

THEORY

Good Process

Good Outcome

Bad Process

Bad Outcome

Description

Expected Value

Long-Term Perspective

Focus On Process

Heuristics

Overconfidence

Myopia

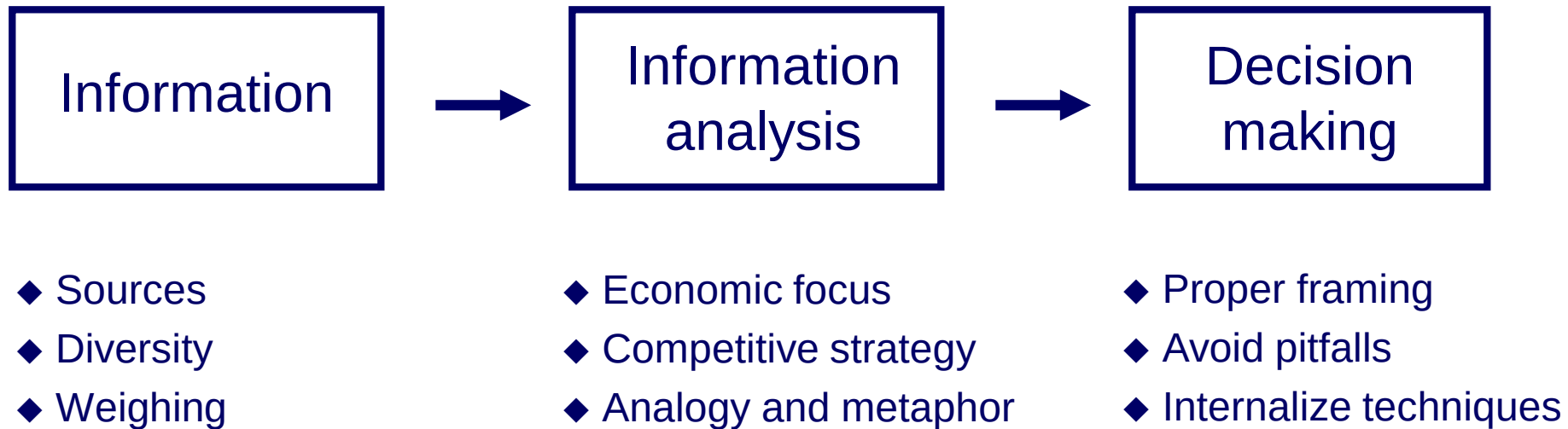
Loss Aversion

Non-Proportional Weighting

PITFALLS

Illustration by Sente Corporation - www.senteco.com

The Investment Process



Agenda

1. Practices of the best
 - ❖ Process versus outcome
 - ❖ Odds in your favor
 - ❖ Understanding the role of time
2. Expected value
 - ❖ Probabilities
 - ❖ Outcomes
3. Why we are suboptimal
 - ❖ Heuristics and biases
 - ❖ How we can benefit

The T Theory

- ◆ The best in all probabilistic fields
 - ❖ Focus on process versus outcome
 - ❖ Always try to have the odds in their favor
 - ❖ Understand the role of time

- ◆ The best have more in common with one another than they do with the average participant in their field

Process versus Outcome

- ◆ In any probabilistic situation, you must develop a disciplined and economic process
- ◆ You must recognize that even an excellent process will yield bad results some of the time
- ◆ The investment community—largely reflecting incentives—now seems too focused on outcomes and not enough on process

Process versus Outcome

		Outcome	
		Good	Bad
Process Used to Make the Decision	Good	Deserved Success	Bad Break
	Bad	Dumb Luck	Poetic Justice

Source: J. Edward Russo and Paul J.H. Schoemaker, *Winning Decisions* (New York: Doubleday, 2002), 5.

Try not to confuse outcomes and process

Process versus Outcome

Any time you make a bet with the *best of it*, where the odds are in your favor, you have earned something on that bet, whether you actually win or lose the bet. By the same token, when you make a bet with the *worst of it*, where the odds are not in your favor, you have lost something, whether you actually win or lose the bet.

David Sklansky, *The Theory of Poker*, 4th ed.
(Henderson, NV: Two Plus Two Publishing, 1999), 10.

Process versus Outcome

Any individual decisions can be badly thought through, and yet be successful, or exceedingly well thought through, but be unsuccessful, because the recognized possibility of failure in fact occurs. But over time, more thoughtful decision-making will lead to better overall results, and *more thoughtful decision-making can be encouraged by evaluating decisions on how well they were made rather than on outcome.*

Robert Rubin
Harvard Commencement Address, 2001

Odds In Your Favor

- ◆ Asset prices reflect a set of expectations
- ◆ Investors must understand those expectations
- ◆ Expectations are analogous to the odds—and the goal of the process is finding mispricings
- ◆ Perhaps the single greatest error in the investment business is a failure to distinguish between knowledge of a company's fundamentals and the expectations implied by the price

Odds In Your Favor

The issue is not which horse in the race is the most likely winner, but which horse or horses are offering odds that exceed their actual chances of victory . . . This may sound elementary, and many players may think that they are following this principle, but few actually do. *Under this mindset, everything but the odds fades from view. There is no such thing as “liking” a horse to win a race, only an attractive discrepancy between his chances and his price.*

Steven Crist, “Crist on Value,” in Beyer, et al., *Bet with the Best* (New York: Daily Racing Form Press, 2001), 64.

Odds In Your Favor

I defined variant perception as holding a well-founded view that was meaningfully different from the market consensus . . . *Understanding market expectation was at least as important as, and often different from, the fundamental knowledge.*

Michael Steinhardt, *No Bull: My Life in and Out of Markets*
(New York: John Wiley & Sons, 2001), 129.

The Role of Time

- ◆ Because investing is about probabilities, the short-term does not distinguish between good and poor processes
- ◆ A quality process has a long-term focus
- ◆ The investment community's short-term focus is costly, and undermines a quality long-term process

The Role of Time

Over a long season the luck evens out, and skill shines through. But in a series of three out of five, or even four out of seven, anything can happen. In a five-game series, the worst team in baseball will beat the best about 15 percent of the time. Baseball science may still give a team a slight edge, but that edge is overwhelmed by chance.

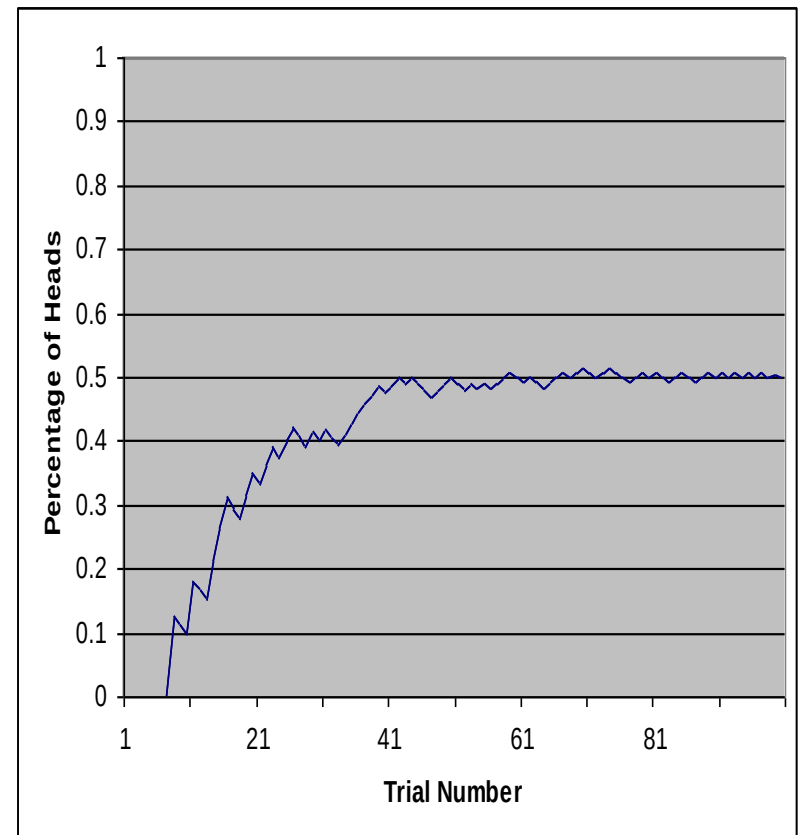
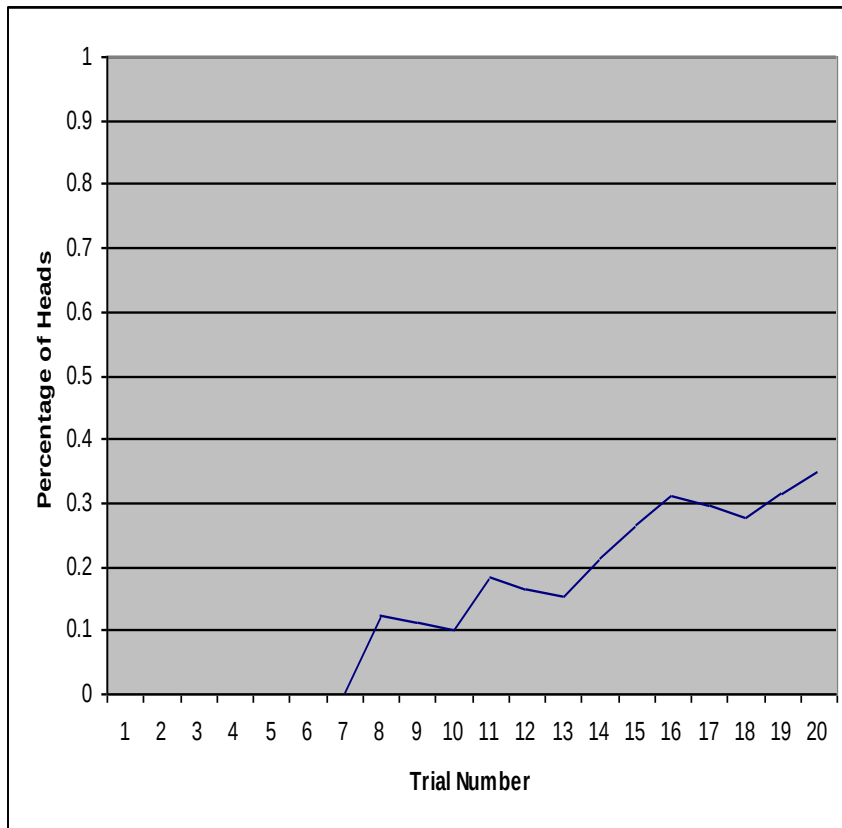
Michael Lewis, *Moneyball: The Art of Winning an Unfair Game*
(New York: W.W. Norton & Company, 2003), 274.

The Role of Time

The result of one particular game doesn't mean a damn thing, and that's why one of my mantras has always been "Decisions, not results." *Do the right thing enough times and the results will take care of themselves in the long run.*

Amarillo Slim, *Amarillo Slim in a World of Fat People*
(New York: Harper Collins, 2003), 101.

The Role of Time



From Theory to Practice

- ◆ Principles of expected value
 - ❖ How do you set probabilities?
 - ❖ How do you consider outcomes?

Expected Value

Expected value is the weighted average value for a distribution of possible outcomes

Take the probability of loss times the amount of possible loss from the probability of gain times the amount of possible gain. That is what we're trying to do. *It's imperfect, but that's what it's all about.*

Warren E. Buffett
Berkshire Hathaway Annual Meeting, 1989.

Expected Value

Expected value—drug development

<u>Scenario</u>	<u>Probability</u>	<u>Value (outcome)</u>	<u>Weighted Value</u>
Breakthrough	10%	\$1,323,920	\$132,392
Above average	10	661,960	66,196
Average	60	66,200	39,720
Below average	10	7,440	744
Dog	10	6,620	662
	<u>100%</u>	<i>Expected Value</i>	<i>\$239,714</i>

Source: David Kellogg and John M. Charnes, "Real Options Valuation for a Biotechnology Company," *Financial Analysts Journal*, May/June, 2000, 76-84.

Expected Value

Risk versus uncertainty

Risk – we don't know outcome, but we know what the underlying distribution looks like

- ❖ incorporates the element of loss/harm

Uncertainty – we don't know the outcome, and we *don't* know what the underlying distribution looks like

- ❖ need not incorporate loss/harm

Source: Frank H. Knight, *Risk, Uncertainty, and Profit* (Boston: Houghton and Mifflin, 1921).

How do we Think about Probabilities?

Three ways to set probability

1. Degrees of belief

- ❖ Subjective probabilities
- ❖ Satisfy probability laws

2. Propensity

- ❖ Reflect properties of object or system
- ❖ Roll of a die: one-in-six probability

3. Frequencies

- ❖ Large sample of appropriate reference class
- ❖ Finance community largely in this camp

Source: Gerd Gigerenzer, *Calculated Risks* (New York: Simon & Schuster, 2002), 26-28.

How do we Think about Probabilities?

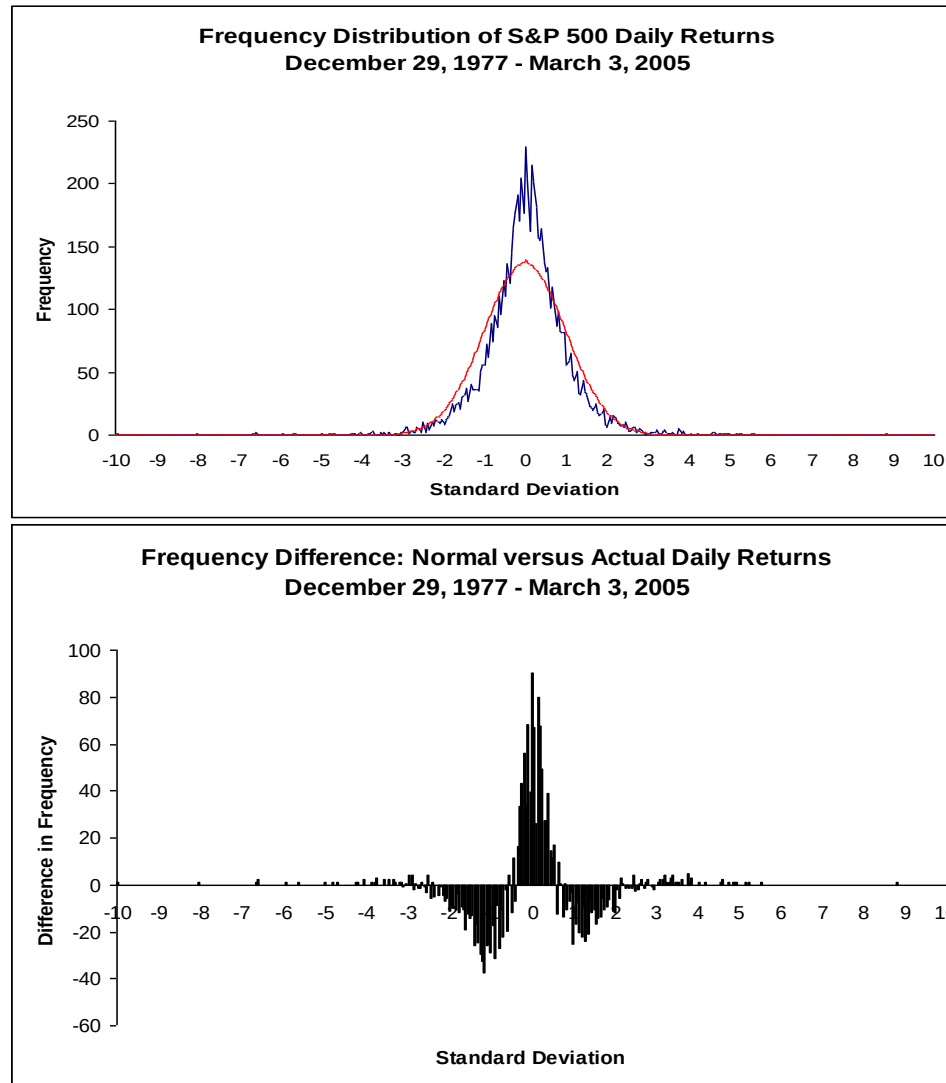
◆ Beware of *nonstationarity*

For past averages to be meaningful, the data being averaged must be drawn from the same population. If this is not the case—if the data come from populations that are different—the data are said to be nonstationary. *When data are nonstationary, projecting past averages typically produces nonsensical results.*

Bradford Cornell, *The Equity Risk Premium*
(New York: John Wiley & Sons, 1999), 45-46.

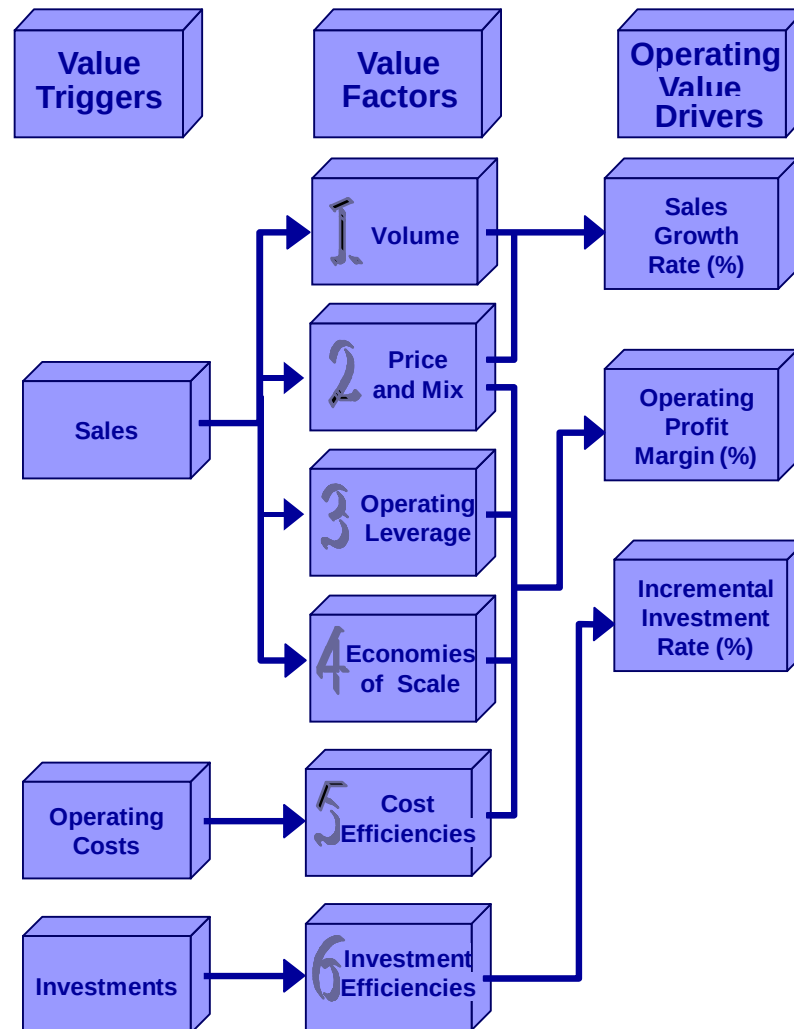
◆ Multiples are probably nonstationary

How do we Think about Outcomes?

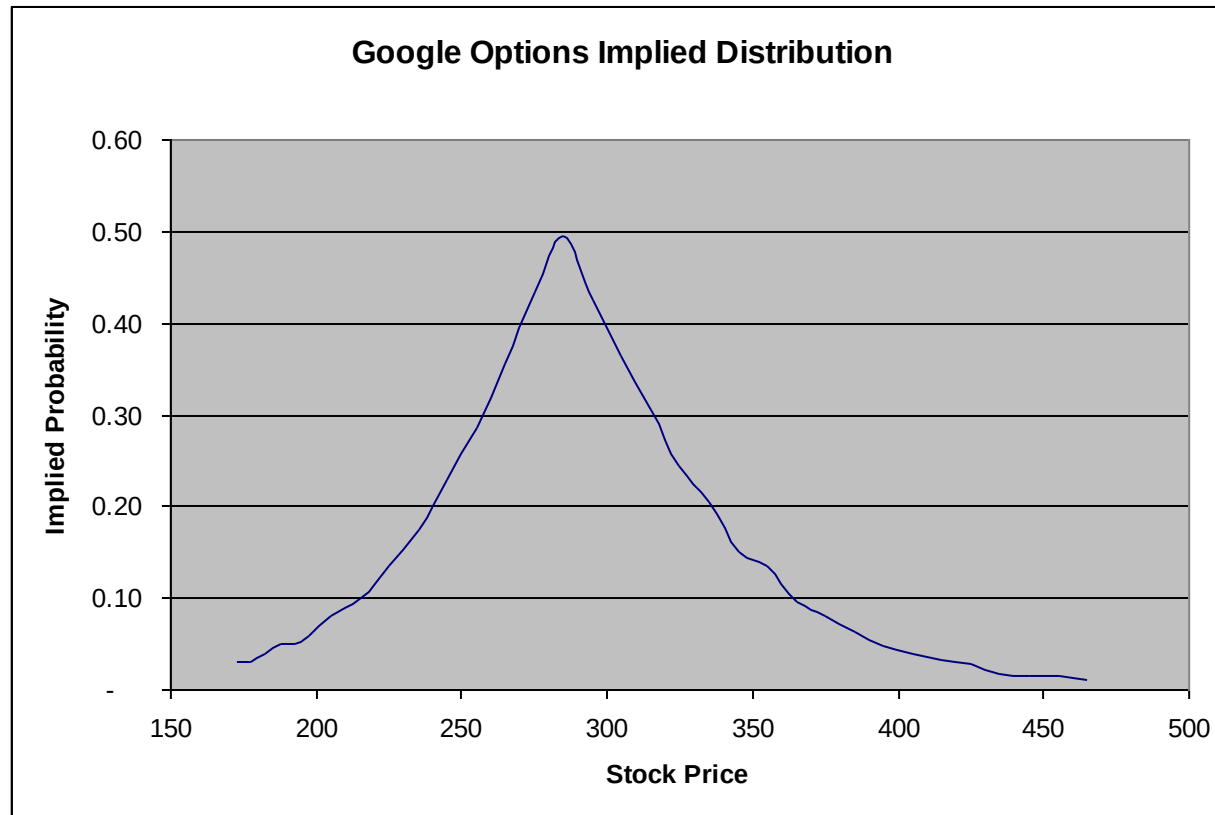


Source: Factset.

How do we Think about Outcomes?



How do we Think about Outcomes?



Frequency versus Magnitude

- ◆ Both frequency (probability) and magnitude (outcome) matter

Good probability, bad expected value

<u>Probability</u>	<u>Outcome</u>	<u>Weighted Value</u>
70%	+1 %	+0.7%
30%	-10	-3.0
100%		-2.3%

Bad probability, good expected value

<u>Probability</u>	<u>Outcome</u>	<u>Weighted Value</u>
70%	-1 %	-0.7%
30%	+10	+3.0
100%		+2.3%

Frequency versus Magnitude

Indeed, *I can be wrong more often than I am right, so long as the leverage on my correct judgments compensates for my mistakes*. At least that is how my investments have worked out thus far. A statistician might deplore this approach, but it has worked for me for a half century.

Leon Levy, *The Mind of Wall Street*
(New York: PublicAffairs, 2002), 197.

Role of Time—Loss Aversion

- ◆ Samuelson's lunch bet
 - ❖ Flip a fair coin
 - ❖ Correct call you win \$200
 - ❖ Incorrect call you lose \$100
- ◆ Samuelson proved that if you are willing to play 100 times, you should play once
- ◆ Samuelson's theory doesn't feel right

See: Paul A. Samuelson, "Risk and Uncertainty: A Fallacy of Large Numbers," *Scientia*, XCVIII, 1963, 108-113.

Role of Time—Loss Aversion

Myopic Loss Aversion

- ❖ We regret losses more than similar-sized gains. Since the stock price is typically the frame of reference, the *probability* of loss or gain is important. A longer holding period means a higher probability of a gain.
- ❖ The more frequently we evaluate our portfolios, the more likely we are to see losses and hence suffer from loss aversion.

Source: Shlomo Benartzi and Richard H. Thaler, “Myopic Loss Aversion and The Equity Premium Puzzle,” *The Quarterly Journal of Economics*, February 1995, 79-92.

Role of Time—Loss Aversion

- ◆ As a result, a long-term investor is willing to place a higher value on a risky asset than a short-term investor
- ◆ Valuation depends on your time horizon

Overconfidence

- ◆ We consistently overrate our capabilities, knowledge, and skill
- ◆ We tend to project outcome ranges that are too narrow
- ◆ Overconfidence can lead to excessive trading

See: Brad Barber and Terrance Odean, "Trading is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors," *Journal of Finance*, 55, April 2000, 773-806.

Heuristics

- ◆ Other pitfalls
 - ❖ Framing
 - ❖ Anchoring and adjusting
 - ❖ Confirmation trap

How Can We Benefit?

- ◆ Look for diversity breakdowns
 - ❖ We often make decisions by observing others
 - ❖ Information cascades—a reasoned or arbitrary decision by one individual triggers action by many
 - ❖ Herding—when a large group of investors make the same choice based on the observations of others, independent of their own knowledge

How Can We Benefit?

- ◆ How do we lose diversity?
 - ❖ Imitation
 - ❖ Solomon Asch experiment

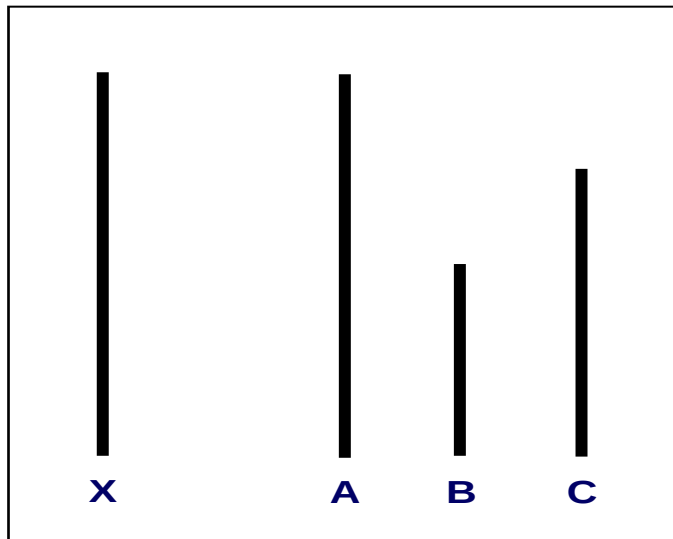


Illustration by LMCM based on S. E. Asch, "Effects of Group Pressure Upon the Modification and Distortion of Judgment," in Harold Guetzkow, ed., *Groups, Leadership and Men* (Pittsburgh, PA: Carnegie Press, 1951).

How Can We Benefit?

- ◆ Asch always wondered: Did the people who gave in to the group do so knowing that their answers were wrong? Or did the social pressure actually change their perceptions?
- ◆ The new study tried to find an answer using fMRI scanners.
- ◆ The researchers found that social conformity showed up in the brain as activity in regions that are entirely devoted to perception.
- ◆ But independence of judgment—standing up for one's beliefs—showed up as activity in brain areas involved in emotion.
- ◆ "We like to think that seeing is believing," said Dr. Gregory Berns, a psychiatrist and neuroscientist at Emory University who led the study.
- ◆ But the study's findings show that seeing is believing what the group tells you to believe.

Source: Sandra Blakeslee, "What Other People Say May Change What You See," *The New York Times*, June 28, 2005.

Takeaways

- ◆ Investing is a probabilistic exercise
- ◆ Expected value is the proper way to think about stocks
- ◆ There are many pitfalls in objectively assessing probabilities and outcomes
- ◆ We need to practice mental discipline or else we'll lose long-term to someone who is practicing that discipline
- ◆ Markets periodically go to excesses