eddie Murray     | 1997 (21)        | 1899          |
| 10   | Willie Mays      | 1973 (22)        | 1903          | 10(18)      | 44       | Frank Robinson   | 1976 (21)        | 1868          |
| 11   | Mel Ott          | 1947 (22)        | 1860          | 11(15)      | 26       | Dave Winfield    | 1995 (22)        | 1848          |
| 12   | Carl Yastrzemski | 1983 (23)        | 1844          | 11(4)       | -175     | Barry Bonds      | 2007 (22)        | 1848          |
| 13   | Ted Williams     | 1960 (19)        | 1839          | 13(47)      | 72       | Sam Crawford     | 1917 (19)        | 1798          |
| 14   | Rafael Palmeiro  | 2005 (20)        | 1835          | 14(5)       | -180     | Lou Gehrig       | 1939 (17)        | 1796          |
| 15   | Dave Winfield    | 1995 (22)        | 1833          | 15(31)      | 51       | Nap Lajoie       | 1916 (21)        | 1782          |
| 16   | Ken Griffey      | 2009 (21)        | 1829          | 16(13)      | -23      | Ted Williams     | 1960 (19)        | 1776          |
| 17   | Al Simmons       | 1944 (20)        | 1827          | 17(23)      | 26       | Reggie Jackson   | 1987 (21)        | 1770          |
| 18   | Frank Robinson   | 1976 (21)        | 1812          | 18(8)       | -125     | Jimmie Foxx      | 1945 (20)        | 1747          |
| 19   | Manny Ramirez    | 2009 (17)        | 1788          | 19(27)      | 29       | Tony Perez       | 1986 (23)        | 1745          |
| 20   | Honus Wagner     | 1917 (21)        | 1732          | 20(11)      | -81      | Mel Ott          | 1947 (22)        | 1725          |
| 21   | Alex Rodriguez   | 2009 (16)        | 1706          | 21(14)      | -50      | Rafael Palmeiro  | 2005 (20)        | 1689          |
| 22   | Frank Thomas     | 2008 (19)        | 1704          | 22(16)      | -37      | Ken Griffey      | 2009 (21)        | 1679          |
| 23   | Reggie Jackson   | 1987 (21)        | 1702          | 23(28)      | 17       | Ernie Banks      | 1971 (19)        | 1661          |
| 24   | Cal Ripken       | 2001 (21)        | 1695          | 24(45)      | 46       | Tris Speaker     | 1928 (22)        | 1653          |
| 25   | Gary Sheffield   | 2009 (22)        | 1676          | 25(17)      | -47      | Al Simmons       | 1944 (20)        | 1646          |
| 26   | Sammy Sosa       | 2007 (18)        | 1667          | 25(35)      | 28       | Harmon Killebrew | 1975 (22)        | 1646          |
| 27   | Tony Perez       | 1986 (23)        | 1652          | 27(42)      | 35       | Willie Stargell  | 1982 (21)        | 1640          |
| 28   | Ernie Banks      | 1971 (19)        | 1636          | 28(40)      | 30       | Willie McCovey   | 1980 (22)        | 1635          |
| 29   | Harold Baines    | 2001 (22)        | 1628          | 29(24)      | -20      | Cal Ripken       | 2001 (21)        | 1625          |
| 30   | Goose Goslin     | 1938 (18)        | 1609          | 30(32)      | 6        | Mike Schmidt     | 1989 (18)        | 1622          |
| 31   | Nap Lajoie       | 1916 (21)        | 1599          | 31(37)      | 16       | Al Kaline        | 1974 (22)        | 1614          |
| 32   | Mike Schmidt     | 1989 (18)        | 1595          | 31(32)      | 3        | George Brett     | 1993 (21)        | 1614          |
| 32   | George Brett     | 1993 (21)        | 1595          | 33(19)      | -73      | Manny Ramirez    | 2009 (17)        | 1598          |
| 34   | Andre Dawson     | 1996 (21)        | 1591          | 34(34)      | 0        | Andre Dawson     | 1996 (21)        | 1586          |
| 35   | Harmon Killebrew | 1975 (22)        | 1584          | 35(29)      | -20      | Harold Baines    | 2001 (22)        | 1573          |
| 35   | Rogers Hornsby   | 1937 (23)        | 1584          | 36(52)      | 30       | Billy Williams   | 1976 (18)        | 1567          |
| 37   | Al Kaline        | 1974 (22)        | 1583          | 37(35)      | -5       | Rogers Hornsby   | 1937 (23)        | 1557          |
| 38   | Jake Beckley     | 1907 (20)        | 1575          | 38(22)      | -72      | Frank Thomas     | 2008 (19)        | 1554          |
| 39   | Jim Thome        | 2009 (19)        | 1565          | 39(53)      | 26       | Rusty Staub      | 1985 (23)        | 1550          |
| 40   | Willie McCovey   | 1980 (22)        | 1555          | 40(25)      | -60      | Gary Sheffield   | 2009 (22)        | 1533          |
| 41   | Fred McGriff     | 2004 (19)        | 1550          | 41(21)      | -95      | Alex Rodriguez   | 2009 (16)        | 1528          |
| 42   | Willie Stargell  | 1982 (21)        | 1540          | 42(43)      | 2        | Harry Heilmann   | 1932 (17)        | 1521          |
| 43   | Harry Heilmann   | 1932 (17)        | 1539          | 43(51)      | 15       | Dave Parker      | 1991 (19)        | 1515          |
| 44   | Joe DiMaggio     | 1951 (13)        | 1537          | 44(38)      | -15      | Jake Beckley     | 1907 (20)        | 1511          |
| 45   | Tris Speaker     | 1928 (22)        | 1529          | 45(26)      | -73      | Sammy Sosa       | 2007 (18)        | 1504          |
| 45   | Jeff Bagwell     | 2005 (15)        | 1529          | 46(50)      | 8        | Mickey Mantle    | 1968 (18)        | 1502          |
| 47   | Sam Crawford     | 1917 (19)        | 1525          | 47(56)      | 16       | Jim Rice         | 1989 (16)        | 1473          |
| 48   | Jeff Kent        | 2008 (17)        | 1518          | 48(30)      | -60      | Goose Goslin     | 1938 (18)        | 1456          |
| 49   | Carlos Delgado   | 2009 (17)        | 1512          | 49(103)     | 52       | Dan Brouthers    | 1904 (19)        | 1449          |
| 50   | Mickey Mantle    | 1968 (18)        | 1509          | 50(73)      | 31       | Johnny Bench     | 1983 (17)        | 1447          |



Table S4. Ranking of career strikeouts (1871–2009).

| Rank | Name              | Traditional Rank |               | Detrended Rank |          |                   |                  |               |
|------|-------------------|------------------|---------------|----------------|----------|-------------------|------------------|---------------|
|      |                   | Final Season (L) | Career Metric | Rank*(Rank)    | % Change | Name              | Final Season (L) | Career Metric |
| 1    | Nolan Ryan        | 1993 (27)        | 5714          | 1(1)           | 0        | Nolan Ryan        | 1993 (27)        | 4937          |
| 2    | Randy Johnson     | 2009 (22)        | 4875          | 2(9)           | 77       | Walter Johnson    | 1927 (21)        | 4681          |
| 3    | Roger Clemens     | 2007 (24)        | 4672          | 3(20)          | 85       | Cy Young          | 1911 (22)        | 4216          |
| 4    | Steve Carlton     | 1988 (24)        | 4136          | 4(4)           | 0        | Steve Carlton     | 1988 (24)        | 3615          |
| 5    | Bert Blyleven     | 1992 (22)        | 3701          | 5(2)           | -150     | Randy Johnson     | 2009 (22)        | 3524          |
| 6    | Tom Seaver        | 1986 (20)        | 3640          | 6(3)           | -100     | Roger Clemens     | 2007 (24)        | 3483          |
| 7    | Don Sutton        | 1988 (23)        | 3574          | 7(46)          | 84       | Lefty Grove       | 1941 (17)        | 3307          |
| 8    | Gaylord Perry     | 1983 (22)        | 3534          | 8(27)          | 70       | Tim Keefe         | 1893 (14)        | 3241          |
| 9    | Walter Johnson    | 1927 (21)        | 3509          | 9(5)           | -80      | Bert Blyleven     | 1992 (22)        | 3223          |
| 10   | Greg Maddux       | 2008 (23)        | 3371          | 10(59)         | 83       | Dazzy Vance       | 1935 (16)        | 3208          |
| 11   | Phil Niekro       | 1987 (24)        | 3342          | 11(26)         | 57       | Bob Feller        | 1956 (18)        | 3193          |
| 12   | Fergie Jenkins    | 1983 (19)        | 3192          | 12(6)          | -100     | Tom Seaver        | 1986 (20)        | 3154          |
| 13   | Pedro Martinez    | 2009 (18)        | 3154          | 13(75)         | 82       | Amos Rusie        | 1901 (10)        | 3138          |
| 14   | Bob Gibson        | 1975 (17)        | 3117          | 14(29)         | 51       | Christy Mathewson | 1916 (17)        | 3116          |
| 15   | Curt Schilling    | 2007 (20)        | 3116          | 15(7)          | -114     | Don Sutton        | 1988 (23)        | 3073          |
| 16   | John Smoltz       | 2009 (21)        | 3084          | 16(43)         | 62       | Rube Waddell      | 1910 (13)        | 3054          |
| 17   | Jim Bunning       | 1971 (17)        | 2855          | 17(79)         | 78       | Kid Nichols       | 1906 (15)        | 3042          |
| 18   | Mickey Lolich     | 1979 (16)        | 2832          | 18(8)          | -125     | Gaylord Perry     | 1983 (22)        | 3015          |
| 19   | Mike Mussina      | 2008 (18)        | 2813          | 19(52)         | 63       | Pete Alexander    | 1930 (20)        | 2926          |
| 20   | Cy Young          | 1911 (22)        | 2803          | 20(11)         | -81      | Phil Niekro       | 1987 (24)        | 2916          |
| 21   | Frank Tanana      | 1993 (21)        | 2773          | 21(223)        | 90       | Bobby Mathews     | 1887 (15)        | 2871          |
| 22   | David Cone        | 2003 (17)        | 2668          | 22(66)         | 66       | Red Ruffing       | 1947 (22)        | 2804          |
| 23   | Chuck Finley      | 2002 (17)        | 2610          | 23(48)         | 52       | Eddie Plank       | 1917 (17)        | 2748          |
| 24   | Tom Glavine       | 2008 (22)        | 2607          | 24(12)         | -100     | Fergie Jenkins    | 1983 (19)        | 2740          |
| 25   | Warren Spahn      | 1965 (21)        | 2583          | 25(57)         | 56       | Bobo Newsom       | 1953 (20)        | 2714          |
| 26   | Bob Feller        | 1956 (18)        | 2581          | 26(25)         | -4       | Warren Spahn      | 1965 (21)        | 2660          |
| 27   | Tim Keefe         | 1893 (14)        | 2562          | 27(14)         | -92      | Bob Gibson        | 1975 (17)        | 2534          |
| 28   | Jerry Koosman     | 1985 (19)        | 2556          | 28(119)        | 76       | Gus Weyhing       | 1901 (14)        | 2533          |
| 29   | Christy Mathewson | 1916 (17)        | 2502          | 29(68)         | 57       | John Clarkson     | 1894 (12)        | 2522          |
| 30   | Don Drysdale      | 1969 (14)        | 2486          | 30(10)         | -200     | Greg Maddux       | 2008 (23)        | 2475          |
| 31   | Jack Morris       | 1994 (18)        | 2478          | 31(42)         | 26       | Early Wynn        | 1963 (23)        | 2471          |
| 32   | Mark Langston     | 1999 (16)        | 2464          | 32(21)         | -52      | Frank Tanana      | 1993 (21)        | 2417          |
| 33   | Jim Kaat          | 1983 (25)        | 2461          | 32(84)         | 61       | Pud Galvin        | 1892 (15)        | 2417          |
| 34   | Sam McDowell      | 1975 (15)        | 2453          | 34(17)         | -100     | Jim Bunning       | 1971 (17)        | 2373          |
| 35   | Luis Tiant        | 1982 (19)        | 2416          | 35(163)        | 78       | Burleigh Grimes   | 1934 (19)        | 2361          |
| 36   | Dennis Eckersley  | 1998 (24)        | 2401          | 36(40)         | 10       | Robin Roberts     | 1966 (19)        | 2355          |
| 37   | Kevin Brown       | 2005 (19)        | 2397          | 37(122)        | 69       | Vic Willis        | 1910 (13)        | 2352          |
| 38   | Sandy Koufax      | 1966 (12)        | 2396          | 38(18)         | -111     | Mickey Lolich     | 1979 (16)        | 2334          |
| 39   | Charlie Hough     | 1994 (25)        | 2362          | 39(85)         | 54       | Tony Mullane      | 1894 (13)        | 2320          |
| 40   | Robin Roberts     | 1966 (19)        | 2357          | 40(113)        | 64       | Carl Hubbell      | 1943 (16)        | 2312          |
| 41   | Jamie Moyer       | 2009 (23)        | 2342          | 41(106)        | 61       | Jim McCormick     | 1887 (10)        | 2301          |
| 42   | Early Wynn        | 1963 (23)        | 2334          | 42(86)         | 51       | Hal Newhouser     | 1955 (17)        | 2275          |
| 43   | Rube Waddell      | 1910 (13)        | 2316          | 43(129)        | 66       | Jack Powell       | 1912 (16)        | 2266          |
| 44   | Juan Marichal     | 1975 (16)        | 2303          | 44(80)         | 45       | Mickey Welch      | 1892 (13)        | 2263          |
| 45   | Dwight Gooden     | 2000 (16)        | 2293          | 45(28)         | -60      | Jerry Koosman     | 1985 (19)        | 2258          |
| 46   | Lefty Grove       | 1941 (17)        | 2266          | 46(16)         | -187     | John Smoltz       | 2009 (21)        | 2256          |
| 47   | Javier Vazquez    | 2009 (12)        | 2253          | 47(114)        | 58       | Tommy Bridges     | 1946 (16)        | 2247          |
| 48   | Eddie Plank       | 1917 (17)        | 2246          | 47(82)         | 42       | Charley Radbourn  | 1891 (11)        | 2247          |
| 49   | Tommy John        | 1989 (26)        | 2245          | 49(13)         | -276     | Pedro Martinez    | 2009 (18)        | 2225          |
| 50   | Jim Palmer        | 1984 (19)        | 2212          | 50(15)         | -233     | Curt Schilling    | 2007 (20)        | 2222          |

Table S5. Ranking of career wins (1890–2009).

| Rank | Name              | Traditional Rank |               | Detrended Rank |          |                   |                  |               |
|------|-------------------|------------------|---------------|----------------|----------|-------------------|------------------|---------------|
|      |                   | Final Season (L) | Career Metric | Rank*(Rank)    | % Change | Name              | Final Season (L) | Career Metric |
| 1    | Cy Young          | 1911 (22)        | 511           | 1(1)           | 0        | Cy Young          | 1911 (22)        | 510           |
| 2    | Walter Johnson    | 1927 (21)        | 417           | 2(2)           | 0        | Walter Johnson    | 1927 (21)        | 420           |
| 3    | Christy Mathewson | 1916 (17)        | 373           | 3(3)           | 0        | Christy Mathewson | 1916 (17)        | 376           |
| 3    | Pete Alexander    | 1930 (20)        | 373           | 4(3)           | -33      | Pete Alexander    | 1930 (20)        | 375           |
| 5    | Pud Galvin        | 1892 (15)        | 364           | 5(5)           | 0        | Pud Galvin        | 1892 (15)        | 365           |
| 6    | Warren Spahn      | 1965 (21)        | 363           | 6(6)           | 0        | Warren Spahn      | 1965 (21)        | 362           |
| 7    | Kid Nichols       | 1906 (15)        | 361           | 7(7)           | 0        | Kid Nichols       | 1906 (15)        | 359           |
| 8    | Greg Maddux       | 2008 (23)        | 355           | 8(8)           | 0        | Greg Maddux       | 2008 (23)        | 351           |
| 9    | Roger Clemens     | 2007 (24)        | 354           | 9(9)           | 0        | Roger Clemens     | 2007 (24)        | 350           |
| 10   | Tim Lincecum      | 1893 (14)        | 342           | 10(10)         | 0        | Tim Keefe         | 1893 (14)        | 342           |
| 11   | Steve Carlton     | 1988 (24)        | 329           | 11(11)         | 0        | Steve Carlton     | 1988 (24)        | 329           |
| 12   | John Clarkson     | 1894 (12)        | 328           | 12(13)         | 7        | Eddie Plank       | 1917 (17)        | 328           |
| 13   | Eddie Plank       | 1917 (17)        | 326           | 13(12)         | -8       | John Clarkson     | 1894 (12)        | 327           |
| 14   | Don Sutton        | 1988 (23)        | 324           | 14(14)         | 0        | Don Sutton        | 1988 (23)        | 324           |
| 14   | Nolan Ryan        | 1993 (27)        | 324           | 14(14)         | 0        | Nolan Ryan        | 1993 (27)        | 324           |
| 16   | Phil Niekro       | 1987 (24)        | 318           | 16(16)         | 0        | Phil Niekro       | 1987 (24)        | 318           |
| 17   | Gaylord Perry     | 1983 (22)        | 314           | 17(17)         | 0        | Gaylord Perry     | 1983 (22)        | 314           |
| 18   | Tom Seaver        | 1986 (20)        | 311           | 18(18)         | 0        | Tom Seaver        | 1986 (20)        | 311           |
| 19   | Charley Radbourn  | 1891 (11)        | 309           | 19(19)         | 0        | Charley Radbourn  | 1891 (11)        | 308           |
| 20   | Mickey Welch      | 1892 (13)        | 307           | 20(20)         | 0        | Mickey Welch      | 1892 (13)        | 307           |
| 21   | Tom Glavine       | 2008 (22)        | 305           | 21(21)         | 0        | Tom Glavine       | 2008 (22)        | 302           |
| 22   | Randy Johnson     | 2009 (22)        | 303           | 22(25)         | 12       | Bobby Mathews     | 1887 (15)        | 300           |
| 23   | Early Wynn        | 1963 (23)        | 300           | 22(23)         | 4        | Early Wynn        | 1963 (23)        | 300           |
| 23   | Lefty Grove       | 1941 (17)        | 300           | 24(23)         | -4       | Lefty Grove       | 1941 (17)        | 299           |
| 25   | Bobby Mathews     | 1887 (15)        | 297           | 24(22)         | -9       | Randy Johnson     | 2009 (22)        | 299           |
| 26   | Tommy John        | 1989 (26)        | 288           | 26(26)         | 0        | Tommy John        | 1989 (26)        | 288           |
| 27   | Bert Blyleven     | 1992 (22)        | 287           | 27(27)         | 0        | Bert Blyleven     | 1992 (22)        | 287           |
| 28   | Robin Roberts     | 1966 (19)        | 286           | 28(28)         | 0        | Robin Roberts     | 1966 (19)        | 285           |
| 29   | Tony Mullane      | 1894 (13)        | 284           | 29(29)         | 0        | Fergie Jenkins    | 1983 (19)        | 284           |
| 29   | Fergie Jenkins    | 1983 (19)        | 284           | 30(31)         | 3        | Jim Kaat          | 1983 (25)        | 283           |
| 31   | Jim Kaat          | 1983 (25)        | 283           | 30(29)         | -3       | Tony Mullane      | 1894 (13)        | 283           |
| 32   | Red Ruffing       | 1947 (22)        | 273           | 32(32)         | 0        | Red Ruffing       | 1947 (22)        | 272           |
| 33   | Mike Mussina      | 2008 (18)        | 270           | 33(33)         | 0        | Burleigh Grimes   | 1934 (19)        | 270           |
| 33   | Burleigh Grimes   | 1934 (19)        | 270           | 34(35)         | 2        | Jim Palmer        | 1984 (19)        | 268           |
| 35   | Jim Palmer        | 1984 (19)        | 268           | 35(33)         | -6       | Mike Mussina      | 2008 (18)        | 267           |
| 36   | Eppa Rixey        | 1933 (21)        | 266           | 36(36)         | 0        | Eppa Rixey        | 1933 (21)        | 266           |
| 36   | Bob Feller        | 1956 (18)        | 266           | 36(38)         | 5        | Jim McCormick     | 1887 (10)        | 266           |
| 38   | Jim McCormick     | 1887 (10)        | 265           | 38(36)         | -5       | Bob Feller        | 1956 (18)        | 265           |
| 39   | Gus Weyhing       | 1901 (14)        | 264           | 39(39)         | 0        | Gus Weyhing       | 1901 (14)        | 263           |
| 40   | Ted Lyons         | 1946 (21)        | 260           | 40(40)         | 0        | Ted Lyons         | 1946 (21)        | 259           |
| 41   | Jamie Moyer       | 2009 (23)        | 258           | 40(44)         | 9        | Al Spalding       | 1877 (7)         | 259           |
| 42   | Jack Morris       | 1994 (18)        | 254           | 42(42)         | 0        | Red Faber         | 1933 (20)        | 255           |
| 42   | Red Faber         | 1933 (20)        | 254           | 43(41)         | -4       | Jamie Moyer       | 2009 (23)        | 254           |
| 44   | Al Spalding       | 1877 (7)         | 253           | 44(42)         | -4       | Jack Morris       | 1994 (18)        | 253           |
| 44   | Carl Hubbell      | 1943 (16)        | 253           | 44(44)         | 0        | Carl Hubbell      | 1943 (16)        | 253           |
| 46   | Bob Gibson        | 1975 (17)        | 251           | 46(46)         | 0        | Bob Gibson        | 1975 (17)        | 251           |
| 47   | Vic Willis        | 1910 (13)        | 249           | 47(47)         | 0        | Vic Willis        | 1910 (13)        | 250           |
| 48   | Jack Quinn        | 1933 (23)        | 247           | 48(48)         | 0        | Jack Quinn        | 1933 (23)        | 247           |
| 49   | Joe McGinnity     | 1908 (10)        | 246           | 48(49)         | 2        | Joe McGinnity     | 1908 (10)        | 247           |
| 50   | Amos Rusie        | 1901 (10)        | 245           | 50(50)         | 0        | Jack Powell       | 1912 (16)        | 245           |

Table S6. Ranking of season home runs for the Modern Era (1920–2009).

| Rank | Name           | Traditional Rank |               | Detrended Rank |          |                |             |               |
|------|----------------|------------------|---------------|----------------|----------|----------------|-------------|---------------|
|      |                | Season (Y#)      | Season Metric | Rank*(Rank)    | % Change | Name           | Season (Y#) | Season Metric |
| 1    | Barry Bonds    | 2001 (16)        | 73            | 1(19)          | 94       | Babe Ruth      | 1920 (7)    | 133           |
| 2    | Mark McGwire   | 1998 (13)        | 70            | 2(8)           | 75       | Babe Ruth      | 1927 (14)   | 102           |
| 3    | Sammy Sosa     | 1998 (10)        | 66            | 3(9)           | 66       | Babe Ruth      | 1921 (8)    | 100           |
| 4    | Mark McGwire   | 1999 (14)        | 65            | 4(72)          | 94       | Babe Ruth      | 1926 (13)   | 82            |
| 5    | Sammy Sosa     | 2001 (13)        | 64            | 5(94)          | 94       | Babe Ruth      | 1924 (11)   | 80            |
| 6    | Sammy Sosa     | 1999 (11)        | 63            | 5(72)          | 93       | Lou Gehrig     | 1927 (5)    | 80            |
| 7    | Roger Maris    | 1961 (5)         | 61            | 7(19)          | 63       | Babe Ruth      | 1928 (15)   | 77            |
| 8    | Babe Ruth      | 1927 (14)        | 60            | 8(61)          | 86       | Jimmie Foxx    | 1933 (9)    | 70            |
| 9    | Babe Ruth      | 1921 (8)         | 59            | 9(94)          | 90       | Babe Ruth      | 1931 (18)   | 68            |
| 10   | Mark McGwire   | 1997 (12)        | 58            | 9(94)          | 90       | Lou Gehrig     | 1931 (9)    | 68            |
| 10   | Ryan Howard    | 2006 (3)         | 58            | 11(10)         | -10      | Jimmie Foxx    | 1932 (8)    | 67            |
| 10   | Hank Greenberg | 1938 (7)         | 58            | 12(215)        | 94       | Cy Williams    | 1923 (12)   | 66            |
| 10   | Jimmie Foxx    | 1932 (8)         | 58            | 12(215)        | 94       | Babe Ruth      | 1923 (10)   | 66            |
| 14   | Alex Rodriguez | 2002 (9)         | 57            | 14(181)        | 92       | Rogers Hornsby | 1922 (8)    | 62            |
| 14   | Luis Gonzalez  | 2001 (12)        | 57            | 15(10)         | -50      | Hank Greenberg | 1938 (7)    | 60            |
| 16   | Hack Wilson    | 1930 (8)         | 56            | 16(301)        | 94       | Ken Williams   | 1922 (7)    | 58            |
| 16   | Ken Griffey    | 1998 (10)        | 56            | 16(592)        | 97       | Rudy York      | 1943 (8)    | 58            |
| 16   | Ken Griffey    | 1997 (9)         | 56            | 18(42)         | 57       | Lou Gehrig     | 1936 (14)   | 57            |
| 19   | Babe Ruth      | 1928 (15)        | 54            | 18(42)         | 57       | Lou Gehrig     | 1934 (12)   | 57            |
| 19   | Babe Ruth      | 1920 (7)         | 54            | 20(16)         | -25      | Hack Wilson    | 1930 (8)    | 56            |
| 19   | Alex Rodriguez | 2007 (14)        | 54            | 21(135)        | 84       | Hank Greenberg | 1946 (12)   | 55            |
| 19   | David Ortiz    | 2006 (10)        | 54            | 21(401)        | 94       | Tilly Walker   | 1922 (12)   | 55            |
| 19   | Mickey Mantle  | 1961 (11)        | 54            | 23(94)         | 75       | Babe Ruth      | 1929 (16)   | 53            |
| 19   | Ralph Kiner    | 1949 (4)         | 54            | 23(899)        | 97       | Charlie Keller | 1943 (5)    | 53            |
| 25   | Jim Thome      | 2002 (12)        | 52            | 25(301)        | 91       | Rogers Hornsby | 1925 (11)   | 52            |
| 25   | Alex Rodriguez | 2001 (8)         | 52            | 25(36)         | 30       | Jimmie Foxx    | 1938 (14)   | 52            |
| 25   | Mark McGwire   | 1996 (11)        | 52            | 25(519)        | 95       | Babe Ruth      | 1922 (9)    | 52            |
| 25   | Willie Mays    | 1965 (14)        | 52            | 28(135)        | 79       | Jimmie Foxx    | 1934 (10)   | 51            |
| 25   | Mickey Mantle  | 1956 (6)         | 52            | 28(1023)       | 97       | Hack Wilson    | 1927 (5)    | 51            |
| 25   | George Foster  | 1977 (9)         | 52            | 28(1023)       | 97       | Cy Williams    | 1927 (16)   | 51            |
| 31   | Johnny Mize    | 1947 (9)         | 51            | 28(457)        | 93       | Ted Williams   | 1942 (4)    | 51            |
| 31   | Willie Mays    | 1955 (4)         | 51            | 32(161)        | 80       | Chuck Klein    | 1929 (2)    | 50            |
| 31   | Ralph Kiner    | 1947 (2)         | 51            | 32(31)         | -3       | Johnny Mize    | 1947 (9)    | 50            |
| 31   | Andrew Jones   | 2005 (10)        | 51            | 32(31)         | -3       | Ralph Kiner    | 1947 (2)    | 50            |
| 31   | Cecil Fielder  | 1990 (5)         | 51            | 35(94)         | 62       | Joe DiMaggio   | 1937 (2)    | 49            |
| 36   | Greg Vaughn    | 1998 (10)        | 50            | 35(592)        | 94       | Babe Ruth      | 1933 (20)   | 49            |
| 36   | Sammy Sosa     | 2000 (12)        | 50            | 35(42)         | 16       | Babe Ruth      | 1930 (17)   | 49            |
| 36   | Jimmie Foxx    | 1938 (14)        | 50            | 35(1134)       | 96       | Bill Nicholson | 1943 (6)    | 49            |
| 36   | Prince Fielder | 2007 (3)         | 50            | 35(181)        | 80       | Hal Trosky     | 1936 (4)    | 49            |
| 36   | Albert Belle   | 1995 (7)         | 50            | 35(686)        | 94       | Bill Nicholson | 1944 (7)    | 49            |
| 36   | Brady Anderson | 1996 (9)         | 50            | 41(181)        | 77       | Mel Ott        | 1929 (4)    | 48            |
| 42   | Larry Walker   | 1997 (9)         | 49            | 41(19)         | -115     | Ralph Kiner    | 1949 (4)    | 48            |
| 42   | Jim Thome      | 2001 (11)        | 49            | 41(215)        | 80       | Jimmie Foxx    | 1936 (12)   | 48            |
| 42   | Sammy Sosa     | 2002 (14)        | 49            | 41(353)        | 88       | Ted Williams   | 1946 (5)    | 48            |
| 42   | Babe Ruth      | 1930 (17)        | 49            | 45(215)        | 79       | Babe Ruth      | 1932 (19)   | 47            |
| 42   | Frank Robinson | 1966 (11)        | 49            | 45(1422)       | 96       | Joe Hauser     | 1924 (3)    | 47            |
| 42   | Albert Pujols  | 2006 (6)         | 49            | 45(1422)       | 96       | Jack Fournier  | 1924 (12)   | 47            |
| 42   | Mark McGwire   | 1987 (2)         | 49            | 45(777)        | 94       | Earl Averill   | 1931 (3)    | 47            |
| 42   | Willie Mays    | 1962 (11)        | 49            | 45(1134)       | 96       | Ken Williams   | 1923 (8)    | 47            |
| 42   | Ted Kluszewski | 1954 (8)         | 49            | 45(3401)       | 98       | George Sisler  | 1920 (6)    | 47            |

Table S7. Ranking of season hits (1890–2009).

| Rank | Name              | Traditional Rank |               | Detrended Rank |          |                  |             |               |
|------|-------------------|------------------|---------------|----------------|----------|------------------|-------------|---------------|
|      |                   | Season (Y#)      | Season Metric | Rank*(Rank)    | % Change | Name             | Season (Y#) | Season Metric |
| 1    | Ichiro Suzuki     | 2004 (4)         | 262           | 1(1)           | 0        | Ichiro Suzuki    | 2004 (4)    | 259           |
| 2    | George Sisler     | 1920 (6)         | 257           | 2(13)          | 84       | Wade Boggs       | 1985 (4)    | 247           |
| 3    | Bill Terry        | 1930 (8)         | 254           | 3(2)           | -50      | George Sisler    | 1920 (6)    | 245           |
| 3    | Lefty O'Doul      | 1929 (6)         | 254           | 4(18)          | 77       | Don Mattingly    | 1986 (5)    | 244           |
| 5    | Al Simmons        | 1925 (2)         | 253           | 5(8)           | 37       | Ty Cobb          | 1911 (7)    | 243           |
| 6    | Chuck Klein       | 1930 (3)         | 250           | 5(27)          | 81       | Kirby Puckett    | 1988 (5)    | 243           |
| 6    | Rogers Hornsby    | 1922 (8)         | 250           | 7(32)          | 78       | Matty Alou       | 1969 (10)   | 242           |
| 8    | Ty Cobb           | 1911 (7)         | 248           | 7(10)          | 30       | Ichiro Suzuki    | 2001 (1)    | 242           |
| 9    | George Sisler     | 1922 (8)         | 246           | 9(16)          | 43       | Rod Carew        | 1977 (11)   | 240           |
| 10   | Ichiro Suzuki     | 2001 (1)         | 242           | 10(36)         | 72       | Joe Torre        | 1971 (12)   | 239           |
| 11   | Heinie Manush     | 1928 (6)         | 241           | 11(44)         | 75       | Nap Lajoie       | 1910 (15)   | 237           |
| 11   | Babe Herman       | 1930 (5)         | 241           | 12(36)         | 66       | Pete Rose        | 1973 (11)   | 236           |
| 13   | Darin Erstad      | 2000 (5)         | 240           | 12(56)         | 78       | Ty Cobb          | 1917 (13)   | 236           |
| 13   | Jesse Burkett     | 1896 (7)         | 240           | 14(18)         | 22       | Ichiro Suzuki    | 2007 (7)    | 235           |
| 13   | Wade Boggs        | 1985 (4)         | 240           | 14(13)         | -7       | Darin Erstad     | 2000 (5)    | 235           |
| 16   | Willie Keeler     | 1897 (6)         | 239           | 16(42)         | 61       | Stan Musial      | 1946 (5)    | 233           |
| 16   | Rod Carew         | 1977 (11)        | 239           | 17(90)         | 81       | Cy Seymour       | 1905 (10)   | 232           |
| 18   | Ichiro Suzuki     | 2007 (7)         | 238           | 18(36)         | 50       | Tommy Davis      | 1962 (4)    | 231           |
| 18   | Don Mattingly     | 1986 (5)         | 238           | 19(119)        | 84       | Ty Cobb          | 1909 (5)    | 230           |
| 18   | Ed Delahanty      | 1899 (12)        | 238           | 19(36)         | 47       | Willie Wilson    | 1980 (5)    | 230           |
| 21   | Paul Waner        | 1927 (2)         | 237           | 19(211)        | 90       | Pete Rose        | 1968 (6)    | 230           |
| 21   | Joe Medwick       | 1937 (6)         | 237           | 19(211)        | 90       | Felipe Alou      | 1968 (11)   | 230           |
| 21   | Harry Heilmann    | 1921 (7)         | 237           | 23(119)        | 80       | Mike Donlin      | 1905 (7)    | 229           |
| 21   | Hugh Duffy        | 1894 (7)         | 237           | 23(68)         | 66       | Kirby Puckett    | 1986 (3)    | 229           |
| 25   | Jack Tobin        | 1921 (7)         | 236           | 25(29)         | 13       | Joe Jackson      | 1911 (4)    | 228           |
| 26   | Rogers Hornsby    | 1921 (7)         | 235           | 25(3)          | -733     | Lefty O'Doul     | 1929 (6)    | 228           |
| 27   | Lloyd Waner       | 1929 (3)         | 234           | 25(150)        | 83       | Nap Lajoie       | 1906 (11)   | 228           |
| 27   | Kirby Puckett     | 1988 (5)         | 234           | 25(101)        | 75       | Pete Rose        | 1969 (7)    | 228           |
| 29   | Joe Jackson       | 1911 (4)         | 233           | 25(101)        | 75       | Felipe Alou      | 1966 (9)    | 228           |
| 30   | Nap Lajoie        | 1901 (6)         | 232           | 25(90)         | 72       | Ralph Garr       | 1971 (4)    | 228           |
| 30   | Earl Averill      | 1936 (8)         | 232           | 25(36)         | 30       | Stan Musial      | 1948 (7)    | 228           |
| 32   | Freddie Lindstrom | 1930 (7)         | 231           | 32(85)         | 62       | Stan Musial      | 1943 (3)    | 227           |
| 32   | Freddie Lindstrom | 1928 (5)         | 231           | 32(5)          | -540     | Al Simmons       | 1925 (2)    | 227           |
| 32   | Earle Combs       | 1927 (4)         | 231           | 32(6)          | -433     | Rogers Hornsby   | 1922 (8)    | 227           |
| 32   | Matty Alou        | 1969 (10)        | 231           | 35(30)         | -16      | Nap Lajoie       | 1901 (6)    | 226           |
| 36   | Willie Wilson     | 1980 (5)         | 230           | 35(56)         | 37       | Ichiro Suzuki    | 2009 (9)    | 226           |
| 36   | Joe Torre         | 1971 (12)        | 230           | 35(177)        | 80       | Ty Cobb          | 1907 (3)    | 226           |
| 36   | Pete Rose         | 1973 (11)        | 230           | 38(68)         | 44       | Hank Aaron       | 1959 (6)    | 225           |
| 36   | Stan Musial       | 1948 (7)         | 230           | 38(63)         | 39       | Tommy Holmes     | 1945 (4)    | 225           |
| 36   | Tommy Davis       | 1962 (4)         | 230           | 38(3)          | -1166    | Bill Terry       | 1930 (8)    | 225           |
| 41   | Rogers Hornsby    | 1929 (15)        | 229           | 41(101)        | 59       | Rod Carew        | 1974 (8)    | 224           |
| 42   | Stan Musial       | 1946 (5)         | 228           | 41(113)        | 63       | Tony Oliva       | 1964 (3)    | 224           |
| 42   | Kiki Cuyler       | 1930 (10)        | 228           | 41(11)         | -272     | Heinie Manush    | 1928 (6)    | 224           |
| 44   | Sam Rice          | 1925 (11)        | 227           | 41(21)         | -95      | Joe Medwick      | 1937 (6)    | 224           |
| 44   | Nap Lajoie        | 1910 (15)        | 227           | 45(18)         | -150     | Ed Delahanty     | 1899 (12)   | 223           |
| 44   | Lance Johnson     | 1996 (10)        | 227           | 45(137)        | 67       | Kirby Puckett    | 1989 (6)    | 223           |
| 44   | Rogers Hornsby    | 1924 (10)        | 227           | 45(247)        | 81       | Nap Lajoie       | 1904 (9)    | 223           |
| 44   | Billy Herman      | 1935 (5)         | 227           | 45(119)        | 62       | Paul Molitor     | 1991 (14)   | 223           |
| 44   | Charlie Gehringer | 1936 (13)        | 227           | 45(9)          | -400     | George Sisler    | 1922 (8)    | 223           |
| 44   | Jim Bottomley     | 1925 (4)         | 227           | 45(229)        | 80       | Roberto Clemente | 1967 (13)   | 223           |

Table S8. Ranking of season runs batted in (RBI) (1890–2009).

| Rank | Name             | Traditional Rank |               | Detrended Rank |          |                  |             |               |
|------|------------------|------------------|---------------|----------------|----------|------------------|-------------|---------------|
|      |                  | Season (Y#)      | Season Metric | Rank*(Rank)    | % Change | Name             | Season (Y#) | Season Metric |
| 1    | Hack Wilson      | 1930 (8)         | 191           | 1(2)           | 50       | Lou Gehrig       | 1931 (9)    | 168           |
| 2    | Lou Gehrig       | 1931 (9)         | 184           | 2(3)           | 33       | Hank Greenberg   | 1937 (6)    | 164           |
| 3    | Hank Greenberg   | 1937 (6)         | 183           | 3(4)           | 25       | Lou Gehrig       | 1927 (5)    | 162           |
| 4    | Lou Gehrig       | 1927 (5)         | 175           | 4(7)           | 42       | Babe Ruth        | 1921 (8)    | 161           |
| 4    | Jimmie Foxx      | 1938 (14)        | 175           | 5(485)         | 98       | Ty Cobb          | 1907 (3)    | 160           |
| 6    | Lou Gehrig       | 1930 (8)         | 174           | 6(17)          | 64       | Jimmie Foxx      | 1933 (9)    | 159           |
| 7    | Babe Ruth        | 1921 (8)         | 171           | 7(8)           | 12       | Hank Greenberg   | 1935 (4)    | 155           |
| 8    | Chuck Klein      | 1930 (3)         | 170           | 7(4)           | -75      | Jimmie Foxx      | 1938 (14)   | 155           |
| 8    | Hank Greenberg   | 1935 (4)         | 170           | 9(10)          | 10       | Jimmie Foxx      | 1932 (8)    | 153           |
| 10   | Jimmie Foxx      | 1932 (8)         | 169           | 10(16)         | 37       | Babe Ruth        | 1927 (14)   | 152           |
| 11   | Joe DiMaggio     | 1937 (2)         | 167           | 10(1)          | -900     | Hack Wilson      | 1930 (8)    | 152           |
| 12   | Sam Thompson     | 1895 (11)        | 165           | 10(930)        | 98       | Honus Wagner     | 1908 (12)   | 152           |
| 12   | Al Simmons       | 1930 (7)         | 165           | 13(989)        | 98       | Ty Cobb          | 1908 (4)    | 150           |
| 12   | Manny Ramirez    | 1999 (7)         | 165           | 13(350)        | 96       | Sherry Magee     | 1910 (7)    | 150           |
| 12   | Lou Gehrig       | 1934 (12)        | 165           | 13(11)         | -18      | Joe DiMaggio     | 1937 (2)    | 150           |
| 16   | Babe Ruth        | 1927 (14)        | 164           | 16(17)         | 5        | Babe Ruth        | 1931 (18)   | 149           |
| 17   | Babe Ruth        | 1931 (18)        | 163           | 17(126)        | 86       | Joe Torre        | 1971 (12)   | 148           |
| 17   | Jimmie Foxx      | 1933 (9)         | 163           | 17(12)         | -41      | Lou Gehrig       | 1934 (12)   | 148           |
| 19   | Hal Trosky       | 1936 (4)         | 162           | 17(414)        | 95       | Cy Seymour       | 1905 (10)   | 148           |
| 20   | Sammy Sosa       | 2001 (13)        | 160           | 17(1131)       | 98       | Mike Donlin      | 1908 (9)    | 148           |
| 21   | Hack Wilson      | 1929 (7)         | 159           | 17(21)         | 19       | Ted Williams     | 1949 (8)    | 148           |
| 21   | Ted Williams     | 1949 (8)         | 159           | 17(21)         | 19       | Vern Stephens    | 1949 (9)    | 148           |
| 21   | Vern Stephens    | 1949 (9)         | 159           | 23(126)        | 81       | Babe Ruth        | 1920 (7)    | 147           |
| 21   | Lou Gehrig       | 1937 (15)        | 159           | 24(126)        | 80       | Ted Williams     | 1942 (4)    | 146           |
| 25   | Sammy Sosa       | 1998 (10)        | 158           | 24(452)        | 94       | Sam Crawford     | 1910 (12)   | 146           |
| 26   | Al Simmons       | 1929 (6)         | 157           | 24(106)        | 77       | Harmon Killebrew | 1969 (16)   | 146           |
| 26   | Juan Gonzalez    | 1998 (10)        | 157           | 24(46)         | 47       | George Foster    | 1977 (9)    | 146           |
| 28   | Alex Rodriguez   | 2007 (14)        | 156           | 24(112)        | 78       | Jim Rice         | 1978 (5)    | 146           |
| 28   | Jimmie Foxx      | 1930 (6)         | 156           | 24(232)        | 89       | Gavvy Cravath    | 1913 (4)    | 146           |
| 30   | Ken Williams     | 1922 (7)         | 155           | 24(34)         | 29       | Tommy Davis      | 1962 (4)    | 146           |
| 30   | Joe DiMaggio     | 1948 (10)        | 155           | 31(30)         | -3       | Joe DiMaggio     | 1948 (10)   | 145           |
| 32   | Babe Ruth        | 1929 (16)        | 154           | 31(49)         | 36       | Johnny Bench     | 1970 (4)    | 145           |
| 32   | Joe Medwick      | 1937 (6)         | 154           | 33(30)         | -10      | Ken Williams     | 1922 (7)    | 144           |
| 34   | Babe Ruth        | 1930 (17)        | 153           | 33(63)         | 47       | Don Mattingly    | 1985 (4)    | 144           |
| 34   | Tommy Davis      | 1962 (4)         | 153           | 35(301)        | 88       | Johnny Bench     | 1972 (6)    | 143           |
| 36   | Rogers Hornsby   | 1922 (8)         | 152           | 35(1059)       | 96       | Ty Cobb          | 1909 (5)    | 143           |
| 36   | Lou Gehrig       | 1936 (14)        | 152           | 35(20)         | -75      | Sammy Sosa       | 2001 (13)   | 143           |
| 36   | Albert Belle     | 1998 (10)        | 152           | 35(21)         | -66      | Lou Gehrig       | 1937 (15)   | 143           |
| 39   | Al Simmons       | 1932 (9)         | 151           | 39(232)        | 83       | Bill Nicholson   | 1943 (6)    | 142           |
| 39   | Mel Ott          | 1929 (4)         | 151           | 39(25)         | -56      | Sammy Sosa       | 1998 (10)   | 142           |
| 39   | Lou Gehrig       | 1932 (10)        | 151           | 39(36)         | -8       | Rogers Hornsby   | 1922 (8)    | 142           |
| 42   | Miguel Tejada    | 2004 (8)         | 150           | 42(26)         | -61      | Juan Gonzalez    | 1998 (10)   | 141           |
| 42   | Babe Ruth        | 1926 (13)        | 150           | 42(42)         | 0        | Hank Greenberg   | 1940 (9)    | 141           |
| 42   | Hank Greenberg   | 1940 (9)         | 150           | 42(42)         | 0        | Babe Ruth        | 1926 (13)   | 141           |
| 42   | Andres Galarraga | 1996 (12)        | 150           | 45(19)         | -136     | Hal Trosky       | 1936 (4)    | 140           |
| 46   | Ryan Howard      | 2006 (3)         | 149           | 45(12)         | -275     | Manny Ramirez    | 1999 (7)    | 140           |
| 46   | Rogers Hornsby   | 1929 (15)        | 149           | 45(28)         | -60      | Alex Rodriguez   | 2007 (14)   | 140           |
| 46   | George Foster    | 1977 (9)         | 149           | 45(194)        | 76       | Enos Slaughter   | 1946 (6)    | 140           |
| 49   | Rafael Palmeiro  | 1999 (14)        | 148           | 45(194)        | 76       | Hank Aaron       | 1963 (10)   | 140           |
| 49   | David Ortiz      | 2005 (9)         | 148           | 50(382)        | 86       | Billy Williams   | 1972 (14)   | 139           |

Table S9. Ranking of season strikeouts (1883–2009).

| Rank | Name              | Traditional Rank |               | Rank* (Rank) | % Change | Detrended Rank    |             |               |
|------|-------------------|------------------|---------------|--------------|----------|-------------------|-------------|---------------|
|      |                   | Season (Y#)      | Season Metric |              |          | Name              | Season (Y#) | Season Metric |
| 1    | Matt Kilroy       | 1886 (1)         | 513           | 1(17)        | 94       | Toad Ramsey       | 1887 (3)    | 557           |
| 2    | Toad Ramsey       | 1886 (2)         | 499           | 2(1)         | -100     | Matt Kilroy       | 1886 (1)    | 523           |
| 3    | Hugh Daily        | 1884 (3)         | 483           | 3(2)         | -50      | Toad Ramsey       | 1886 (2)    | 509           |
| 4    | Dupee Shaw        | 1884 (2)         | 451           | 4(16)        | 75       | Tim Keefe         | 1883 (4)    | 478           |
| 5    | Charley Radbourn  | 1884 (4)         | 441           | 5(13)        | 61       | Mark Baldwin      | 1889 (3)    | 463           |
| 6    | Charlie Buffinton | 1884 (3)         | 417           | 6(204)       | 97       | Cy Seymour        | 1898 (3)    | 457           |
| 7    | Guy Hecker        | 1884 (3)         | 385           | 6(22)        | 72       | Jim Whitney       | 1883 (3)    | 457           |
| 8    | Nolan Ryan        | 1973 (7)         | 383           | 8(25)        | 68       | Amos Rusie        | 1890 (2)    | 445           |
| 9    | Sandy Koufax      | 1965 (11)        | 382           | 9(129)       | 93       | Dazzy Vance       | 1924 (5)    | 443           |
| 10   | Bill Sweeney      | 1884 (2)         | 374           | 10(3)        | -233     | Hugh Daily        | 1884 (3)    | 442           |
| 11   | Randy Johnson     | 2001 (14)        | 372           | 11(403)      | 97       | Amos Rusie        | 1893 (5)    | 439           |
| 12   | Pud Galvin        | 1884 (7)         | 369           | 12(27)       | 55       | Amos Rusie        | 1891 (3)    | 434           |
| 13   | Mark Baldwin      | 1889 (3)         | 368           | 13(43)       | 69       | Bill Hutchison    | 1892 (5)    | 431           |
| 14   | Nolan Ryan        | 1974 (8)         | 367           | 14(18)       | 22       | Rube Waddell      | 1904 (7)    | 419           |
| 15   | Randy Johnson     | 1999 (12)        | 364           | 15(42)       | 64       | Charley Radbourn  | 1883 (3)    | 417           |
| 16   | Tim Keefe         | 1883 (4)         | 361           | 16(4)        | -300     | Dupee Shaw        | 1884 (2)    | 412           |
| 17   | Toad Ramsey       | 1887 (3)         | 355           | 17(578)      | 97       | Amos Rusie        | 1894 (6)    | 410           |
| 18   | Rube Waddell      | 1904 (7)         | 349           | 18(19)       | 5        | Bob Feller        | 1946 (8)    | 407           |
| 19   | Bob Feller        | 1946 (8)         | 348           | 19(5)        | -280     | Charley Radbourn  | 1884 (4)    | 403           |
| 20   | Randy Johnson     | 2000 (13)        | 347           | 20(29)       | 31       | Tim Keefe         | 1888 (9)    | 399           |
| 21   | Hardie Henderson  | 1884 (2)         | 346           | 21(77)       | 72       | Amos Rusie        | 1892 (4)    | 395           |
| 22   | Jim Whitney       | 1883 (3)         | 345           | 22(496)      | 95       | Amos Rusie        | 1895 (7)    | 392           |
| 22   | Mickey Welch      | 1884 (5)         | 345           | 23(6)        | -283     | Charlie Buffinton | 1884 (3)    | 381           |
| 24   | Jim McCormick     | 1884 (7)         | 343           | 24(70)       | 65       | Sadie McMahan     | 1890 (2)    | 379           |
| 25   | Nolan Ryan        | 1977 (11)        | 341           | 24(59)       | 59       | Rube Waddell      | 1903 (6)    | 379           |
| 25   | Amos Rusie        | 1890 (2)         | 341           | 26(74)       | 64       | Jack Stivetts     | 1890 (2)    | 377           |
| 27   | Charlie Sweeney   | 1884 (2)         | 337           | 26(74)       | 64       | Bill Hutchison    | 1890 (3)    | 377           |
| 27   | Amos Rusie        | 1891 (3)         | 337           | 28(216)      | 87       | John Clarkson     | 1887 (5)    | 372           |
| 29   | Tim Keefe         | 1888 (9)         | 335           | 29(90)       | 67       | Pud Galvin        | 1883 (6)    | 370           |
| 30   | Tim Keefe         | 1884 (5)         | 334           | 30(299)      | 89       | Dazzy Vance       | 1925 (6)    | 368           |
| 30   | Randy Johnson     | 2002 (15)        | 334           | 31(49)       | 36       | John Clarkson     | 1885 (3)    | 366           |
| 32   | Nolan Ryan        | 1972 (6)         | 329           | 32(44)       | 27       | Walter Johnson    | 1910 (4)    | 364           |
| 32   | Randy Johnson     | 1998 (11)        | 329           | 33(83)       | 60       | John Clarkson     | 1889 (7)    | 357           |
| 34   | Nolan Ryan        | 1976 (10)        | 327           | 34(64)       | 46       | Ed Morris         | 1885 (2)    | 354           |
| 35   | Ed Morris         | 1886 (3)         | 326           | 35(7)        | -400     | Guy Hecker        | 1884 (3)    | 352           |
| 36   | Tony Mullane      | 1884 (4)         | 325           | 36(57)       | 36       | Walter Johnson    | 1912 (6)    | 343           |
| 36   | Sam McDowell      | 1965 (5)         | 325           | 37(10)       | -270     | Bill Sweeney      | 1884 (2)    | 342           |
| 38   | Lady Baldwin      | 1886 (3)         | 323           | 38(887)      | 95       | Doc McJames       | 1898 (4)    | 340           |
| 39   | Curt Schilling    | 1997 (10)        | 319           | 38(79)       | 51       | Bobby Mathews     | 1885 (13)   | 340           |
| 40   | Sandy Koufax      | 1966 (12)        | 317           | 38(321)      | 88       | Matt Kilroy       | 1887 (2)    | 340           |
| 41   | Curt Schilling    | 2002 (15)        | 316           | 41(204)      | 79       | Noodles Hahn      | 1901 (3)    | 338           |
| 42   | Charley Radbourn  | 1883 (3)         | 315           | 41(271)      | 84       | Vic Willis        | 1902 (5)    | 338           |
| 43   | Bill Hutchison    | 1892 (5)         | 314           | 43(12)       | -258     | Pud Galvin        | 1884 (7)    | 337           |
| 44   | J.R. Richard      | 1979 (9)         | 313           | 44(132)      | 66       | Bill Hutchison    | 1891 (4)    | 336           |
| 44   | Pedro Martinez    | 1999 (8)         | 313           | 44(109)      | 59       | Ed Walsh          | 1908 (5)    | 336           |
| 44   | Walter Johnson    | 1910 (4)         | 313           | 46(78)       | 41       | Rube Waddell      | 1905 (8)    | 335           |
| 44   | John Clarkson     | 1886 (4)         | 313           | 46(147)      | 68       | Toad Ramsey       | 1890 (6)    | 335           |
| 48   | Steve Carlton     | 1972 (8)         | 310           | 46(118)      | 61       | Christy Mathewson | 1903 (4)    | 335           |
| 49   | Larry McKeon      | 1884 (1)         | 308           | 46(14)       | -228     | Nolan Ryan        | 1974 (8)    | 335           |
| 49   | Mickey Lolich     | 1971 (9)         | 308           | 50(137)      | 63       | Bob Feller        | 1941 (6)    | 334           |

Table S10. Ranking of season strikeouts for the Modern Era (1920–2009).

| Rank | Name           | Traditional Rank |               | Rank*(Rank) | % Change | Detrended Rank     |             |               |
|------|----------------|------------------|---------------|-------------|----------|--------------------|-------------|---------------|
|      |                | Season (Y#)      | Season Metric |             |          | Name               | Season (Y#) | Season Metric |
| 1    | Nolan Ryan     | 1973 (7)         | 383           | 1(72)       | 98       | Dazzy Vance        | 1924 (5)    | 443           |
| 2    | Sandy Koufax   | 1965 (11)        | 382           | 2(6)        | 66       | Bob Feller         | 1946 (8)    | 407           |
| 3    | Randy Johnson  | 2001 (14)        | 372           | 3(197)      | 98       | Dazzy Vance        | 1925 (6)    | 368           |
| 4    | Nolan Ryan     | 1974 (8)         | 367           | 4(4)        | 0        | Nolan Ryan         | 1974 (8)    | 335           |
| 5    | Randy Johnson  | 1999 (12)        | 364           | 5(79)       | 93       | Bob Feller         | 1941 (6)    | 334           |
| 6    | Bob Feller     | 1946 (8)         | 348           | 6(1)        | -500     | Nolan Ryan         | 1973 (7)    | 333           |
| 7    | Randy Johnson  | 2000 (13)        | 347           | 7(75)       | 90       | Bob Feller         | 1940 (5)    | 325           |
| 8    | Nolan Ryan     | 1977 (11)        | 341           | 8(133)      | 93       | Van Mungo          | 1936 (6)    | 323           |
| 9    | Randy Johnson  | 2002 (15)        | 334           | 9(47)       | 80       | Hal Newhouser      | 1946 (8)    | 322           |
| 10   | Nolan Ryan     | 1972 (6)         | 329           | 10(102)     | 90       | Bob Feller         | 1939 (4)    | 321           |
| 10   | Randy Johnson  | 1998 (11)        | 329           | 11(435)     | 97       | Lefty Grove        | 1926 (2)    | 317           |
| 12   | Nolan Ryan     | 1976 (10)        | 327           | 12(124)     | 90       | Bob Feller         | 1938 (3)    | 316           |
| 13   | Sam McDowell   | 1965 (5)         | 325           | 12(400)     | 97       | Dazzy Vance        | 1923 (4)    | 316           |
| 14   | Curt Schilling | 1997 (10)        | 319           | 12(367)     | 96       | Dazzy Vance        | 1928 (9)    | 316           |
| 15   | Sandy Koufax   | 1966 (12)        | 317           | 15(12)      | -25      | Nolan Ryan         | 1976 (10)   | 310           |
| 16   | Curt Schilling | 2002 (15)        | 316           | 16(8)       | -100     | Nolan Ryan         | 1977 (11)   | 301           |
| 17   | J.R. Richard   | 1979 (9)         | 313           | 17(578)     | 97       | Dazzy Vance        | 1927 (8)    | 299           |
| 17   | Pedro Martinez | 1999 (8)         | 313           | 18(175)     | 89       | Bobo Newsom        | 1938 (8)    | 298           |
| 19   | Steve Carlton  | 1972 (8)         | 310           | 18(382)     | 95       | Dizzy Dean         | 1933 (3)    | 298           |
| 20   | Mickey Lolich  | 1971 (9)         | 308           | 18(17)      | -5       | J.R. Richard       | 1979 (9)    | 298           |
| 20   | Randy Johnson  | 1993 (6)         | 308           | 21(2)       | -950     | Sandy Koufax       | 1965 (11)   | 294           |
| 22   | Mike Scott     | 1986 (8)         | 306           | 21(251)     | 91       | Hal Newhouser      | 1945 (7)    | 294           |
| 22   | Sandy Koufax   | 1963 (9)         | 306           | 23(269)     | 91       | Lefty Grove        | 1930 (6)    | 293           |
| 24   | Pedro Martinez | 1997 (6)         | 305           | 24(26)      | 7        | J.R. Richard       | 1978 (8)    | 289           |
| 25   | Sam McDowell   | 1970 (10)        | 304           | 24(600)     | 96       | Lefty Grove        | 1928 (4)    | 289           |
| 26   | J.R. Richard   | 1978 (8)         | 303           | 26(767)     | 96       | Lefty Grove        | 1927 (3)    | 282           |
| 27   | Nolan Ryan     | 1989 (23)        | 301           | 27(484)     | 94       | Dizzy Dean         | 1932 (2)    | 274           |
| 27   | Vida Blue      | 1971 (3)         | 301           | 28(499)     | 94       | Red Ruffing        | 1932 (9)    | 273           |
| 29   | Curt Schilling | 1998 (11)        | 300           | 29(37)      | 21       | Steve Carlton      | 1980 (16)   | 272           |
| 30   | Randy Johnson  | 1995 (8)         | 294           | 30(449)     | 93       | George Earnshaw    | 1930 (3)    | 271           |
| 31   | Curt Schilling | 2001 (14)        | 293           | 31(10)      | -210     | Nolan Ryan         | 1972 (6)    | 270           |
| 32   | Roger Clemens  | 1997 (14)        | 292           | 31(528)     | 94       | Lefty Grove        | 1932 (8)    | 270           |
| 33   | Randy Johnson  | 1997 (10)        | 291           | 33(791)     | 95       | Pete Alexander     | 1920 (10)   | 269           |
| 33   | Roger Clemens  | 1988 (5)         | 291           | 34(874)     | 96       | Lefty Grove        | 1929 (5)    | 268           |
| 35   | Randy Johnson  | 2004 (17)        | 290           | 35(1174)    | 97       | Walter Johnson     | 1924 (18)   | 267           |
| 36   | Tom Seaver     | 1971 (5)         | 289           | 36(423)     | 91       | Dizzy Dean         | 1936 (6)    | 265           |
| 37   | Steve Carlton  | 1982 (18)        | 286           | 37(499)     | 92       | Dizzy Dean         | 1935 (5)    | 264           |
| 37   | Steve Carlton  | 1980 (16)        | 286           | 38(964)     | 96       | Pat Malone         | 1929 (2)    | 261           |
| 39   | Pedro Martinez | 2000 (9)         | 284           | 38(37)      | -2       | Steve Carlton      | 1982 (18)   | 261           |
| 40   | Tom Seaver     | 1970 (4)         | 283           | 38(20)      | -90      | Mickey Lolich      | 1971 (9)    | 261           |
| 40   | Sam McDowell   | 1968 (8)         | 283           | 41(346)     | 88       | Johnny Vander Meer | 1941 (5)    | 260           |
| 42   | Denny McLain   | 1968 (6)         | 280           | 41(1153)    | 96       | George Uhle        | 1926 (8)    | 260           |
| 43   | Sam McDowell   | 1969 (9)         | 279           | 43(537)     | 91       | Hal Newhouser      | 1944 (6)    | 259           |
| 44   | Bob Veale      | 1965 (4)         | 276           | 44(5)       | -780     | Randy Johnson      | 1999 (12)   | 258           |
| 44   | John Smoltz    | 1996 (9)         | 276           | 45(70)      | 35       | Herb Score         | 1956 (2)    | 257           |
| 44   | Dwight Gooden  | 1984 (1)         | 276           | 46(423)     | 89       | Dizzy Dean         | 1934 (4)    | 255           |
| 47   | Hal Newhouser  | 1946 (8)         | 275           | 46(19)      | -142     | Steve Carlton      | 1972 (8)    | 255           |
| 47   | Steve Carlton  | 1983 (19)        | 275           | 46(27)      | -70      | Vida Blue          | 1971 (3)    | 255           |
| 49   | Mario Soto     | 1982 (6)         | 274           | 49(105)     | 53       | Herb Score         | 1955 (1)    | 253           |
| 49   | Fergie Jenkins | 1970 (6)         | 274           | 49(729)     | 93       | Lefty Gomez        | 1932 (3)    | 253           |