The Statistical Revolution in Sports and Why You Should Care

Jason W. Rosenfeld

Director of Basketball Analytics

Charlotte Hornets

Mental compass of talk

1) How'd we get here?
2) Where we are today
3) Finding your place
4) Where we're going
5) Why *you* should care
6) What I look for as I hire

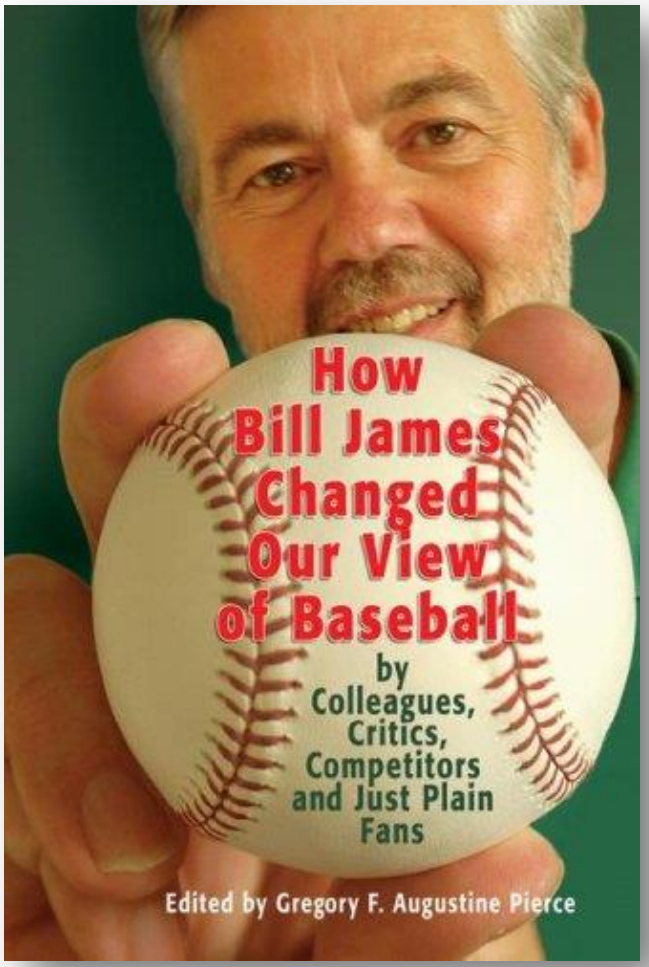
I. How'd we get here?

Father of Baseball Stats Research

Bill James understood the value of *objective* data, and began writing about it in the 1970s.

Who Was Bill James?

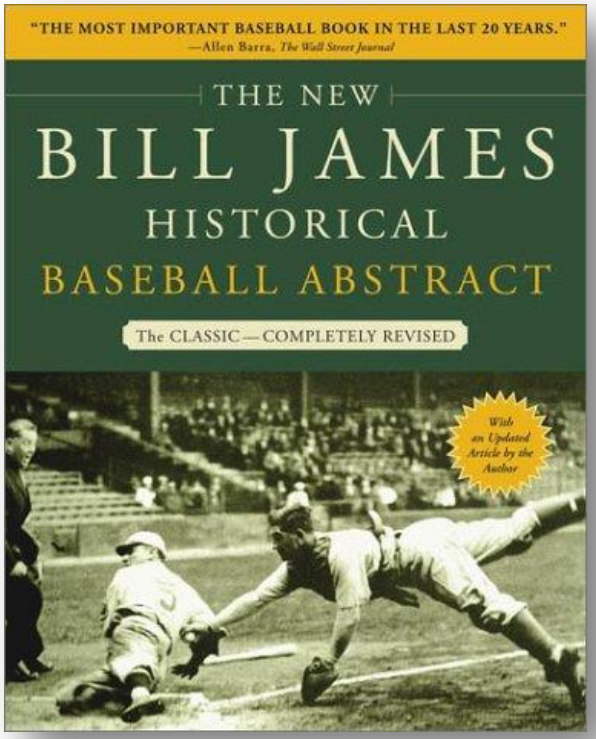
- Not a player. Only a fan.
- Researched, analyzed and wrote in unprecedented ways.
- Asked unexplored analytical questions.



What did his data say?

- Much of the conventional wisdom touted by players, managers and sports writers is flawed.

- Evaluation of players and in-game strategies could be improved.



James at Work

- Notable contributions: On Base Percentage (OBP).
- First to put forth the belief that BA didn't reflect a hitter's value as much as his OBP.

The mainstream was emphasizing the wrong number to evaluate players.

Who's right? Maybe the mainstream and James are both wrong!

Luck versus Skill

- Sports involve skill and luck.
- Luck is inherently unpredictable.
- Can we measure skill in performance?

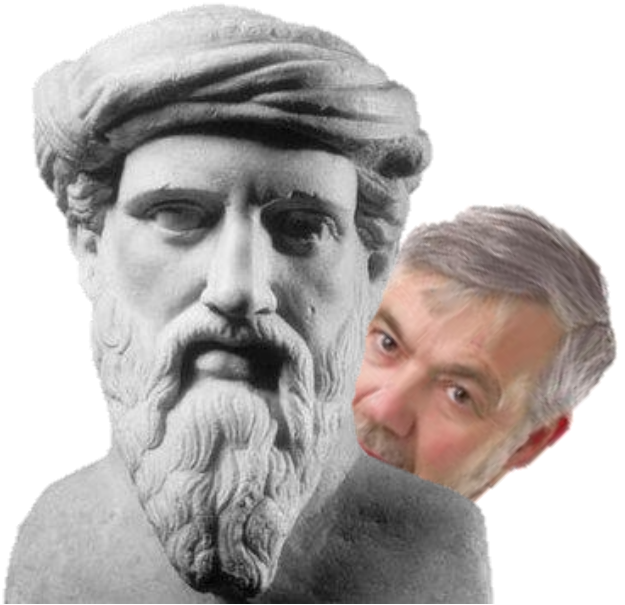
Predictive value

- Batting avg. – once “holy grail” of baseball stats.
- BA is one of the stats most influenced by luck. OBP less so.
- IP Hr Rate and Strikeout rate even less so.
- So, BA, IP Hr Rate and Strikeout rate have better predictive value.

Pythagoras and James

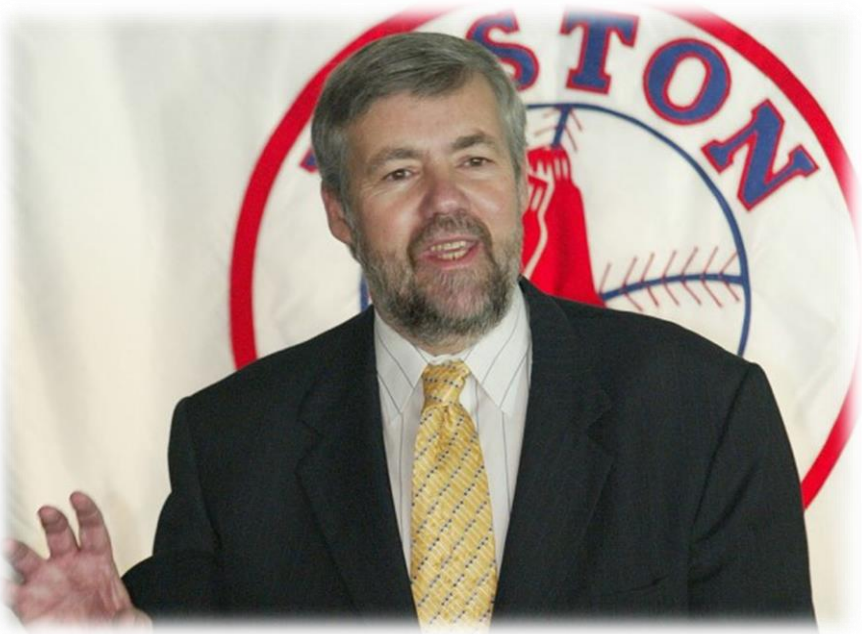
- Even bigger contribution was the *Pythagorean Expectation* formula.
- Named for its resemblance to the Pythagorean Formula from geometry.

How many points a team scores & allows is closely tied to number of games won



Winning Formula

$$\text{winning\%} = \frac{(\text{runs scored})^2}{(\text{runs scored})^2 + (\text{runs allowed})^2}$$



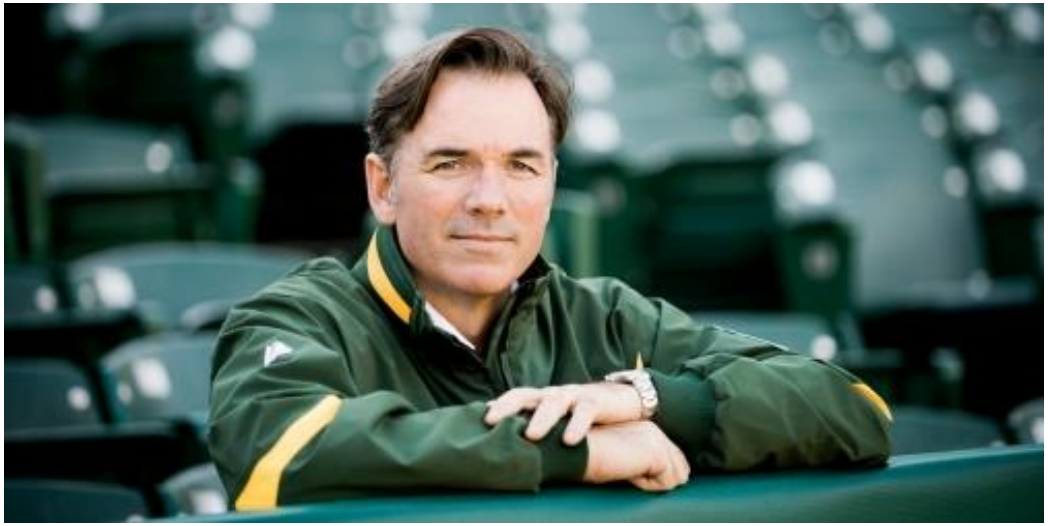
Pythagoras on the Court

- Does this extend to basketball? Yes & no.
- No, not directly.
- Yes, after deriving the appropriate exponent.

$$\text{winning } \% = \frac{(\text{points scored})^{14}}{(\text{points scored})^{14} + (\text{points allowed})^{14}}$$

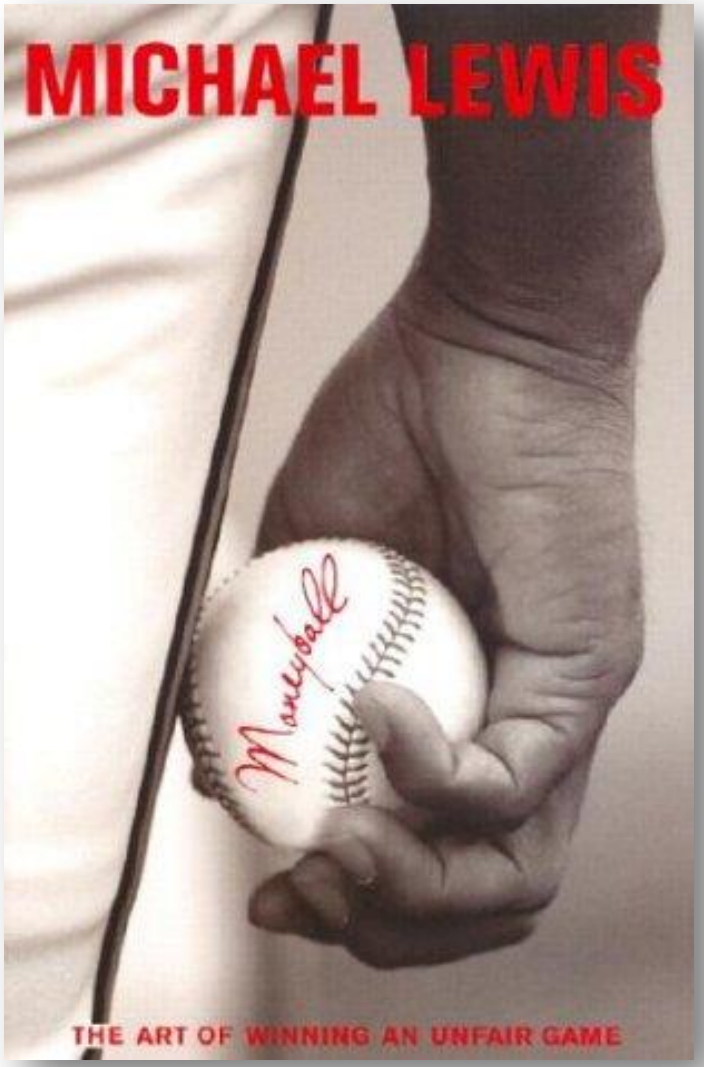
Getting smarter with stats

- Oakland A's General Manager, Billy Beane, applies James' principles.
- Despite low payroll, A's enjoy amazing success, making the playoffs 4 straight seasons.



Taking notice…

In 2003, *Moneyball* is written, which chronicles Beane's successful use of James' techniques.



Baseball focused

Why so much research on baseball?

1. Bill James pioneered the field.
2. Baseball is very amenable to statistical research and analysis.

Unlike basketball and football, baseball is a discrete, and very much individualistic-type game.

Possession Based Analysis

- Evaluate teams based on how many points they score and allow *per 100 possessions, NOT per game*.
- Essential - Teams play at various paces.

Possessions and Pace

- Teams alternate possessions.
- At the end of the game, each team has about the same number of possessions.
- How many? Depends on the ***pace*** of the teams.
- Thus, we analyze offenses and defenses on a ***per possession*** or ***per 100 possession*** basis.

Exciting Pace, Unexciting Results

- Any team can run the ball and shoot quickly just to score a lot of points.
- But, the team gives the ball back each time!

Nugget of insight

- The 1990-91 Denver Nuggets scored many points, 120 ppg, but used 117 possessions.
- ***Per possession***, they only scored 1.026 points, or 102.56 points ***per 100 possessions***.

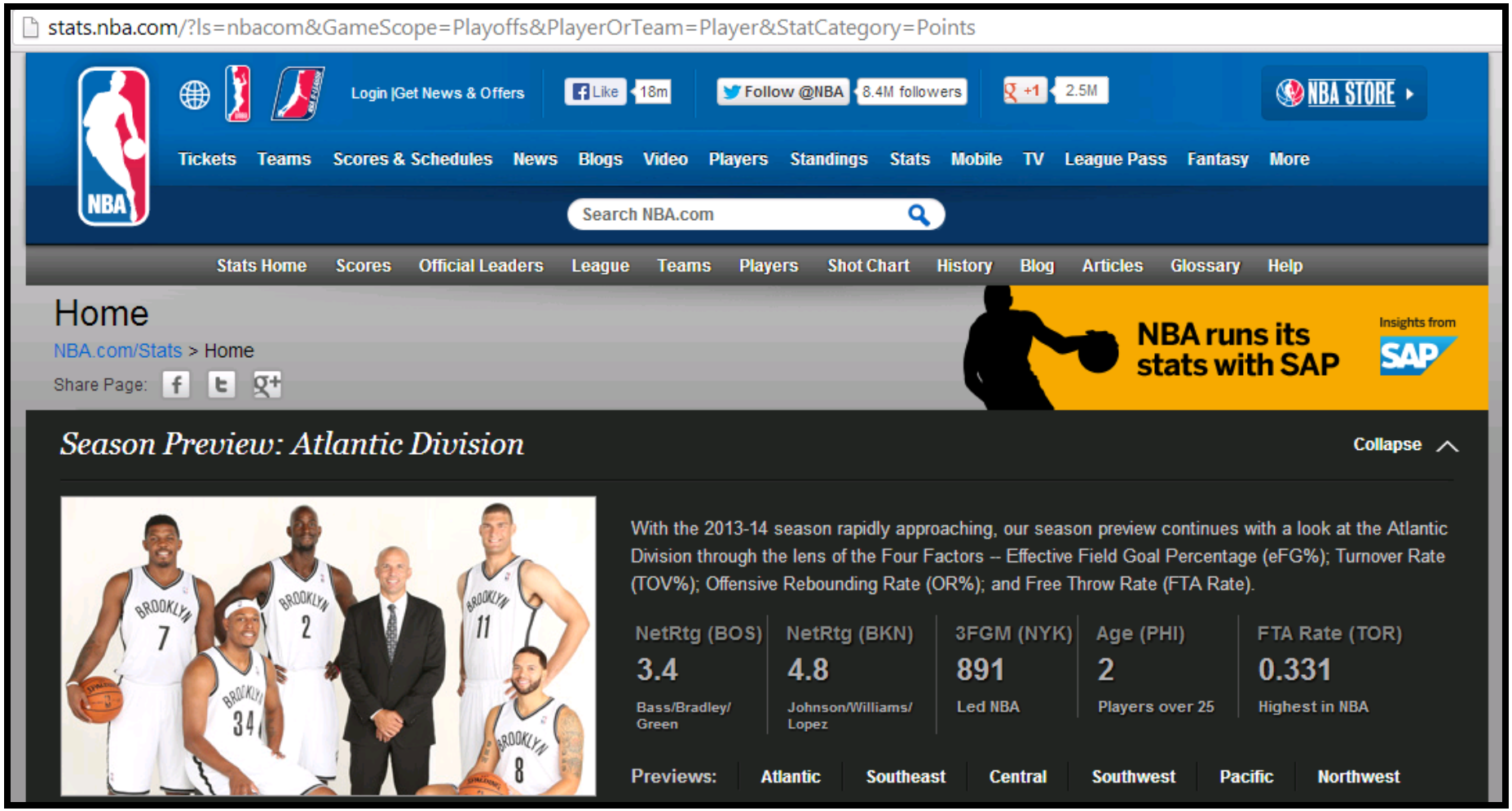
Slow, But Steady in 98-99

- Miami Heat were the opposite.
- Scored 89 ppg on 86.4 possessions; they averaged 1.030 ***points per possession***.
- **While averaging 30 fewer points per game, the Heat actually had a *more efficient* offense than Denver.**

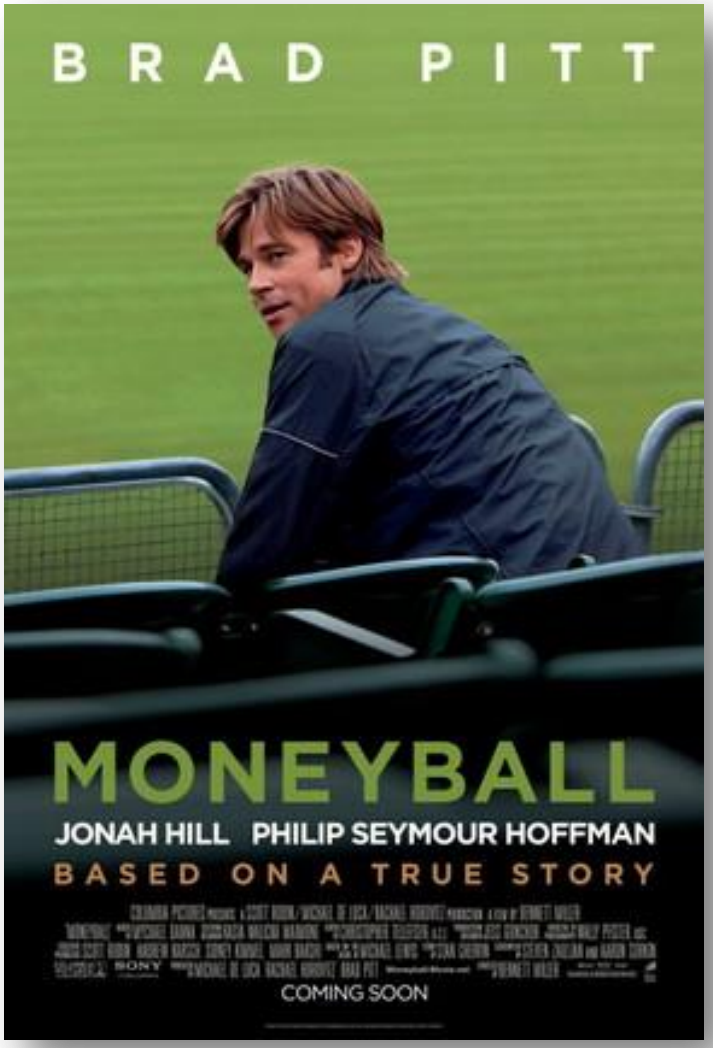
II. Where we are today

Image credit: http://www.needian.com/blog/en/

NBA.com/Stats



Moneyball


BRAD PITT
MONEYBALL
JONAH HILL PHILIP SEYMOUR HOFFMAN
BASED ON A TRUE STORY
COMING SOON