Title: The Drunkard's Walk

Date: May 06, 2009 07:00 PM

URL: http://pirsa.org/09050048

Abstract: In The Drunkard's Walk, acclaimed writer and scientist Leonard Mlodinow shows us how randomness, change, and probability reveal a tremendous amount about our daily lives, and how we misunderstand the significance of everything from a casual conversation to a major financial setback. As a result, successes and failures in life are often attributed to clear and obvious cases, when in actuality they are more profoundly influenced by chance. By showing us the true nature of chance and revealing the psychological illusions that cause us to misjudge the world around us, Mlodinow gives us the tools we need to make more informed decisions.
Leonard Mlodinow received his doctorate in physics from the University of California, Berkeley, was an Alexander von Humboldt fellow at the Max Planck Institute, and now teaches about randomness to future scientists at Caltech. Along the way he also wrote for the television series MacGyver and Star Trek: The Next Generation. His previous books include Euclid's Window: The Story of Geometry from Parallel Lines to Hyperspace, Feynman's Rainbow: A Search for Beauty in Physics and in Life, and, with Stephen Hawking, A Briefer History of Time. He lives in South Pasadena, California.

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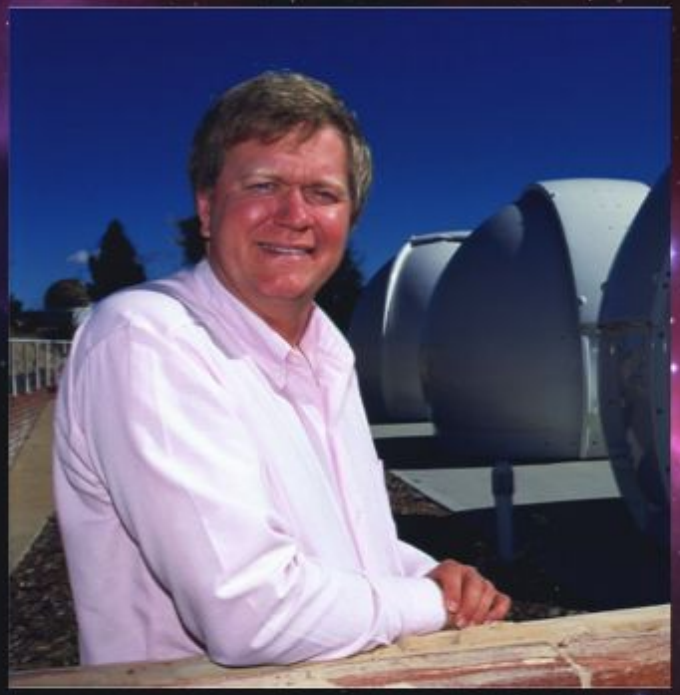

Brian Schmidt

Australian National University

INTERNATIONAL YEAR OF ASTRONOMY 2009

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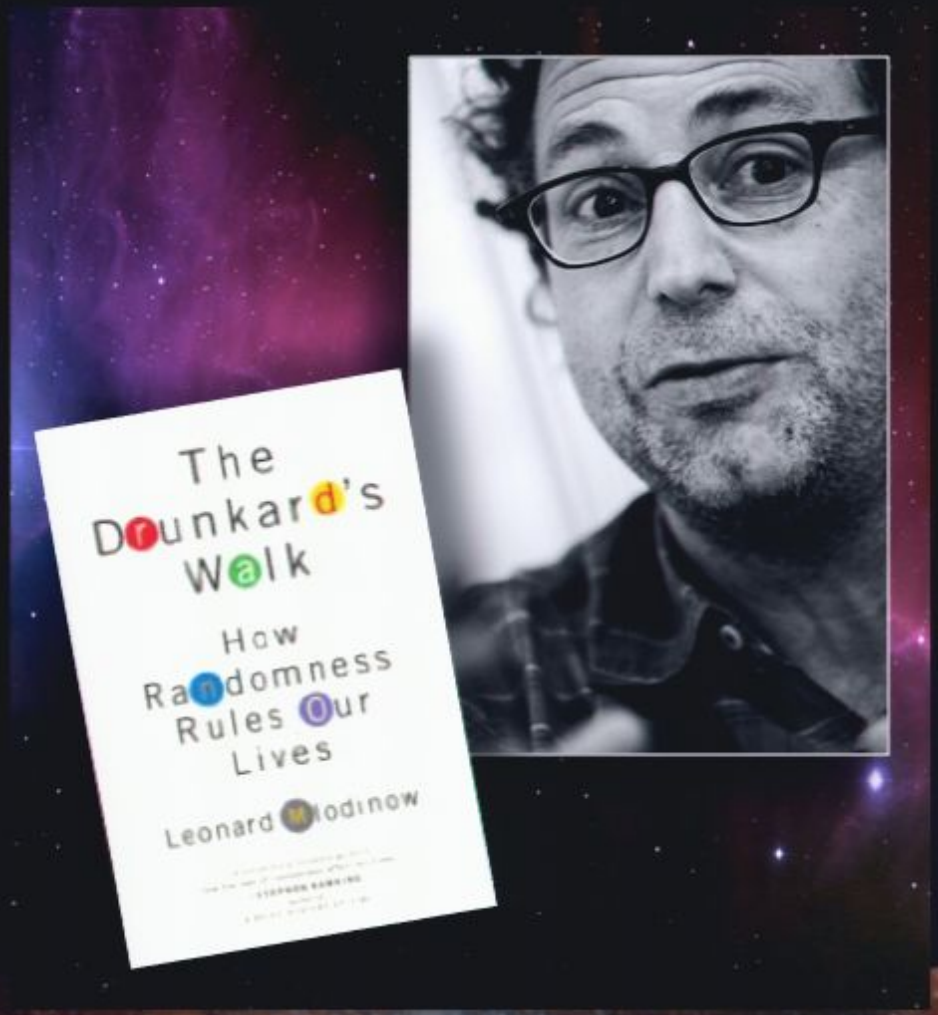
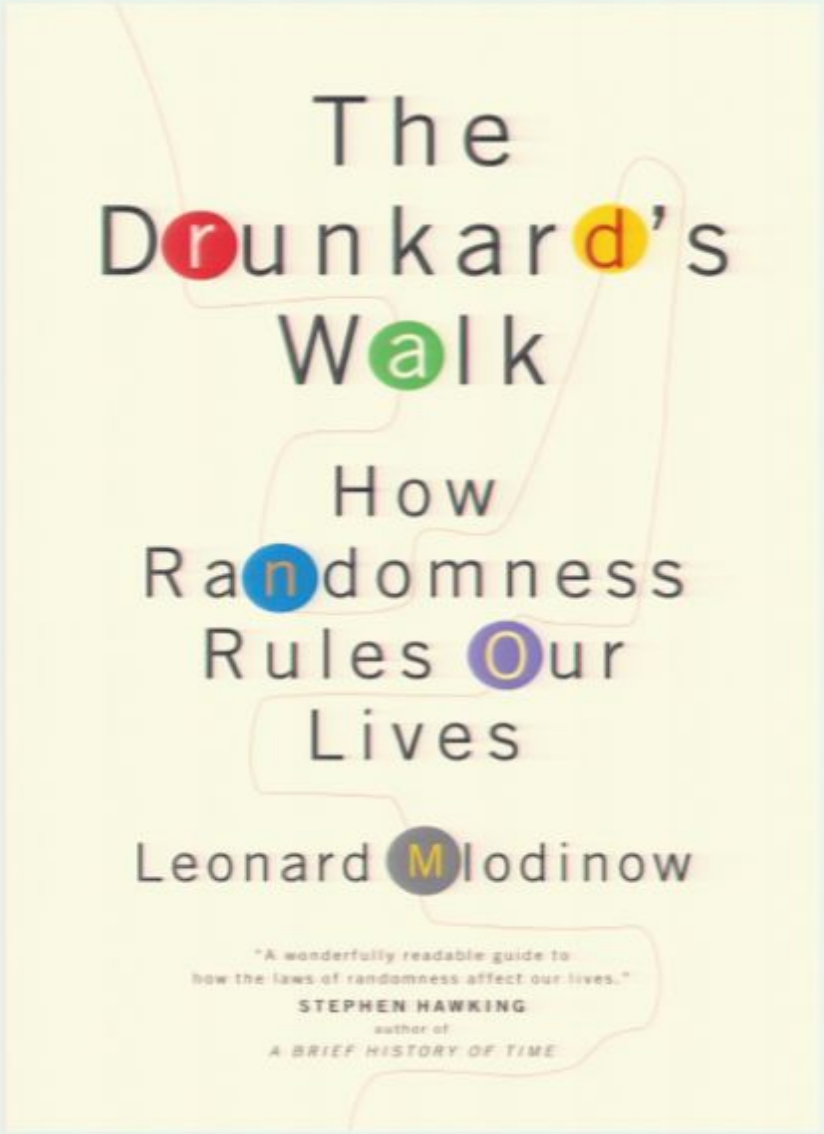


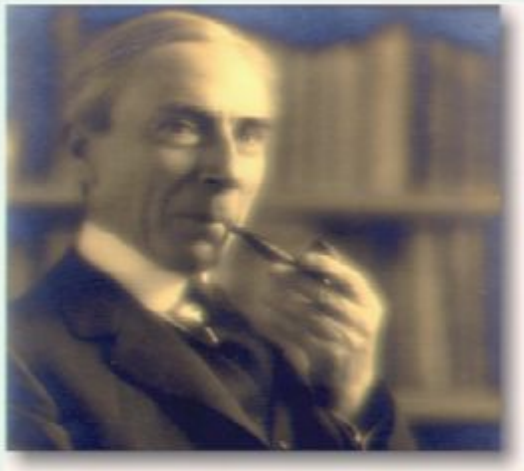
The Drunkard's Walk

Leonard Mlodinow

Caltech

PERIMETER INSTITUTE FOR THEORETICAL PHYSICS

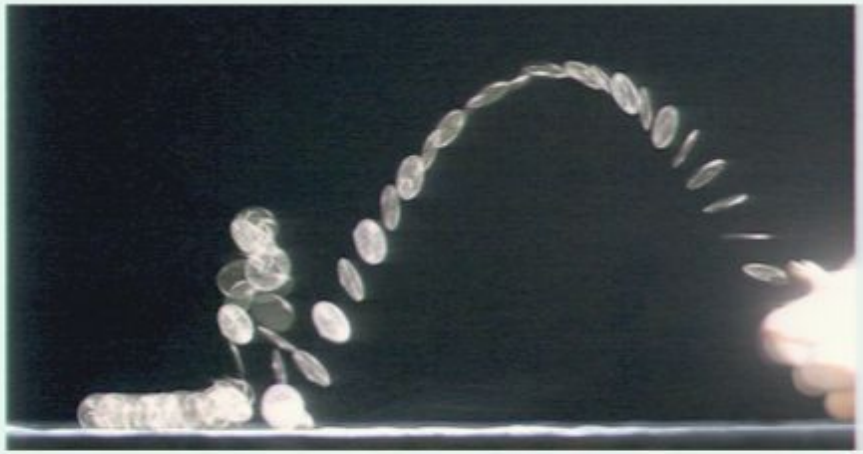

The Drunkard's Walk
How Randomness Rules Our Lives
Leonard Mlodinow
"A wonderfully readable guide to how the laws of randomness affect our lives."
STEPHEN HAWKING
author of
A BRIEF HISTORY OF TIME



We all start from "naive realism," i.e., the doctrine that things are what they seem. We think that grass is green, that stones are hard, and that snow is cold. But physics assures us that the greenness of grass, the hardness of stones, and the coldness of snow are not the greenness, hardness, and coldness that we know in our experience, but something very different..." Bertrand Russell

Random process is one with no definite outcome: multiple possible outcomes each with certain probability.

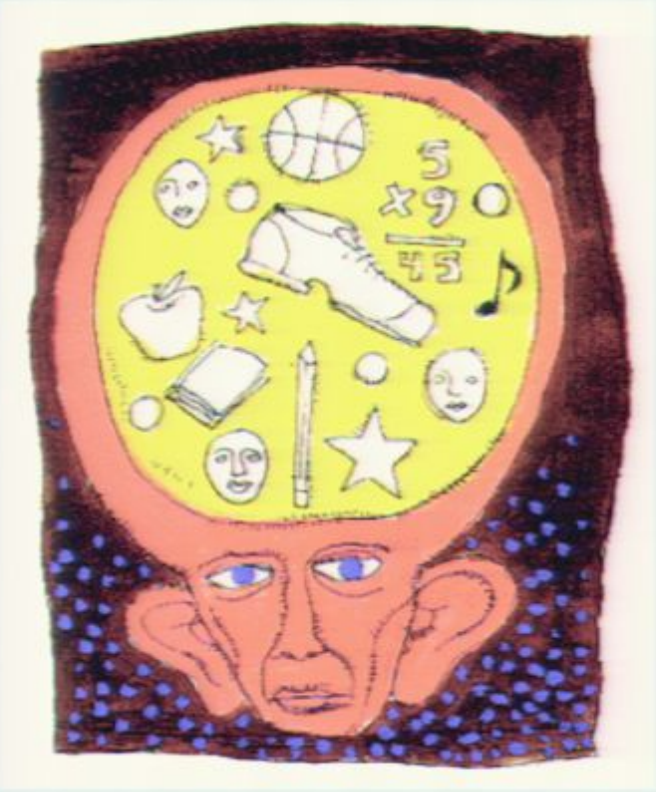
Randomness is context dependent (except quantum randomness)



Drunkard's Walk

Drunkard's Walk means
random wanderings

Some illusions related to randomness



The Illusion of Small Numbers

Real life results are usually not a reliable indicator of underlying qualities.

The Monty Hall Illusion

The inclusion of conditions or new information changes probabilities in subtle ways.

Psychological Illusions

Due to subtle psychological factors people have a hard time being objective in the face of incomplete or uncertain data.

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eg, in a 5-year period, what are the odds a CEO or a company with a 60% chance of having a good year will see that faithfully reflected in their results, i.e., that they will have 60% good years (3 out of 5)?...

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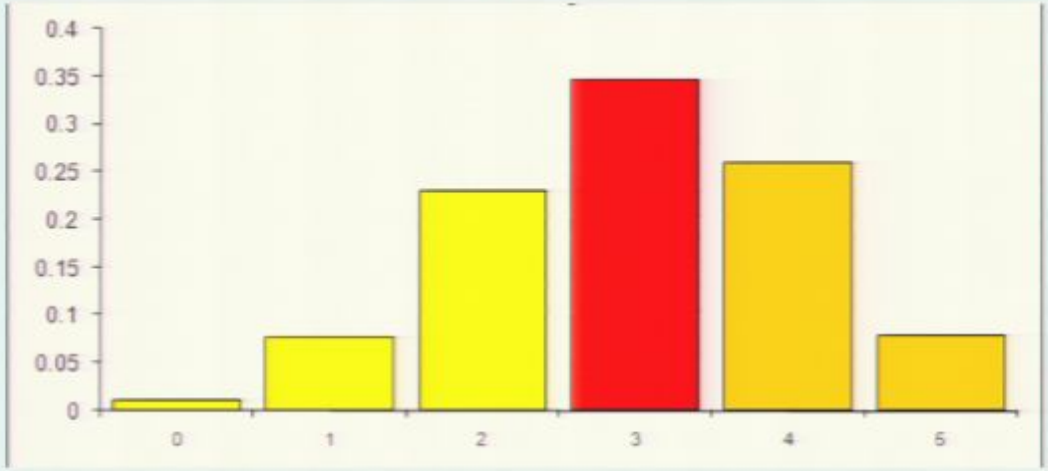
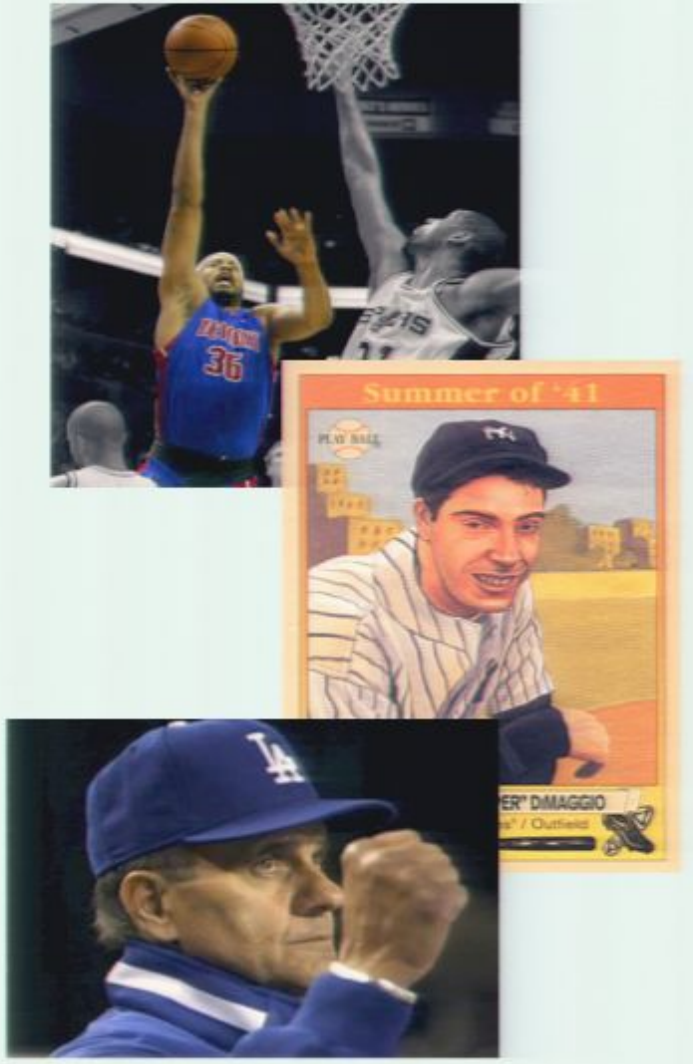


Chances of 3/5 good years are only 1 in 3!

"The Hot Hand"

Spurts of talent or spurts of luck?...



"The Hot Hand"

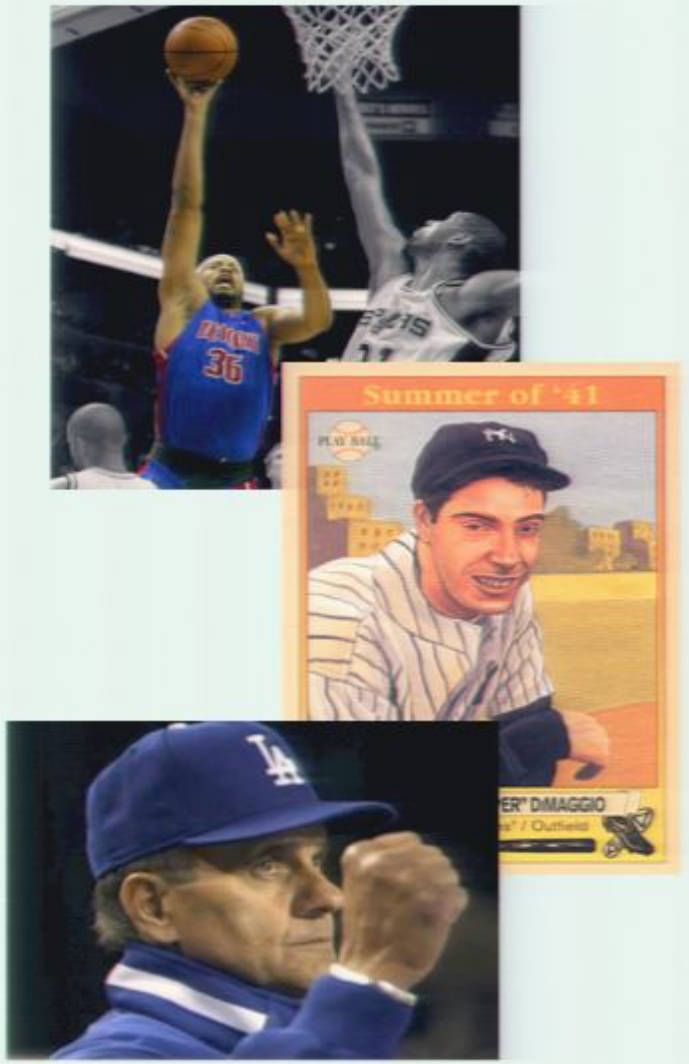
Spurts of talent or spurts of luck?...

eg:

Philadelphia 76ers and Boston Celtics: p(hit | hit previous) = p(hit | missed previous)

Joe DiMaggio

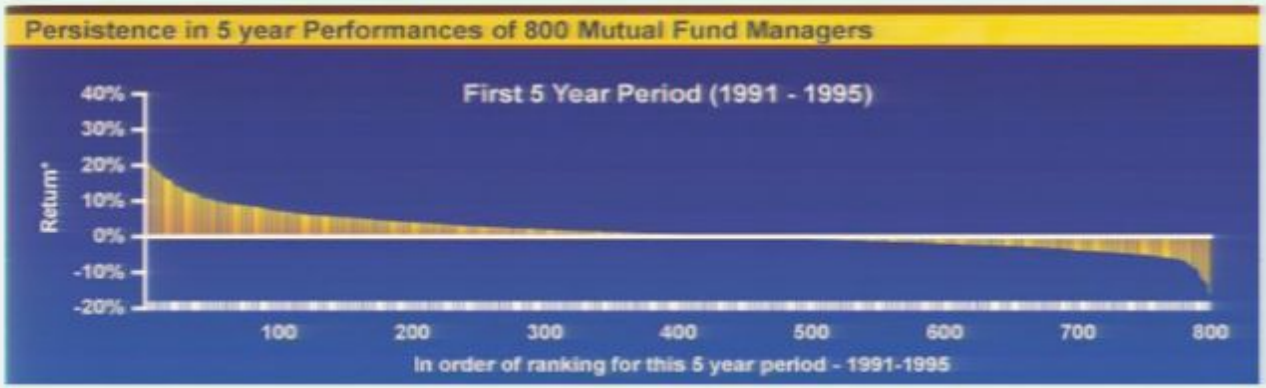
Fired coaches



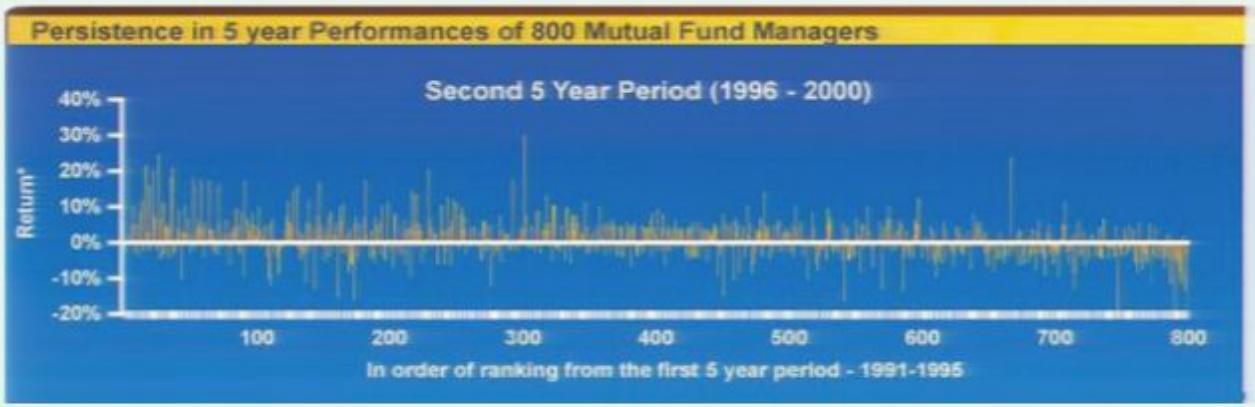
"Track Records"

How meaningful are they?

1991-1995 relative return of top 800 mutual funds, ranked



1996-2000 relative return of top 800 mutual funds, still ranked according to 1991-1995 performance



How long must you observe?

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Championship Sports Series: suppose superior team (or company) has 55/45 edge over inferior team (or company).

Play a best of X series. What are the chances the inferior team will win the series?...

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Championship Sports Series: suppose superior team (or company) has 55/45 edge over inferior team (or company).

Play a best of X series. What are the chances the inferior team will win the series?...

# games played	approx. prob. inferior team wins
best of 7...	

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The greatest money manager of our time

What do ant colonies, novels and river systems have to do with making money? Ask Bill Miller, the man who's topped the market 15 years running.

Fortune managing editor Andy Serwer reports.
November 15 2006: 4:07 PM EST

PHOTO: MICHAEL O'NEILL

(Fortune Magazine) -- Have you heard the story about the money managers and the three bears? It was a gorgeous afternoon last June on a ranch outside Cody, Wyo. Legendary investor Bill Miller was riding horseback with Chris Davis of Davis Funds and Michael Larson, who runs Cascade, Bill Gates' investment company.
The three had been out about an hour when dead ahead of them, no more than 100 yards off, appeared three grizzly bears. Larson gently pulled up on his reins and quietly began to back his horse away. But Miller had other ideas. "Let's see how close we can get," he said, and edged ahead. Larson stayed back. "I don't know what Bill was thinking," Larson said later. "I guess he figures he's on a horse and can ride faster than Chris Davis."

"Odds of beating S&P for 13 years straight are 1 in 149,012"

"Odds of beating S&P the 14th year are 1 in 372,529"

"Greatest fund feat in past 40 years"

The Scientific View:

Testing the talent hypothesis…

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Prob (Someone among 1000 managers beating it at least 15 years in a row starting in 1991) = 3 in 100…

Prob (Someone among 1000 managers beating it at least 15 years in a row starting any year in the last 40 years) = (almost) 3 in 4!

Headline should NOT be:

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The greatest money manager of our time

By Andy Serwer, Fortune managing editor
November 28 2006: 10:58 AM EST

But rather…

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Expected 15-year run finally occurs

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THE WALL STREET JOURNAL.

The Fallen

Bill Miller

The declining fortunes of leading business figures. Second in a series.

DECEMBER 10, 2008

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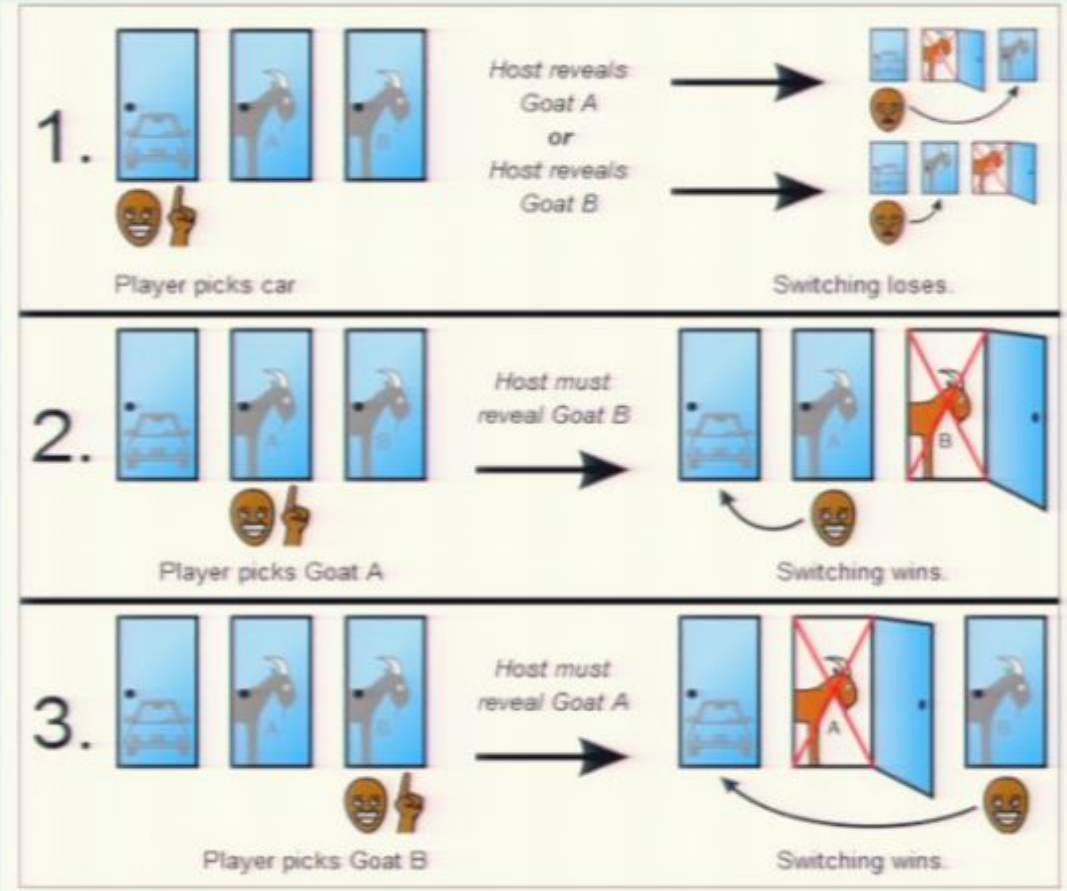
2. The Monty Hall Illusion: Conditional Probability



Lucky Guess Scenario
P = 1/3

Wrong Guess Scenario
P = 1/3

Wrong Guess Scenario
P = 1/3

Suppose the probability of a false positive (i.e., the test comes out positive but there is no tumor) on a screening mammogram is about 10%.

If a patient has a positive test, what are the chances she actually has a tumor?

A. 90%
B. about 75%
C. 9%

1st surprise: We cannot say. Need more info!...

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Assume about 1% really have cancer; assume no false negatives...

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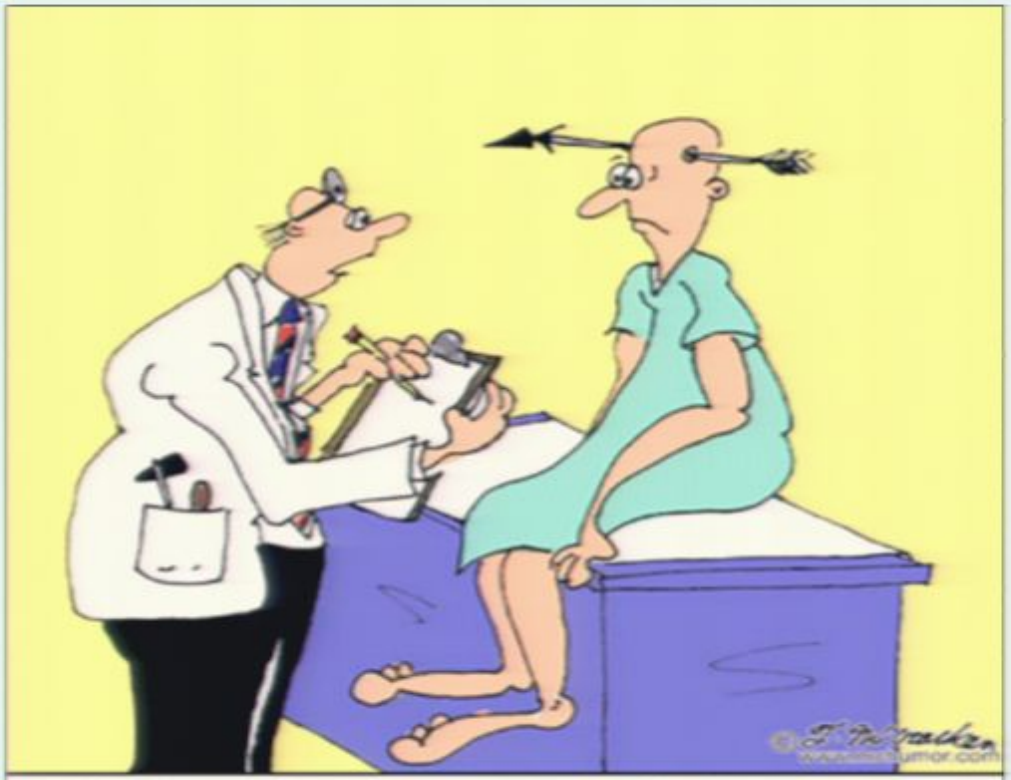
Doctors like answers (a) and (b):

In one study 1/3 physicians chose answer (a) : probability of cancer is about 90%

In another study 95% doctors chose (b): around 75%.

Can we trust common sense (and doctors)?



"Off hand, I'd say you're suffering from an arrow through your head, but just to play it safe, I'm ordering a bunch of tests."

Actual answer was (c): 9%...

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fraction of **all those tested** *who* tested positive, but aren't

IS NOT THE SAME AS

fraction of **all those *who* tested positive**, but aren't...

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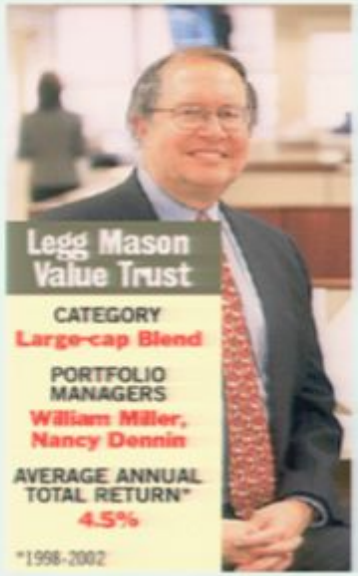
FFFFFFFFFF PNNNNNNNNN NNNNNNNNNN
NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
NNNNNNNNNN NNNNNNNNNN NNNNNNNNNN
NNNNNNNNNN

100 women P= true positive F= false positive N=negative (assume no false negative)...

F F F F F F F F F F P

3. Psychological Illusions

Many psychological factors impede our ability to recognize randomness.



Belief in a “Just World:” Who did a better job?...

Expectation bias

Anchoring

The phenomenon in which having a number in mind – even an implausible one, or one you consciously try to disregard – affects your thinking.

Our powers of assessment and estimation are easily thrown off!
By planting seeds in people's minds you can influence their honest or impartial judgment.

Before the talk, you were divided into 2 isolated groups.

Each group silently read and answered 2 questions.

Second question:

“How many countries are there in Africa?”…

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	Group 1/Group 2	mean
Phi Beta Kappa Society (NY)	58/39	48.5
Society of Engineers (SFBay)	74/26	50
Google (SFBay)	65/30	47
Microsoft (Sea)	50/24	37
Seattle Town Hall (Sea)	52/23	37.5

First question:

group 1 was asked "Are there more than 180 countries in Africa?"

group 2 was asked "Are there more than 5 countries in Africa?"

Examples:

Civil suit awards are affected by the amount demanded by the plaintiff.

Bail amounts are influenced by prosecution requests

Bidding prices on homes are affected by asking prices,
even if they are unreasonably high

Gamblers judge bets based on payoffs, and undervalue the impact of small odds

Control

People tend unconsciously to feel they have control over random events. True even if *consciously* they know they do not.

Do students believe they can foretell coin tosses?...

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1) Would your performance be hampered by distraction?

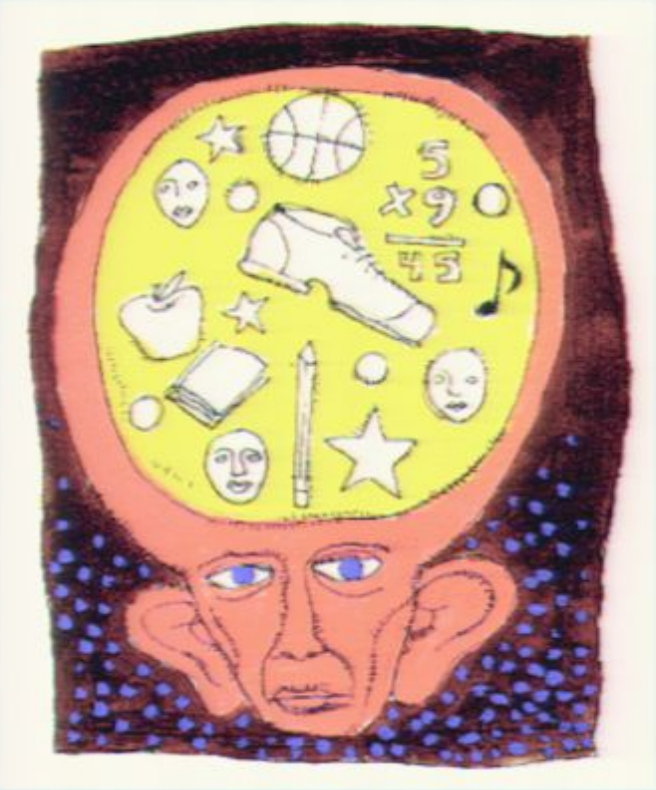
2) Would your performance improve with practice?...

Do students believe they can foretell coin tosses?...

1) Would your performance be hampered by distraction? Yes (25%)

2) Would your performance improve with practice?... Yes (40%)

Some illusions related to randomness



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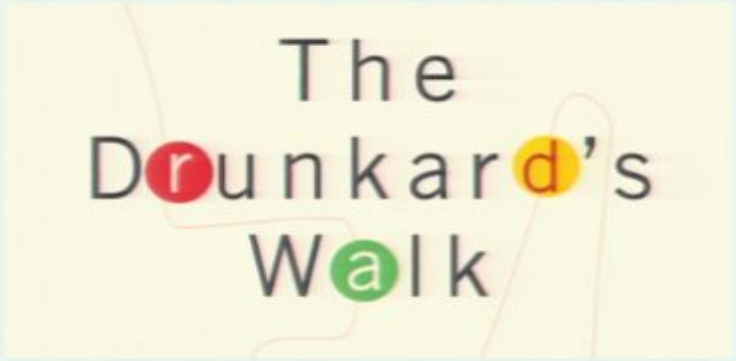
If you want to succeed, double your failure rate."

--Thomas J. Watson, IBM



THE END