

# Investing Psychology and Behavioral Finance

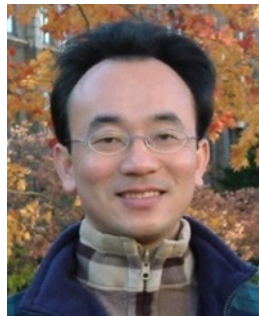
1142AIFQA03

MBA, IM, NTPU (M5147) (Spring 2026)  
Tue 5, 6, 7 (13:10-16:00) (B3F17)

Min-Yuh Day, Ph.D,  
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Institute of Information Management, National Taipei University

<https://web.ntpu.edu.tw/~myday>



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# Syllabus

Week	Date	Subject/Topics
1	2026/02/24	Introduction to Artificial Intelligence in Finance and Quantitative Analysis
2	2026/03/03	AI in FinTech: Metaverse, Web3, DeFi, NFT, Generative AI and Agentic AI for Financial Innovation Applications
3	2026/03/10	Investing Psychology and Behavioral Finance
4	2026/03/17	Event Studies in Finance
5	2026/03/24	Case Study on AI in Finance and Quantitative Analysis I
6	2026/03/31	Finance Theory and Data-Driven Finance

# Syllabus

**Week Date Subject/Topics**

7 2026/04/07 Make-up holiday for NTPU Sports Day (No Classes)

**8 2026/04/14 Midterm Project Report**

**9 2026/04/21 Financial Econometrics**

**10 2026/04/28 AI-First Finance**

**11 2026/05/05 Industry Practices of AI in Finance and  
Quantitative Analysis**

**12 2026/05/12 Case Study on AI in Finance and Quantitative Analysis II**

# Syllabus

<b>Week</b>	<b>Date</b>	<b>Subject/Topics</b>
<b>13</b>	<b>2026/05/19</b>	<b>Deep Learning in Finance; Reinforcement Learning in Finance; Generative AI and Agentic AI in Finance</b>
<b>14</b>	<b>2026/05/26</b>	<b>Algorithmic Trading; Risk Management; Trading Bot and Event-Based Backtesting</b>
<b>15</b>	<b>2026/06/02</b>	<b>Final Project Report I</b>
<b>16</b>	<b>2026/06/09</b>	<b>Final Project Report II</b>

# **Investing Psychology and Behavioral Finance**

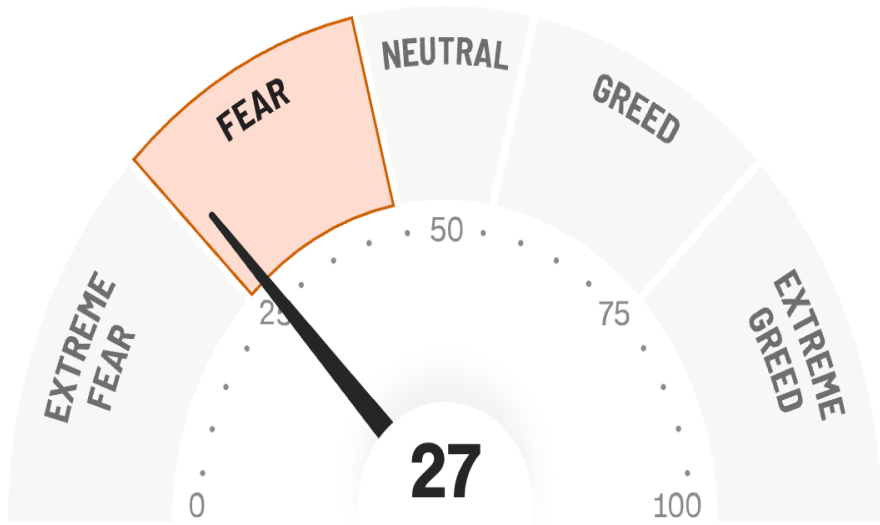
# Outline

- **Investing Psychology**
  - **Investor Sentiment**
  - **Consumer Psychology and Behavior**
- **Behavioral Finance**
  - **Prospect Theory: An Analysis of Decision Under Risk**
  - **Behavioral Heuristics and Biases in Decision Making**
  - **Herding Behavior in Finance**

# Investor Sentiment

# Fear & Greed Index

What emotion is driving the market now?



Previous close			
<b>Fear</b>	26	<b>Fear</b>	33
1 month ago		1 year ago	
<b>Neutral</b>	51	<b>Extreme Fear</b>	17

Last updated Mar 9 at 6:46:51 PM ET



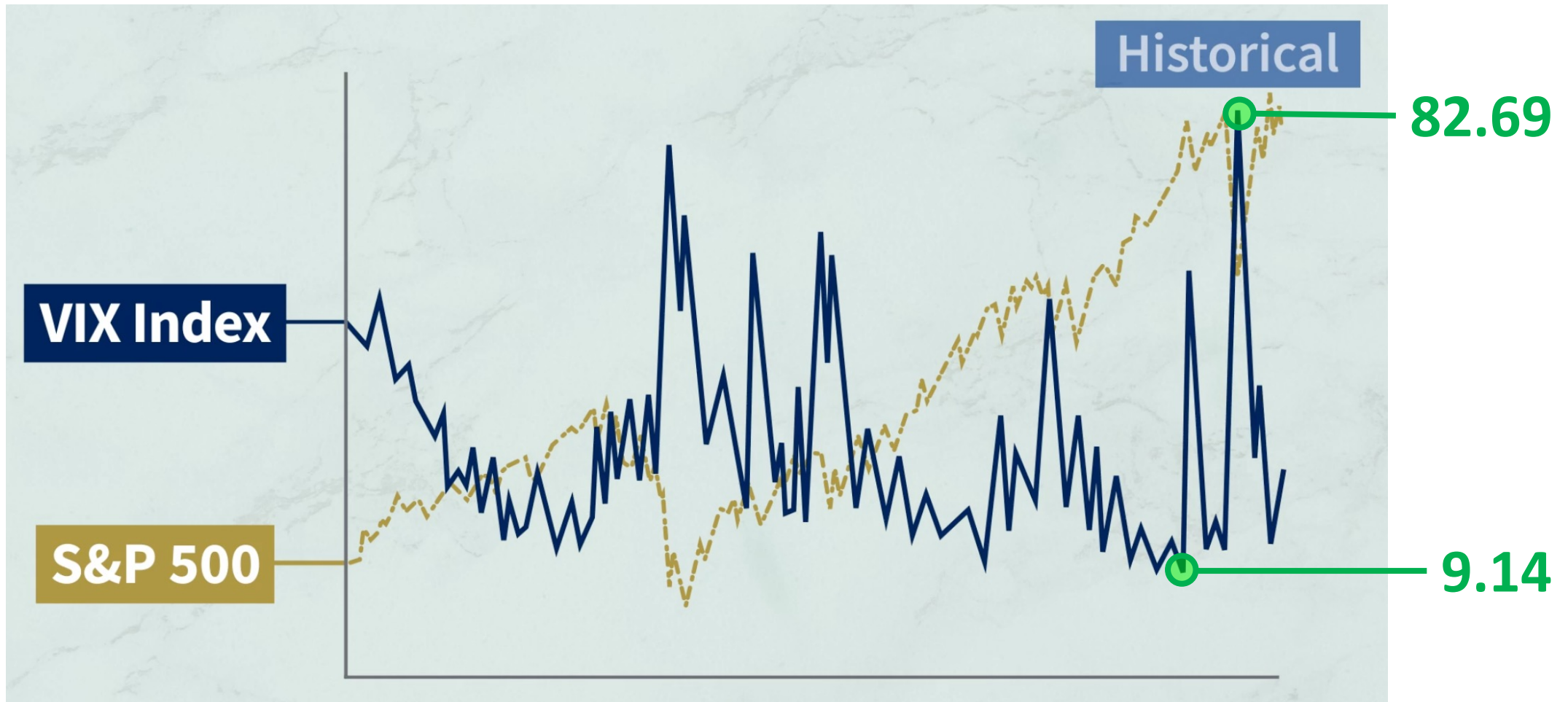
Last updated Mar 9 at 6:46:51 PM EDT



Cboe

# VIX (Volatility Index)

An Indicator of Expected Market Volatility



Min-Yuh Day and Yensen Ni (2023),

# Be greedy when others are fearful: Evidence from a two-decade assessment of the NDX 100 and S&P 500 indexes,

International Review of Financial Analysis, 90, 102856.



International Review of Financial  
Analysis

Volume 90, November 2023, 102856



Be greedy when others are fearful:  
Evidence from a two-decade  
assessment of the NDX 100 and S&P  
500 indexes

[Min-Yuh Day](#)<sup>a</sup>, [Yensen Ni](#)<sup>b</sup>  

# **Consumer Psychology and Behavior**

# How consumers think, feel, and act

# Fintech Impact on Consumer Behavior



Source: <http://bitcoinist.com/fintech-impact-consumer-behavior-mobile-payments/>

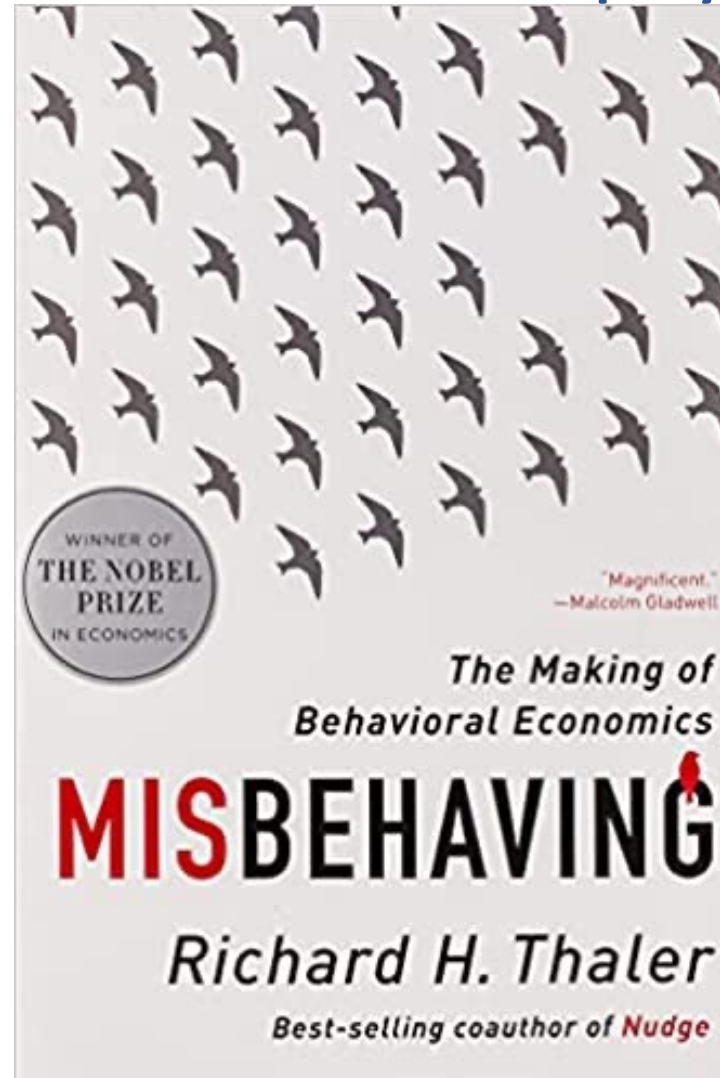
# Behavioral Finance

Richard H. Thaler (2016),  
**Misbehaving: The Making of Behavioral Economics,**

W. W. Norton & Company



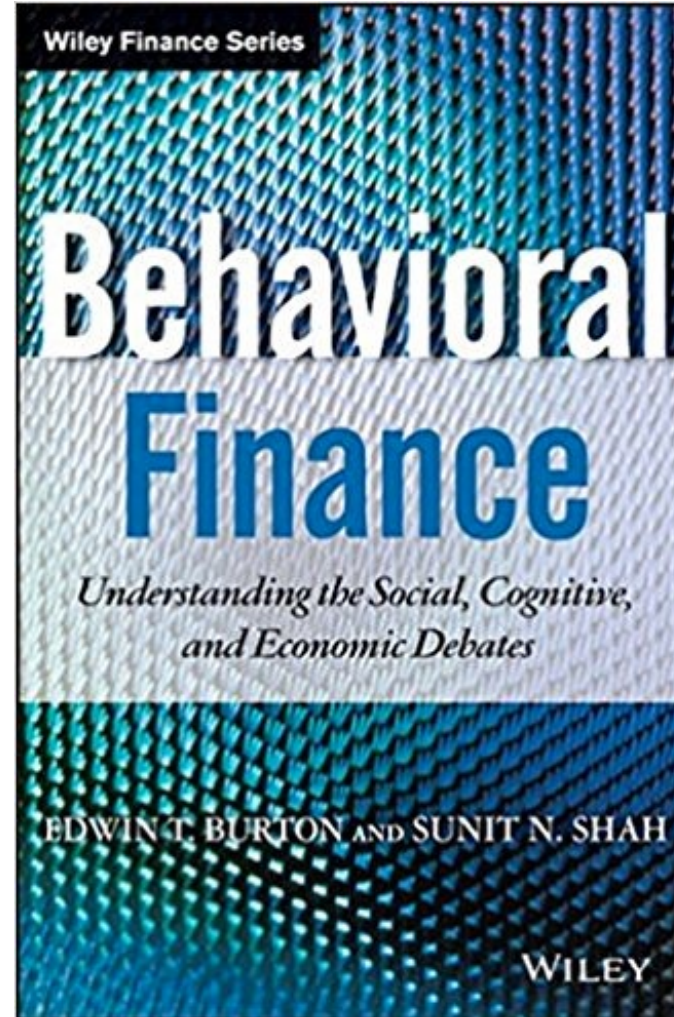
Richard H. Thaler



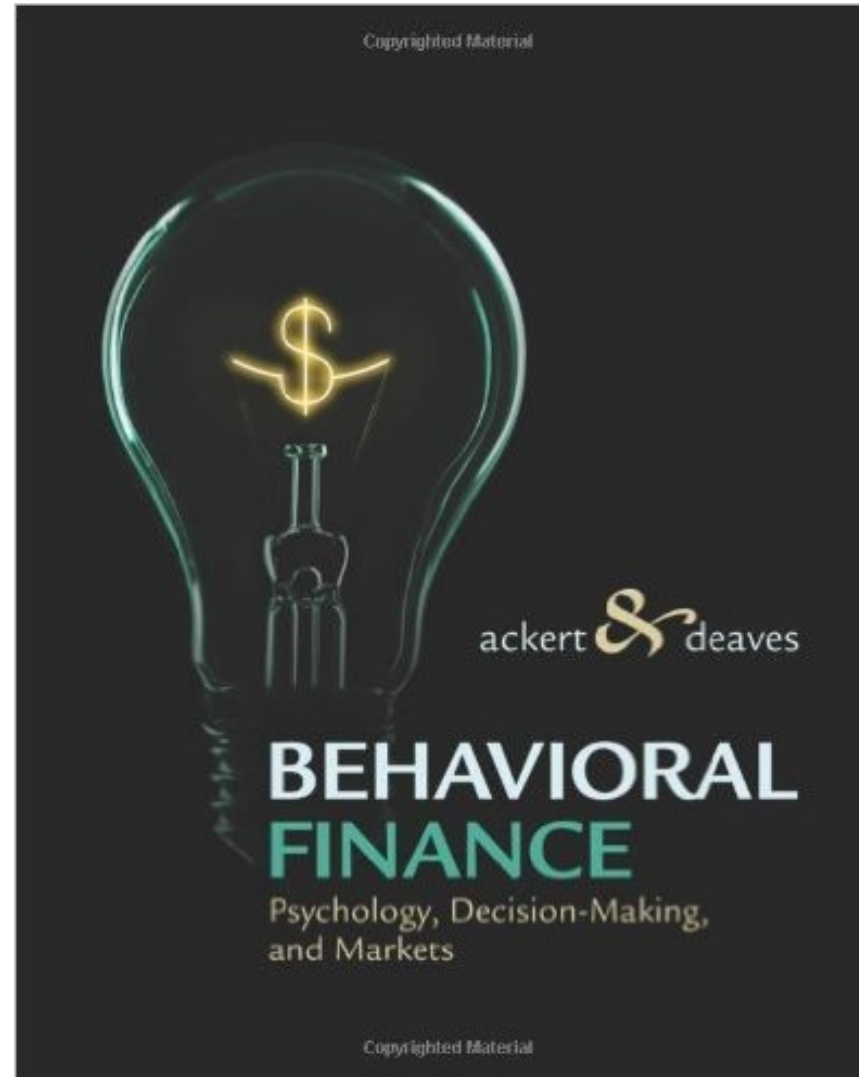
Edwin Burton and Sunit N. Shah (2013)

# Behavioral Finance:

Understanding the Social, Cognitive, and Economic Debates,  
Wiley



Lucy Ackert and Richard Deaves (2009),  
**Behavioral Finance: Psychology, Decision-Making, and Markets,**  
South-Western College Pub

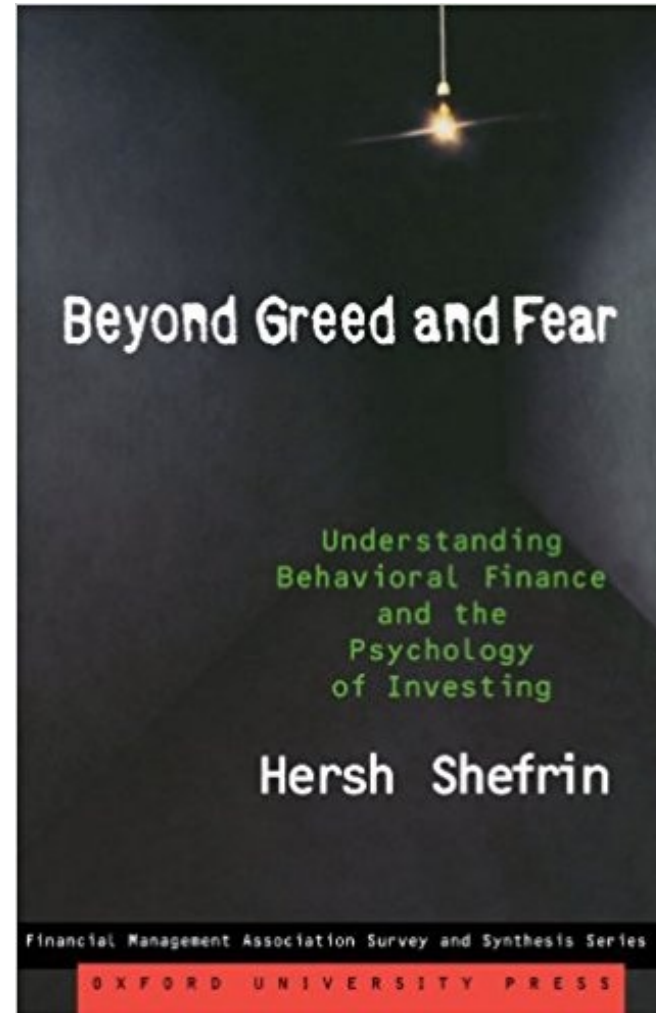


Hersh Shefrin (2007),

# Beyond Greed and Fear:

Understanding Behavioral Finance and the Psychology of Investing,

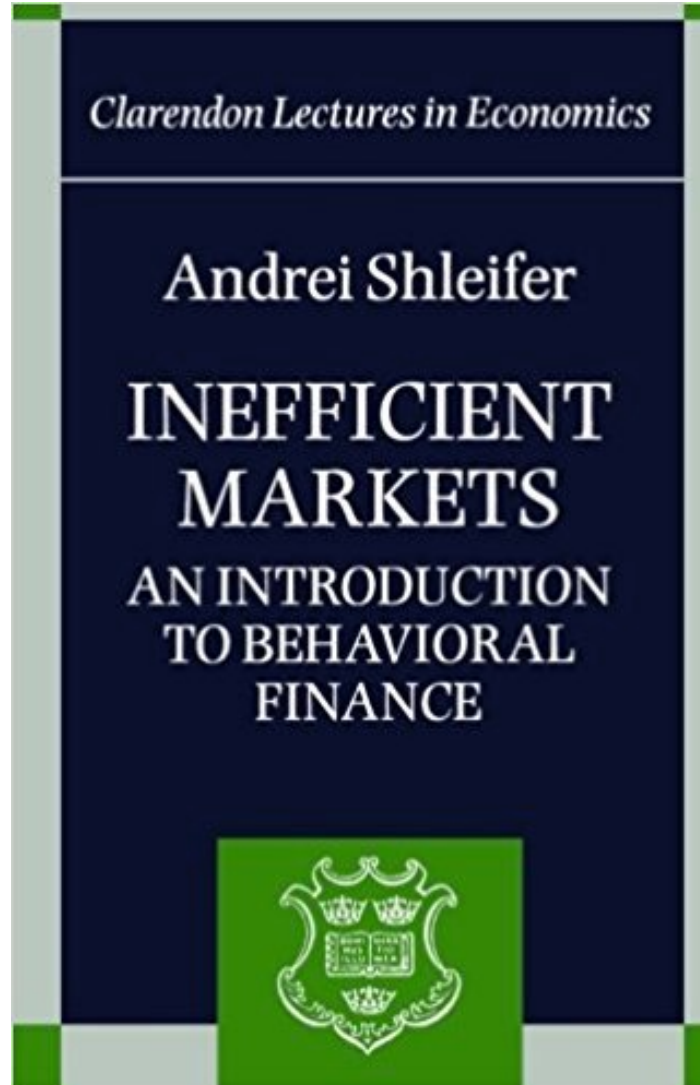
Oxford University Press



Andrei Shleifer (2000),

# Inefficient Markets: An Introduction to Behavioral Finance,

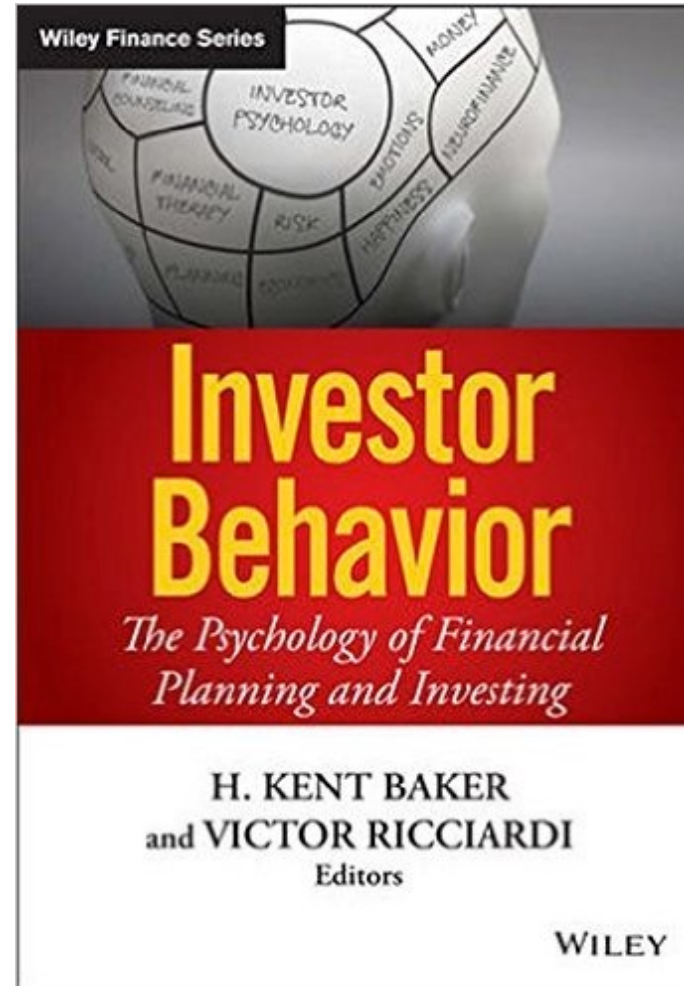
Oxford University Press



H. Kent Baker and Victor Ricciardi (2014)

# Investor Behavior: The Psychology of Financial Planning and Investing,

Wiley



**Marketing**

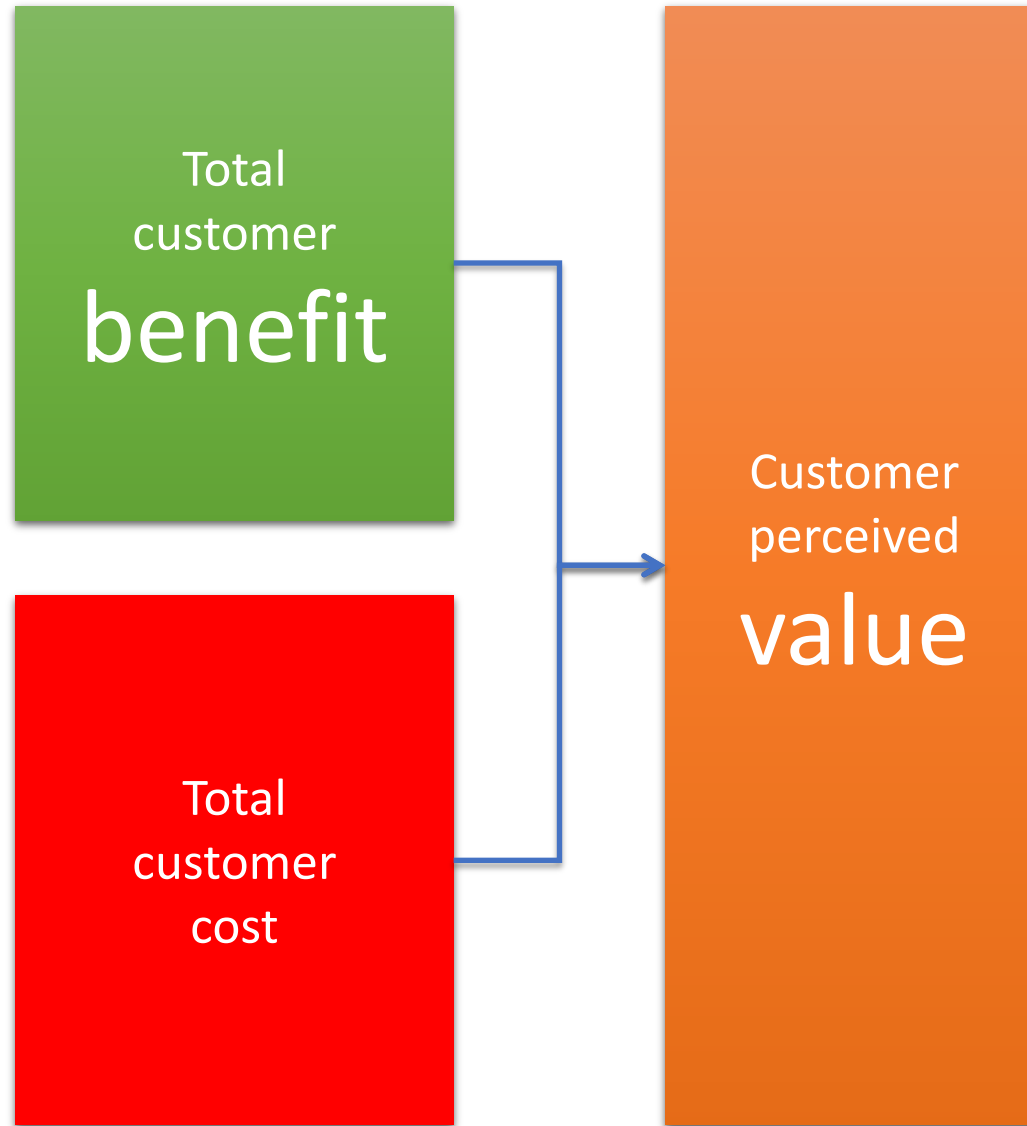
**“Meeting  
needs  
profitably”**

# Value

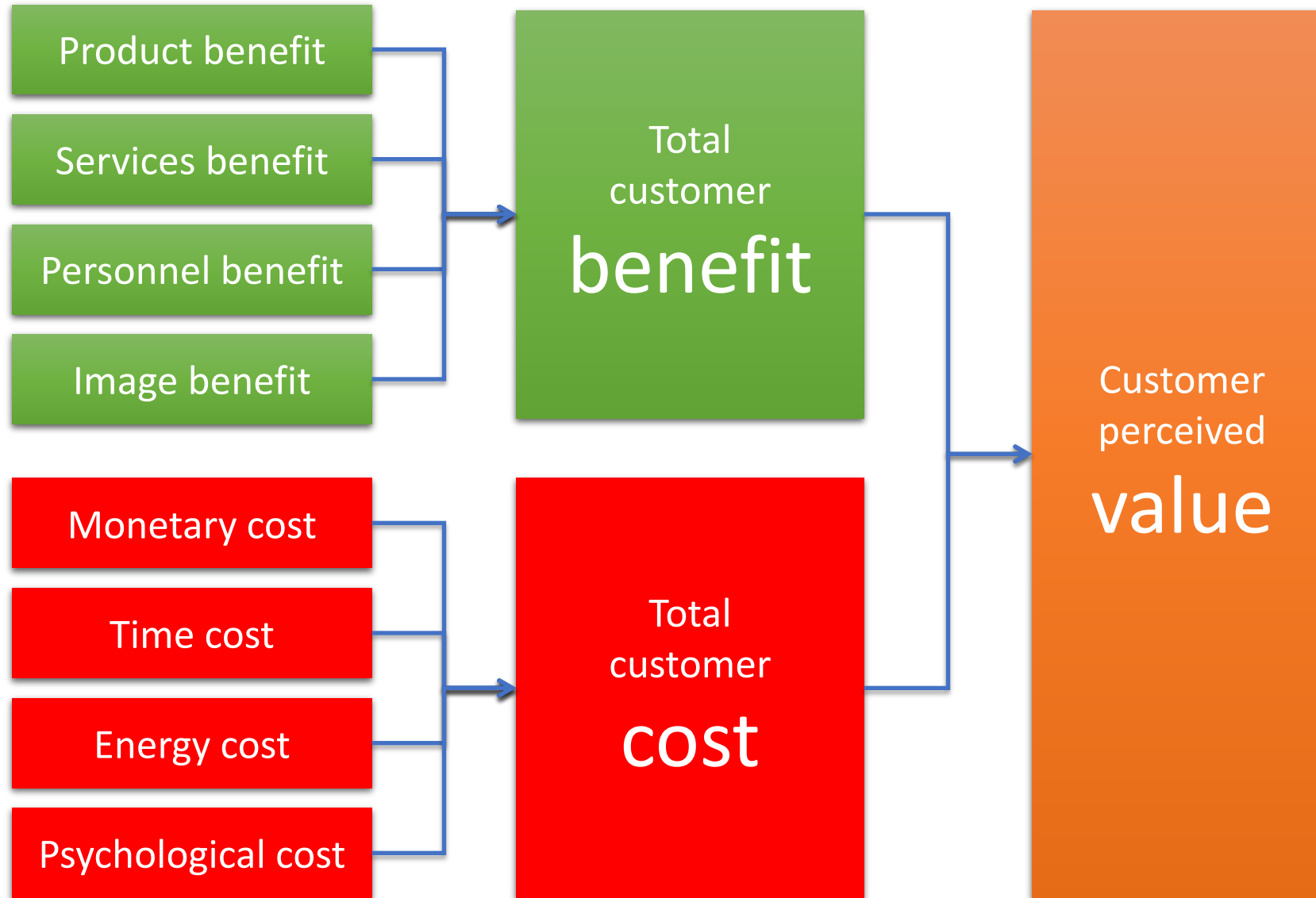
the sum of the  
tangible and  
intangible

benefits and costs

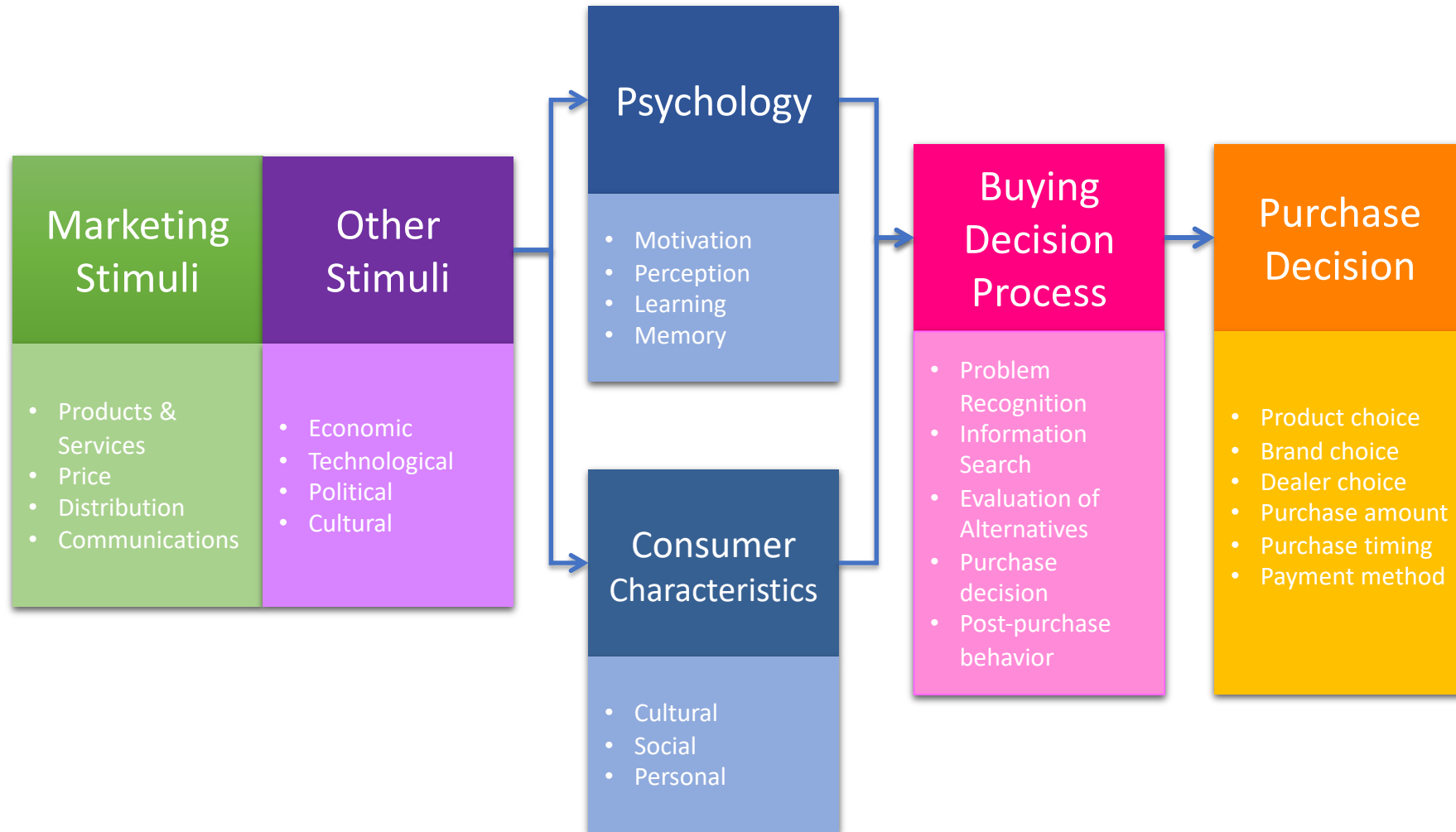
# Value



# Customer Perceived Value

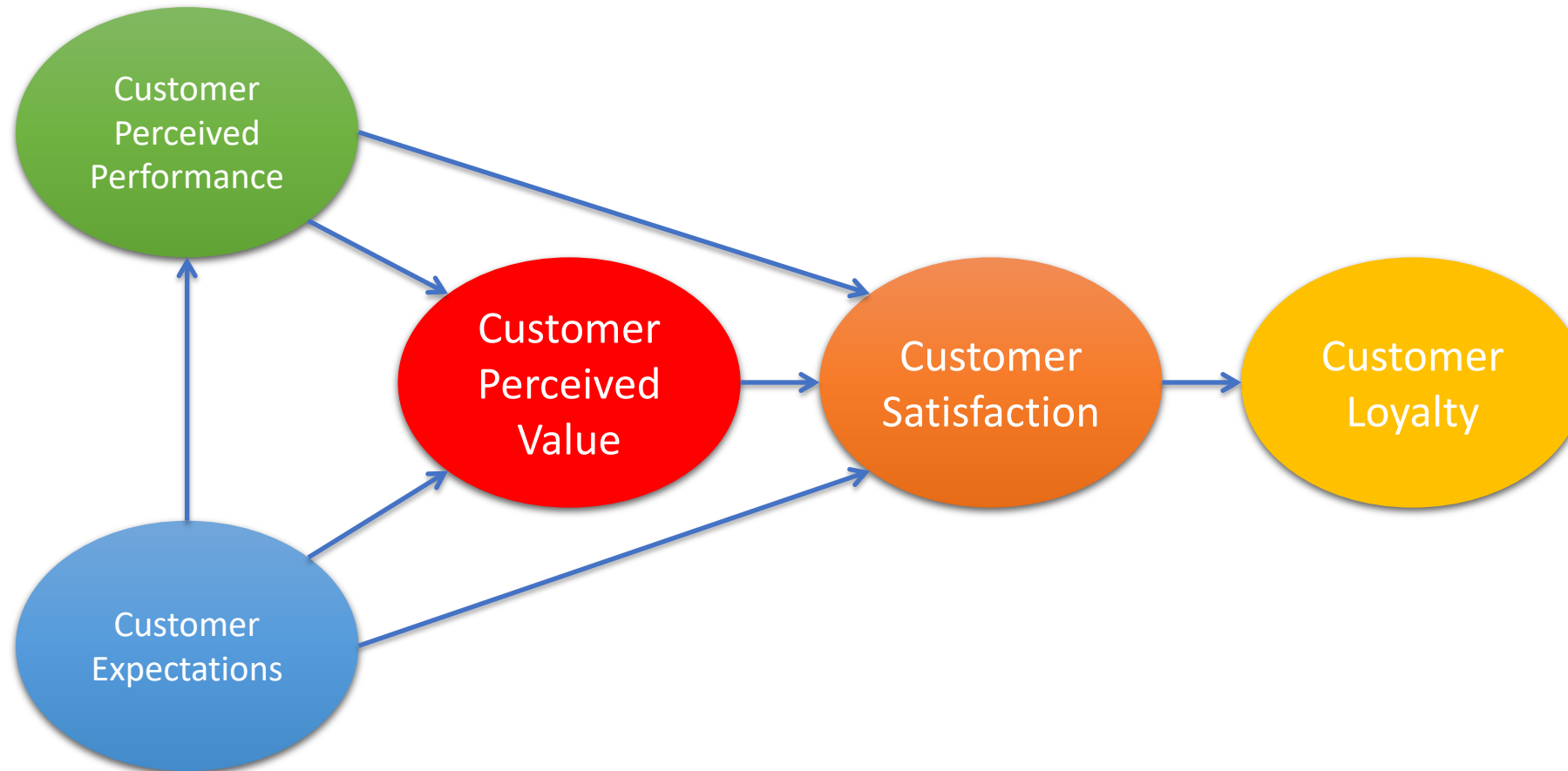


# Model of Consumer Behavior



**Building**  
**Customer Value,**  
**Satisfaction,**  
**and**  
**Loyalty**

# Customer Perceived Value, Customer Satisfaction, and Loyalty



# Theory of Reasoned Action (TRA)

# TRA (1975)

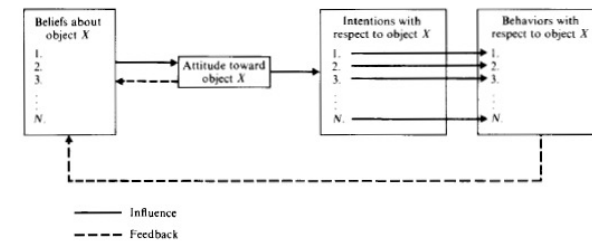


Fig. 1.1 Schematic presentation of conceptual framework relating beliefs, attitudes, intentions, and behaviors with respect to a given object.

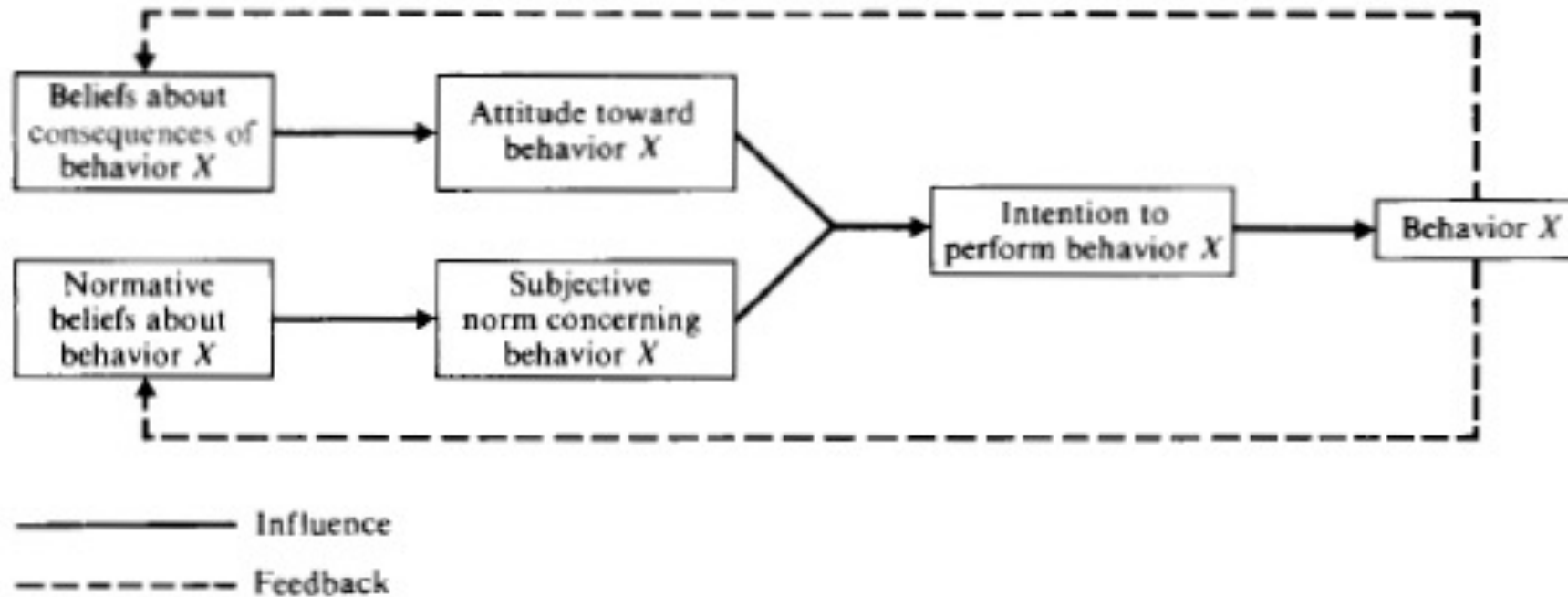


Fig. 1.2 Schematic presentation of conceptual framework for the prediction of specific intentions and behaviors.

# TRA (1989)

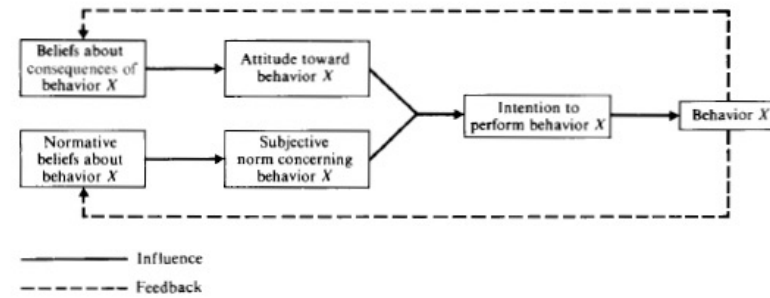


Fig. 1.2 Schematic presentation of conceptual framework for the prediction of specific intentions and behaviors.

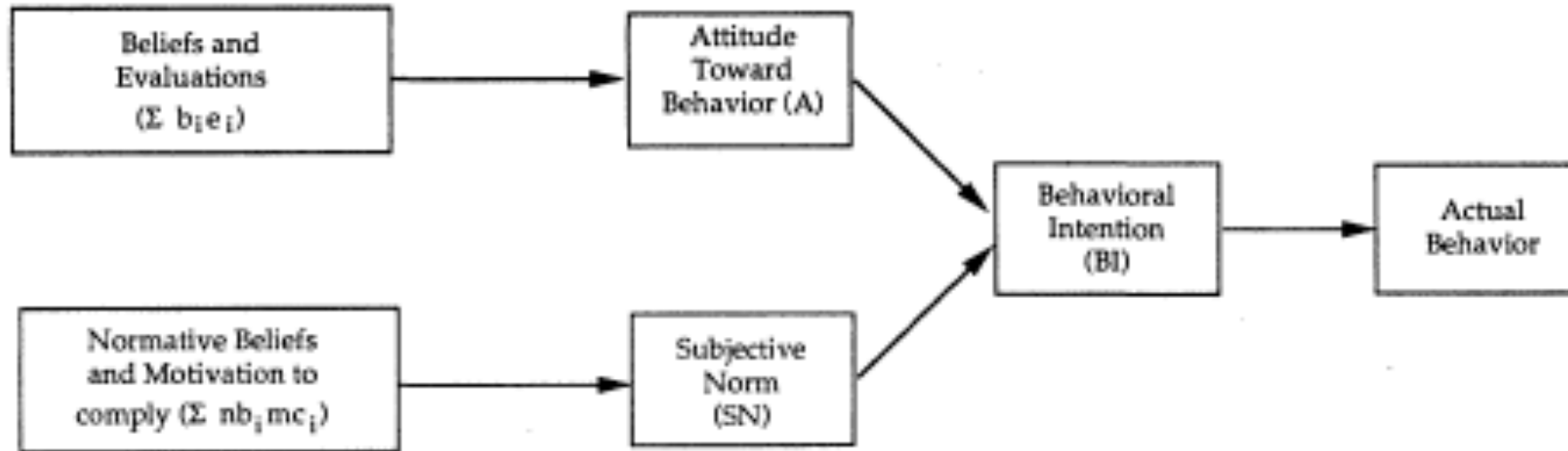


FIGURE 1. Theory of Reasoned Action (TRA).

# Theory of Planned Behavior (TPB)

Source: Ajzen, I., (1985) "From Intentions to Actions: A Theory of Planned Behavior," in J. Kuhl and J. Beckmann (Eds.) Action Control: From Cognition to behavior, Springer Verlag, New York, 1985, pp.11-39.

# TPB (1985)

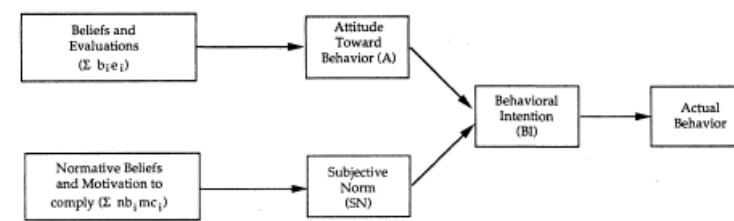


FIGURE 1. Theory of Reasoned Action (TRA).

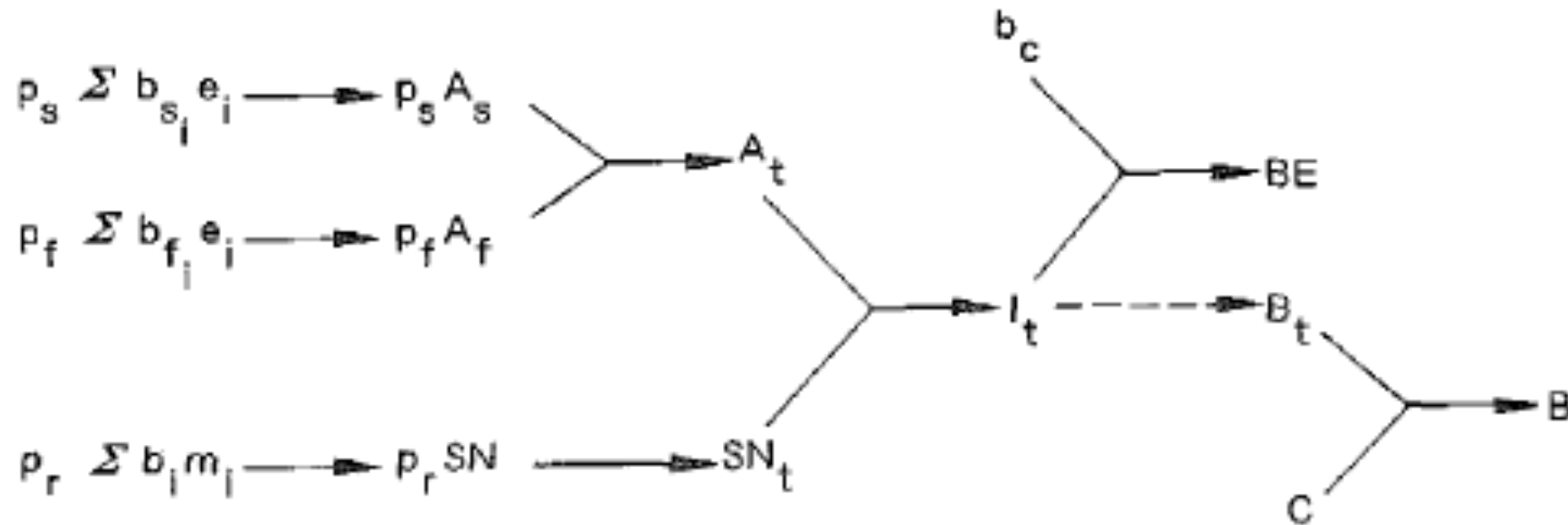


Fig. 2.1. Schematic presentation of the theory of planned behavior

# TPB (1989)

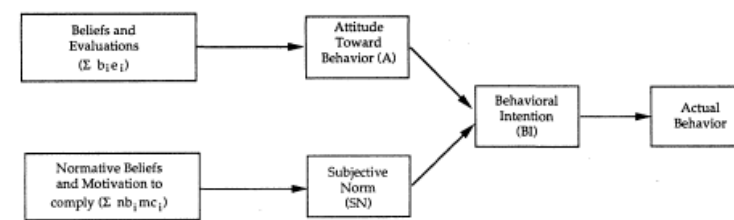


FIGURE 1. Theory of Reasoned Action (TRA).

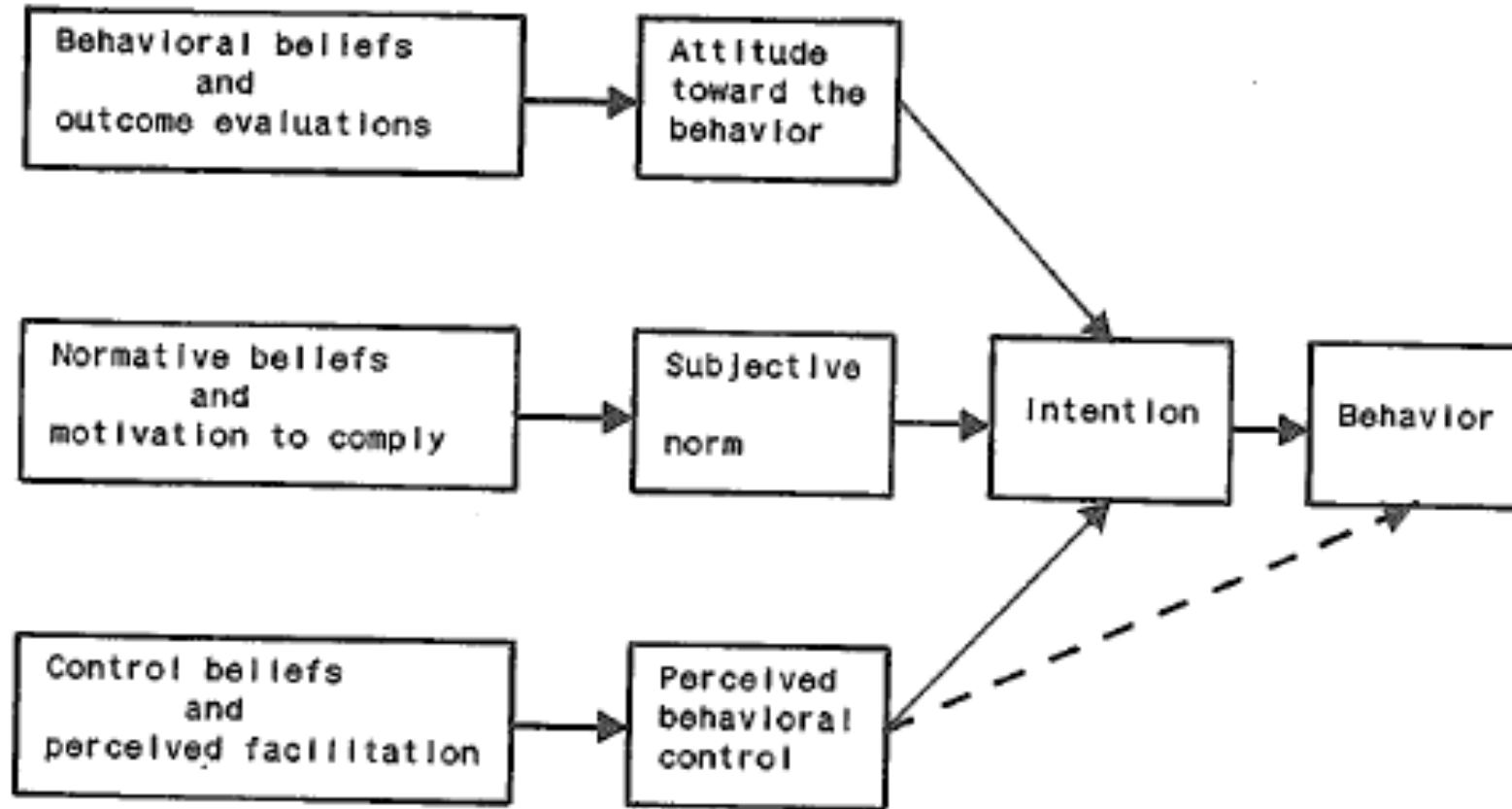


FIG. 10.2. Theory of planned behavior.

# TPB (1991)

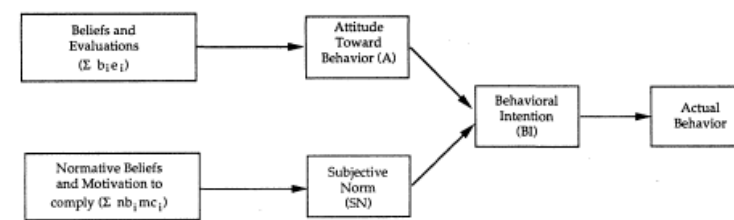


FIGURE 1. Theory of Reasoned Action (TRA).

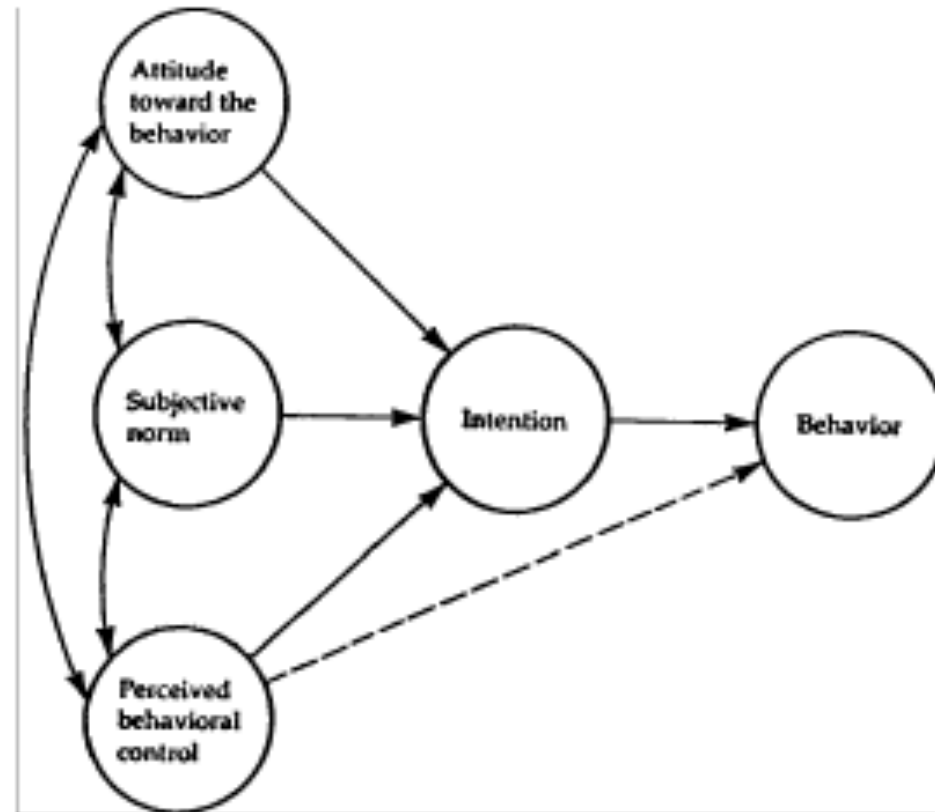



FIG. 1. Theory of planned behavior

Icek Aizen (Ajzen): Homepage - Microsoft Internet Explorer

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網址(D) http://www.people.umass.edu/aizen/index.html



# Icek Aizen (Ajzen)

Professor of Psychology  
University of Massachusetts

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[Contact](#)

[Background](#)

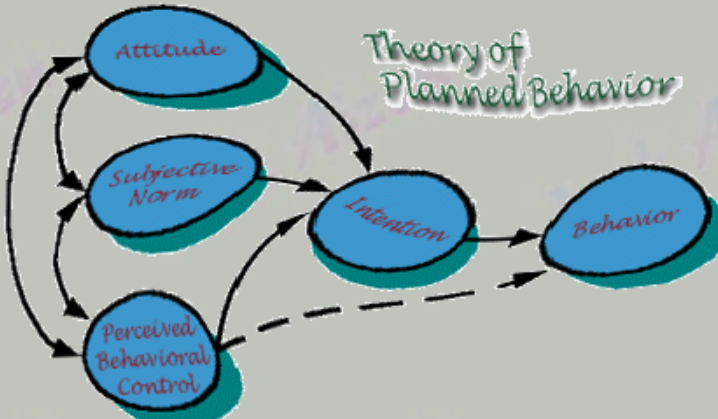
[Teaching](#)

[Research](#)

[Publications](#)

[TpB](#)

[Consulting](#)



Theory of Planned Behavior

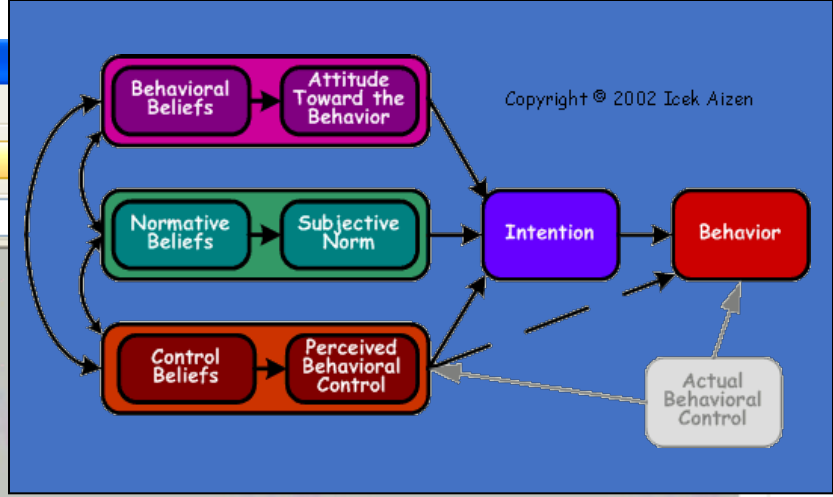
Attitude → Intention → Behavior

Subjective Norm → Intention → Behavior

Perceived Behavioral Control → Intention → Behavior

Perceived Behavioral Control → Behavior

Last modified: April 13, 2005



# Technology Acceptance Model (TAM)

# TAM (1989)

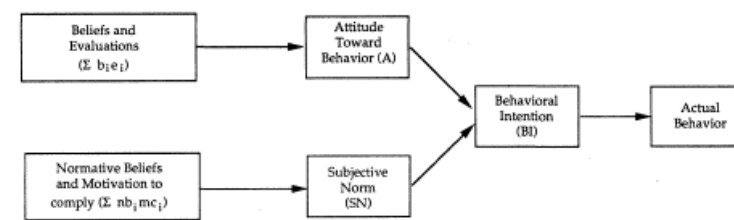


FIGURE 1. Theory of Reasoned Action (TRA).

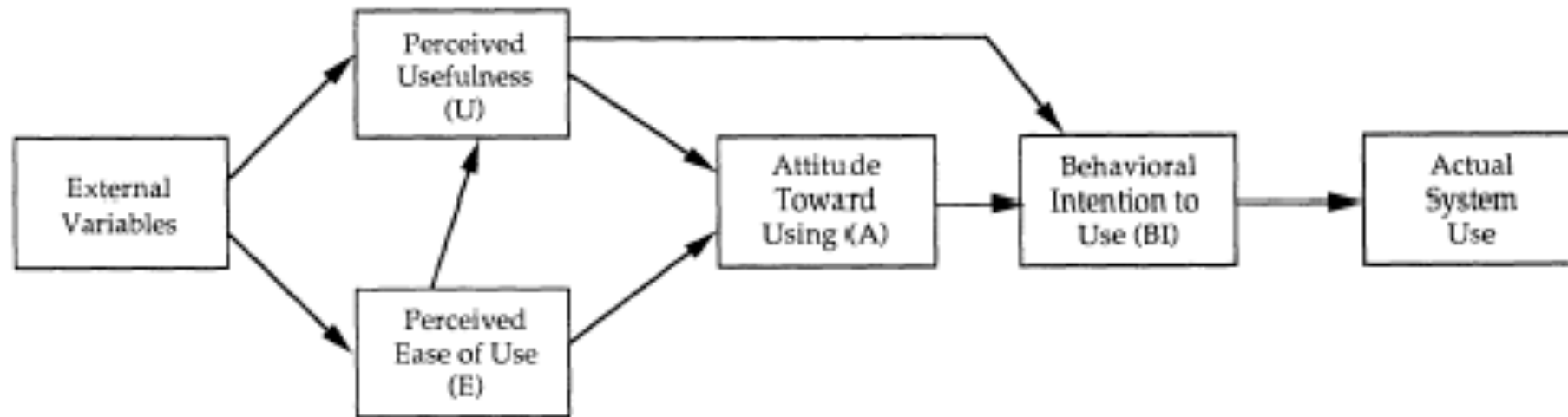


FIGURE 2. Technology Acceptance Model (TAM).

# TAM2 (2000)

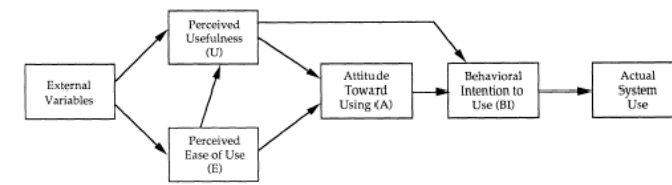
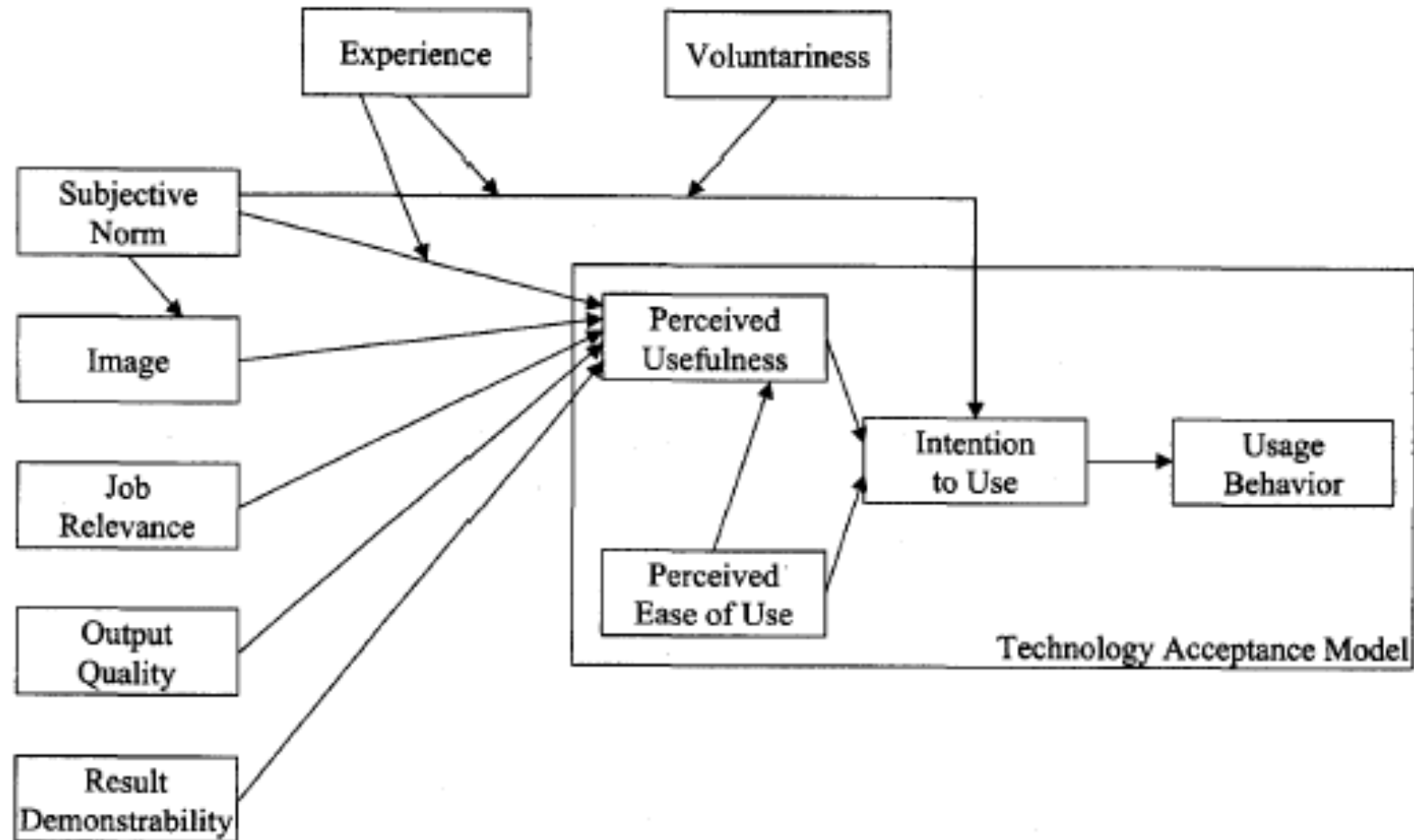


FIGURE 2. Technology Acceptance Model (TAM).

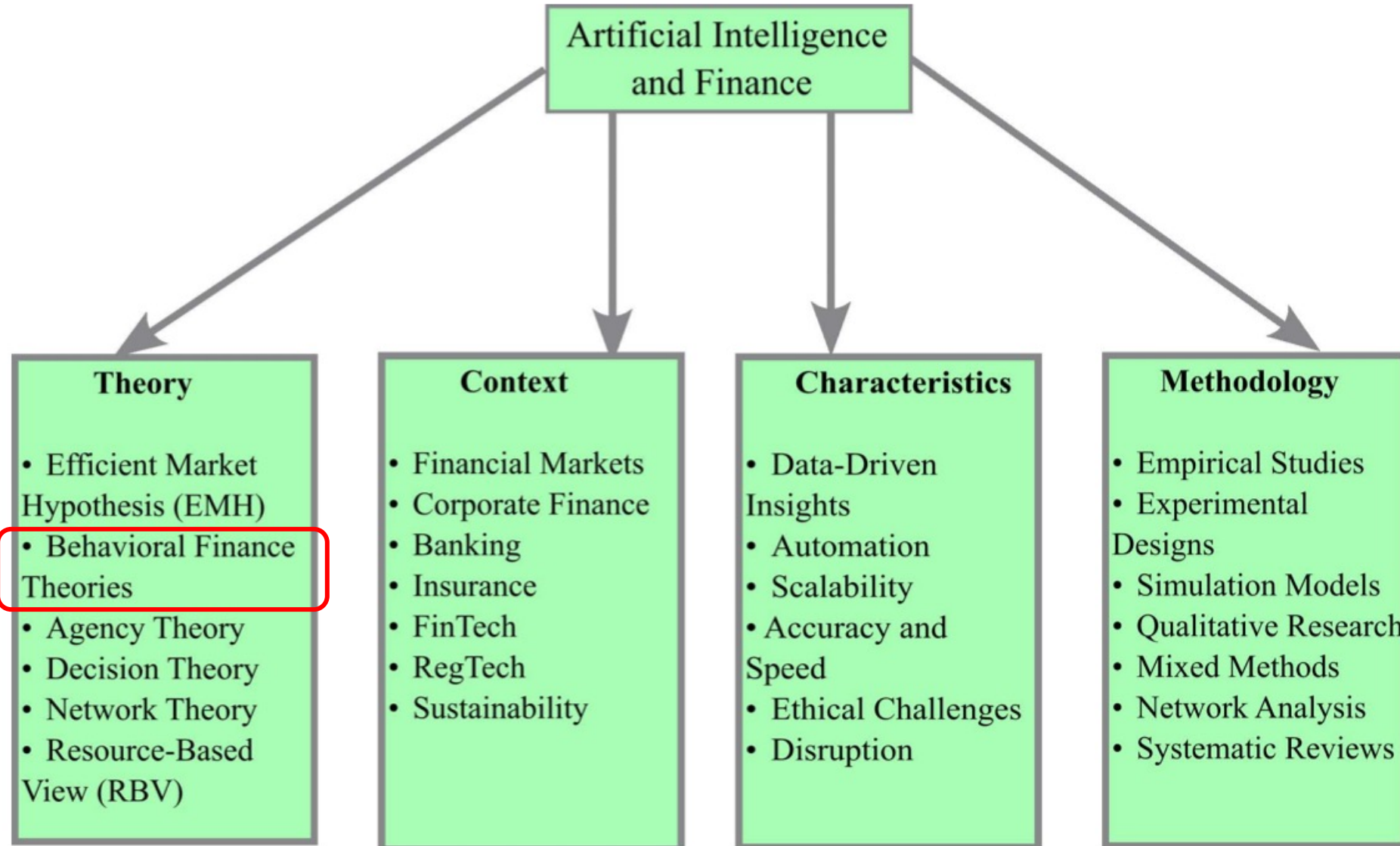
Figure 1 Proposed TAM2—Extension of the Technology Acceptance Model



Venkatesh, V., & Davis, F. D. (2000) "A theoretical extension of the technology acceptance model: Four longitudinal field studies", *Management Science*, 46(2), pp. 186-204.

# Behavioral Finance

# TCCM Framework for AI and Finance



**Behavioral Finance**

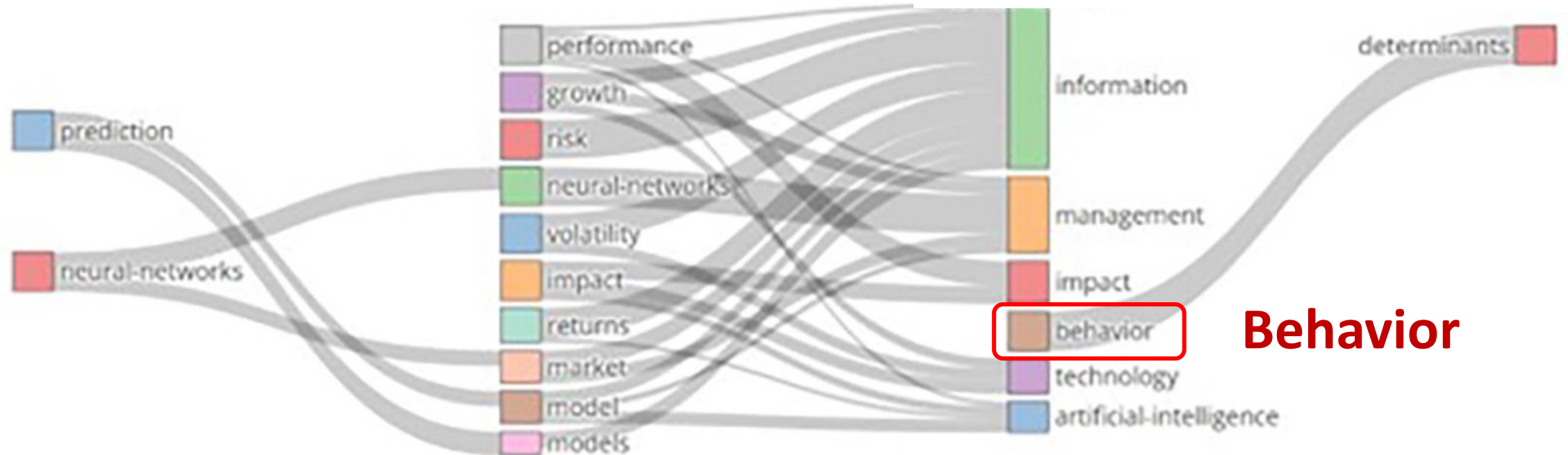
# Evolution of AI and Finance Research

1993-2010

2011-2020

2021-2024

2025-2025



**Rational Behavior**

**Irrational Behavior**

**Emotion**

**Sentiment**

# Modern Financial Research

- **Theoretical Finance**
  - study of **logical relationships among assets.**
- **Empirical Finance**
  - study of **data in order to infer relationships.**
- **Behavioral Finance**
  - integrates **psychology** into the **investment process.**

# Psychology in Behavior Finance

- **Beliefs**
- **Preferences**
  - **Prospect theory**
  - **Ambiguity aversion**

# Behavioral Finance Themes

- **Heuristic-Driven Bias**
- **Framing Dependence**
- **Inefficient Markets**

# Herding Behavior

- **Herding refers to the lemming-like behavior of investors and analysts looking around, seeing what each other is doing, and heading in that direction.**
- **There may not have been safety in numbers, but there probably was some comfort in them.**

# Herding Behavior in Finance

- Gavrilakis, N., & Floros, C. (2023).  
**ESG performance, herding behavior and stock market returns: evidence from Europe.**  
Operational Research, 23(1), 3.
- Youssef, M. (2022).  
**What drives herding behavior in the cryptocurrency market?**  
Journal of Behavioral Finance, 23(2), 230-239.
- Manahov, V. (2021).  
**Cryptocurrency liquidity during extreme price movements: is there a problem with virtual money?**  
Quantitative Finance, 21(2), 341-360.
- Hsieh, S. F., Chan, C. Y., & Wang, M. C. (2020).  
**Retail investor attention and herding behavior.**  
Journal of Empirical Finance, 59, 109-132.
- Christoffersen, J., & Staehr, S. (2019).  
**Individual risk tolerance and herding behaviors in financial forecasts.**  
European Financial Management, 25(5), 1348-1377.

# Efficient Market Hypothesis (EMH)

# Expected Utility Theory (EUT)

# Prospect theory:

## An analysis of decision under risk

# Prospect Theory

(Kahneman and Tversky, 1979)

## ECONOMETRICA

VOLUME 47

MARCH, 1979

NUMBER 2

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### PROSPECT THEORY: AN ANALYSIS OF DECISION UNDER RISK

BY DANIEL KAHNEMAN AND AMOS TVERSKY<sup>1</sup>

This paper presents a critique of expected utility theory as a descriptive model of decision making under risk, and develops an alternative model, called prospect theory. Choices among risky prospects exhibit several pervasive effects that are inconsistent with the basic tenets of utility theory. In particular, people underweight outcomes that are merely probable in comparison with outcomes that are obtained with certainty. This tendency, called the certainty effect, contributes to risk aversion in choices involving sure gains and to risk seeking in choices involving sure losses. In addition, people generally discard components that are shared by all prospects under consideration. This tendency, called the isolation effect, leads to inconsistent preferences when the same choice is presented in different forms. An alternative theory of choice is developed, in which value is assigned to gains and losses rather than to final assets and in which probabilities are replaced by decision weights. The value function is normally concave for gains, commonly convex for losses, and is generally steeper for losses than for gains. Decision weights are generally lower than the corresponding probabilities, except in the range of low probabilities. Overweighting of low probabilities may contribute to the attractiveness of both insurance and gambling.

Source: Kahneman, Daniel, and Amos Tversky. "Prospect theory: An analysis of decision under risk."

*Econometrica: Journal of the econometric society* (1979): 263-291.

# Decision Making under Risk

# Which of the following would you prefer?

- **A:**

- **50% chance to win 1,000,**

- **50% chance to win nothing;**

- **B:**

- **450 for sure.**

Which of the following would you prefer?

A: 50% chance to win 1,000,

B: 450 for sure.

50% chance to win nothing;

# Decision

**PROBLEM 1: Choose between**

**A:** 2,500 with probability .33,  
2,400 with probability .66,  
0 with probability .01;

**B:** 2,400 with certainty.

# Decision

PROBLEM 1: Choose between

A: 2,500 with probability .33,      B: 2,400 with certainty.  
2,400 with probability .66,  
0 with probability .01;

$N = 72$       [18]      [82]\*

# Decision

**PROBLEM 2: Choose between**

**C: 2,500 with probability .33,  
0 with probability .67;**      **D: 2,400 with probability .34,  
0 with probability .66.**

# Decision

PROBLEM 2: Choose between

C: 2,500 with probability .33,  
0 with probability .67;      D: 2,400 with probability .34,  
0 with probability .66.

$N = 72$

[83]\*

[17]

# Expected Utility

$$u(2,400) > .33u(2,500) + .66u(2,400) \text{ or } .34u(2,400) > .33u(2,500)$$

# Decision

**PROBLEM 3:**

**A: (4,000,.80),      or      B: (3,000).**

# Decision

PROBLEM 3:

A: (4,000,.80), or B: (3,000).

$N = 95$  [20] [80]\*

# Decision

**PROBLEM 4:**

**C: (4,000,.20),      or      D: (3,000,.25).**

# Decision

PROBLEM 4:

C: (4,000,.20), or D: (3,000,.25).

$N = 95$  [65]\* [35]

# Decision

## PROBLEM 5:

A: 50% chance to win a three-week tour of England, France, and Italy;

$N = 72$  [22]

B: A one-week tour of England, with certainty.

[78]\*

## PROBLEM 6:

C: 5% chance to win a three-week tour of England, France, and Italy;

$N = 72$  [67]\*

D: 10% chance to win a one-week tour of England.

[33]

# Decision

## PROBLEM 7:

A: (6,000, .45),    B: (3,000, .90).

$N = 66$  [14]

[86]\*

## PROBLEM 8:

C: (6,000, .001),    D: (3,000, .002).

$N = 66$  [73]\*

[27]

# Preferences Between Positive and Negative Prospects

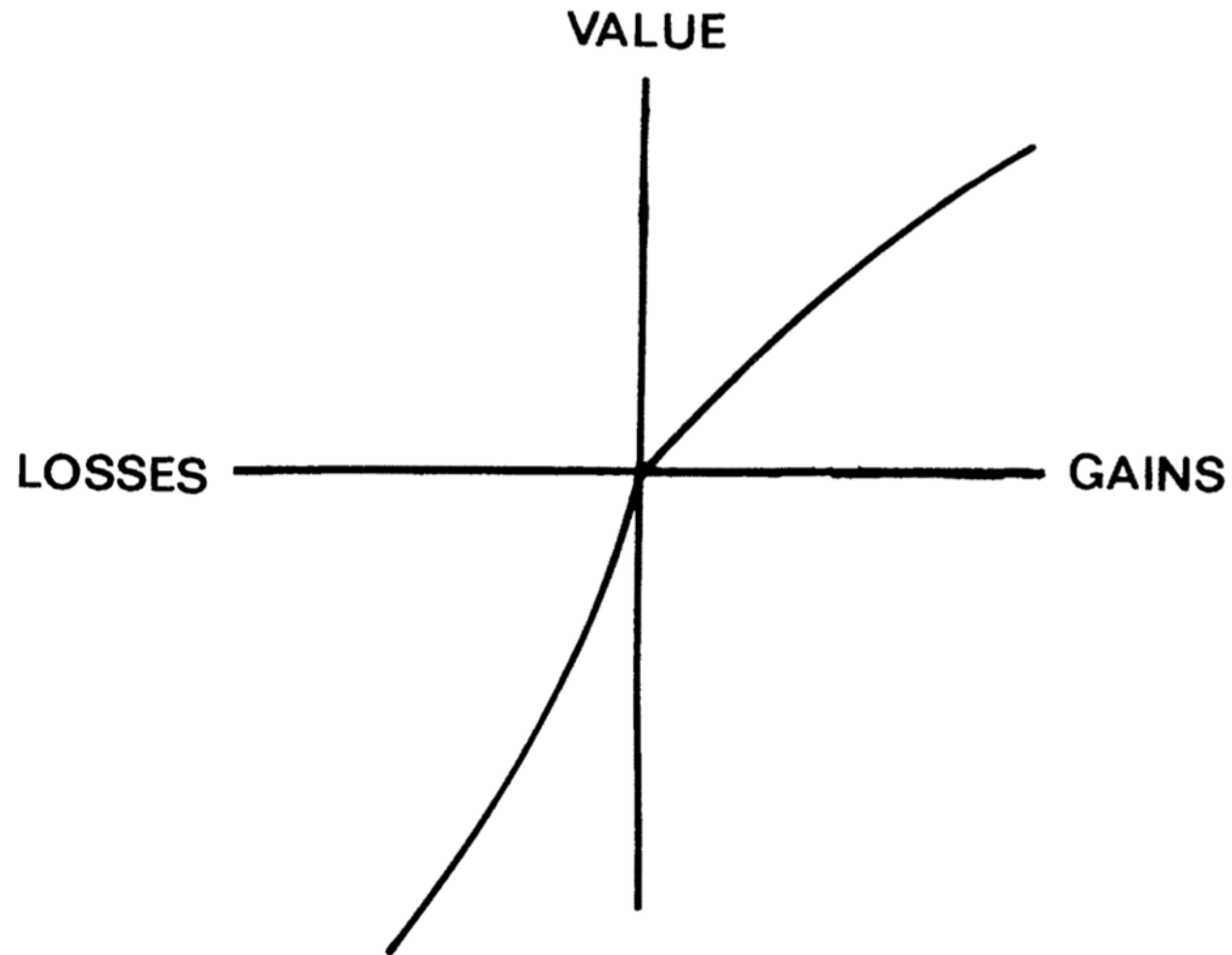
Positive prospects			Negative prospects				
Problem 3: $N = 95$	$(4,000, .80)$ [20]	$<$	$(3,000)$ [80]*	Problem 3': $N = 95$	$(-4,000, .80)$ [92]*	$>$	$(-3,000)$ [8]
Problem 4: $N = 95$	$(4,000, .20)$ [65]*	$>$	$(3,000, .25)$ [35]	Problem 4': $N = 95$	$(-4,000, .20)$ [42]	$<$	$(-3,000, .25)$ [58]
Problem 7: $N = 66$	$(3,000, .90)$ [86]*	$>$	$(6,000, .45)$ [14]	Problem 7': $N = 66$	$(-3,000, .90)$ [8]	$<$	$(-6,000, .45)$ [92]*
Problem 8: $N = 66$	$(3,000, .002)$ [27]	$<$	$(6,000, .001)$ [73]*	Problem 8': $N = 66$	$(-3,000, .002)$ [70]*	$>$	$(-6,000, .001)$ [30]

# Certainty, Probability, and Possibility

Source: Kahneman, Daniel, and Amos Tversky. "Prospect theory: An analysis of decision under risk."  
*Econometrica: Journal of the econometric society* (1979): 263-291.

# Prospect theory

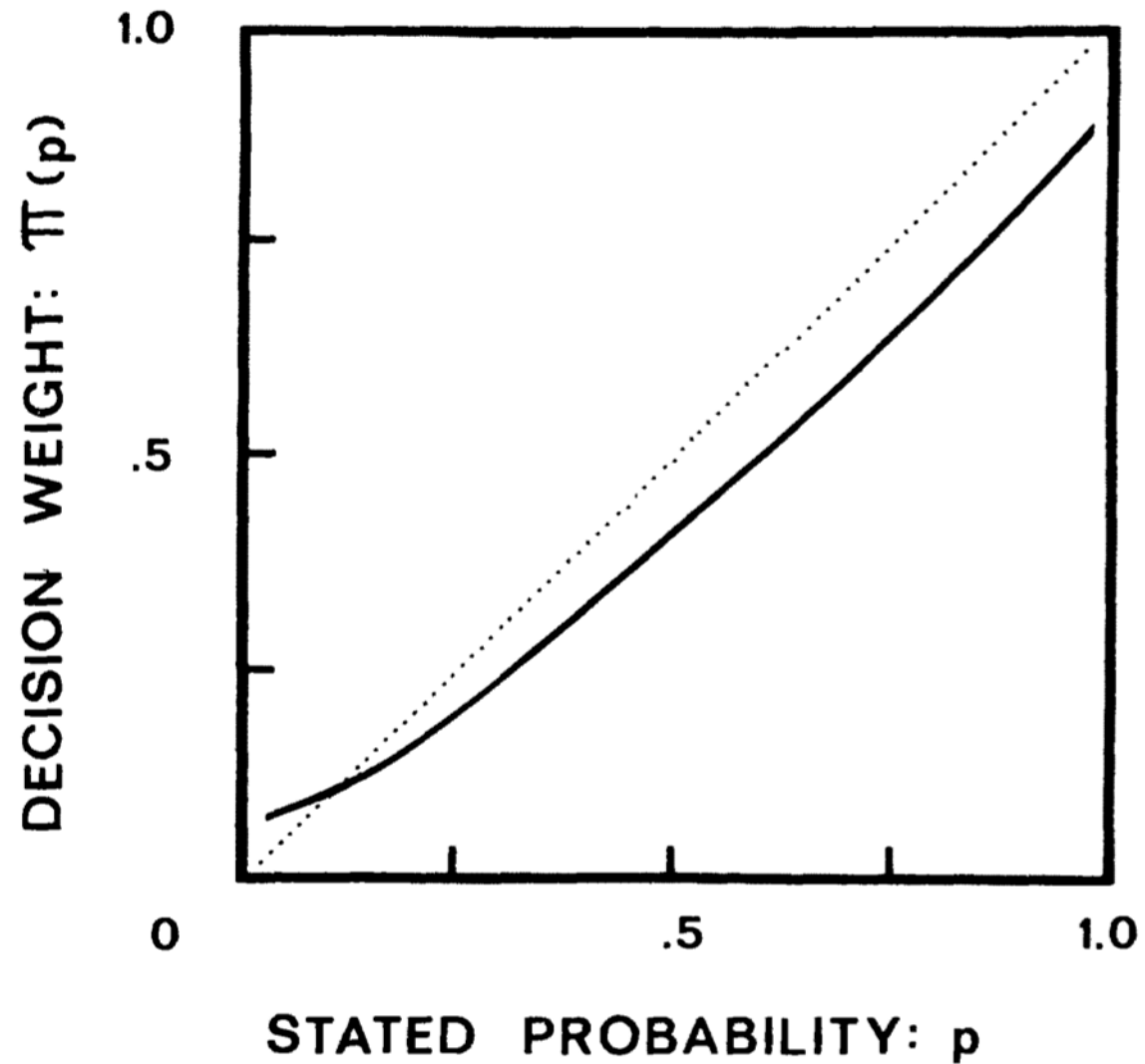
## Value Function



Source: Kahneman, Daniel, and Amos Tversky. "Prospect theory: An analysis of decision under risk."  
*Econometrica: Journal of the econometric society* (1979): 263-291.

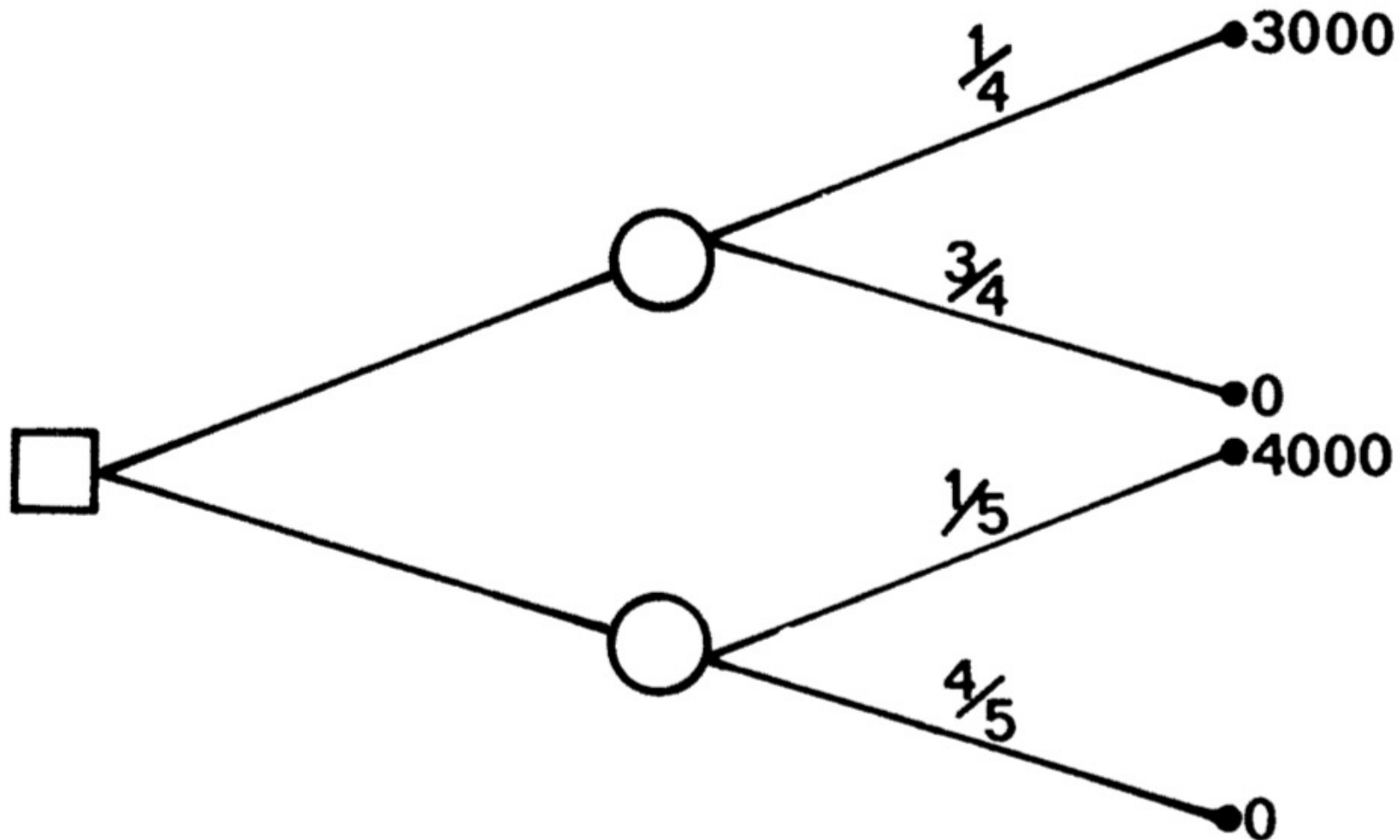
# Prospect theory

## Weighting Function

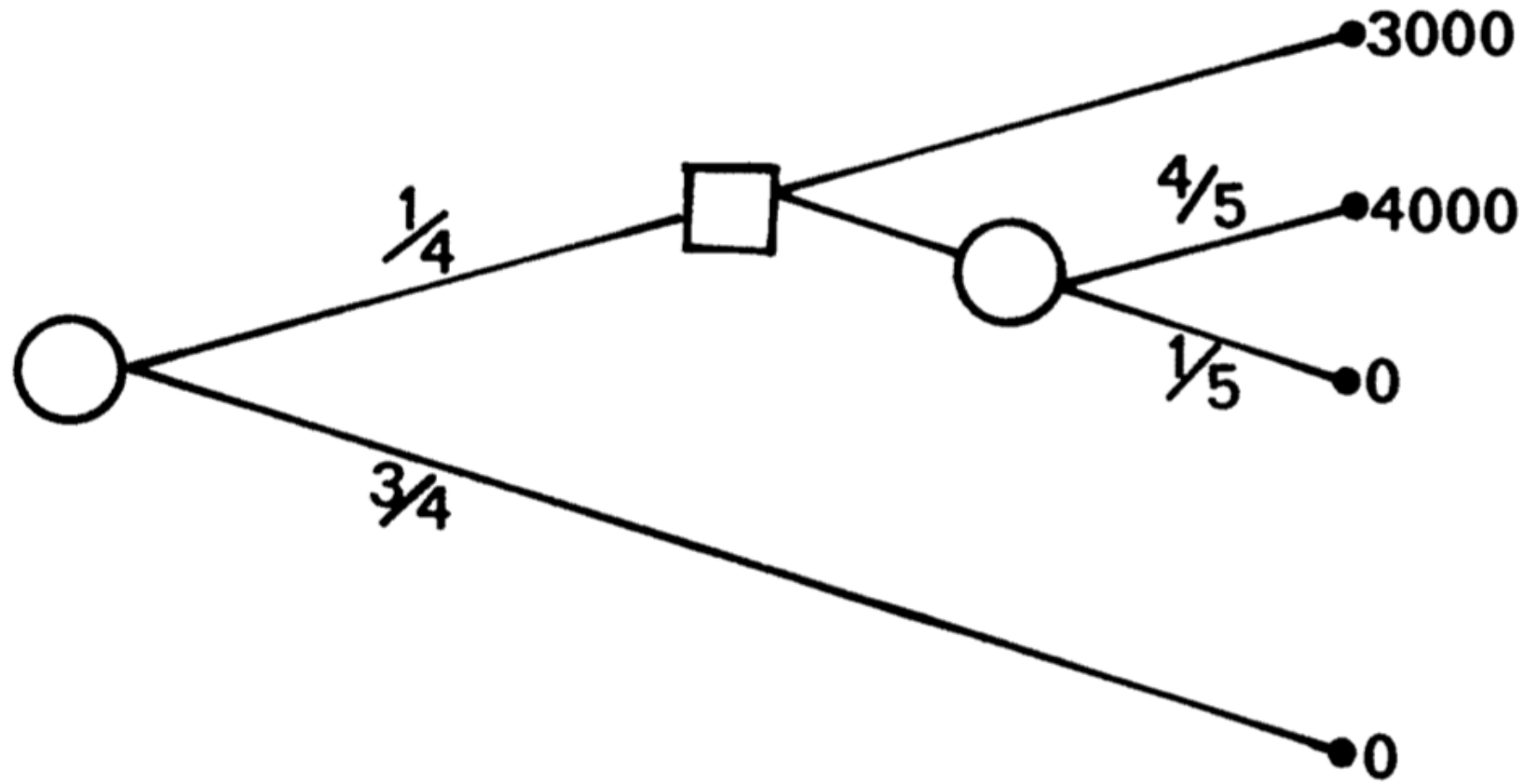


Source: Kahneman, Daniel, and Amos Tversky. "Prospect theory: An analysis of decision under risk." *Econometrica: Journal of the econometric society* (1979): 263-291.

# Problem 4 as a decision tree (standard formulation)



# Problem 10 as a decision tree (sequential formulation)





# Decision

## PROBLEM 13:

(6,000, .25), or (4,000, .25; 2,000, .25).

$N = 68$  [18]

[82]\*

## PROBLEM 13':

(-6,000, .25), or (-4,000, .25; -2,000, .25).

$N = 64$  [70]\*

[30]

# Decision

PROBLEM 14:

$(5,000, .001)$ ,      or       $(5)$ .  
 $N = 72$        $[72]^*$        $[28]$

PROBLEM 14':

$(-5,000, .001)$ ,      or       $(-5)$ .  
 $N = 72$        $[17]$        $[83]^*$

# Prospect theory

- People underweight outcomes that are merely probable in comparison with outcomes that are obtained with certainty.
- This tendency, called the **certainty effect**, contributes to **risk aversion** in choices involving **sure gains** and to **risk seeking** in choices involving **sure losses**.

# Prospect theory

- People generally discard components that are shared by all prospects under consideration.
- This tendency, called the **isolation effect**, leads to **inconsistent preferences** when the **same choice** is presented in different form .

# Prospect theory

- People generally discard components that are shared by all prospects under consideration.
- This tendency, called the **isolation effect**, leads to **inconsistent preferences** when the **same choice** is presented in different form .

# Prospect theory

- **Value** is assigned to **gains and losses** rather than to **final assets** and in which **probabilities** are replaced by **decision weights**.
- The value function is normally concave for gains, commonly convex for losses, and is generally steeper for losses than for gains.

# Prospect theory

- **Decision weights** are generally **lower** than the corresponding probabilities, except in the range of low probabilities.
- **Overweighting** of low probabilities may contribute to the attractiveness of both insurance and gambling.

# **Behavioral Heuristics and Biases in Decision Making**

# Behavioral Finance Anomalies

- **The Rational Man**
  - **Consumer Choice with Certainty**
  - **Consumer Choice with Uncertainty**
  - **The Allais Paradox**

# Prospect Theory

- **The Reference Point**
- **The S-Curve**
- **Loss Aversion**

# Behavioral Finance Anomalies

- **Perception Biases**
- **Inertial Effects**
- **Causality and Statistics**
- **Illusions**

# Perception Biases

- **Saliency**
- **Framing**
- **Anchoring**
- **Sunk Cost Bias**

# Inertial Effects

- **Endowment Effect**
- **Status Quo Effect**
- **Disposition Effect**

# Causality and Statistics

- **Representativeness**
- **Conjunction Fallacy**
- **Reading into Randomness**
- **Small Sample Bias**
- **Probability Neglect**

# Illusions

- **Illusion of Talent**
- **Illusion of Skill**
- **Illusion of Superiority**
- **Illusion of Validity**

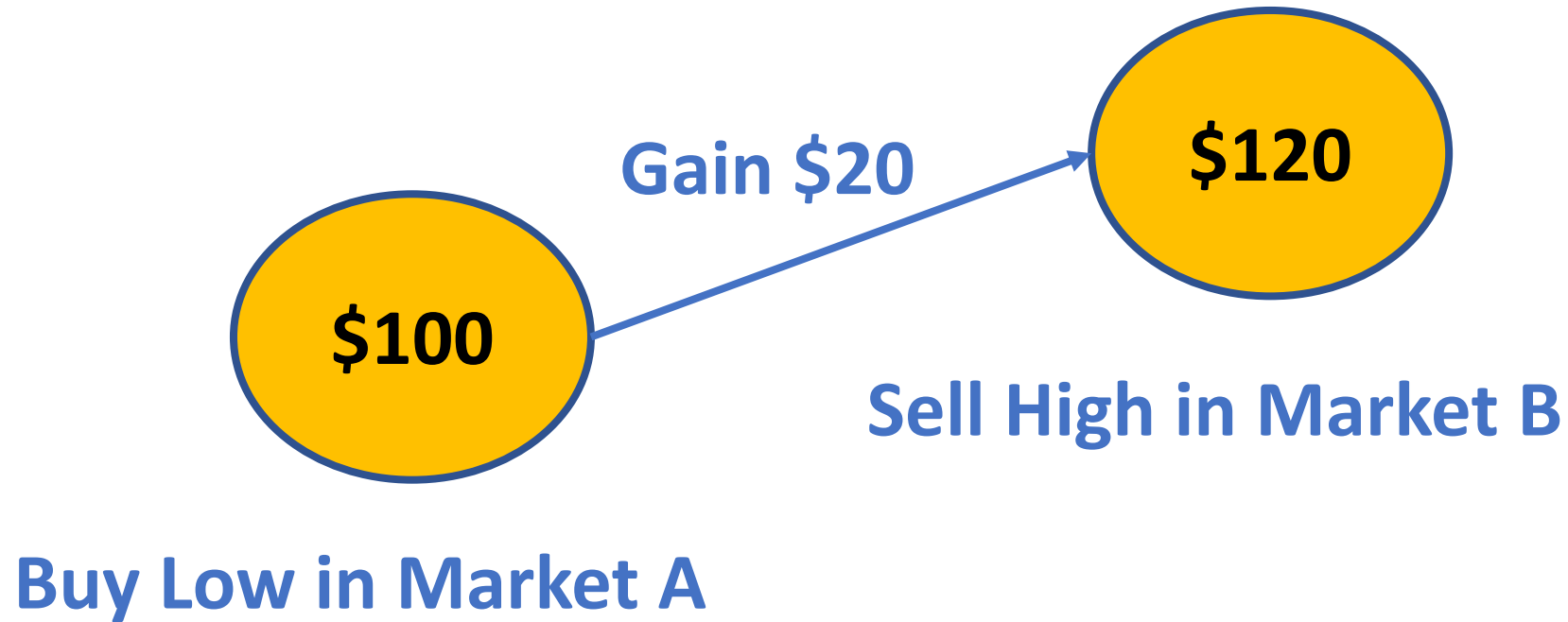
# Behavioral Finance: Two Major Foundations

- **Investor Sentiment**
  - **creates disturbances to efficient prices.**
- **Limited arbitrage**
  - **arbitrage is never riskfree, hence it does not counter irrational disturbances.**
    - Prices may not react to information by the “right” amount.
    - Prices may react to non-information.
    - Markets may remain efficient.

# Arbitrage



# Arbitrage



# Heuristics

- **Overconfidence**
  - **people overestimate the reliability of their knowledge.**
- **Excessive trading**
- **Framing Effect**

# Heuristics

- **Regret Aversion**
  - **anticipation of a future regret can influence current decision.**
- **Disposition Effect**
  - **sell winners, hold on to the losers.**
- **Anchoring and adjustment: can create under-reaction.**

# Fashions and Fads

- **People are influenced by each other. There is a social pressure to conform.**
- **Herding behavior: “safety-in-numbers”.**
- **Informational Cascades**
- **Positive Feedback**
- **Example: excessive demand for internet IPOs. Extremely high opening day returns.**

# Social Influences

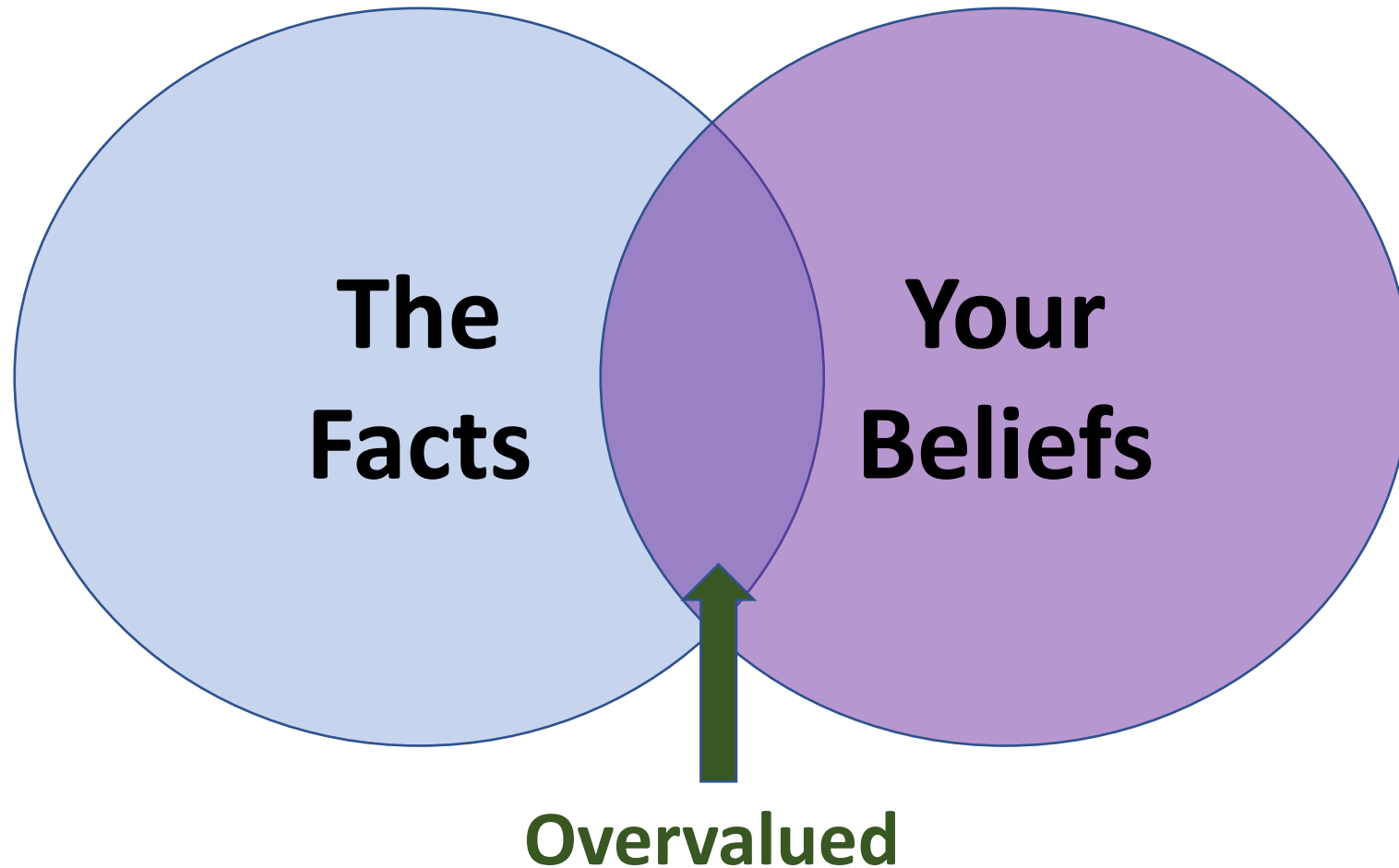
- **Social norms**
  - The informal opinions, rules, and procedures of a group.
  - Your peers and social groups influence your investment participation
- **Herding Behavior**
  - The movement into or out of a stock or industry of companies by large groups of investors.

# Psychology of Belief

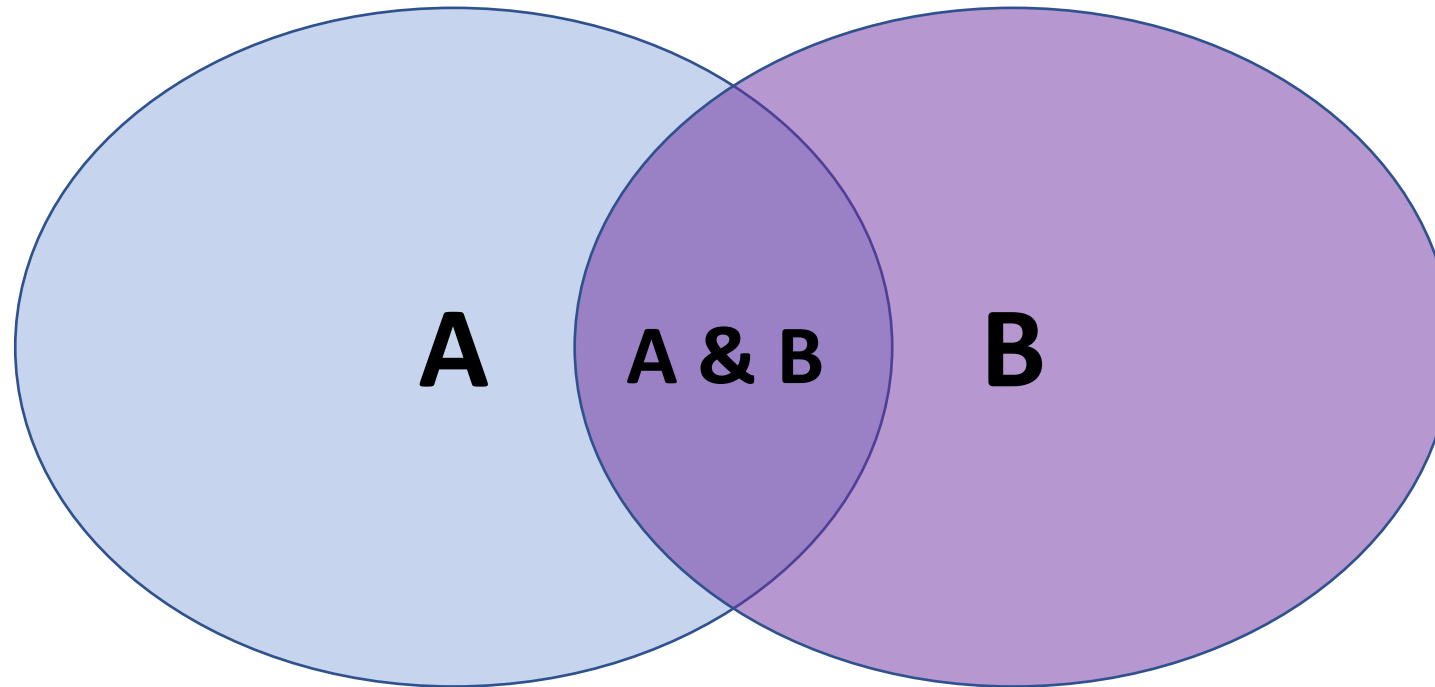
## Confirmation Bias



# Confirmation Bias



# Representativeness Heuristic



$$P(A \& B) < P(A) \text{ or } P(B)$$

# Katona's Economic Psychology Model

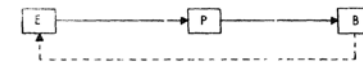
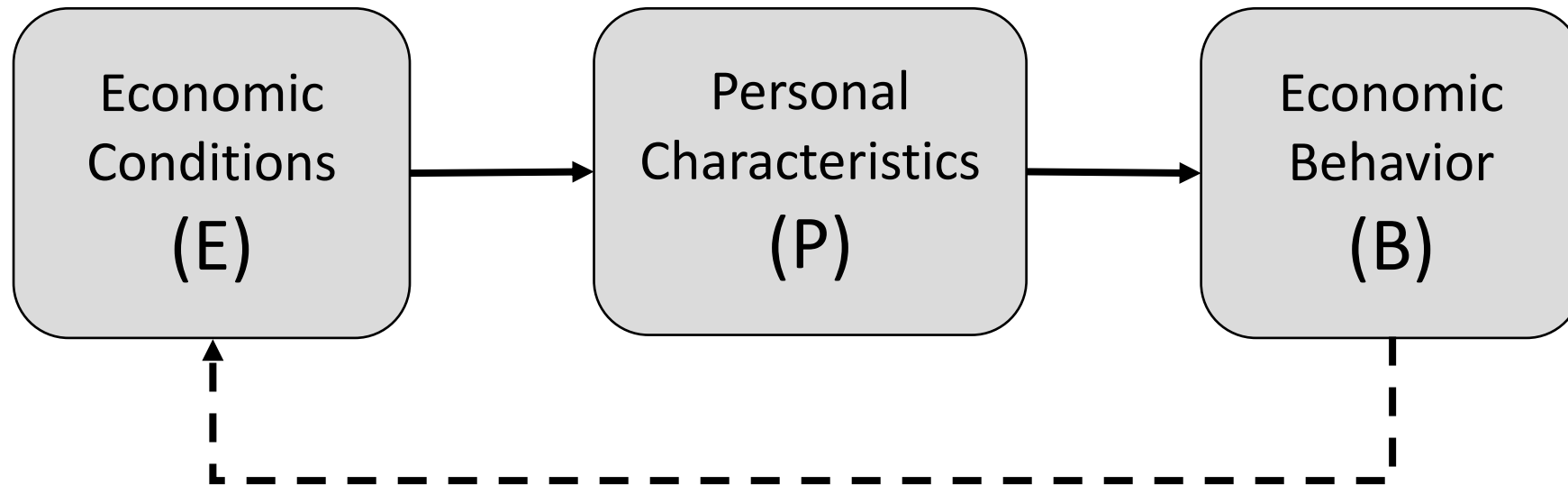


Fig. 1. Katona's model



# Summary

- **Investing Psychology**
  - **Investor Sentiment**
  - **Consumer Psychology and Behavior**
- **Behavioral Finance**
  - **Prospect Theory: An Analysis of Decision Under Risk**
  - **Behavioral Heuristics and Biases in Decision Making**
  - **Herding Behavior in Finance**

# References

- Yves Hilpisch (2020), *Artificial Intelligence in Finance: A Python-Based Guide*, O'Reilly Media.
- Aurélien Géron (2019), *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems*, 2nd Edition, O'Reilly Media.
- Yves Hilpisch (2018), *Python for Finance: Mastering Data-Driven Finance*, 2nd Edition, O'Reilly Media.
- Paolo Sironi (2016), "FinTech Innovation: From Robo-Advisors to Goal Based Investing and Gamification", Wiley.
- Chris Kelliher (2022), *Quantitative Finance With Python: A Practical Guide to Investment Management, Trading, and Financial Engineering*, Chapman and Hall/CRC.
- Susanne Chishti and Janos Barberis (2016), "The FINTECH Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries", Wiley.
- Richard H. Thaler (2016), *Misbehaving: The Making of Behavioral Economics*, W. W. Norton & Company
- Lucy Ackert and Richard Deaves (2009), "Behavioral Finance: Psychology, Decision-Making, and Markets", South-Western College Pub.
- Hersh Shefrin (2007), "Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing", Oxford University Press.
- Edwin Burton and Sunit N. Shah (2013), "Behavioral Finance: Understanding the Social, Cognitive, and Economic Debates", Wiley.
- Daniel Kahneman and Amos Tversky (1979), "Prospect theory: An analysis of decision under risk." *Econometrica: Journal of the econometric society* (1979): 263-291.
- Day, M. Y., & Ni, Y. (2023). Be greedy when others are fearful: Evidence from a two-decade assessment of the NDX 100 and S&P 500 indexes. *International Review of Financial Analysis*, 90, 102856.
- Roy, P., Ghose, B., Singh, P. K., Tyagi, P. K., & Vasudevan, A. (2025). Artificial Intelligence and Finance: A bibliometric review on the Trends, Influences, and Research Directions. *F1000Research*, 14, 122.
- Manahov, V. (2021). Cryptocurrency liquidity during extreme price movements: is there a problem with virtual money? *Quantitative Finance*, 21(2), 341-360.
- Gavrilakis, N., & Floros, C. (2023). ESG performance, herding behavior and stock market returns: evidence from Europe. *Operational Research*, 23(1), 3.
- Hsieh, S. F., Chan, C. Y., & Wang, M. C. (2020). Retail investor attention and herding behavior. *Journal of Empirical Finance*, 59, 109-132.
- Christoffersen, J., & Staehr, S. (2019). Individual risk tolerance and herding behaviors in financial forecasts. *European Financial Management*, 25(5), 1348-1377.
- Frijns, B., & Huynh, T. D. (2018). Herding in analysts' recommendations: The role of media. *Journal of Banking & Finance*, 91, 1-18.