Data Delusions

How Math, Metrics, and Analytics Can Mislead Us

May 19, 2023

Project TBD
Transformation By Design

DATA DELUSIONS

1. Humans + Data
2. Flaws & Frames
3. Metric Fixation

3

Cognitive Tendencies

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- **Equate precision with accuracy and objectivity**

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As of March 2020

741,882 Big Macs Sold Per Day in U.S.

Source: I made it up.

- Equate precision with accuracy and objectivity
- Underestimate impact of emotions on reactions to data

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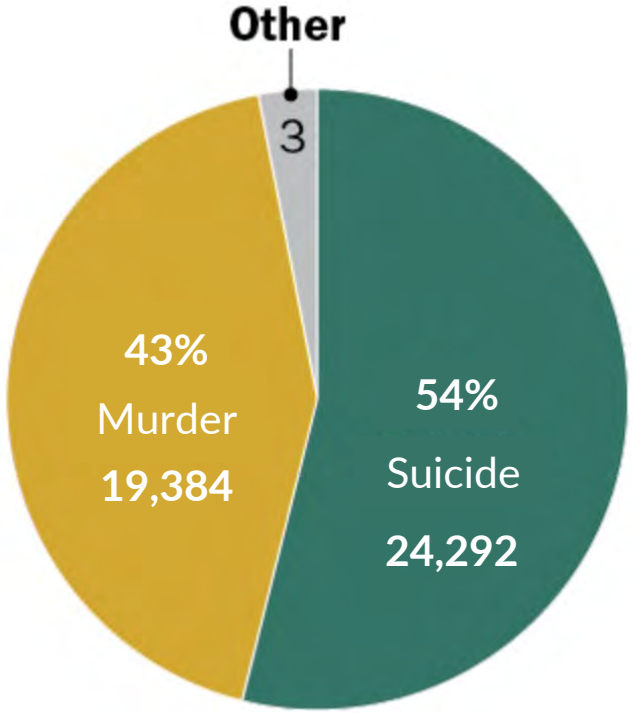
EMOTIONS IMPACT HOW WE REACT

1 Mars is 30 million miles away from Earth.

2



Suicides accounted for more than half of U.S. gun deaths in 2020.

Source: Pew Research Center

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- Underestimate impact of emotions on reactions to data
- Substitute numbers for understanding

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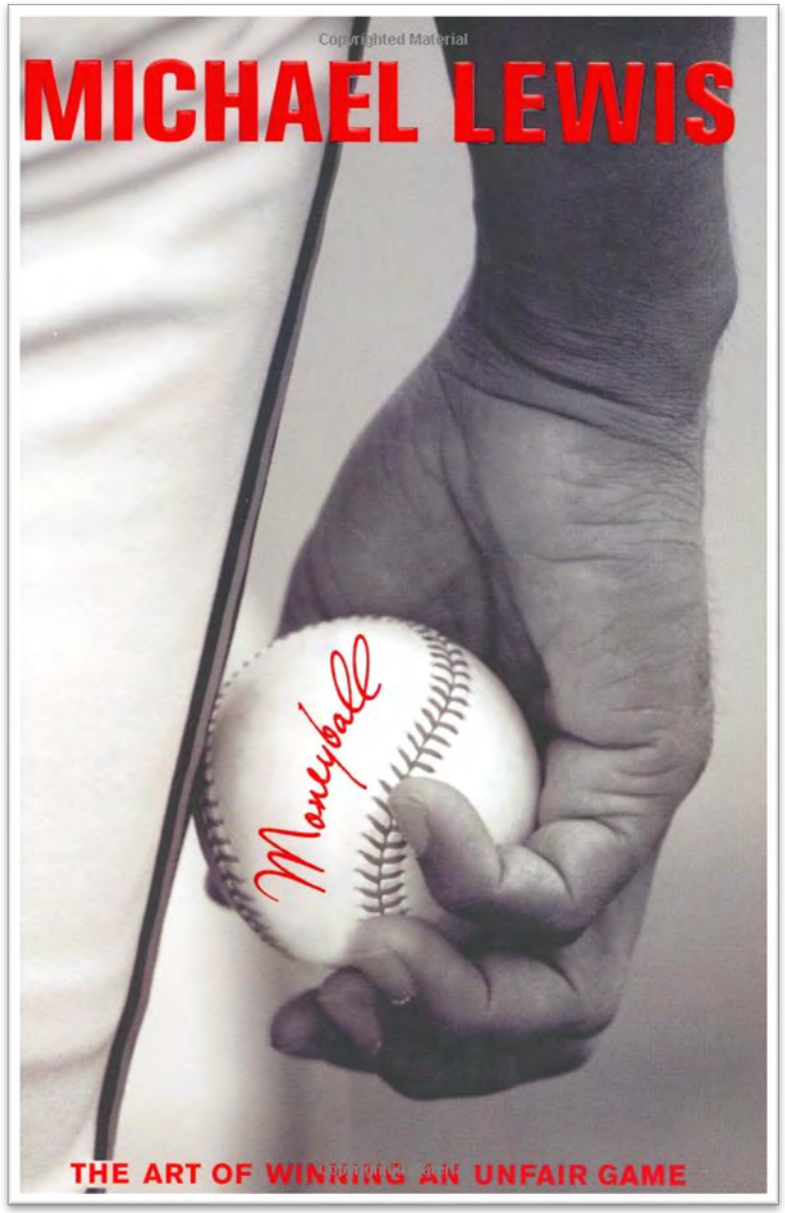
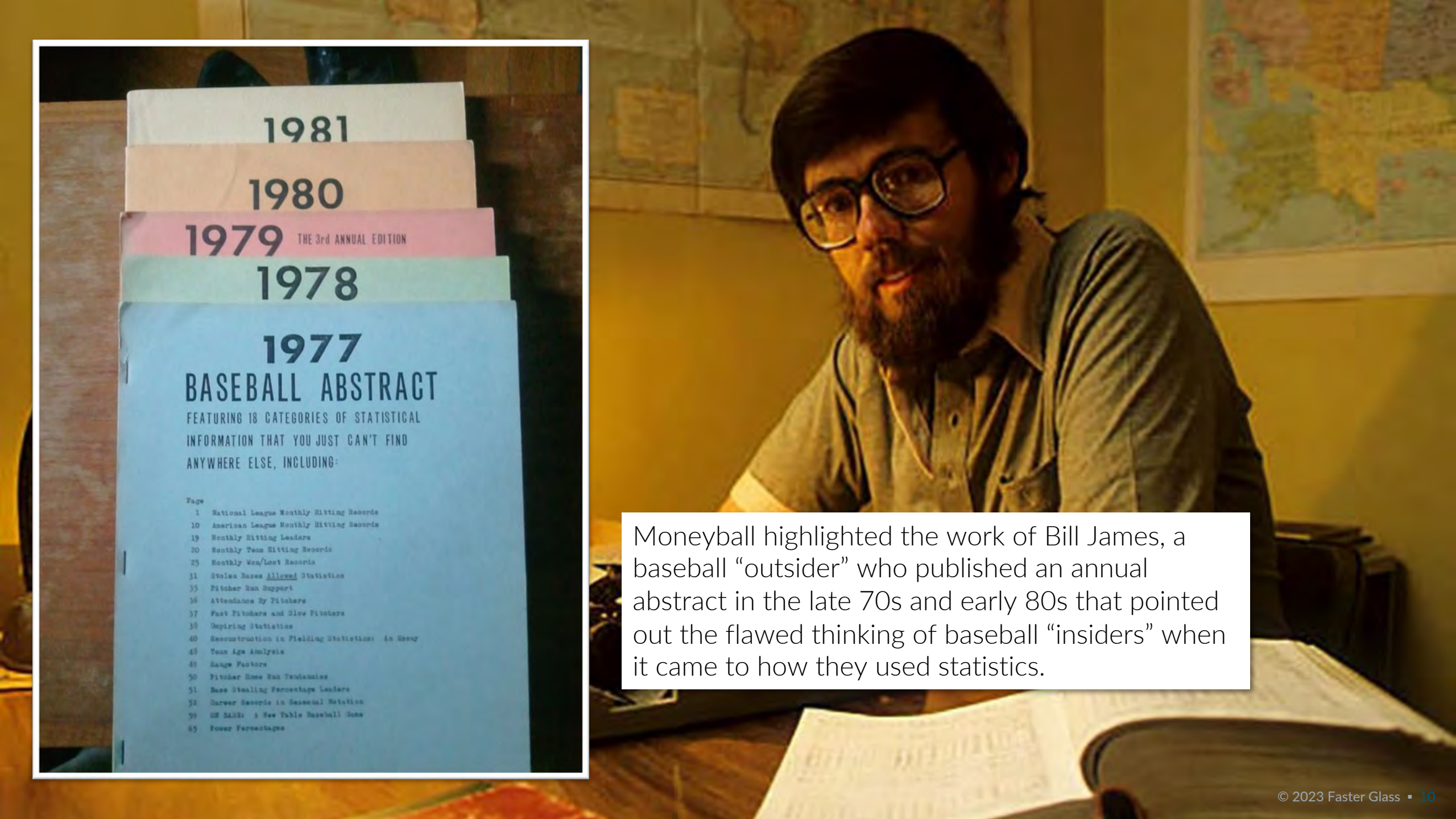
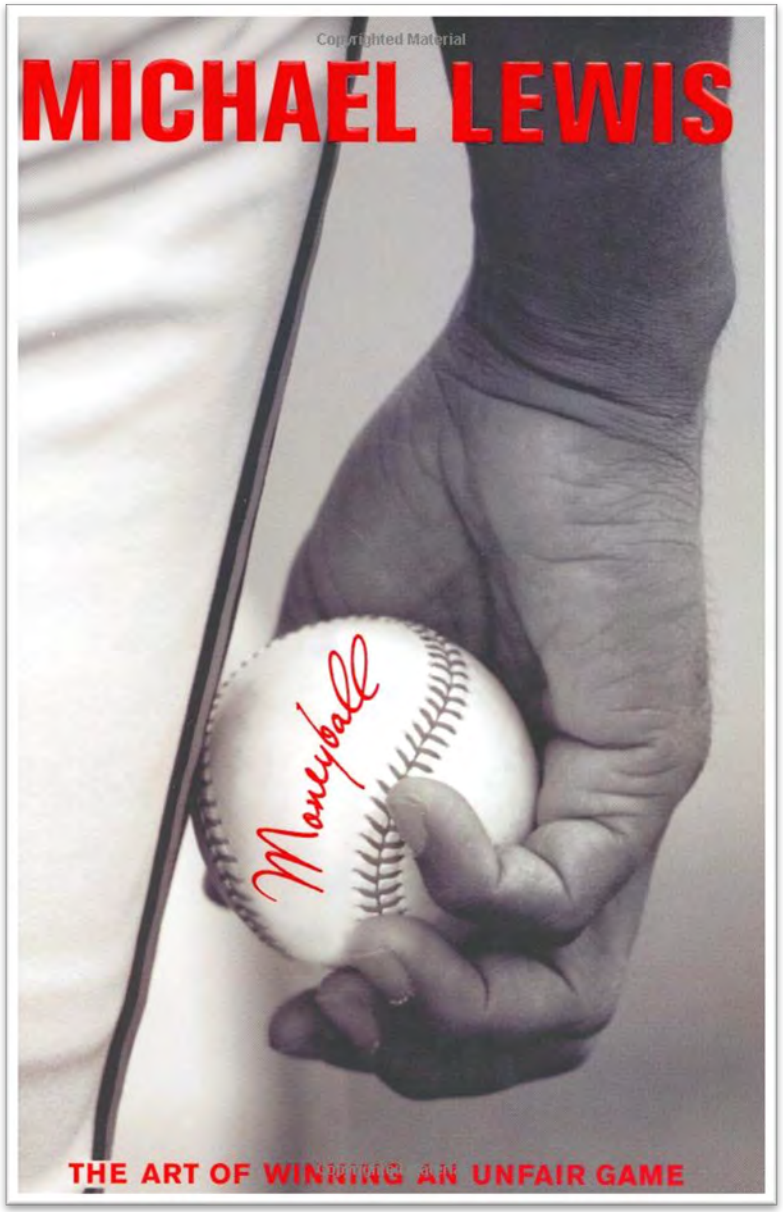


Moneyball

The Art of Winning An Unfair Game



Moneyball highlighted the work of Bill James, a baseball “outsider” who published an annual abstract in the late 70s and early 80s that pointed out the flawed thinking of baseball “insiders” when it came to how they used statistics.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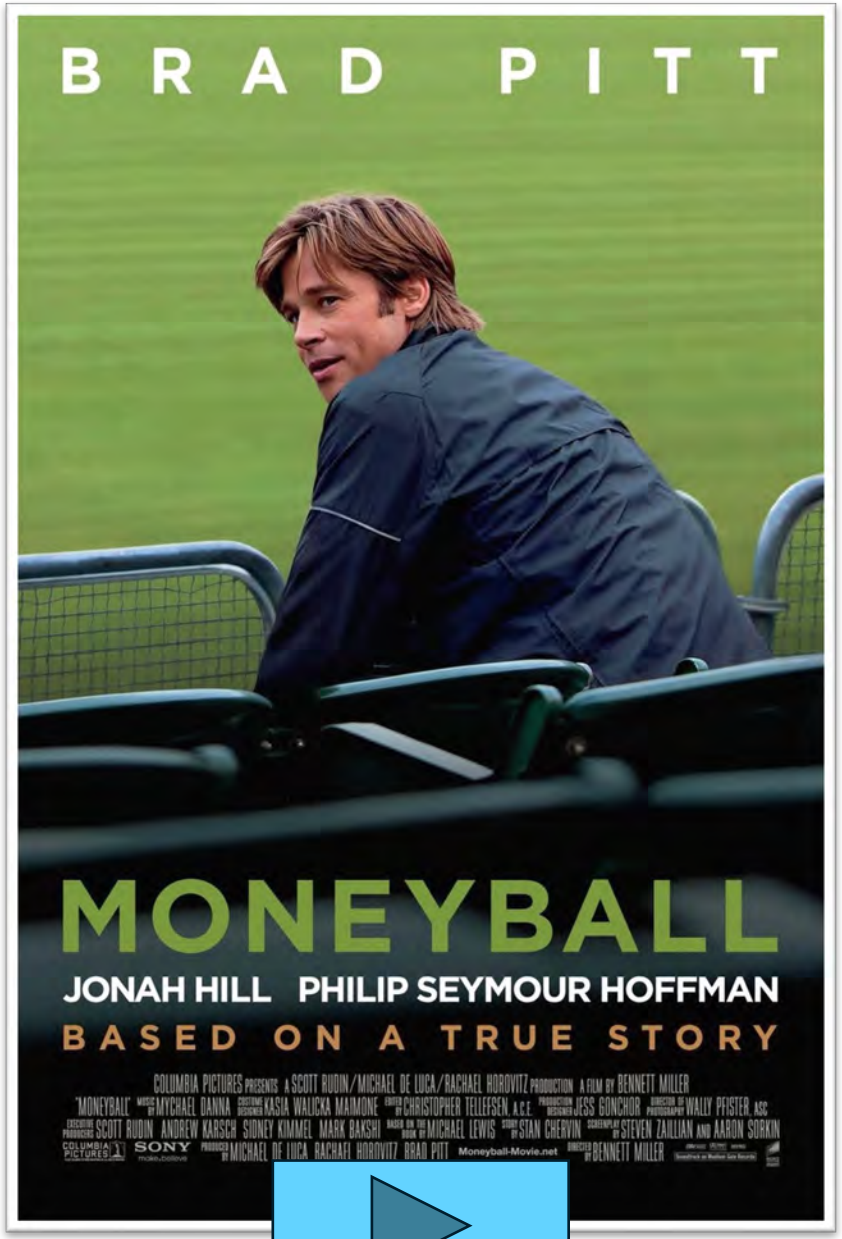
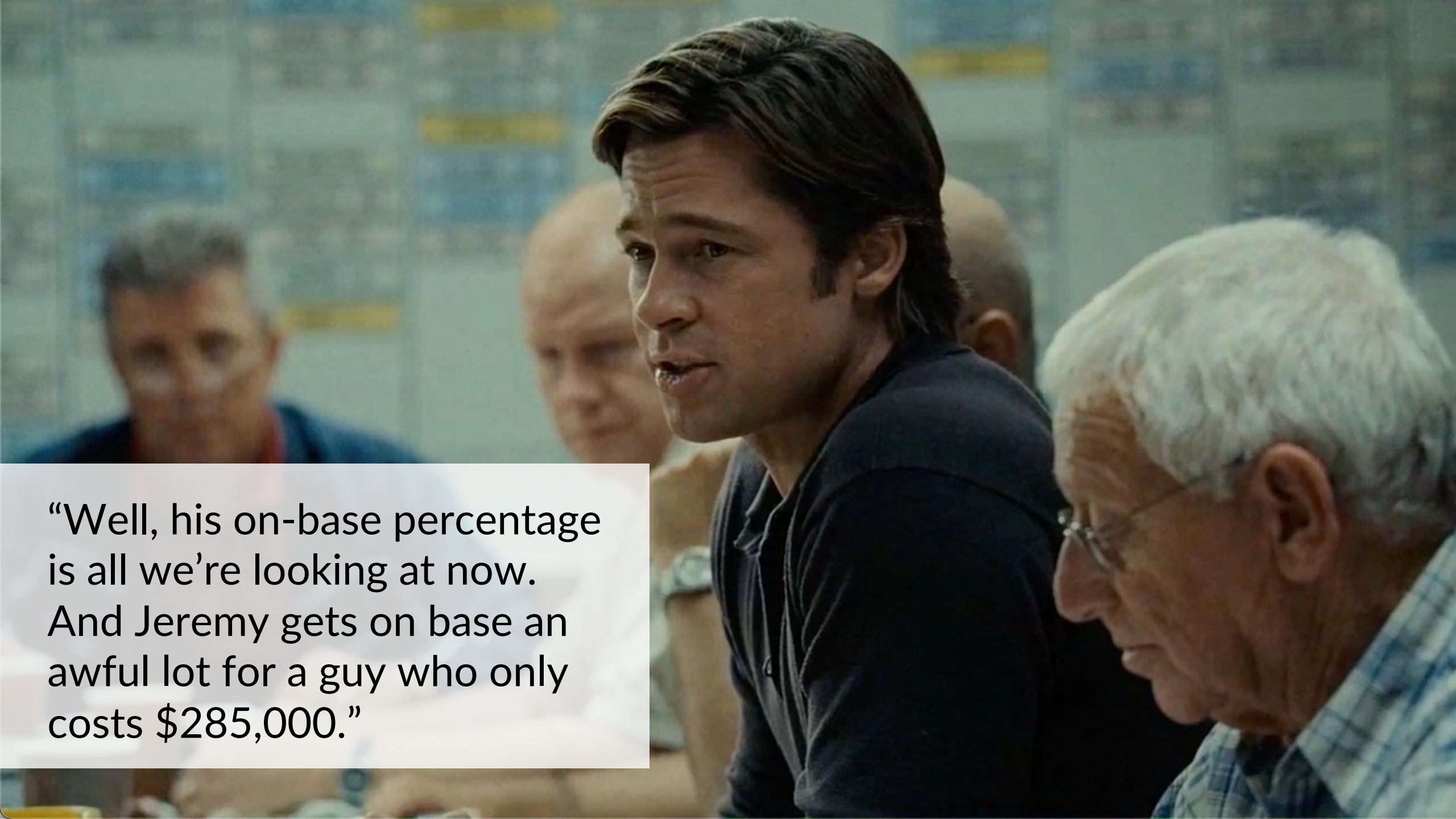
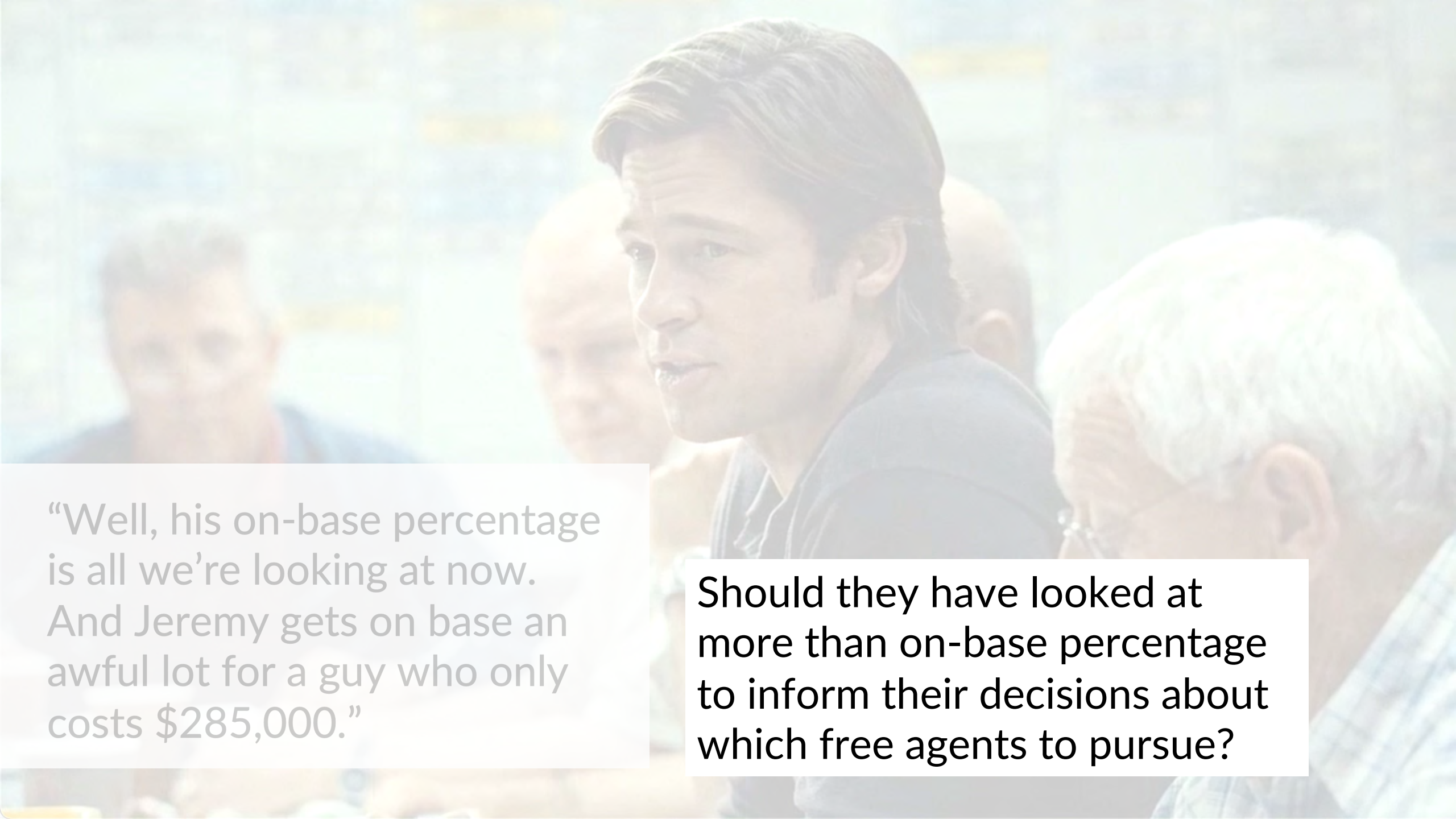
MICHAEL LEWIS
Moneyball
THE ART OF WINNING AN UNFAIR GAME


BRAD PITT
MONEYBALL
JONAH HILL PHILIP SEYMOUR HOFFMAN
BASED ON A TRUE STORY
COLUMBIA PICTURES PRESENTS A SCOTT RUDIN/MICHAEL DE LUCA/RACHAEL HORovitz PRODUCTION A FILM BY BENNETT MILLER
"MONEYBALL" MUSIC BY MYCHAEL DANNA COSTUME DESIGNER KASIA WALICKA MAIMONE EDITED BY CHRISTOPHER TELLEFSEN, A.C.E. PRODUCTION DESIGNER JESS GONCHOR DIRECTOR OF PHOTOGRAPHY WALLY PFISTER, ASC
EXECUTIVE PRODUCERS SCOTT RUDIN ANDREW KARSCH SIDNEY KIMMEL MARK BAKSHI BASED ON THE BOOK BY MICHAEL LEWIS STORY BY STAN CHERVIN SCREENPLAY BY STEVEN ZAILLIAN AND AARON SORKIN
COLUMBIA PICTURES SONY make.believe PRODUCED BY MICHAEL DE LUCA RACHAEL HORovitz BRAD PITT Moneyball-Movie.net DIRECTED BY BENNETT MILLER


“Well, his on-base percentage is all we’re looking at now. And Jeremy gets on base an awful lot for a guy who only costs $285,000.”



"Well, his on-base percentage is all we're looking at now. And Jeremy gets on base an awful lot for a guy who only costs $285,000."

Should they have looked at more than on-base percentage to inform their decisions about which free agents to pursue?

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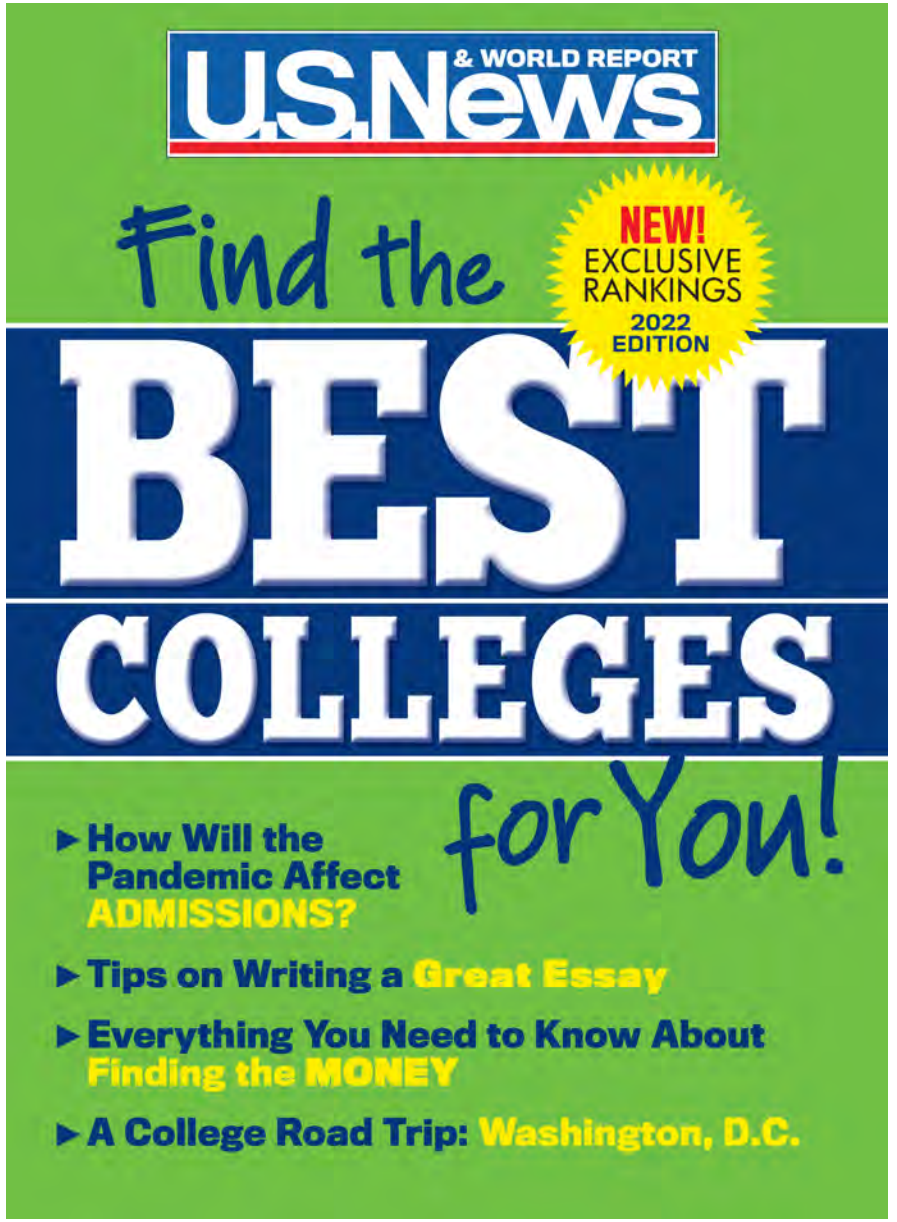
College Rankings

If we better understood how college rankings are calculated by U.S. News & World Report, we might think differently about how much credence we should give them.



73% increase in assaults on CBP officers in 2017

73% increase in assaults on CBP officers in 2017

786 assaults = 73% ↑

despite ↓ in apprehensions

73% increase in assaults on CBP officers in 2017

1 incident = 126 assaults

7 officers x 6 detainees x 3 projectiles (rocks, bottles, tree branches)

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What can we do differently?

CURIOSITY

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LONDON UNDERGROUND USAGE

“Crush Capacity” = 1,000+ people

Average occupancy = 130

Average occupancy = 130?

LONDON UNDERGROUND USAGE

9 Trains x 0

1 Train x 1,000

Average Occupancy = 100

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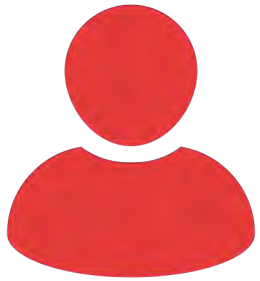
LONDON UNDERGROUND USAGE

Average # of Riders per Train (Train-centric)



Average Rider Experience per Trip (Rider-centric)

Law of Averages

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Beware of the

Flaw of Averages

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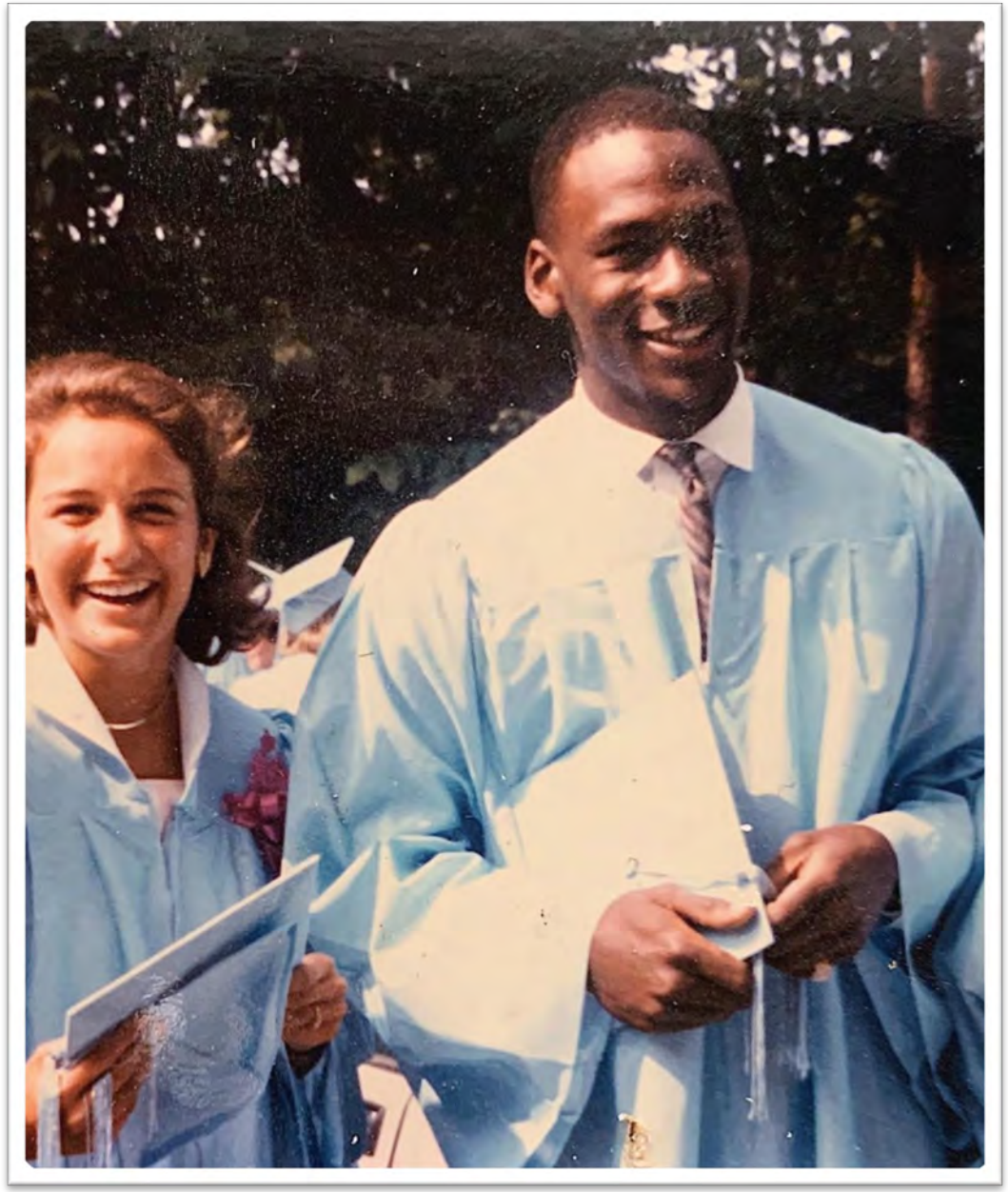
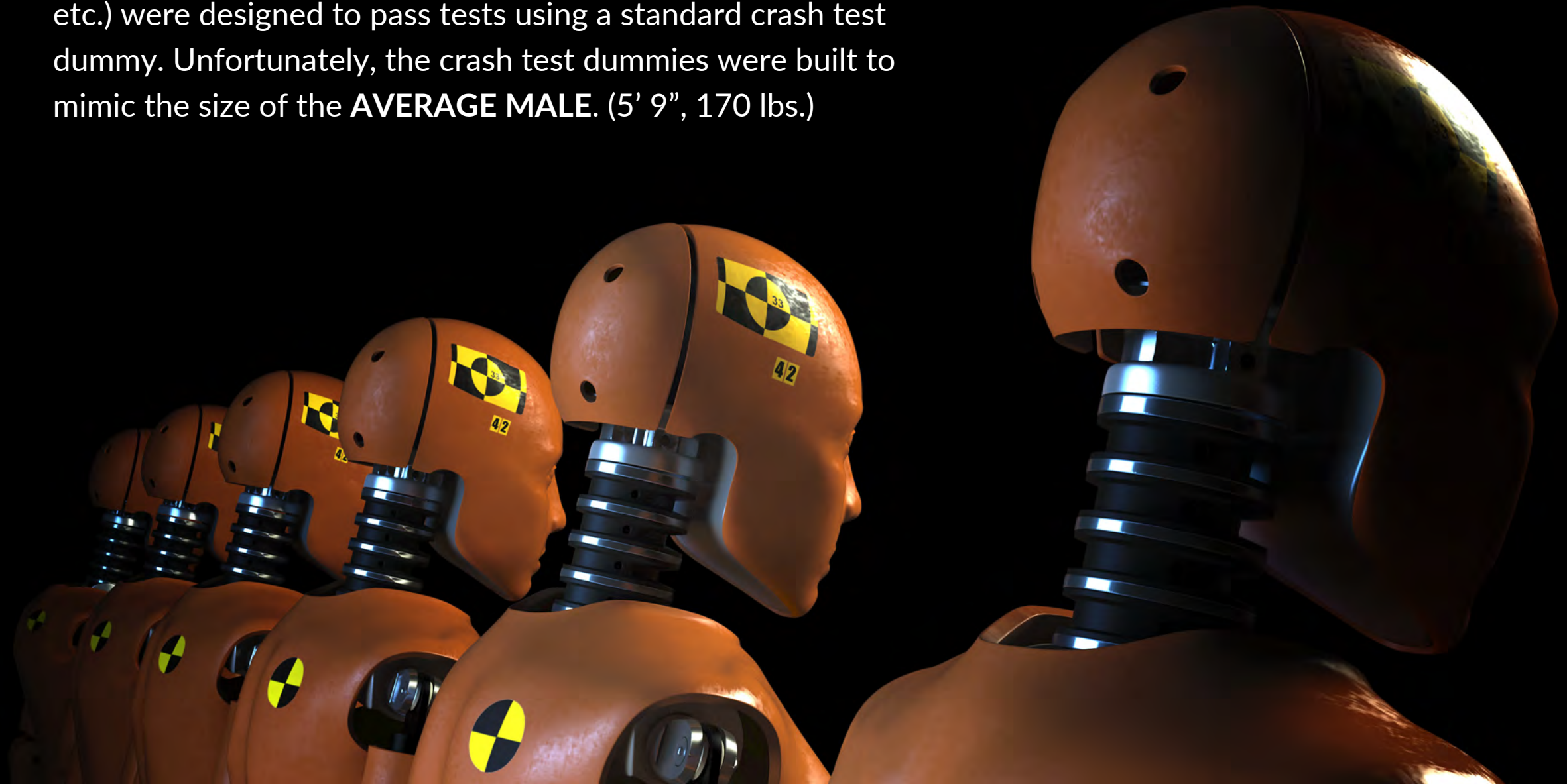
In the 1986, the **average salary** for a UNC-Chapel Hill graduate with a **B.A. in Geography** was **$250,000/yr**.



For decades, automobile safety systems (seat belts, airbags, etc.) were designed to pass tests using a standard crash test dummy. Unfortunately, the crash test dummies were built to mimic the size of the **AVERAGE MALE**. (5’ 9”, 170 lbs.)



Women were 47% more likely to be seriously injured

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VALUE OF MEASUREMENT

”If you cannot measure it, you cannot improve it.”

- Attributed (wrongly) to Lord Kelvin

”Anything that can be measured can be improved.”

- Paul Collier

”What gets measured gets done.”

- Tom Peters

VALUE OF MEASUREMENT

”Not everything that can be counted counts, and not everything that counts can be counted.”

- William Bruce Cameron

POTENTIAL UNINTENDED CONSEQUENCES

Campbell's Law

> "Once a metric has been identified as a primary indicator for success, its ability to accurately measure success tends to be compromised."

Anything that can be measured AND rewarded can be gamed.

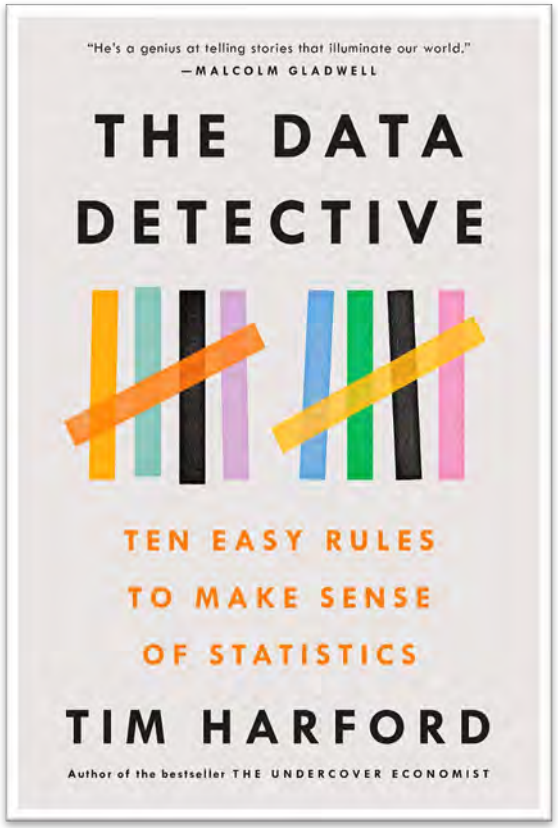
HOW METRICS CAN BE GAMED

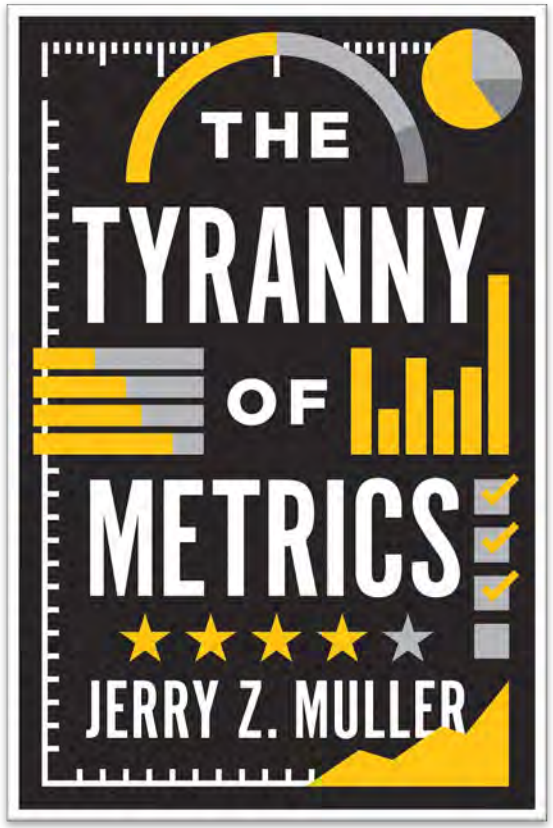
1. Gaming through creaming
2. Improving numbers through omission or distortion of data
3. Cheating, especially when the stakes of what is being measured are high

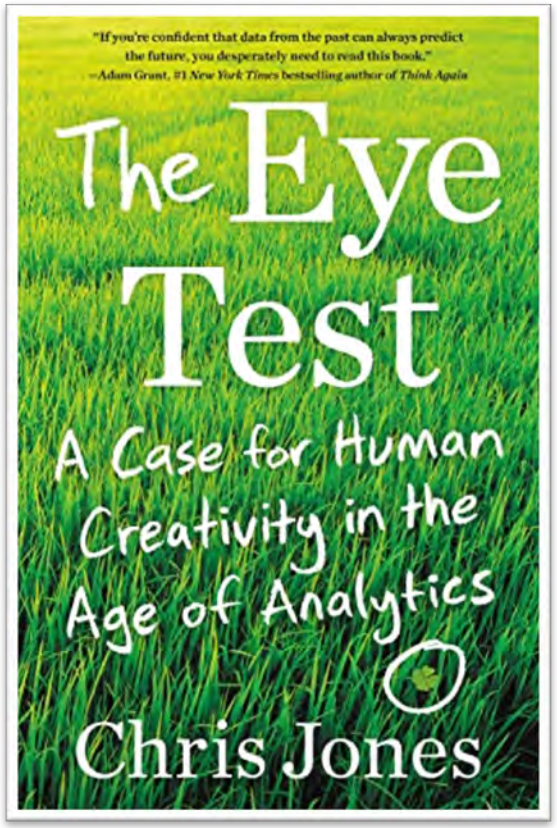
Innovation requires curiosity

Good design requires good judgment

RESOURCES


"He's a genius at telling stories that illuminate our world."
—MALCOLM GLADWELL
THE DATA DETECTIVE
TEN EASY RULES TO MAKE SENSE OF STATISTICS
TIM HARFORD
Author of the bestseller THE UNDERCOVER ECONOMIST


THE TYRANNY OF METRICS
JERRY Z. MULLER


"If you're confident that data from the past can always predict the future, you desperately need to read this book."
—Adam Grant, #1 New York Times bestselling author of Think Again
The Eye Test
A Case for Human Creativity in the Age of Analytics
Chris Jones

Project **T**ransformation **B**y **D**esign

Cats, Curiosity, and Decision-Making

Friday, June 16th
8:30 AM – 9:30 AM

Kingsmen Software @ Camp North End

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