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# Applications of Behavioral Finance

October 2017

# Traditional Finance

## Thinking Like an Econ

Traditional finance is based on hypotheses about how investors and markets **should** behave.

Investors are modeled as rational.

Individuals are assumed to be risk averse, self-interested utility maximizers.

**Rational Economic Man**

- An individual will try to obtain the highest possible economic well-being or utility given budget constraints and the available information about opportunities.

# Problems With Traditional Finance

## Traditional finance was built based on the premise that investors act rationally and markets are efficient.

Keynes (1936): No human can be fully informed of “all circumstances and maximize his expected utility by determining his complete, reflexive, transitive, and continuous preferences over alternative bundles of consumption goods at all times.”

“Rational Economic Man” does not account for the fact that people can have difficulty prioritizing short-term versus long-term goals.

**Selected Research Studies on Market Anomalies**

| Year | Authors | Article or Study Title | Anomalies Discovered |
|---|---|---|---|
| 1968 | Ball and Brown | ”An Empirical Evaluation of Accounting Income Numbers” | Post earnings announcement drift |
| 1976 | Rozeff and Kinney | ”Capital Market Seasonality: The Case of Stock Market Returns” | January effect: January stock returns were higher than in any other month |
| 1981 | Gibbons and Hess | ”Day of the Week Effects and Asset Returns” | Monday effect: Stock prices tended to go down on Mondays |
| 1981 | Shiller | ”Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends” | Excess volatility |
| 1982 | Rendleman, Jr., Jones, and Latane | ”Empirical Anomalies Based on Unexpected Earnings and the Importance of Risk Adjustments” | Earnings surprises and their effect on the stock price |
| 1985 | De Bondt and Thaler | ”Does the Stock Market Overreact?” | Stock market overreacts to bad news |
| 1991 | Ritter | ”The Long-Run Performance of Initial Public Offerings” | Negative long-run performance of IPOs |
| 1992 | Fama and French | ”The Cross-Section of Expected Stock Returns” | Value investing |
| 1993 | Jegadeesh and Titman | ”Returns to Buying Winners and Selling Losers; Implications for Stock Market Efficiency” | Momentum |

# Behavioral Finance

## Thinking Like a Human

Behavioral finance was born from the combination of economics and psychology.

Behavioral finance differs from traditional finance in that it focuses on how investors and markets behave in **practice** rather than in theory.

- Macro Behavioral Finance considers market anomalies that distinguish markets from the efficient markets of traditional finance.
- Micro Behavioral Finance examines behaviors or biases that distinguish individual investors from the rational actors envisioned in neoclassical economic theory.

Behavioral finance neither assumes that people act rationally and consider all available information in decision making, nor that markets are efficient.

# Investor Biases

## Departures From Rational Behavior

All humans are likely to hold some “biases,” which just means that we don’t always make the most rational decisions. We each have constraints, and our comfort levels vary in response to uncertainty, which is not considered in traditional economics.

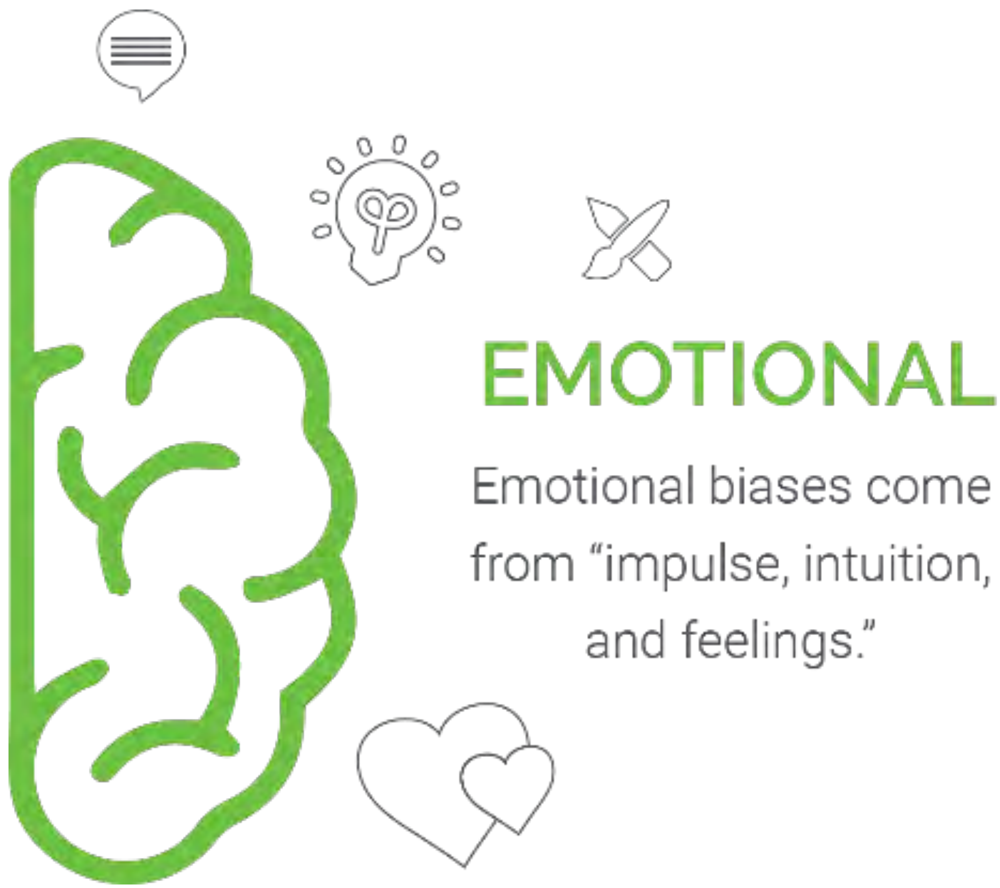
Biases are classified as either emotional or cognitive:

- Emotional biases come from “impulse or intuition”.
- Cognitive biases are caused by errors in calculation or faulty reasoning.

# Emotional Biases

## Departures From Rational Behavior

- Loss Aversion
- Endowment
- Overconfidence
- Regret Aversion
- Self-Attribution
- Self-Control
- Status Quo



# Loss Aversion

## Emotional Bias

1. Chose one of these two outcomes:
   a) An assured gain of $475
   b) A 25% chance of gaining $2,000 and a 75% chance of gaining nothing
2. Choose one of these two outcomes:
   a) An assured loss of $725
   b) A 75% chance of losing $1,000 and a 25% chance of losing nothing

# Loss Aversion

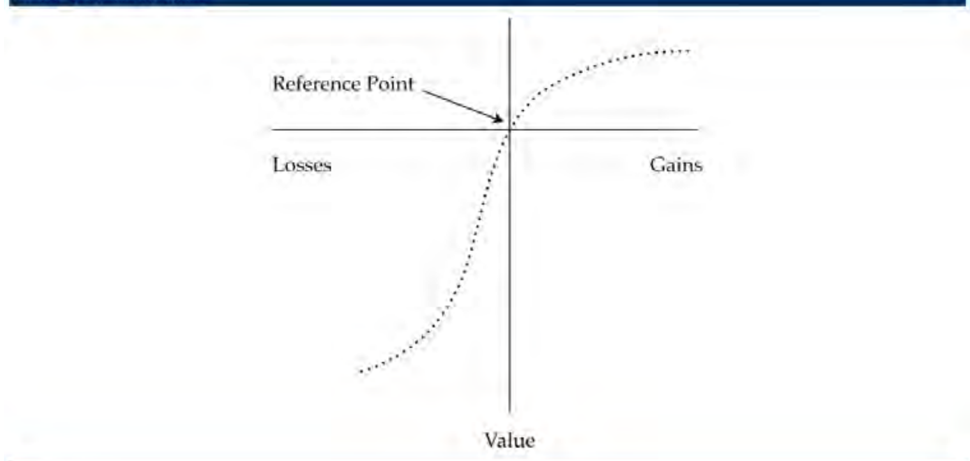
## Emotional Bias

People tend to strongly prefer avoiding losses as opposed to achieving gains. Psychologically, the possibility of a loss is twice as powerful a motivator as the possibility of making a gain of equal magnitude.

### Consequences

- Investors may hold a loss position for too long hoping that they may eventually break even.
- Investors may sell winners soon to lock in gains but hold onto losses far too long.
- Investors may avoid risky assets, increasing the chance of not achieving long-term financial goals.

Exhibit 3. Value Function of Loss Aversion



# Loss Aversion

## Emotional Bias

The rational response for Question 1 is “B,” but loss-averse investors are likely to opt for the assurance of a profit in “A.”

The rational response for Question 2 is “A,” but loss-averse investors are more likely to select “B”.

1. Chose one of these two outcomes:
   a) An assured gain of $475
   b) A 25% chance of gaining $2,000 and a 75% chance of gaining nothing

2. Choose one of these two outcomes:
   a) An assured loss of $725
   b) A 75% chance of losing $1,000 and a 25% chance of losing nothing

# Endowment

## Emotional Bias

People value an asset more when they hold rights to it than when they do not.

**Consequences**

- Investors may fail to sell certain assets and replace them with other assets, especially inherited securities.
- Investors may maintain an inappropriate asset allocation.
- Investors may continue to hold classes of assets with which they are familiar.

# Endowment

## Emotional Bias

A group of college students were surveyed and asked if they preferred a candy bar or a coffee mug. The classroom was split around 50/50. Every student was given a coffee mug, and was then given the choice to keep the mug or trade it in for a candy bar. 89% chose to keep the coffee mug. The study was replicated with another group, but the group was given a candy bar first. 90% declined to trade in their candy bar for a coffee mug.


Source: J.L. Knetsch, 1989

# Regret Aversion

## Emotional Bias

Investors tend to avoid making decisions out of fear that the decisions will turn out poorly; Investors try to avoid the pain of regret associated with bad decisions.

**Consequences**

- Investors may be too conservative because they have suffered losses in the past and want to avoid the pain of making another bad decision.
- Investors may engage in herding behavior because buying into mass consensus can limit the potential for future regret.

An investor may want to invest in SNAP because of all of the publicity surrounding the IPO. The investor has the fear of “missing out” on returns that “everyone else” will be getting.

After investing in SNAP at $17 and watching it rise to $27 the investor considers selling because she believes the fair value is closer to $20. However, the investor fears of missing out on the future returns if SNAP turns out to be the next Facebook, so she does nothing.

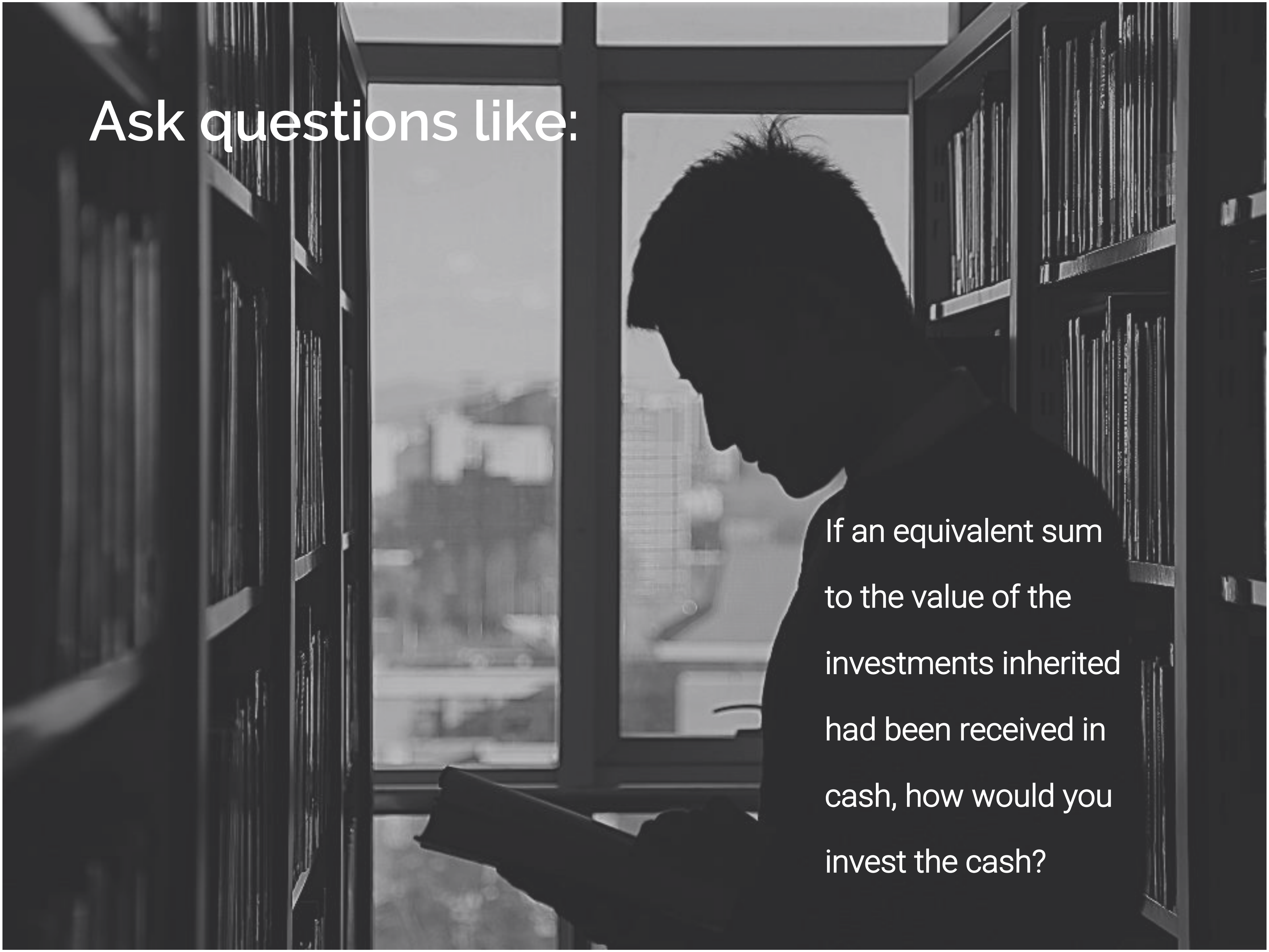
# How To Manage

## Emotional Biases

Emotional biases stem from impulse, intuition, and feelings and as a result may be hard to correct.

- Focus on the cognitive aspects of the biases.
- Educate the investor about the investment decision-making process and portfolio theory.
- Drawing attention to the biases is unlikely to lead to positive outcomes; the individual is likely to become defensive rather than receptive to considering alternatives.

# Ask questions like:

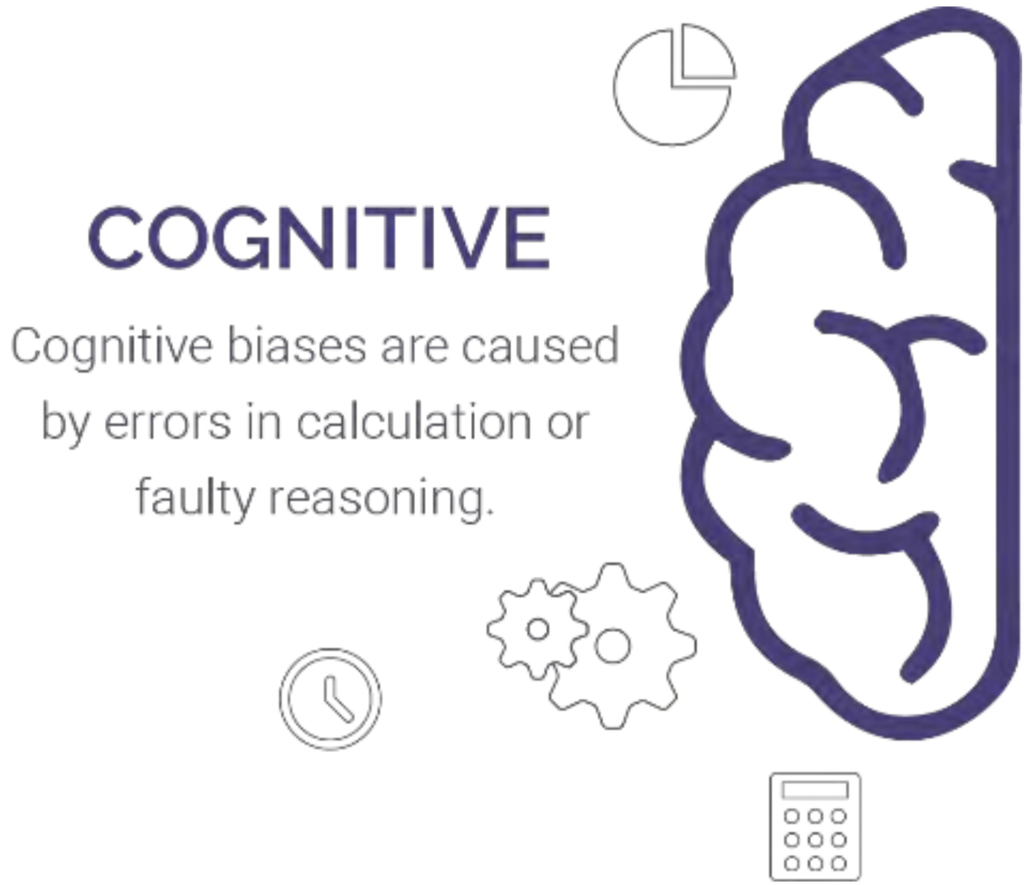


If an equivalent sum to the value of the investments inherited had been received in cash, how would you invest the cash?

# Cognitive Biases

## Departures From Rational Behavior

- Confirmation
- Representativeness
- Hindsight
- Anchoring and Adjustment
- Mental Accounting
- Framing
- Availability



# Confirmation

## Cognitive Bias

If the card has a vowel on one side, then it must have an even number on the other side.

A Q 4 7

Which two cards would you turn over to test the rule?

# Confirmation

## Cognitive Bias

Investors only tend to look for and notice information that confirms their beliefs.

**Consequences**

- Investors may hold an under diversified portfolio because they are convinced that it is a good investment based on faulty reasoning.
- Investors may hold a disproportionate amount of their investment assets in their employing company's stock because they believe in their company and are convinced of its favorable prospects.

# Confirmation

## Cognitive Bias

The Correct Answer is “A” and “7”. Most people select “4” because they want to confirm the hypothesis, not refute it.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# Representativeness

## Cognitive Bias

Linda is 31 years old, single, outspoken and very bright. She majored in philosophy. As a student, she was deeply concerned with the issue of discrimination and social justice, and also participated in antinuclear demonstrations.

Which of the following is more probable:

1. Linda is a bank teller.
2. Linda is a bank teller and is active in the feminist movement.

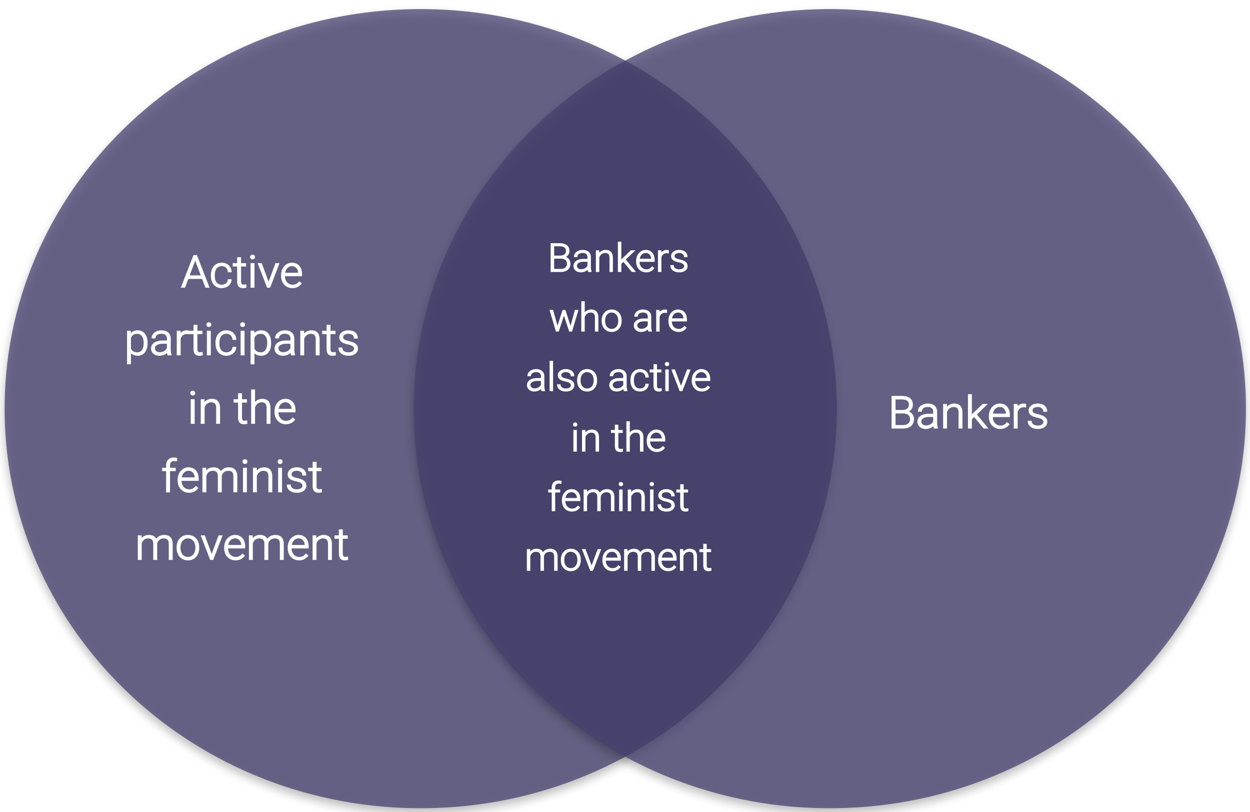
# Representativeness

## Cognitive Bias

Investors tend to classify new information based on past experiences and classifications. This may cause investors to use "rules of thumb" incorrectly.

**Consequences:**

- Investors may make investment decisions based on a manager's short term performance and ignore other relevant information.
- Investors may incorrectly classify an investment by incorrectly comparing it to a previously held investment.

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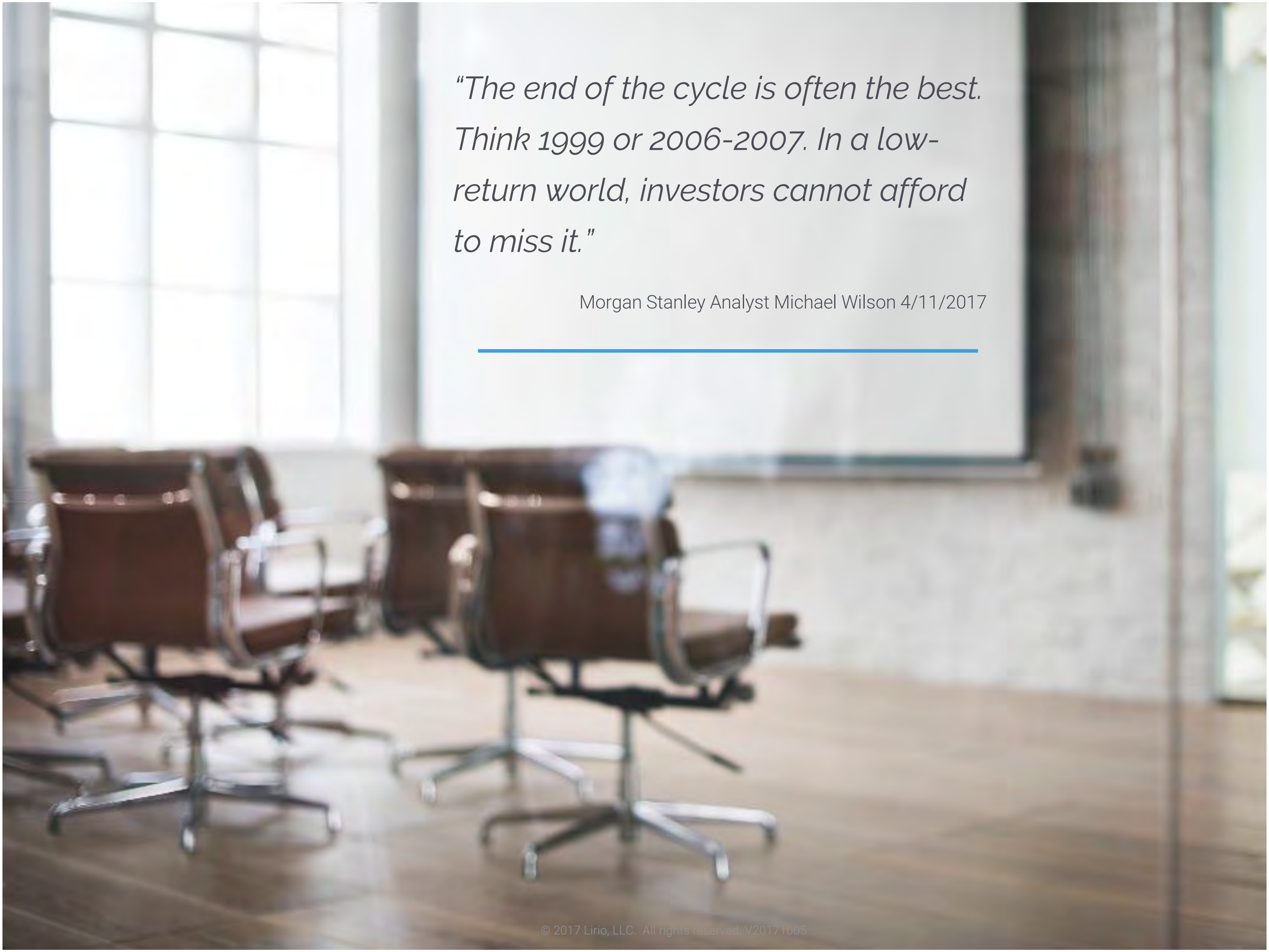
# Hindsight

## Cognitive Bias

Investors see past events as having been predictable and reasonable to expect.

**Consequences**

- Investors may overestimate their ability to get out of the market before things get bad.
- Investors may unfairly assess money manager or security performance. “Shouldn’t he have been able to see the collapse in oil prices coming? He must not be a good manager.”



*“The end of the cycle is often the best. Think 1999 or 2006-2007. In a low-return world, investors cannot afford to miss it.”*

Morgan Stanley Analyst Michael Wilson 4/11/2017

# Pop Quiz

## Cognitive Bias

Are there more or less than 120 countries in Africa?

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# Pop Quiz

## Cognitive Bias

How many countries
are in Africa?

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# Anchoring and Adjustment

## Cognitive Bias

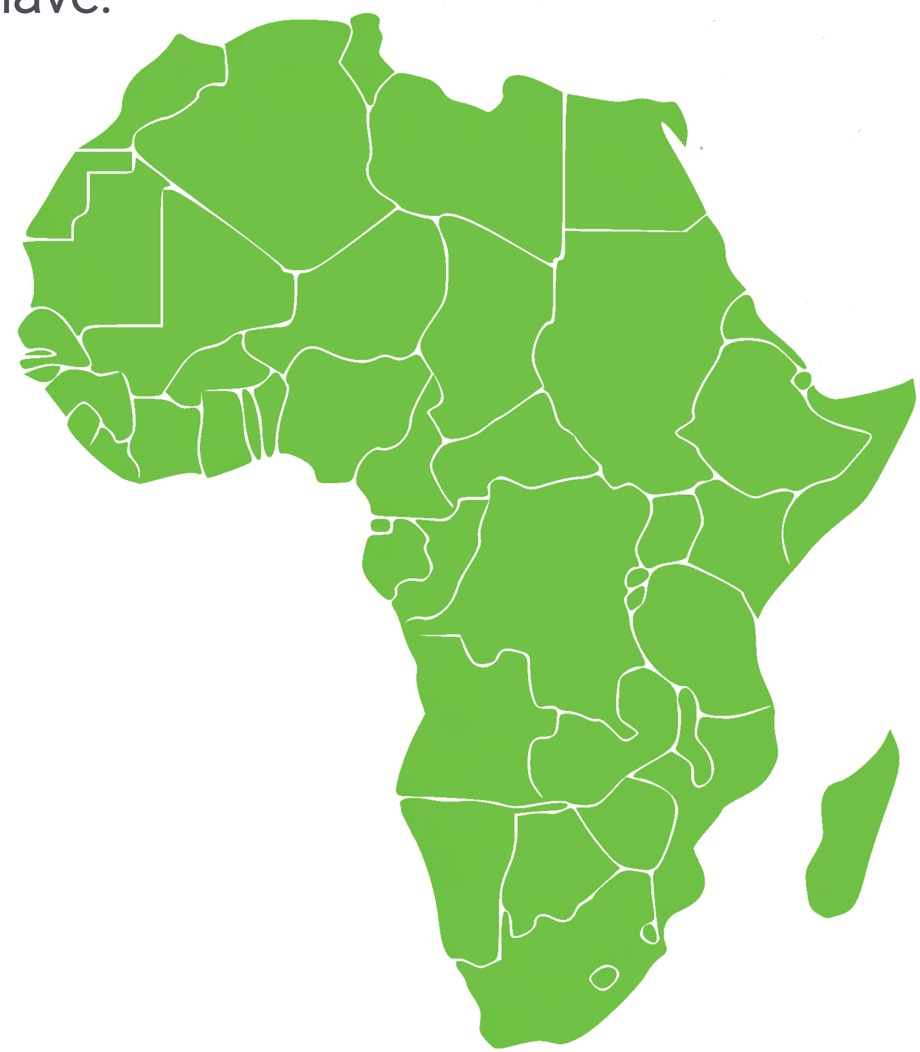
Information-processing bias in which the use of a psychological heuristic influences the way people estimate probabilities. When required to estimate a value with unknown magnitude, people generally begin by envisioning some initial default number–an “anchor”—which they adjust up or down to reflect subsequent information and analysis.

**Consequences**

- Investors may fail to adequately adjust for new information.
- Investors may be “anchored” to the price they paid for an investment and will be unwilling to sell until the investment reaches this price again even if the fundamentals have dramatically changed.

The correct answer is 54. If someone does not know the correct answer, they may “anchor” their answer for Question #2 to 120 because it is the only information they have.

1. Are there more or less than 120 countries in Africa?
2. How many countries are there in Africa?



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# Mental Accounting

## Cognitive Bias

Investors treat one sum of money differently from another equal-sized sum based on which mental account the money is assigned.

**Consequences**

- Investors may hold inefficient portfolios because they ignore the correlation of assets between their different accounts.
- Investors may irrationally distinguish between returns derived from income and those derived from capital appreciation.

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# Mental Accounting

## Cognitive Bias

Between the box office and the entrance, you lost your ticket.

A $10 bill fell out of your pocket and you will not be able to recover it.



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# Framing

## Cognitive Bias

Information-processing bias in which a person answers a question differently based on the way in which it is asked.

**Consequence:**

> Investors may misidentify risk tolerance because of how questions about risk tolerance were framed.

The US is preparing for an outbreak of an unusual Asian disease, which is expected to kill 600 people.

If program A is adopted, 200 people will be saved.

If program B is adopted, there is a 1/3 probability that 600 people will be saved and a 2/3 probability that no people will be saved.

(72% of Physicians Chose A)

If program A is adopted, 400 people will die.

If program B is adopted, there is a 1/3 probability that nobody will die and a 2/3 probability that 600 people will die.

(22% of Physicians Chose A)

Source: Kahneman and Tversky 1984

# Availability

## Cognitive Bias

# Availability

## Cognitive Bias

Out of the names just read, were there more male names or more female names?

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# Availability

## Cognitive Bias

Investors may estimate the probability of an outcome based on how easily the outcome comes to mind.

### Consequences

- Investment decisions may be influenced by how easily information is recalled, even if it is not the most relevant.
    - If asked to identify the “best” mutual fund company, investors are likely to select a firm that spends heavily on advertising, such as Fidelity or Schwab. (Pompian 2006)
- Investors may fail to diversify because they only invest in familiar assets.

# Availability

## Cognitive Bias

The list of names had 14 male and 15 female names, but the male names include more famous people. When asked to determine if the list had more male or female names, most people select male because they are able to recall the famous names.


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# How To Manage

## Cognitive Bias

Cognitive errors are statistical, information-processing, or memory errors that result in faulty reasoning and analysis. These biases are more easily corrected by education and by ensuring that investors have accurate and complete information.

Individuals are less likely to make cognitive errors if they are aware of the possibility of their occurrence.

# Behavioral Investor Types

## Introduction

An investor's background, past experiences, and attitudes can play a significant role in decisions made during the asset allocation process. If investors fitting specific psychographic profiles are more likely to exhibit specific investor biases, then practitioners can attempt to recognize the relevant behavioral tendencies **before** investment decisions are made.

| Barnwell Two-Way Model | Bailard, Biehl, and Kaiser Five-Way Model | | Michael Pompian |
|---|---|---|---|
| Active<br>vs<br>Passive | Confident<br>vs<br>Anxious | Careful<br>vs<br>Impetuous | Risk Tolerance<br>vs<br>Behavioral Biases |

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# Practical Uses

## Adjust or Adapt?

What should an Advisor do if a client has a behavioral bias?

- The wealthier the client, the more the advisor should **adapt** to the behavioral biases.
- The less wealthy, the more the advisor should **moderate** the bias.
- In general, moderate cognitive biases, adapt to emotional biases.

**Deviations from a "Rational" Portfolio**

| | **Bias Type: Cognitive** | **Bias Type: Emotional** |
|---|---|---|
| High Wealth Level/Low SLR | Modest Asset Allocation Change Suggestion: +/- 5 to 10% Max Per Asset Class | Stronger Asset Allocation Change Suggestion: +/- 10 to 15% Max Per Asset Class |
| Low Wealth Level/High SLR | Close to the Rational Asset Allocation Suggestion: +/- 0 to 3% Max Per Asset Class | Modest Asset Allocation Change Suggestion: +/- 5 to 10% Max Per Asset Class |

Source: The Behavioral Biases of Individuals, Michael M. Pompian

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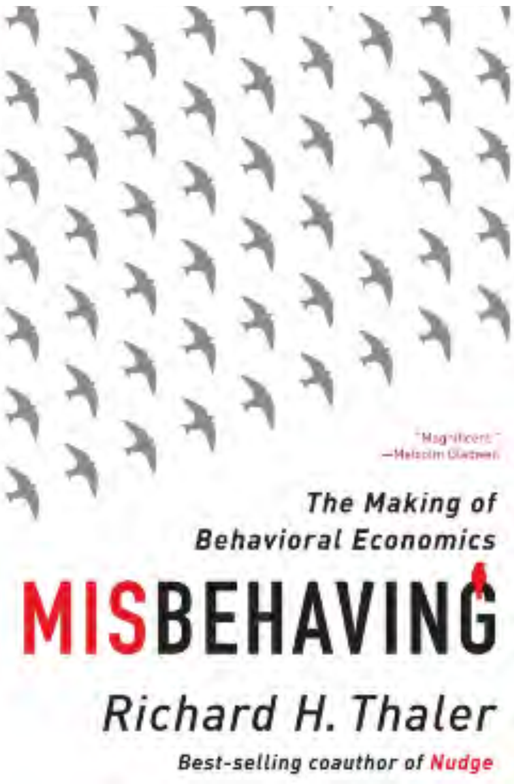
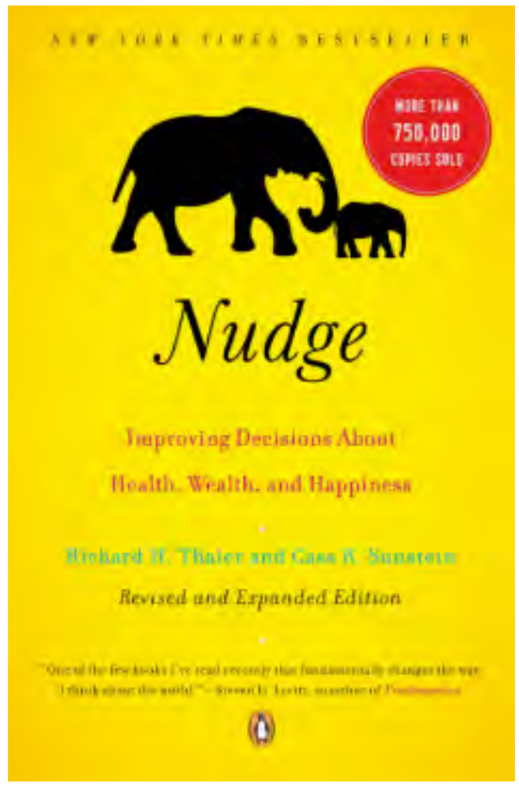
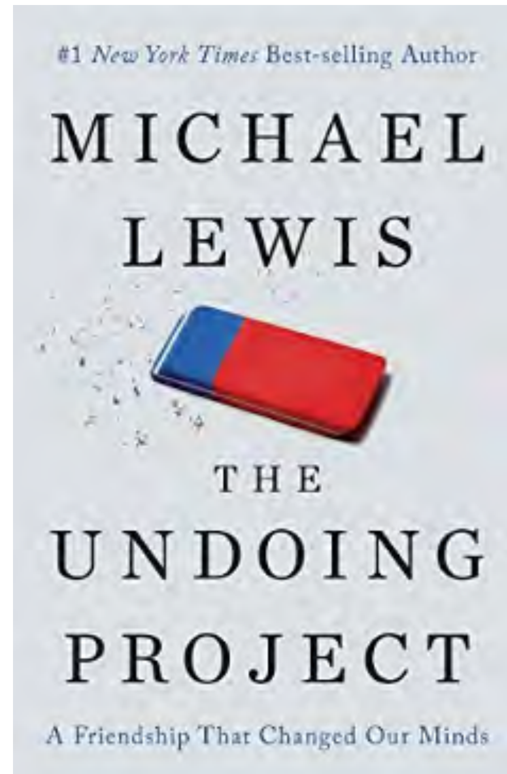
# Further Reading



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Contact Us:

9202 S. Northshore Drive
Suite 300
Knoxville, TN 37922
865.243.8000

finworx.com

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