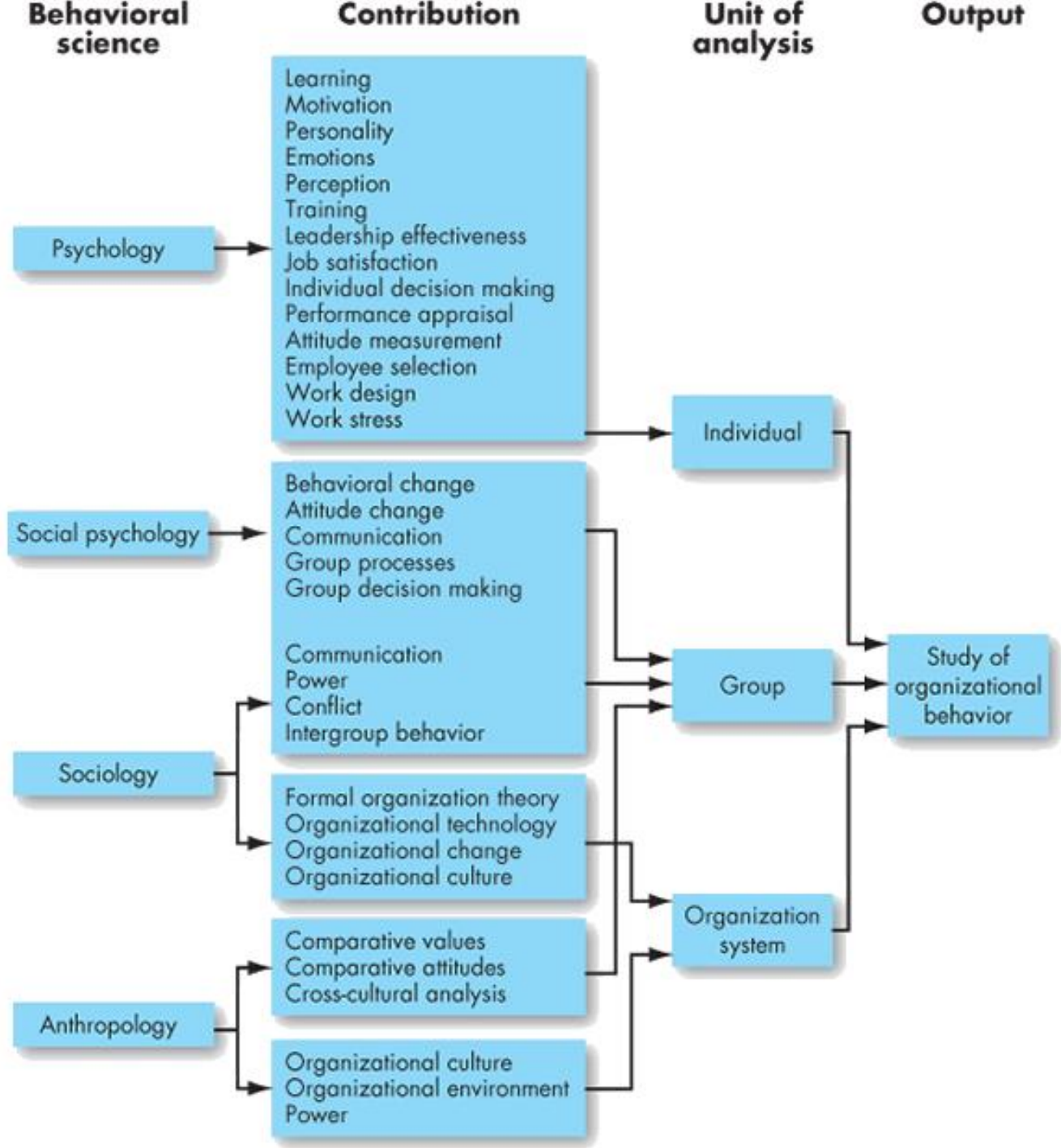
Decision Making Under Uncertainty

From Cashew Nuts to Artificial Intelligence

The role of a manager is to get things done.

What's the role of a manager?

Behaving like a manager means having command of the whole range of management skills and applying them as they become appropriate – Herbert A. Simon


Behavioral science
Contribution
Unit of analysis
Output
Psychology
Learning
Motivation
Personality
Emotions
Perception
Training
Leadership effectiveness
Job satisfaction
Individual decision making
Performance appraisal
Attitude measurement
Employee selection
Work design
Work stress
Individual
Social psychology
Behavioral change
Attitude change
Communication
Group processes
Group decision making
Sociology
Communication
Power
Conflict
Intergroup behavior
Group
Study of organizational behavior
Formal organization theory
Organizational technology
Organizational change
Organizational culture
Organization system
Anthropology
Comparative values
Comparative attitudes
Cross-cultural analysis
Organizational culture
Organizational environment
Power

Managerial Roles

Role	Description
Interpersonal	
Figurehead	Symbolic head; required to perform a number of routine duties of a legal or social nature
Leader	Responsible for the motivation and direction of employees
Liaison	Maintains a network of outside contacts who provide favors and information
Informational	
Monitor	Receives a wide variety of information; serves as nerve center of internal and external information of the organization
Disseminator	Transmits information received from outsiders or from other employees to members of the organization
Spokesperson	Transmits information to outsiders on organization's plans, policies, actions, and results; serves as expert on organization's industry
Decisional	
Entrepreneur	Searches organization and its environment for opportunities and initiates projects to bring about change
Disturbance handler	Responsible for corrective action when organization faces important, unexpected disturbances
Resource allocator	Makes or approves significant organizational decisions
Negotiator	Responsible for representing the organization at major negotiations

Mintzberg, H. (1973). The nature of managerial work.

Financial Skills

Ability to understand, communicate money and make investment and financial decisions

Planning

Leading

Manager

Organizing

Controlling

Conceptual Skills

Managers must have the mental ability to analyze and diagnose complex situations

Human Skills

Ability to understand, communicate with, motivate, and support other people, both individually and in groups

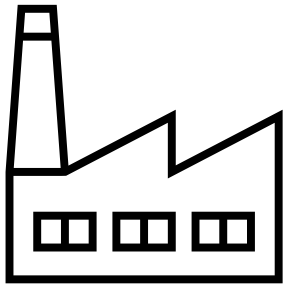
Technical Skills

Encompass the ability to apply specialized knowledge or expertise

Why Financial Skills?

$$

What should firms spend their funds on?
Investment decisions



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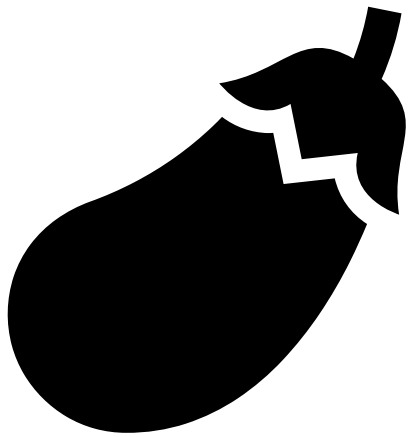
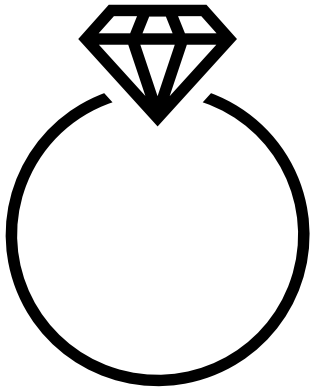
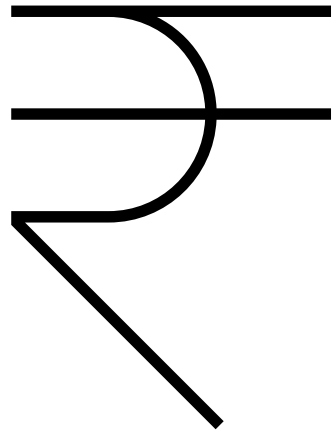
Where should they get their funds?
Financing decisions







History of Decision-Making Research

1938 — The Functions of the Executive
Chester Bernard

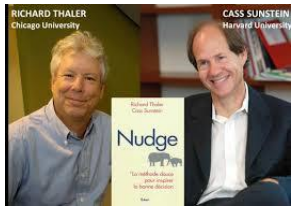
1958 — Organizations
Herbert Simon - Nobel Prize 1978

1963 — A Behavioral Theory of the Firm
James March

1971 — Management Decision Making
Richard M. Cyert

1979 — Prospect Theory: An Analysis of Decision under Risk
Daniel Kahneman - Nobel Prize 2002 and Amos Tversky

2009 — Nudge
Richard Thaler - Nobel Prize 2017 and Cass Sunstein



2020 … — Behavioral Change for Good
Angela Duckworth and Kathy Milkman

Challenges in Decision Making Under Uncertainty

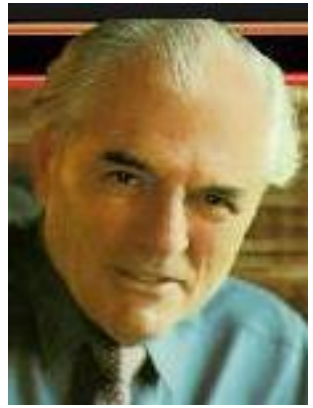
The difficulties in decision making are largely due to the degrees of uncertainty and the gaps in our knowledge about the problem space as well as the solution space. – Herbert Simon

https://www.youtube.com/watch?v=eTXkZURBq7k

Cuban Missile Crisis – October, 1962

Challenger Shuttle Disaster – January 1986

Group Think

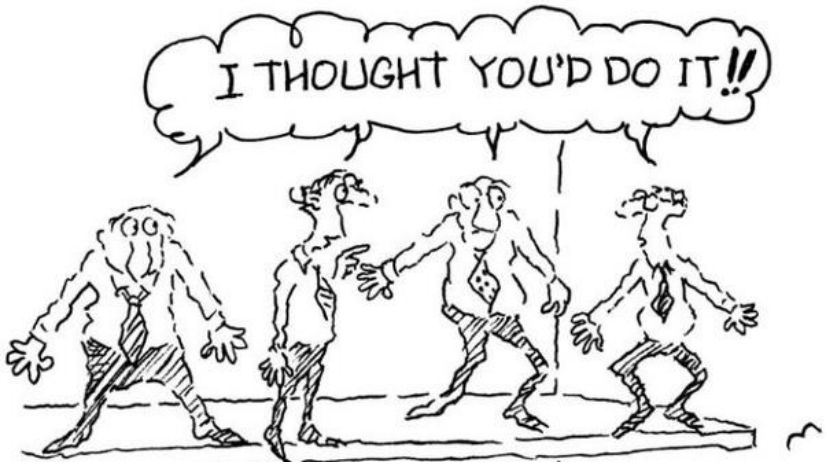


The advantages of having decisions made by groups are often lost because of powerful psychological pressures that arise when the members work closely together, share the same set of values and, above al, face a crisis situation that puts everyone under intense stress – Irving Janis, 1972

Janis, I. L. (1972). Victims of Groupthink: A psychological study of foreign-policy decisions and fiascos.

Voice Bystander Effect

The Voice Bystander Effect: How Information Redundancy Inhibits Employee Voice



Employees often remain silent rather than speak up to managers with work-related ideas, concerns, and opinions. As a result, managers can remain in the dark about issues that are otherwise well known to, or universally understood by, frontline employees.

Voice is prone to "***bystander effects***," such that, the ***more certain information is shared among employees, the less any particular employee feels individually responsible for bringing up that information with managers***.

Such bystander effects are especially likely to occur when peers of focal employees, on average, enjoy high-quality relationships with managers and thereby have adequate relational access to voice up the hierarchy.

Hussain, I., Shu, R., Tangirala, S., & Ekkirala, S. (2019). The voice bystander effect: How information redundancy inhibits employee voice. *Academy of Management Journal*, *62*(3), 828-849.

Abilene Paradox

Jerry B. Harvey, 1974

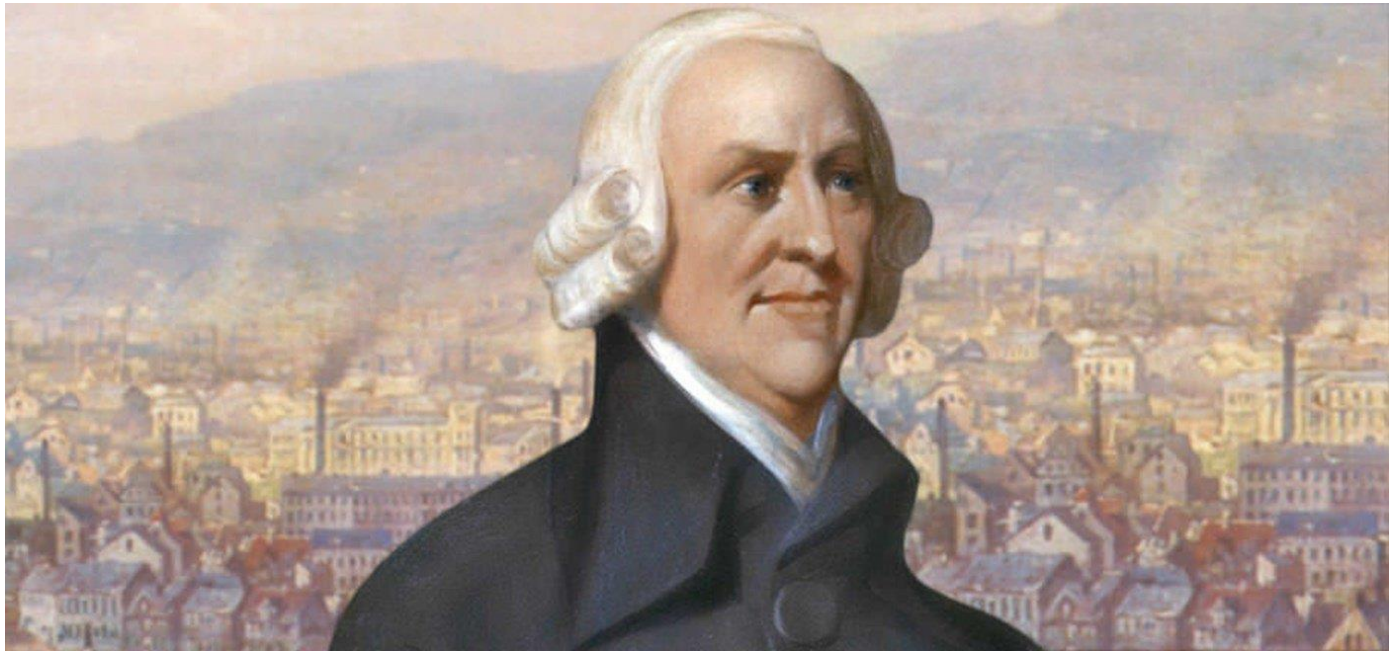
A group of people collectively decide on a course of action that is counter to the preferences of many or all of the individuals in the group. It involves a common breakdown of group communication in which each member mistakenly believes that their own preferences are counter to the group's and, therefore, does not raise objections.

A common phrase relating to the Abilene paradox is a desire to not "rock the boat".

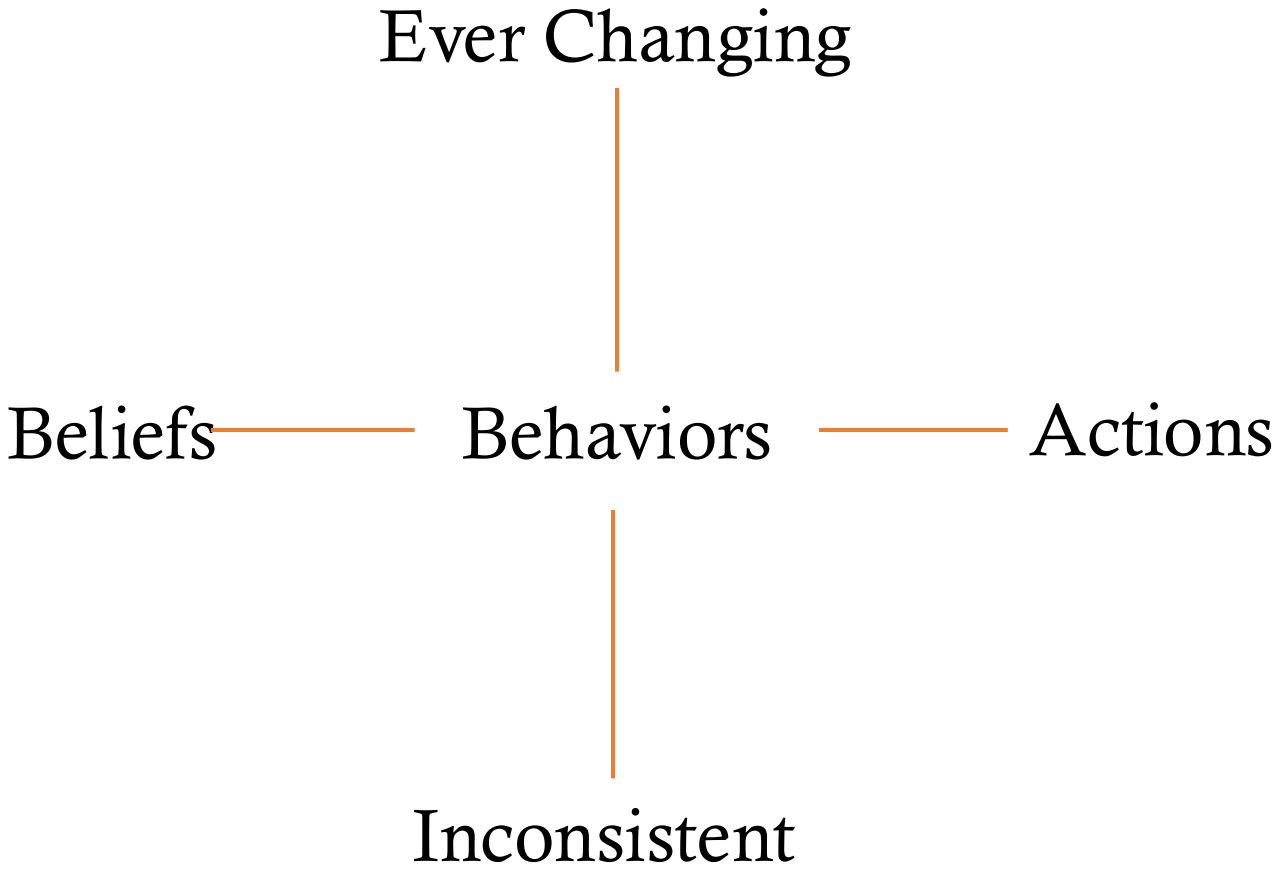
This differs from groupthink in that the Abilene paradox is characterized by an inability to manage agreement

Harvey, J. B. (1974). The Abilene paradox: the management of agreement. *Organizational dynamics*.

Why decision making under uncertainty is so difficult?

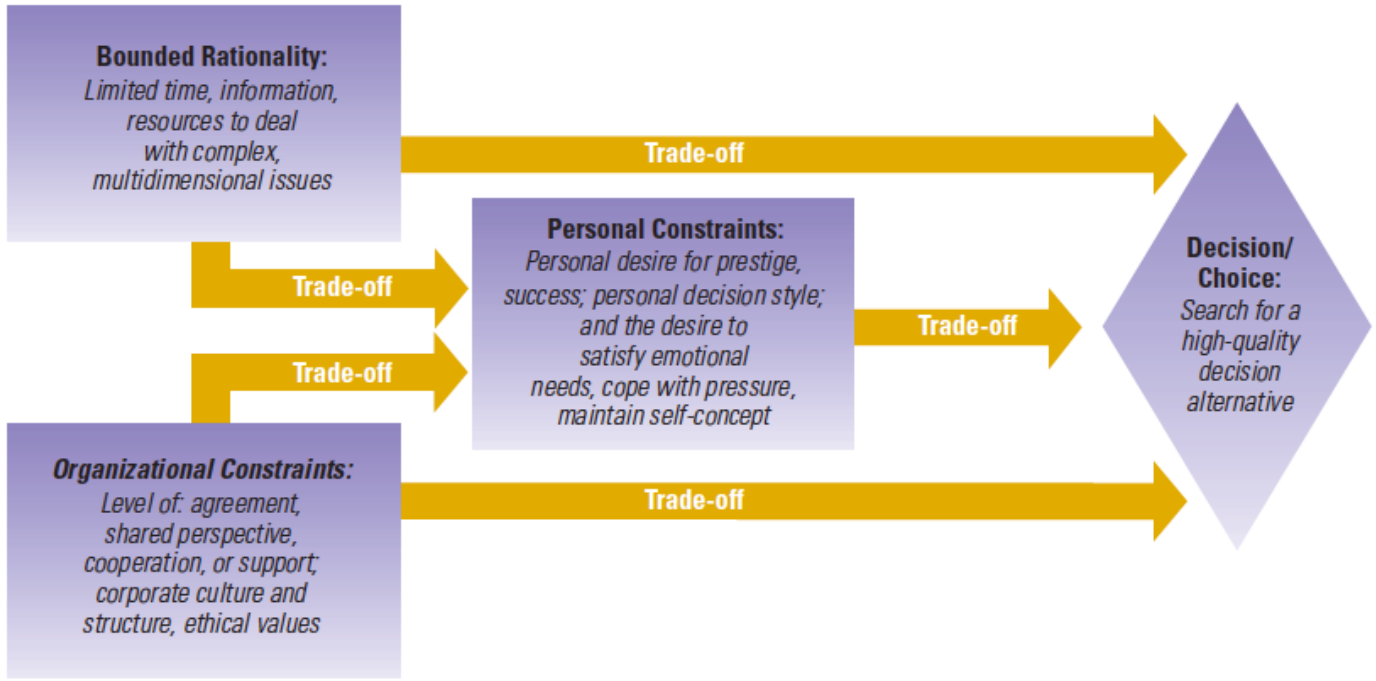


Smith, A. (1937). The wealth of nations [1776].


Ever Changing
Beliefs
Behaviors
Actions
Inconsistent

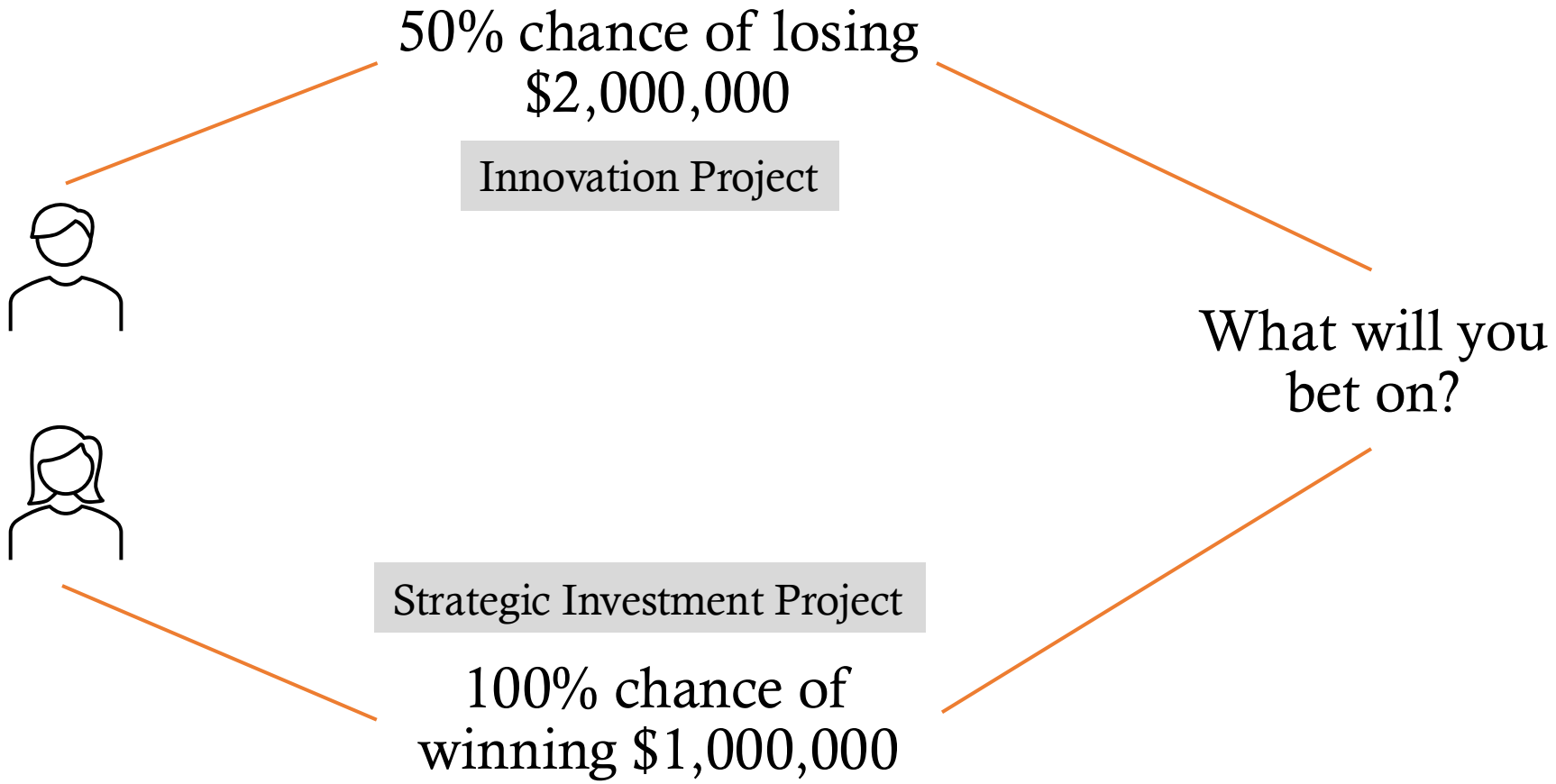
https://www.youtube.com/watch?v=GFqdkxs_2og

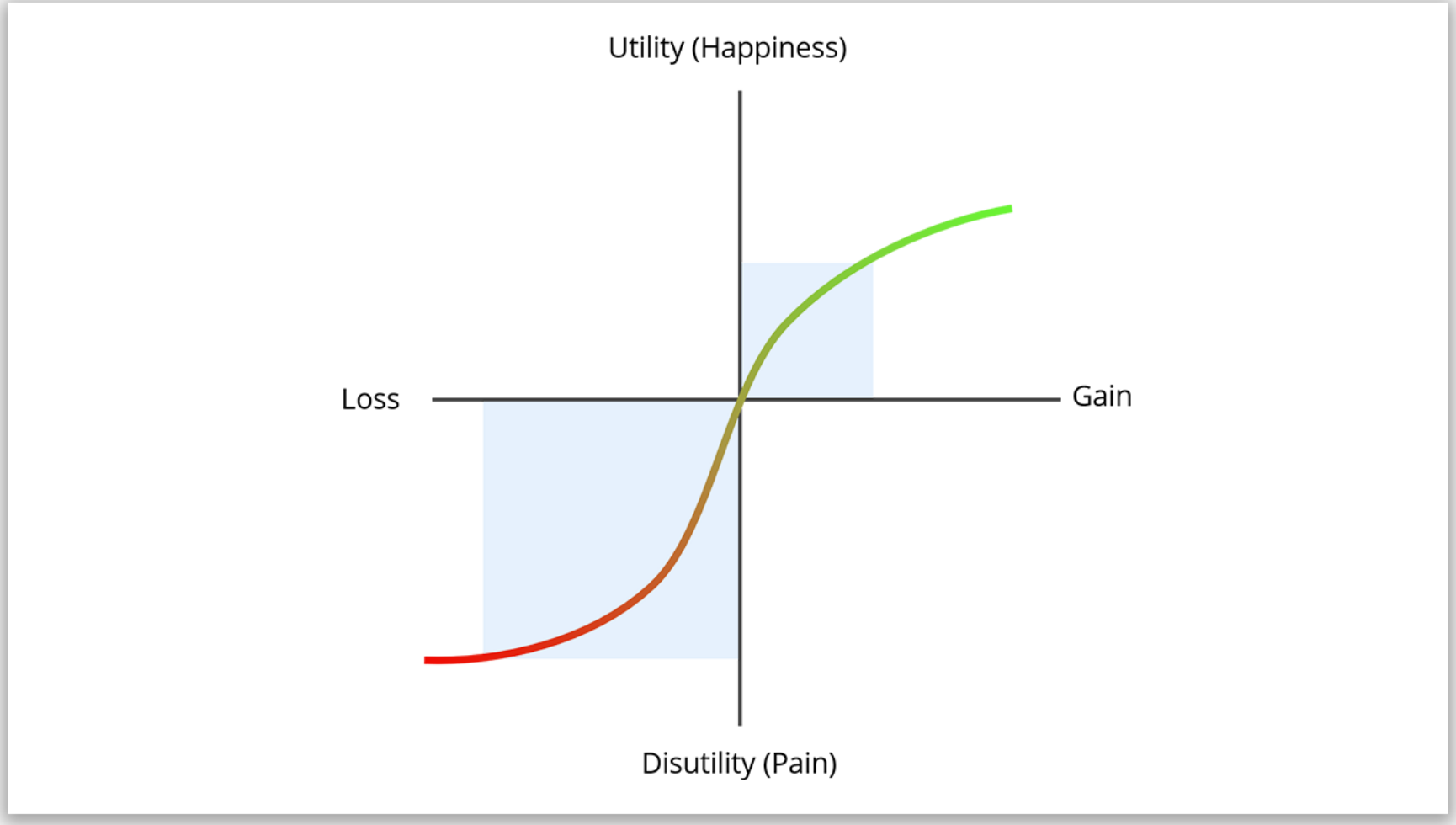
We are Homo Sapiens and not Home Economicus



In 1957, Herbert Simon introduced the term "***bounded rationality***" as a shorthand for his ***brief against neoclassical economics*** and his ***call to replace the perfect rationality assumptions of homo economicus*** with a ***conception of rationality tailored to cognitively limited agents***.

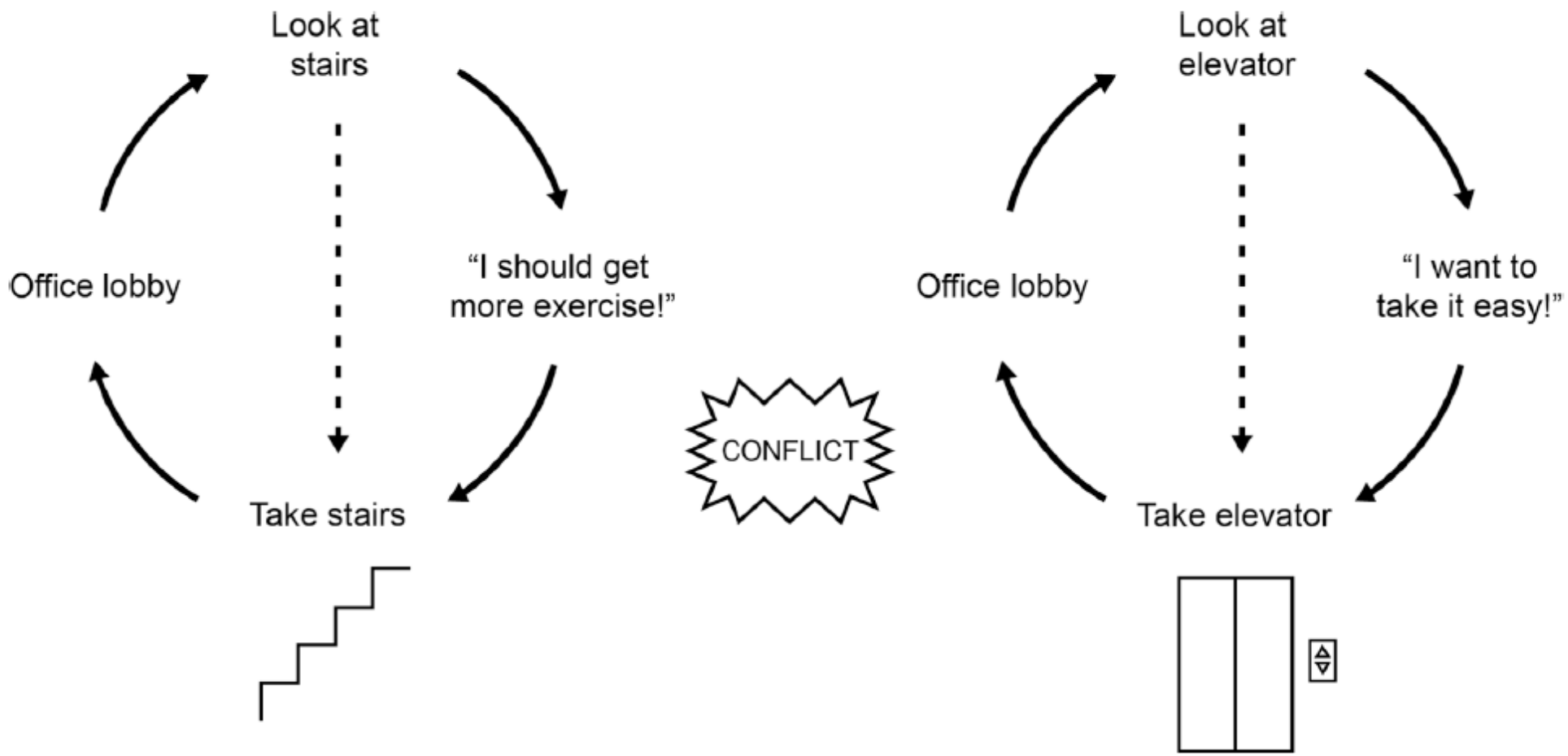
Bounded Rationality ~~equals~~ Irrational Behavior – it simply means there are ***time and resource constraints***, and ***human brain has limited ability to deal with too many choices***


50% chance of losing $2,000,000
Innovation Project
What will you bet on?
Strategic Investment Project
100% chance of winning $1,000,000

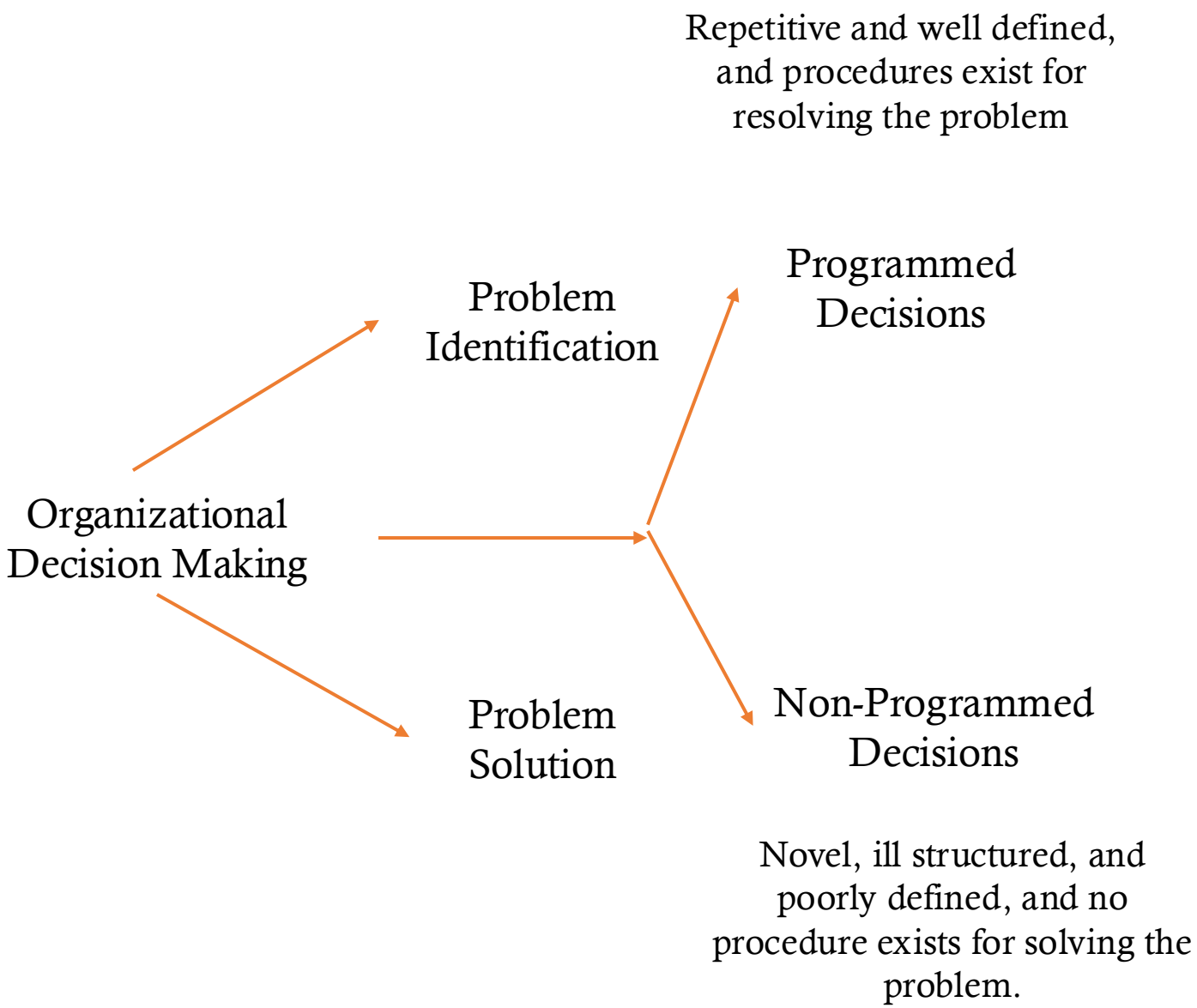


Kahneman, D., & Tversky, A. (2013). Prospect theory: An analysis of decision under risk. In *Handbook of the fundamentals of financial decision making: Part I* (pp. 99-127).

How do I make the right product design decision?



What kind of decisions are we making?



And then there are “wicked problems”

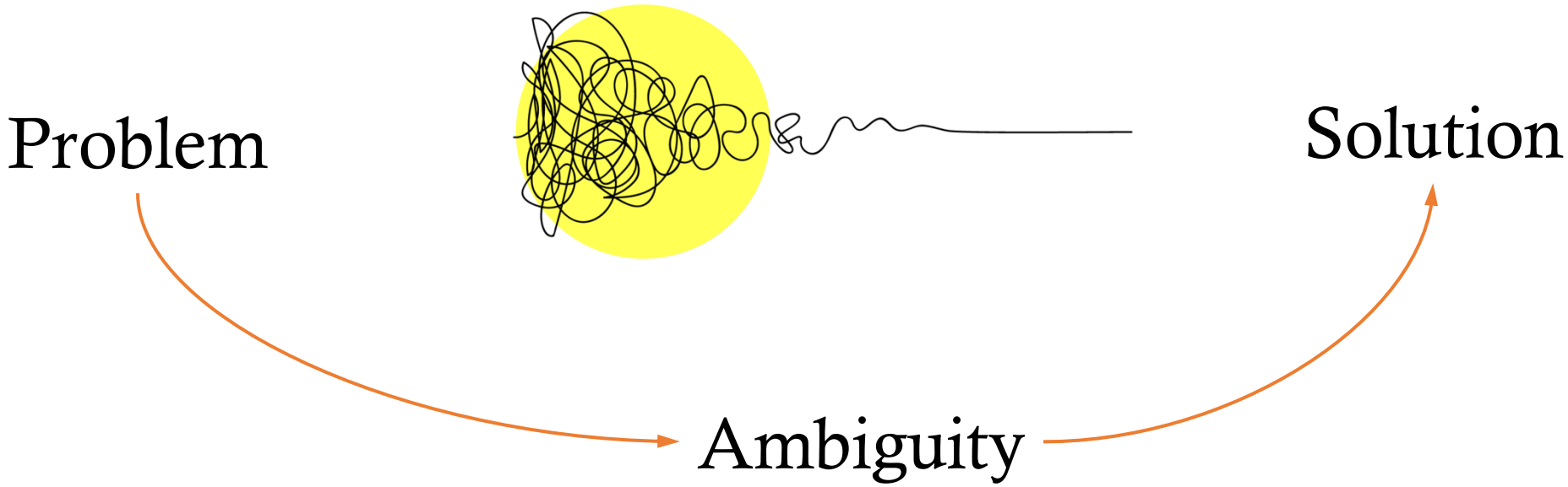
Horst Rittel / Melvin Webber

In 1973, design theorists Horst Rittel and Melvin Webber introduced the term "wicked problem" in order to draw attention to the complexities and challenges of addressing planning and social policy problems.

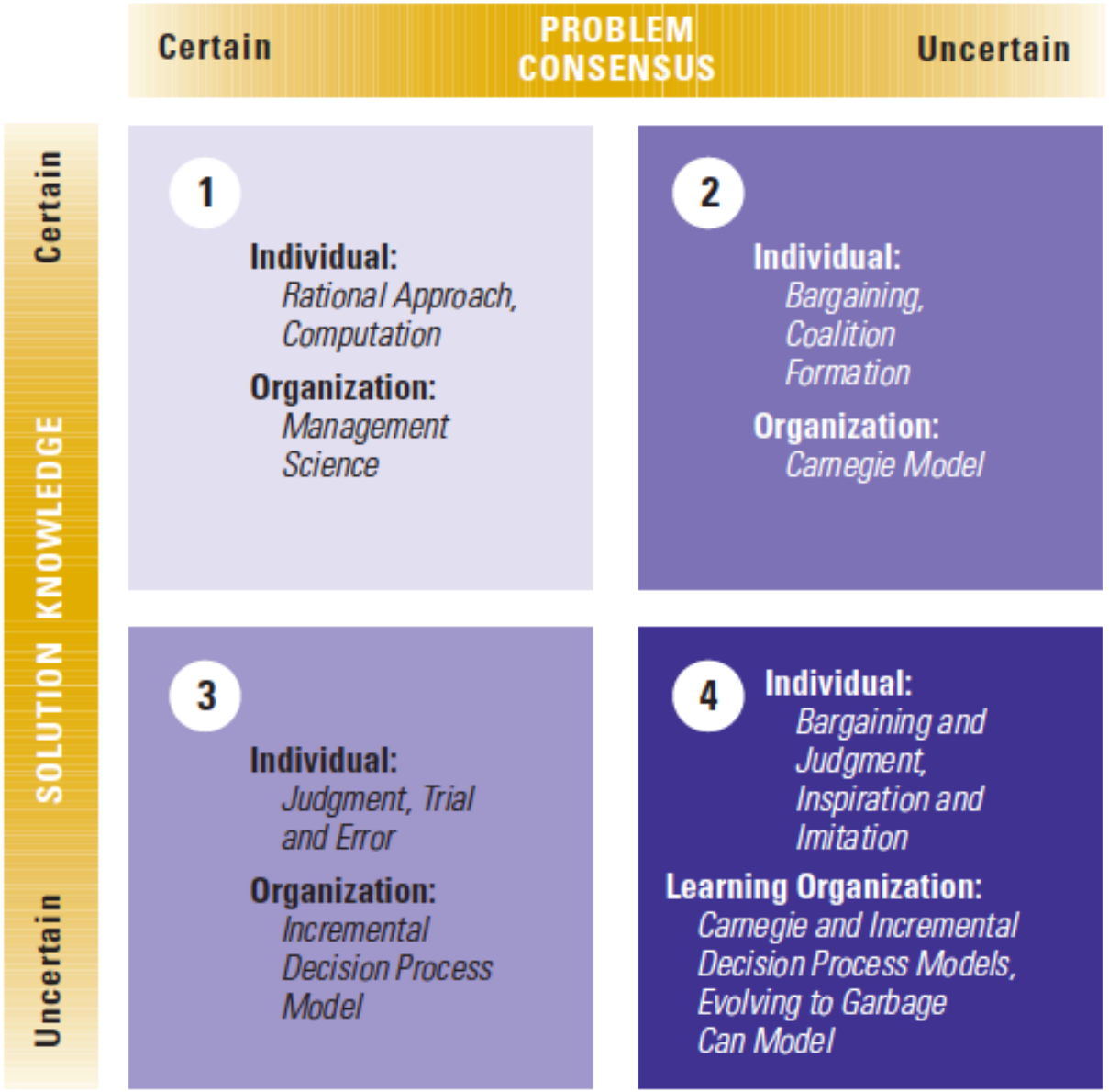
Wicked problems of planning lack clarity in both their aims and solutions. In addition to these challenges of articulation and internal logic, they are subject to real-world constraints that prevent multiple and risk-free attempts at solving.

Strategy as a wicked problem

https://hbr.org/2008/05/strategy-as-a-wicked-problem


Problem
Solution
Ambiguity

A Ready Reckoner for Organizational Decision Making



Daft, R. L. (2020). *Organization theory & design*. Cengage learning.

Role of Intuition in Decision Making

Intuition is not a process that operates independently of analysis; rather, the two processes are essential complementary components of effective decision-making systems.

Simon, H. A. (1987). Making management decisions: The role of intuition and emotion. *Academy of Management Perspectives*, *1*(1), 57-64.

What is Intuition?

Chess Grandmasters – Apply "intuition," i.e., one's professional "judgment" to the situation. A few seconds' glance at the position suggests a good move, although the player has no awareness of how the judgment was evoked.

The grandmaster's memory holds more than a set of patterns. Recognizing the pattern brings to the grandmaster's mind at once moves that may be appropriate to the situation. It is this recognition that enables the professional to play very strong chess at a rapid rate.

In essence what appears as "intuition" is nothing but an "organized set of patterns"

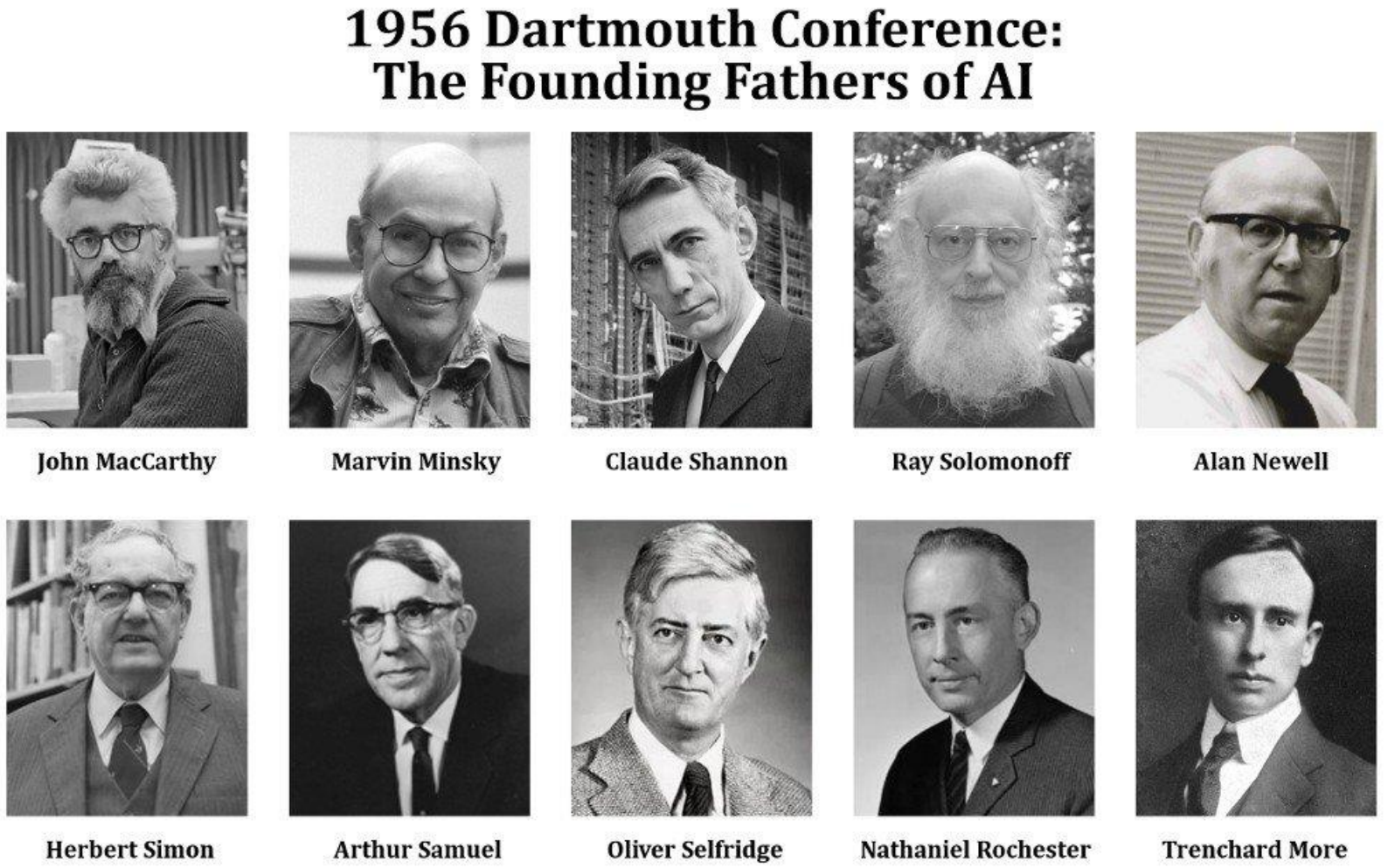
There is nothing "irrational" about intuitive or judgmental reasoning based on productions.

Intuitive skills of managers depend on the same kinds of mechanisms as the intuitive skills of chess masters or physicians. The experienced manager, too, has in his or her memory a large amount of knowledge, gained from training and experience and organized in terms of recognizable chunks and associated information.

Good managers rely on intuition and analytic techniques and we find a continuum of decision-making styles involving an intimate combination of the two kinds. The nature of the problem to be solved will be a principal determinant of the mix i.e., intuition and analytical.

https://www.youtube.com/watch?v=1UqekPMfNk4

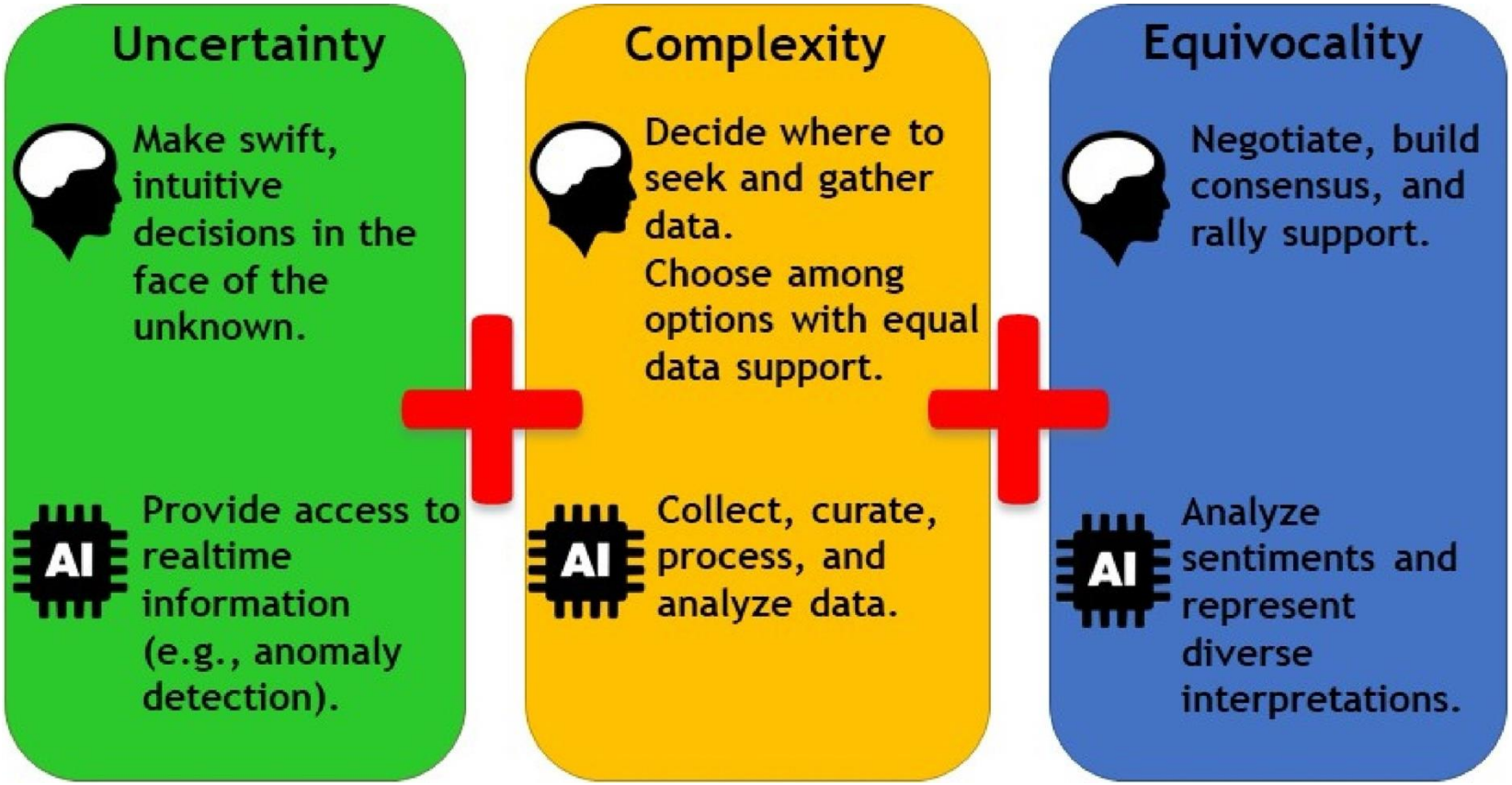
Dawn of the Age of Artificial Intelligence



Moor, J. (2006). The Dartmouth College artificial intelligence conference: The next fifty years. *Ai Magazine*, *27*(4), 87-87.

Decision Making in the Age of Artificial Intelligence

How can humans and new artificial intelligences be complementary in organizational decision making?



Glikson, E., & Woolley, A. W. (2020). Human trust in artificial intelligence: Review of empirical research. *Academy of Management Annals*, *14*(2), 627-660.

You Expect an "A", Instead You Get a "C"

2020

Algorithmic Accountability

2021

..if no one from your school has gotten the highest grade in the past three years, it's extremely unlikely—if not impossible—for anyone from your school to attain that grade this year. …In addition, the algorithm puts more weight on the CAGs if there are fewer than 15 students in a particular subject at a particular school. That meant students at smaller schools were more likely to benefit from grade inflation than those at larger schools.

https://blogs.lse.ac.uk/impactofsocialsciences/2020/08/26/fk-the-algorithm-what-the-world-can-learn-from-the-uks-a-level-grading-fiasco/

Who's the fairest of all?

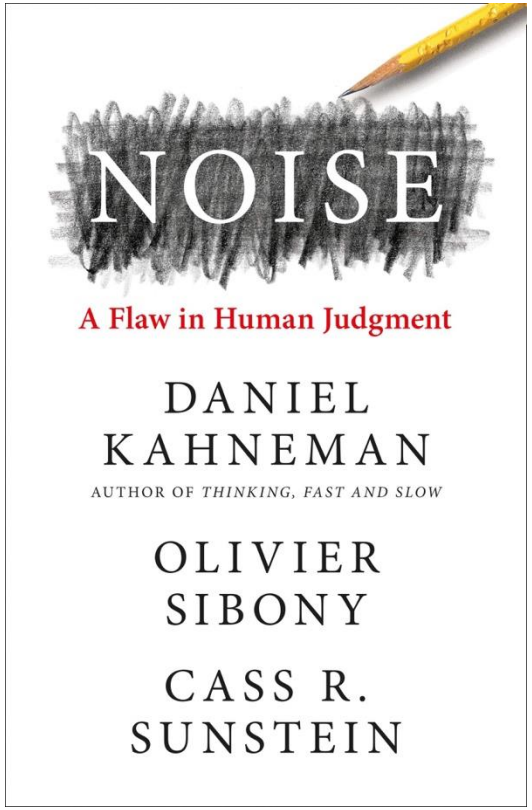
Fairness is an increasingly important concern as machine learning models are used to support decision making in high-stakes applications such as mortgage lending, hiring, insurance claims.

Machine learning models are increasingly used to inform high stakes decisions about people. Although machine learning, by its very nature, is always a form of statistical discrimination, the discrimination becomes objectionable when it places certain privileged groups at systematic advantage and certain unprivileged groups at systematic disadvantage. Biases in training data, due to either prejudice in labels or under-/over-sampling, yields models with unwanted bias

AI Fairness 360

Bellamy, R. K., Dey, K., Hind, M., Hoffman, S. C., Houde, S., Kannan, K., ... & Zhang, Y. (2018). AI Fairness 360: An extensible toolkit for detecting, understanding, and mitigating unwanted algorithmic bias. *arXiv preprint arXiv:1810.01943*.

Noise - A Flaw in Human Judgement (and Decision Making)



Organizations expect consistency from these professionals: Identical cases should be treated similarly, if not identically. The problem is that humans are unreliable decision makers; their judgments are strongly influenced by irrelevant factors, such as their current mood, the time since their last meal, and the weather.

This chance variability of judgments is called noise. It is an invisible tax on the bottom line of many companies

Studies Have Shown That While Humans Can Provide Useful Input, Algorithms Do Better In The Role Of Final Decision Maker

Kahneman, D., Rosenfield, A. M., Gandhi, L., & Blaser, T. (2016). Noise. *Harvard Bus Rev*, 38-46.

Finally – Its about a series choices

The way we perceive the probability of rare events often changes as we acquire direct experience—but are the new perceptions more accurate?

It's hard to be objective about fairness—because what seems fair so often depends on your reference points.

Making a decision in isolation—versus in a comparison—relies on different processes and tends to produce different results.

A lack of resources can constrain your ability to make the best choices in life. But surprisingly, there are advantages to scarcity in some contexts.

Decision Making is "Both/And" and Not "Either/Or"

Paradoxes of Leadership

1. Are we managing for today or for tomorrow?
   - Tensions around time frame are especially salient, because a firm's long-term survival depends on experimenting, taking risks, and learning from failure in the pursuit of new products, services, and processes
2. Do we adhere to boundaries or cross them?
   - Leaders are always making and unmaking decisions around boundaries—geographic, cultural, and functional.
3. Do we focus on creating value for our shareholders and investors or for a broader set of stakeholders?
   - All firms exist to create value, but leaders may be torn between maximizing profits for the firm and trying to generate wider benefits—for investors, employees, customers, and society

Paradoxical Mindset

1. From well-intentioned consistency to consistent inconsistency.
   - Aristotelian logic treats contradictions and tensions as signals that we need to seek a more accurate, unified truth. If one idea is "right," its opposite must be wrong;
2. From scarce resources to abundant resources
   - Traditional leadership approaches assume that resources—time, money, people, and so on—are limited.
3. From stability and certainty to dynamism and change
   - Leaders seek to reduce their followers' discomfort with uncertainty by asserting control—making decisions that minimize complexity and emphasize stability

To unleash the power of paradox, leaders must both separate and connect opposing forces.

Smith, W. K., Lewis, M. W., & Tushman, M. L. (2016). Both/and" leadership. *Harvard Business Review*, *94*(5), 62-70.

Leadership Is Decision Making

Sundar Pichai on Leadership and Decision Making

Pichai has admitted that he was a little surprised when first asked to take over as CEO of one of the most famous companies in the world. But when asked for lessons learned since taking over the helm, his first response is interesting.

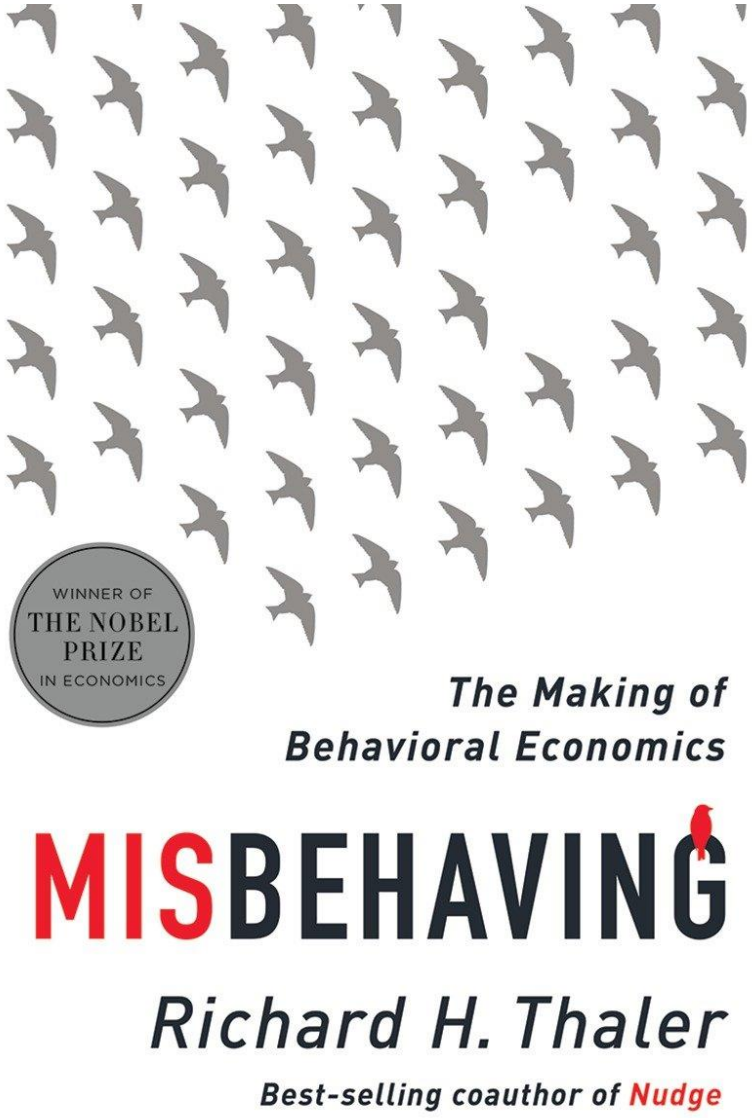
Namely, that the ***biggest part of his job isn't making major decisions***. ***It's moving the needle***.

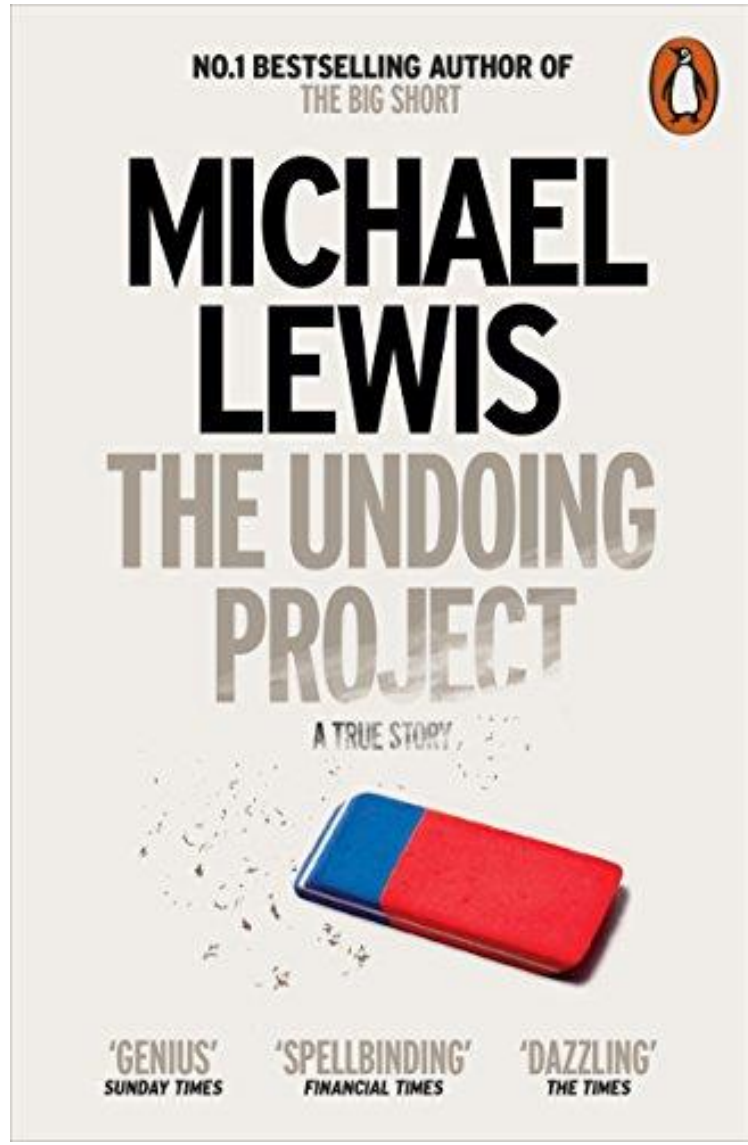
"***There are very few decisions that are extremely high stakes, where mistakes are going to have major consequences***," explains Pichai. "It's the incremental decisions that lead to progress."

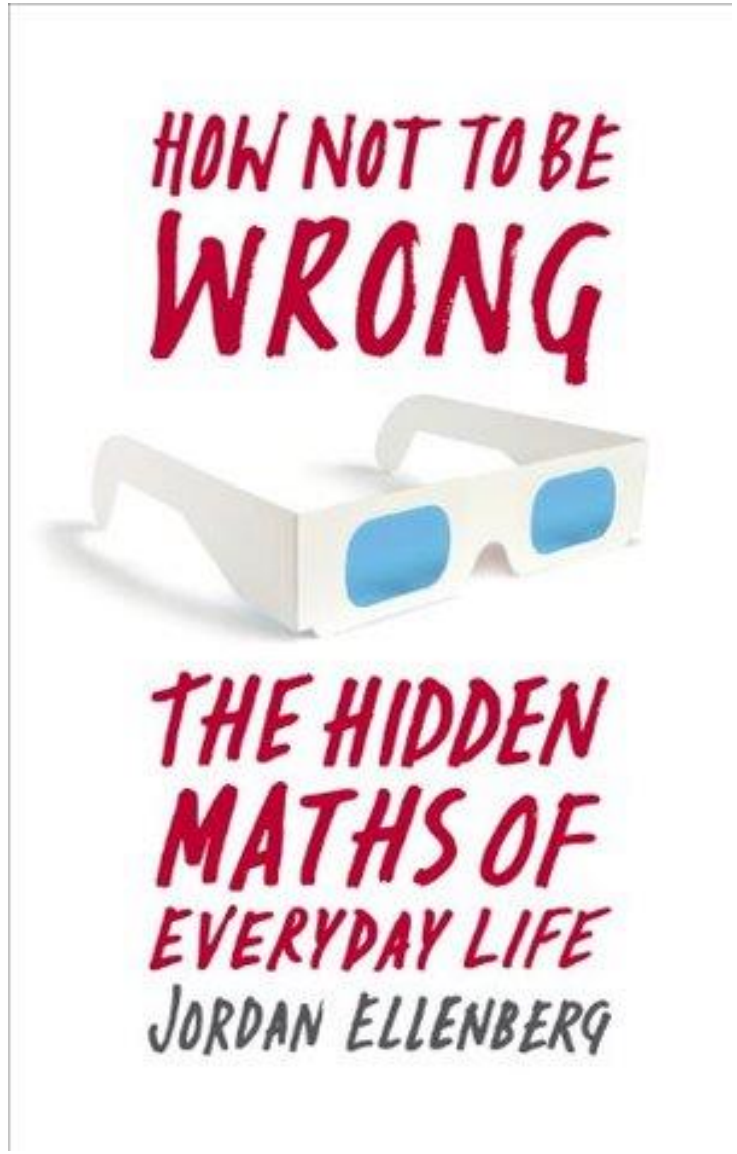
With an organization this large (Google's parent company, Alphabet, currently has more than 130,000 employees), ***Pichai says it's easy for issues to get stuck in stasis, especially if those issues are complex***. ***Discussion after discussion, with no decisions, keeps a company from advancing on its goals.*** Pichai's job is to keep that from happening.

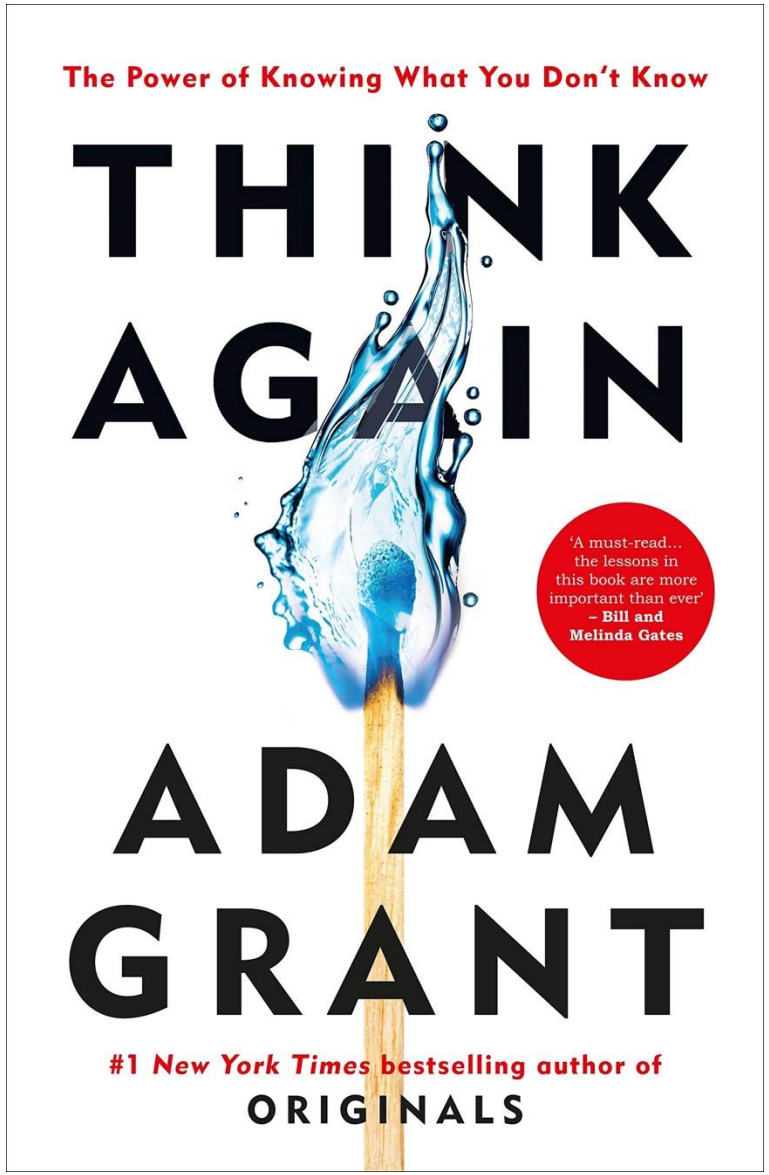
He learned how to do so from his mentor, business executive and former Columbia University football coach Bill Campbell. (Campbell passed away in 2016.) Campbell taught that ***one of the primary jobs of a leader is to "break ties",*** to make the decision when fellow executives or colleagues are at a stalemate.

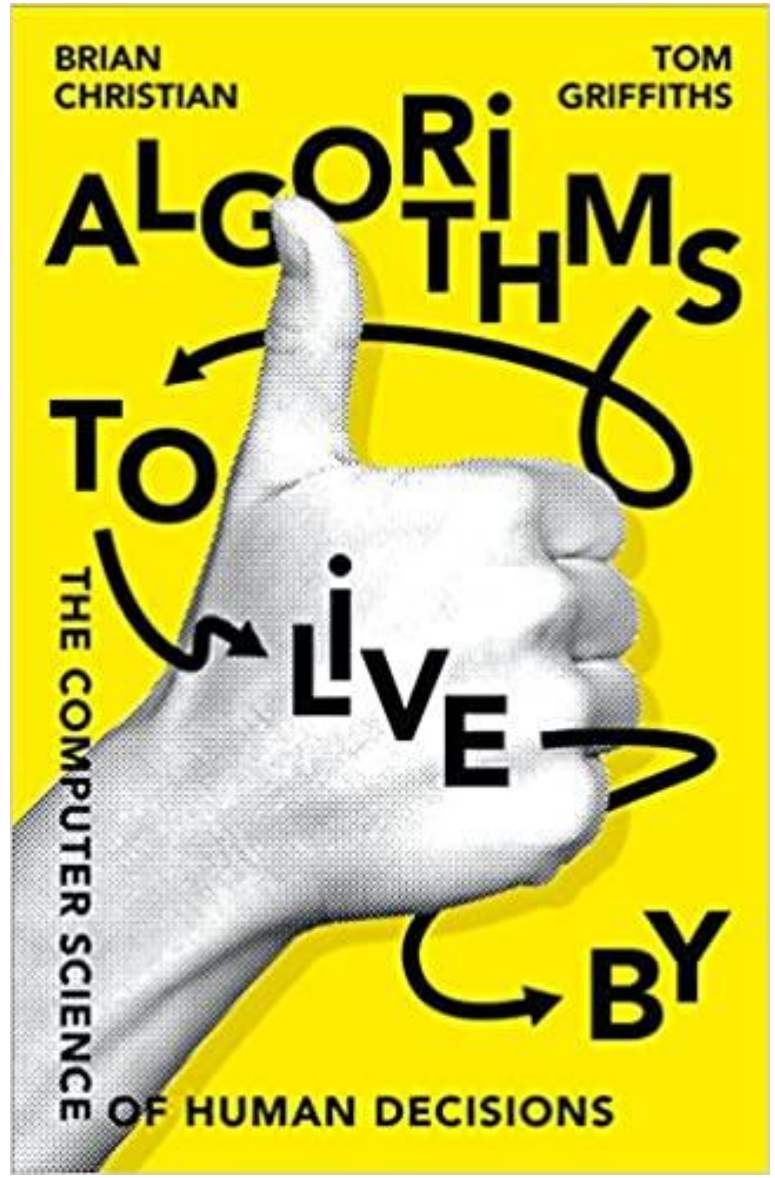
"Leadership is decision making. Moving things forward."

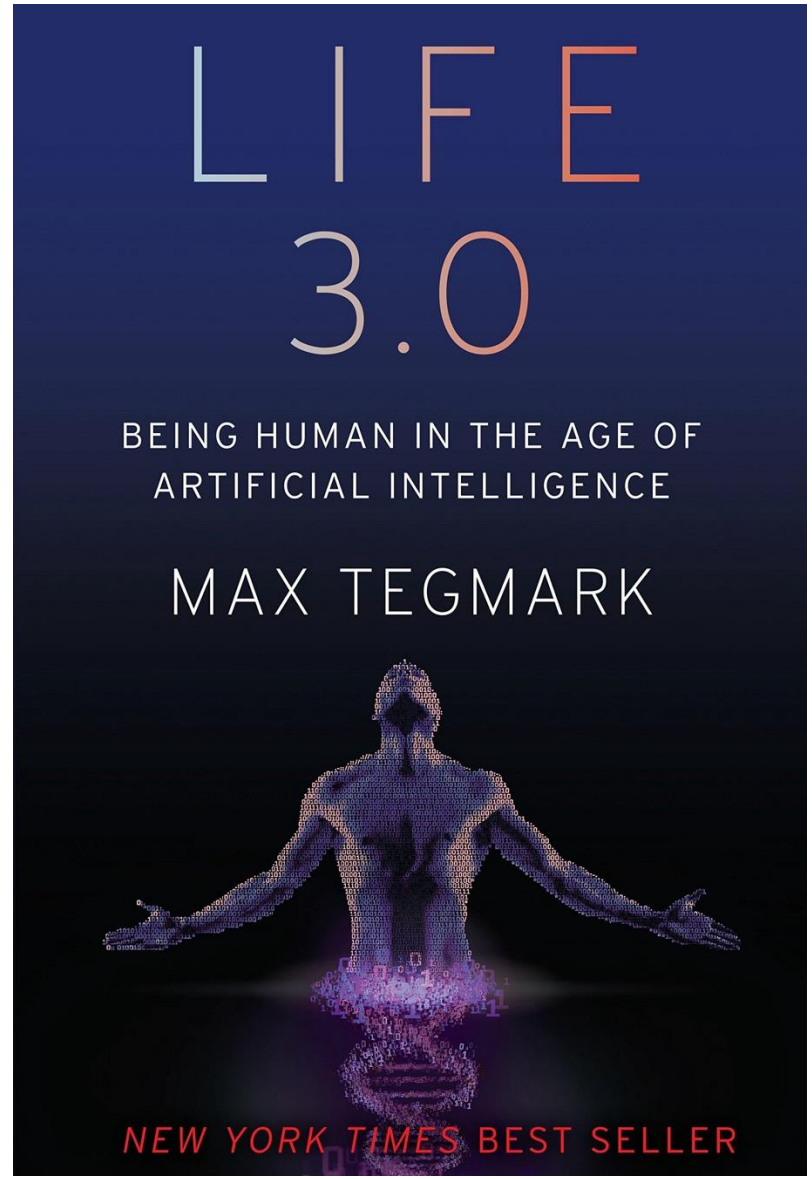

WINNER OF
THE NOBEL
PRIZE
IN ECONOMICS
The Making of
Behavioral Economics
MISBEHAVING
Richard H. Thaler
Best-selling coauthor of Nudge


NO.1 BESTSELLING AUTHOR OF
THE BIG SHORT
MICHAEL
LEWIS
THE UNDOING
PROJECT
A TRUE STORY
'GENIUS'
SUNDAY TIMES
'SPELLBINDING'
FINANCIAL TIMES
'DAZZLING'
THE TIMES


HOW NOT TO BE
WRONG
THE HIDDEN
MATHS OF
EVERYDAY LIFE
JORDAN ELLENBERG


The Power of Knowing What You Don't Know
THINK AGAIN
'A must-read... the lessons in this book are more important than ever' – Bill and Melinda Gates
ADAM GRANT
#1 New York Times bestselling author of ORIGINALS


BRIAN CHRISTIAN
TOM GRIFFITHS
ALGORITHMS TO LIVE BY
THE COMPUTER SCIENCE OF HUMAN DECISIONS


LIFE 3.0
BEING HUMAN IN THE AGE OF ARTIFICIAL INTELLIGENCE
MAX TEGMARK
NEW YORK TIMES BEST SELLER

The effective manager does not have the luxury of choosing between "analytic" and "intuitive" approaches to problems.

Impact of Decision-Making Research

Research Paper	Area	Citations
Kahneman, D., & Tversky, A. (2013). Prospect theory: An analysis of decision under risk. In *Handbook of the fundamentals of financial decision making: Part I* (pp. 99-127).	Prospect Theory	67286
Cyert, R. M., March, J. G., & Clarkson, G. P. (1992). A behavioral theory of the firm.	Organizational Behavior	34104
Barnard, C. I. (1968). *The functions of the executive* (Vol. 11). Harvard university press.	Decision Making	25037
Janis, I. L. (1972). Victims of Groupthink: A psychological study of foreign-policy decisions and fiascoes.	Group Think	10066
Simon, H. A. (1997). *Models of bounded rationality: Empirically grounded economic reason* (Vol. 3). MIT press.	Bounded Rationality	6232
Cohen, M. D., March, J. G., & Olsen, J. P. (1972). A garbage can model of organizational choice. *Administrative science quarterly*, 1-25.	Garbage Can Model	12313
Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *science*, *185*(4157), 1124-1131.	Prospect Theory	41295
Simon, H. A. (1987). Making management decisions: The role of intuition and emotion. *Academy of Management Perspectives*, *1*(1), 57-64.	Intuition	1867
Thaler, R. H., & Sunstein, C. R. (2009). *Nudge: Improving decisions about health, wealth, and happiness*. Penguin.	Behavioral Economics	18781
Thaler, R. H. (1999). Mental accounting matters. *Journal of Behavioral decision making*, *12*(3), 183-206.	Mental Accounting	4215