



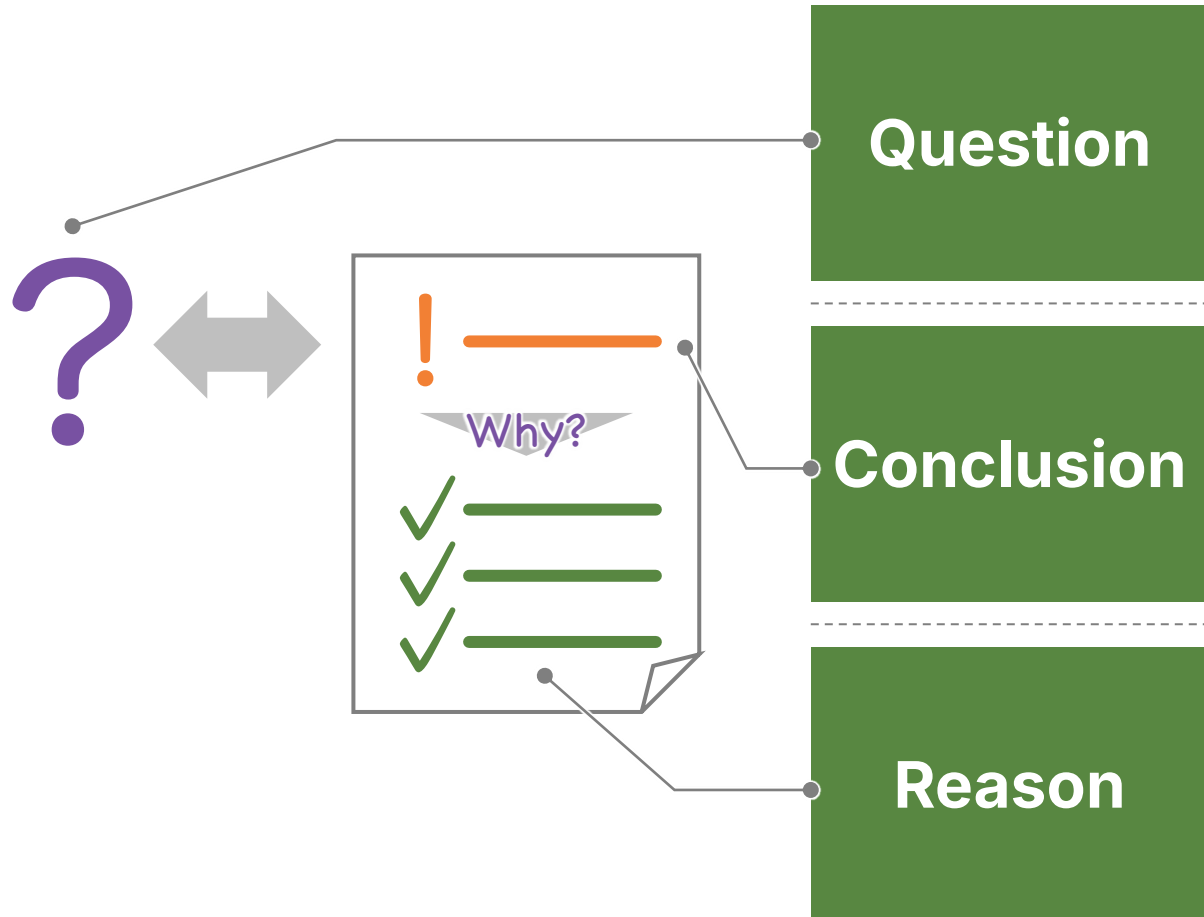
*Critical Thinking in the Age of AI*  
**Slides from the Text**

2026/5/21  
Liffel



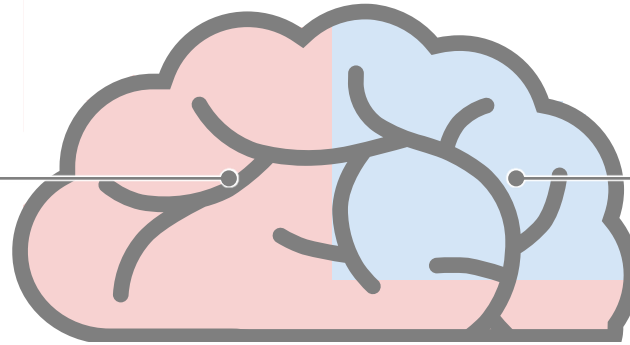
# The Three Elements of Decision-Making

- Decision-making consists of three elements: (1) Question, (2) Conclusion, and (3) Reason
  - Using these terms, "decision-making" can be restated as: reaching a conclusion on a question



- What you want to decide
  - What do I want to decide right now?
  - The question can always be written as an interrogative sentence
- The result of the decision — a direct answer to the question
  - What did I ultimately decide to do, or to treat as "right"?
- The cause, basis, or process that led to the conclusion
  - Why did I arrive at that conclusion?
  - Some decisions have no reason

# The Ape System and the Human System



## Ape System (System 1)

## Human System (System 2)

### Definition

- A decision-making system that produces conclusions **instantly**

- A decision-making system that produces conclusions **deliberately**

### Operation

- **Fast and cost-free**
  - Reaches a conclusion before the question is even consciously identified

- **Slow and costly**
  - Starts by identifying the question
  - Derives the conclusion from reasons

### State

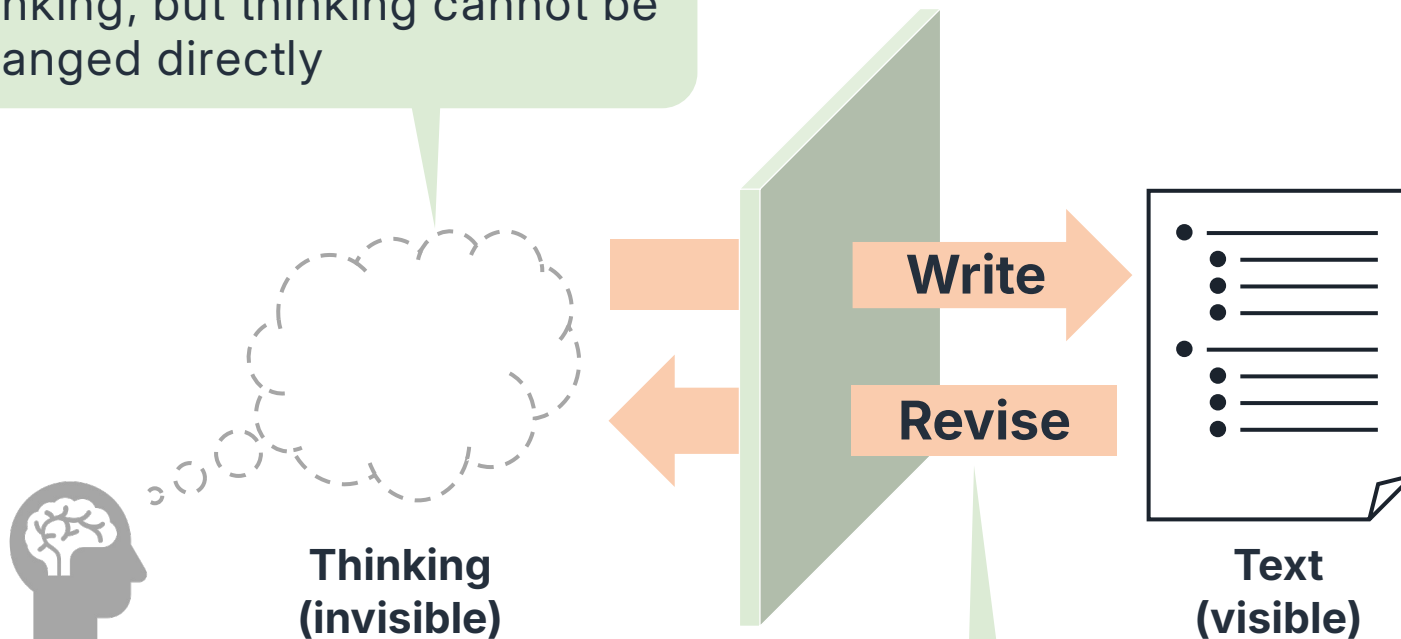
- **Always ON (autopilot)**
  - Cannot be turned off

- **Normally OFF (manual control)**
  - You need to actively engage it

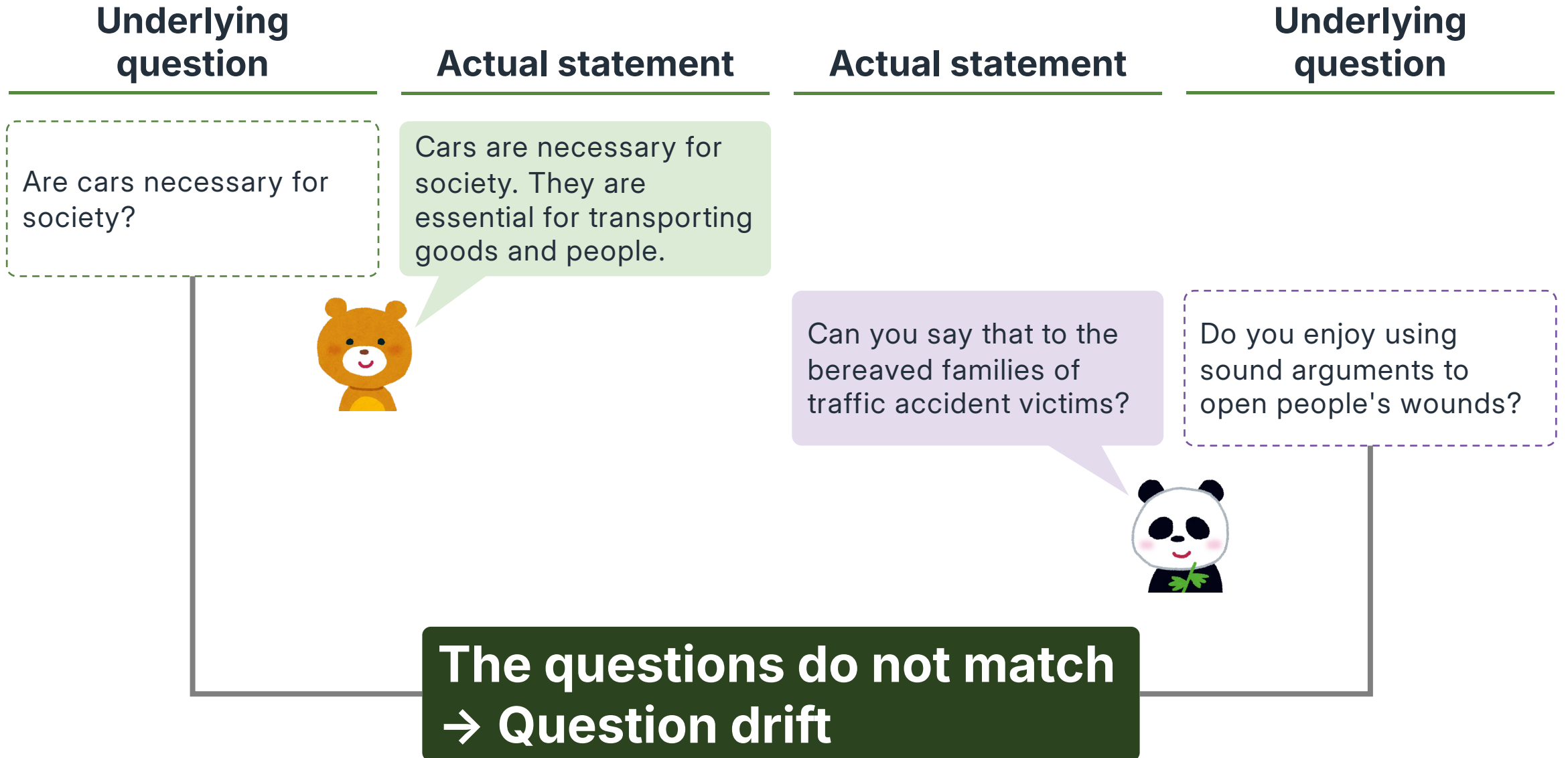
# The Fundamental Principle of Rationality: Use of Text

- The only way to learn rational thinking is to write sentences and revise them
  - Reflect your thinking in the mirror of text, then revise it

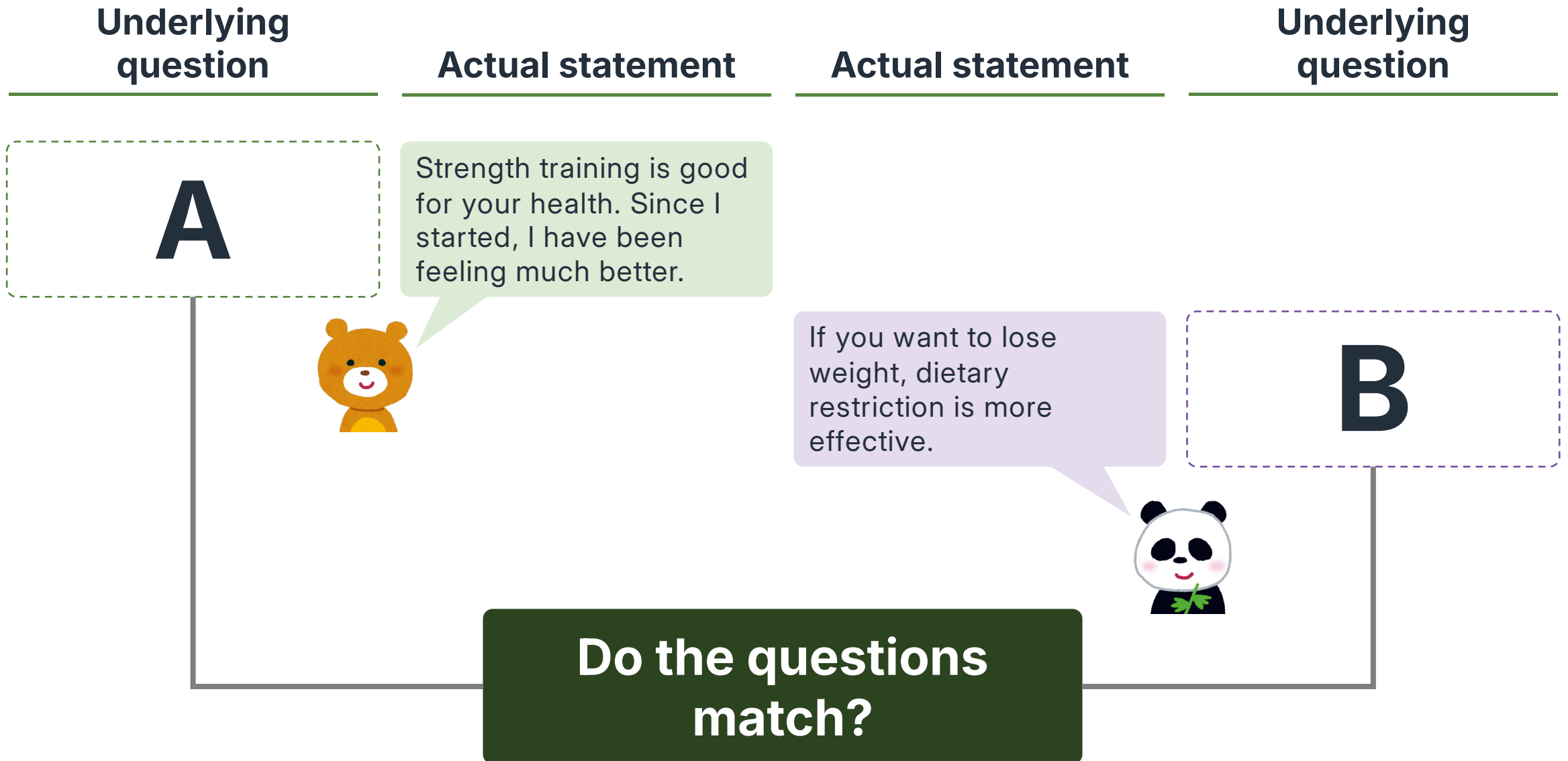
The goal is to change your thinking, but thinking cannot be changed directly



# Example of Question Drift

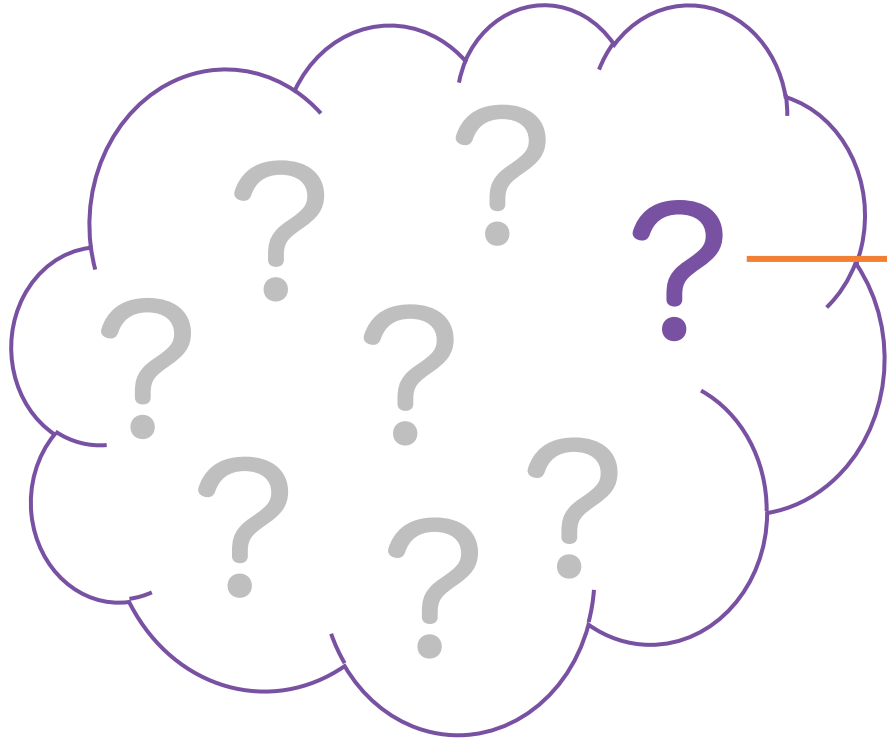


# Exercise



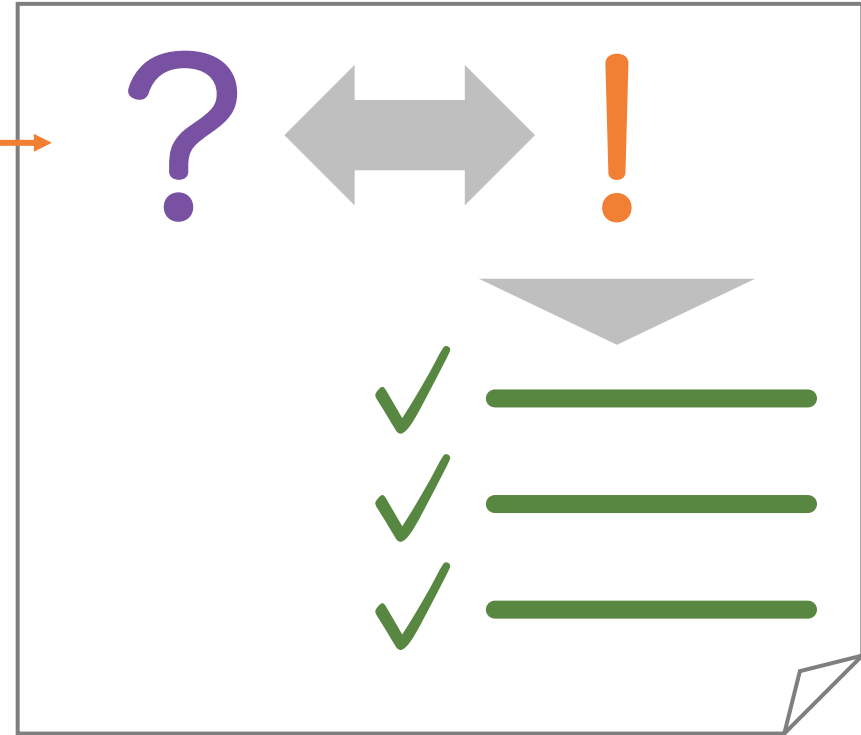
# Setting the Question and Rational Thinking

## Setting the question (Value of the question)



**Decide what to think about  
(the question)**

## Rational thinking (Rightness)



**Find the right answer  
to a given question**

# The Process of Decision-Making | Decision-Making and Rationality



## Question

- Decide what to decide on
  - What question do I need to answer right now?

All activities for reaching a conclusion

- Reach a conclusion
  - Think of reasons, do research, etc.

Where rationality applies

- 
- Rationality concerns the process of reaching a conclusion
    - How did you reach the conclusion?



## Conclusion

- Finalize the conclusion
  - What is the answer to the question?

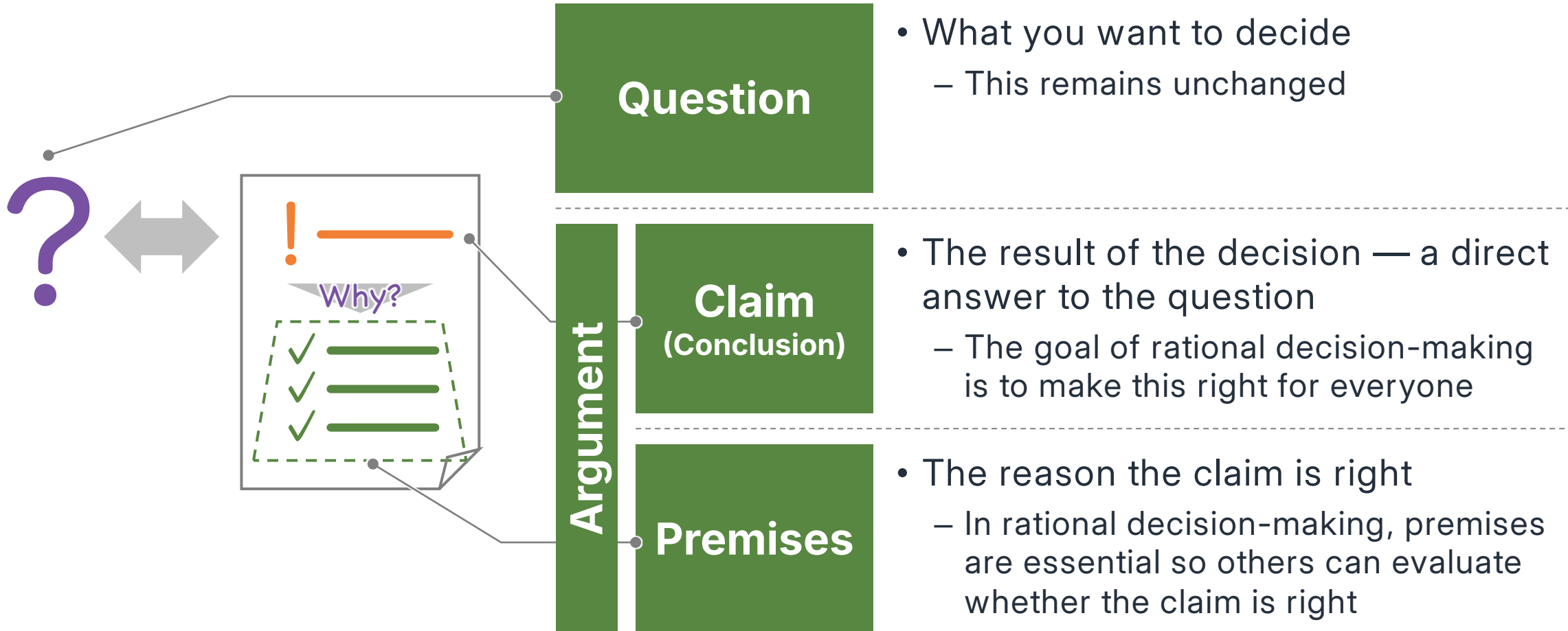


- Do something based on the conclusion
  - Put the conclusion into action, announce it, etc.

- 
- Whether the final conclusion (resolution) was right has no direct relation to rationality
    - An irrationally reached conclusion can still be right

# The Three Elements of Rational Decision-Making

- In rational decision-making, you build an argument (claim and premises) for the question
  - Unlike decision-making in general, having no premises is not acceptable



# Question, Claim, Premises | Exercise

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Should I buy a house or rent one?

I think you should rent.

There are three reasons.

First, buying property in Country A right now means you are likely overpaying. Country A's population will keep declining, so there will only be more and more surplus housing. In other words, as rents are likely to fall, it makes more sense to keep switching to cheaper rentals as they become available.

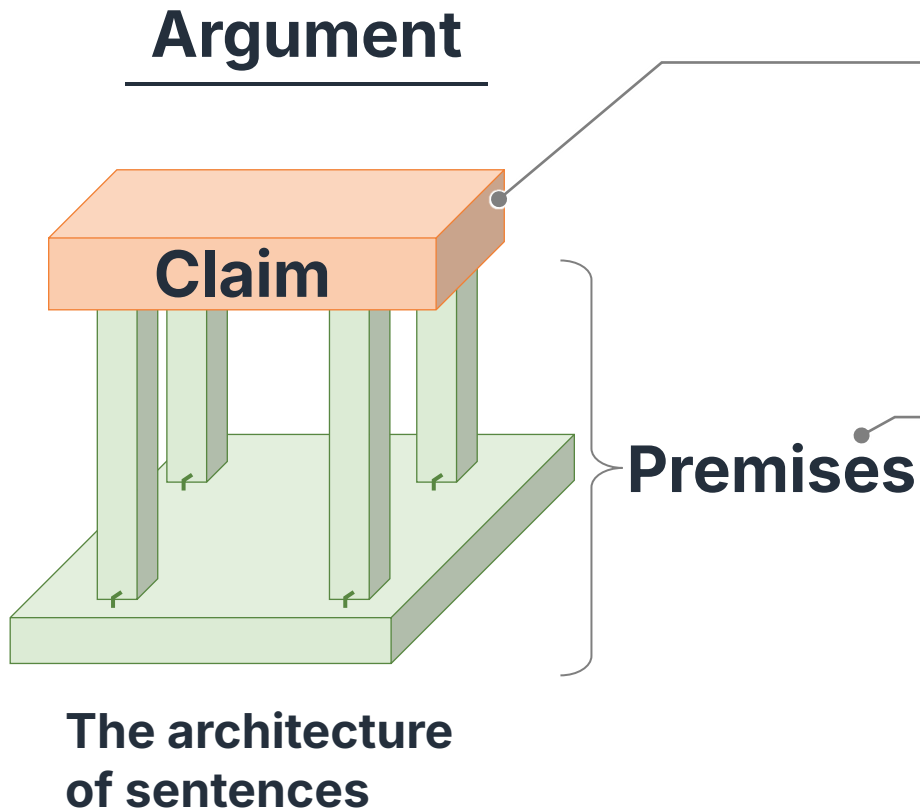
Second, flexibility to move. You're still young, and you haven't decided to live in this town forever, right? Then renting makes it easier to move if something comes up.

Third...(omitted)



# Picturing an Argument (Claim and Premises) | What Rationality Is

- Rationality is about examining whether the premises fully support the rightness of the claim

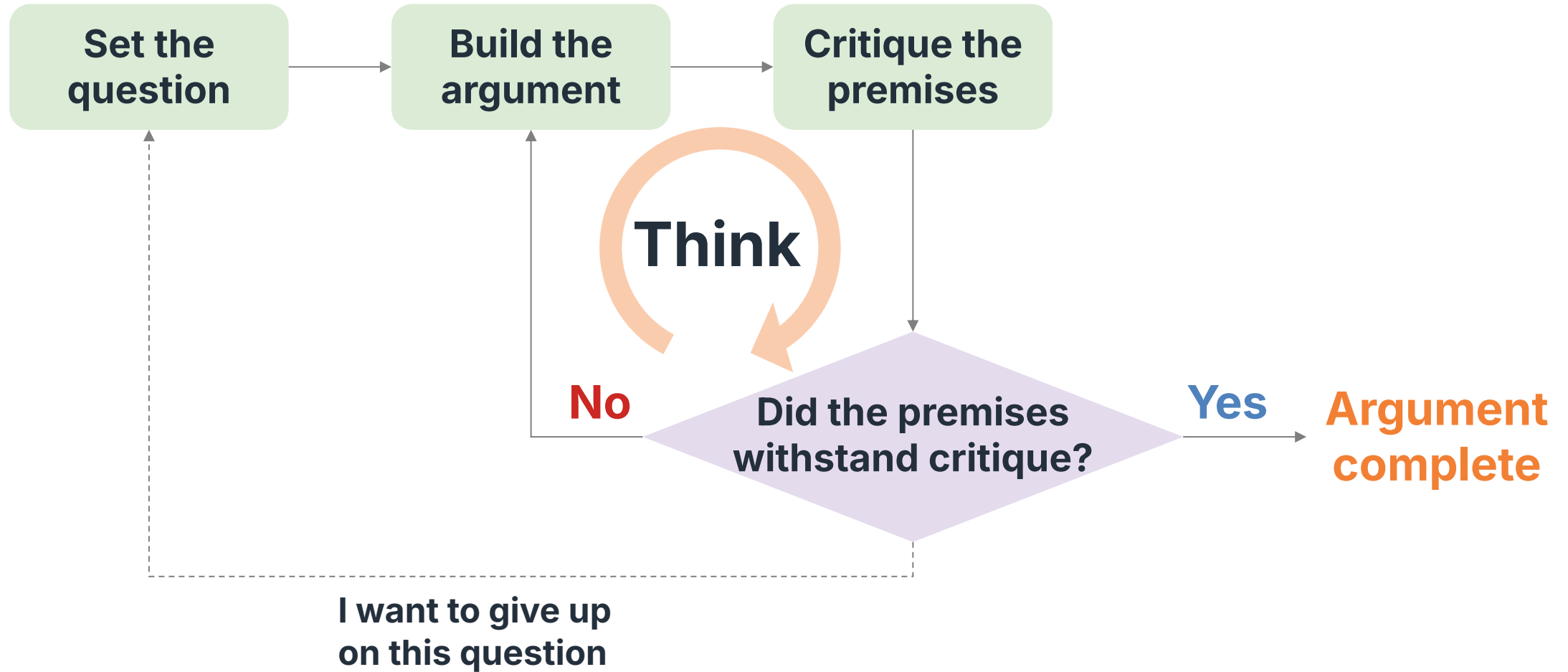


- A claim is a single sentence
  - By its nature, a claim cannot be expressed in multiple sentences
  - The goal of rational decision-making is to make this right for everyone (= stabilize the roof)

- Premises consist of multiple sentences
  - Supporting the rightness of a claim requires many statements
  - It is safe to say that most of an argument is premises

- Whether the premises support the claim determines whether it is “rational”
  - If the roof looks stable to everyone, the claim is rational

# What It Means to Think Rationally (Critically)



# Confirmation Bias

- Confirmation bias is the tendency to collect only information that confirms the opinions and beliefs you already hold

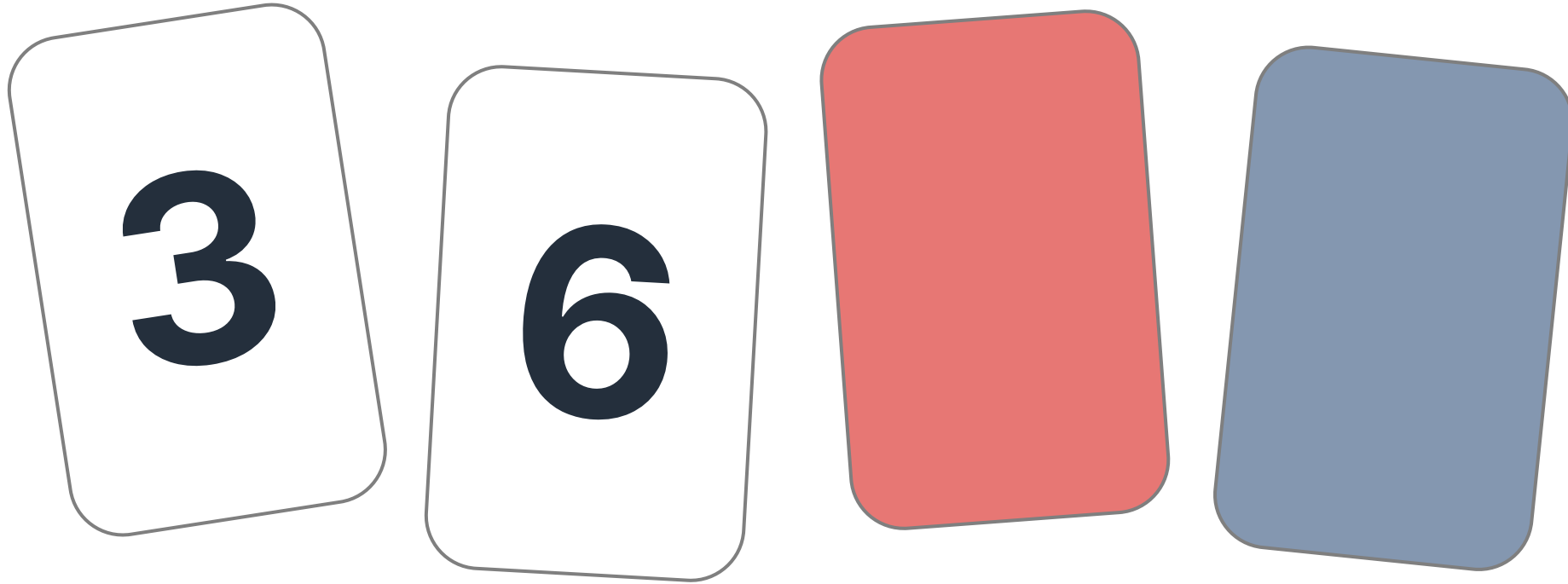


- Confirmation bias causes us to perceive mainly information that confirms our opinions and beliefs, and to overlook information that disconfirms them
  - This bias operates at an unconscious level

**We must doubt to think rationally,  
but that is difficult for humans**

# The Wason Selection Task

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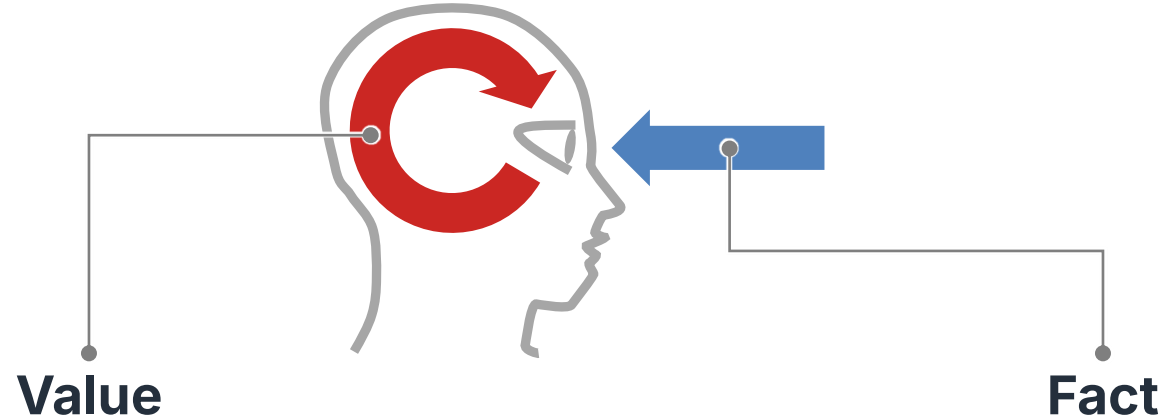


# Classifying Questions

	What you are asking	Is the conclusion debatable?	
		Yes	No
<b>Action</b>	<ul style="list-style-type: none"><li>• What should we do?<ul style="list-style-type: none"><li>– In principle, this type of question is the question</li></ul></li></ul>	<b>Action question</b> <ul style="list-style-type: none"><li>• e.g., Should I run every day?</li></ul>	<b>No question exists</b>
<b>Value</b>	<ul style="list-style-type: none"><li>• How should things be?<ul style="list-style-type: none"><li>– Absolute rightness of the answer <b>cannot be expected</b></li></ul></li></ul>	<b>Value question</b> <ul style="list-style-type: none"><li>• e.g., Which matters more, money or health?</li></ul>	
<b>Fact</b>	<ul style="list-style-type: none"><li>• How are things?<ul style="list-style-type: none"><li>– Absolute rightness of the answer <b>can be expected</b></li></ul></li></ul>	<b>Factual question</b> <ul style="list-style-type: none"><li>• e.g., Is running good for health?</li></ul>	

# Value and Fact

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## Definition

- What arises from within yourself
  - Emotions, and the norms, goals, and morals derived from them
  - “ought / good-or-evil” world

- What exists outside yourself
  - Things that can be observed, or the principles and laws derived from them
  - “is / true-or-false” world

## Related words

- Politics, religion, culture
- Instinct, genes

- Science, natural laws, knowledge
- Reason

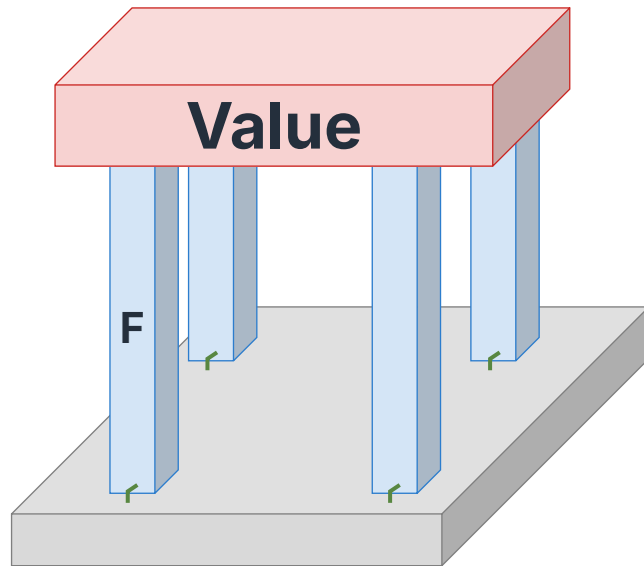
## Absolute rightness

- Whether it can be expected is unclear
  - Even experts disagree

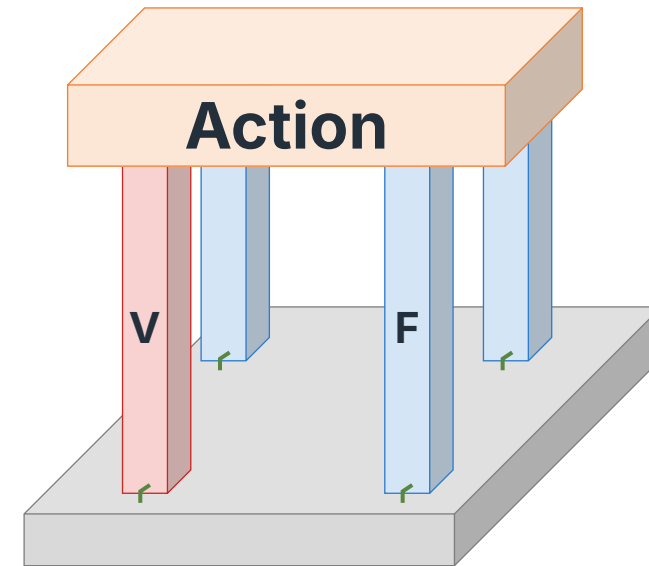
- Can be expected
  - Humans observe it in the same way

# Understanding Hume's Law (The Is-Ought Problem) Correctly

## Deriving value from fact



## Deriving action from value and fact

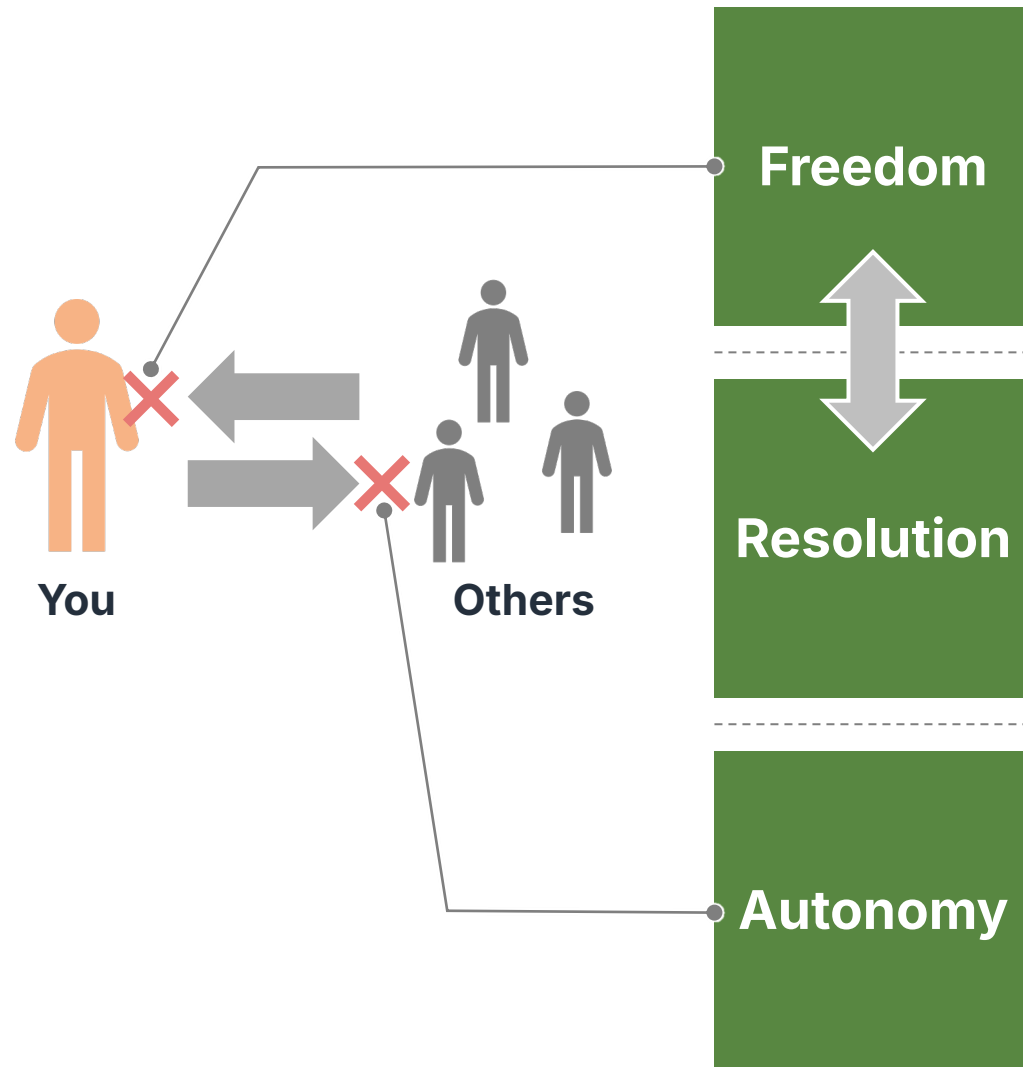


- Deriving value this way does not guarantee its rightness
  - There is no method for determining the rightness of values



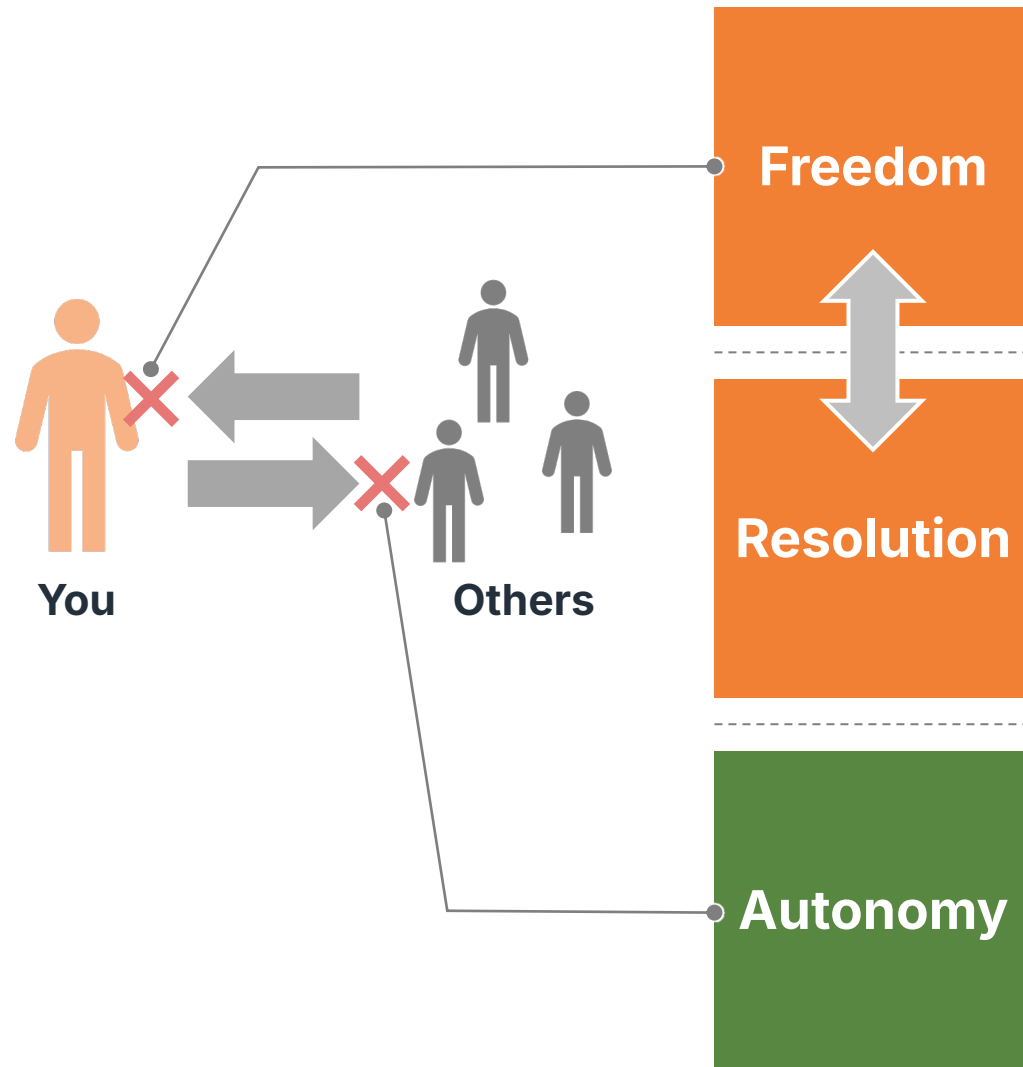
- It is not a problem for value to appear in the premises that lead to action
  - It is impossible to decide on action without involving value

# The Three Conditions on Claims



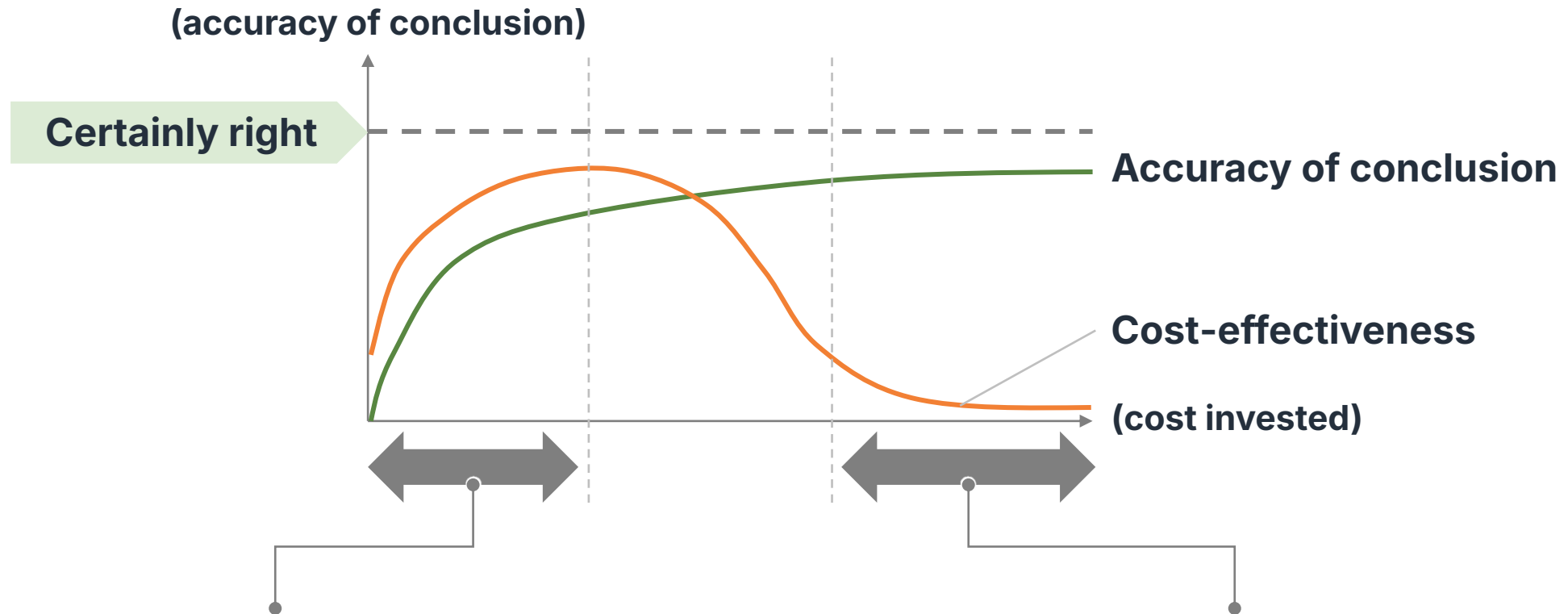
- You do not have to resolve until sufficient cost has been invested
  - Resolve: finalizing the conclusion and ending the decision-making
  - Meaning the claim remains flexible
- Once sufficient cost has been invested, either resolve or abort the decision
  - Not a condition of rationality
  - Investing too much cost will worsen the cost-effectiveness of decision-making
- Think with your own mind, and take responsibility for your claim (No authoritarianism about facts)
  - Authoritarianism: the attitude of unconditionally trusting others' claims rather than what has been observed

# The Three Conditions on Claims



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# Cost-Effectiveness of Decision-Making (Conceptual)



- Resolving before investing sufficient cost is **irrational**
  - It gives up the possibility of efficiently improving the accuracy of the conclusion

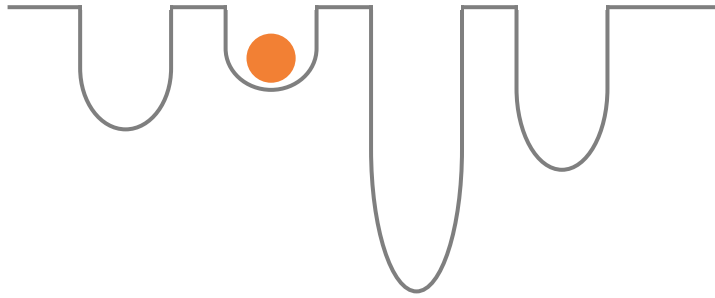
- Not resolving even after investing sufficient cost is **inefficient**
  - Continued cost investment does not improve the accuracy of the conclusion proportionally

# How to Use Cost Correctly in Decision-Making

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## The Decision-Making Roulette (Conceptual)

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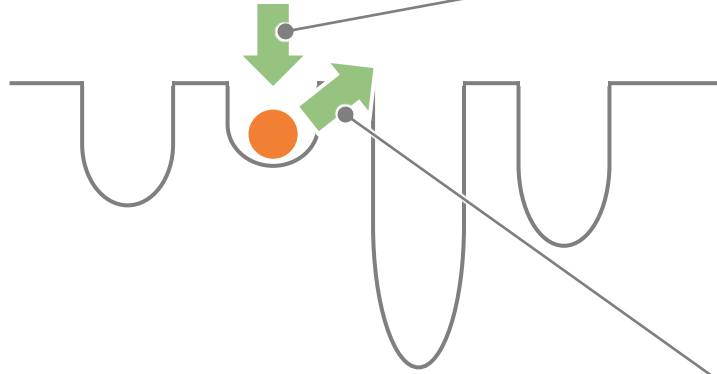


### Rules

- The goal is to settle the ball in the deepest slot possible
  - Think of “depth of slot = closeness to truth”
- The depth of the slot cannot be known in advance, and cannot be fully known even after the ball settles
  - You can never be certain whether your conclusion is true
- You may apply any force to the ball, and you may apply force any number of times

# How to Use Cost Correctly in Decision-Making

## The Decision-Making Roulette (Conceptual)



- Collecting information that affirms your current claim does not contribute to rationality
  - It only pushes the ball deeper into its current position
  - Applying force this way gives zero chance of changing the claim


### Rules

- The goal is to settle the ball in the deepest slot possible
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- Only information that negates your current claim contributes to raising rationality
  - A force that scrapes the ball sideways from its current position
  - Keep applying this force and the ball will settle into a deeper hole

# Example of Double Standards

## Statement




Whether you're in a marathon or in a sauna, you should wear a mask.



Is there data showing masks cause heatstroke?  
Or a paper?

## Statement



Isn't the risk of heatstroke greater?

## Level of evidence demanded

- **Lowest**

- This argument has no premises at all



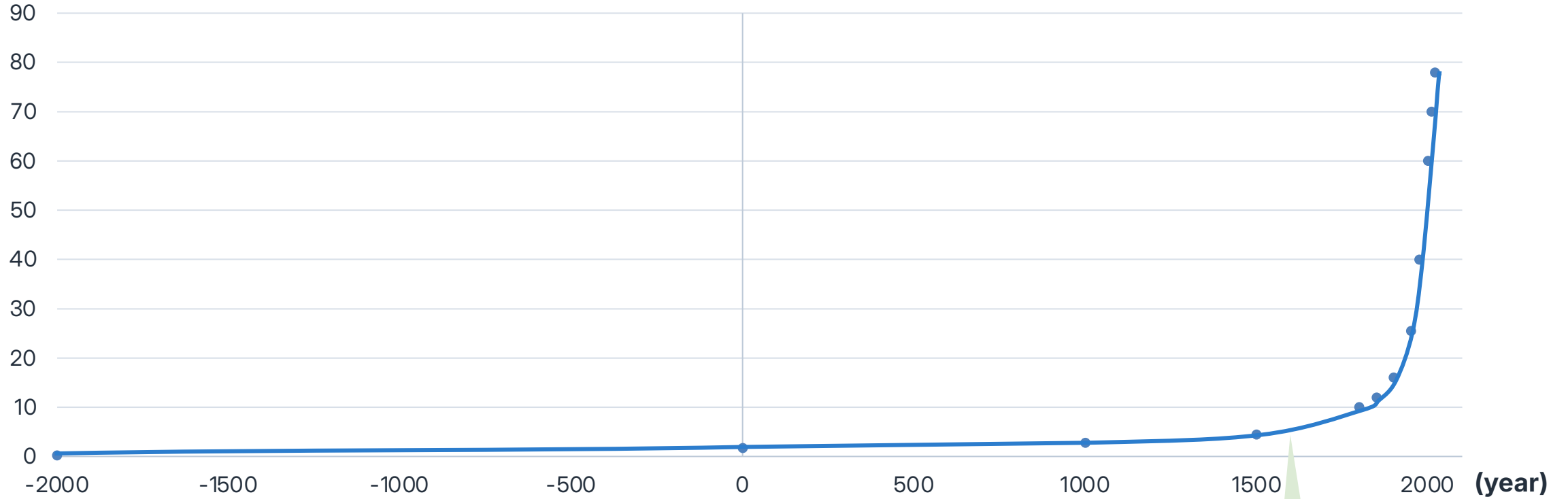
**For the same question, the level of evidence demanded differs**

- **Highest**

- Normally, data cannot be prepared for something like this

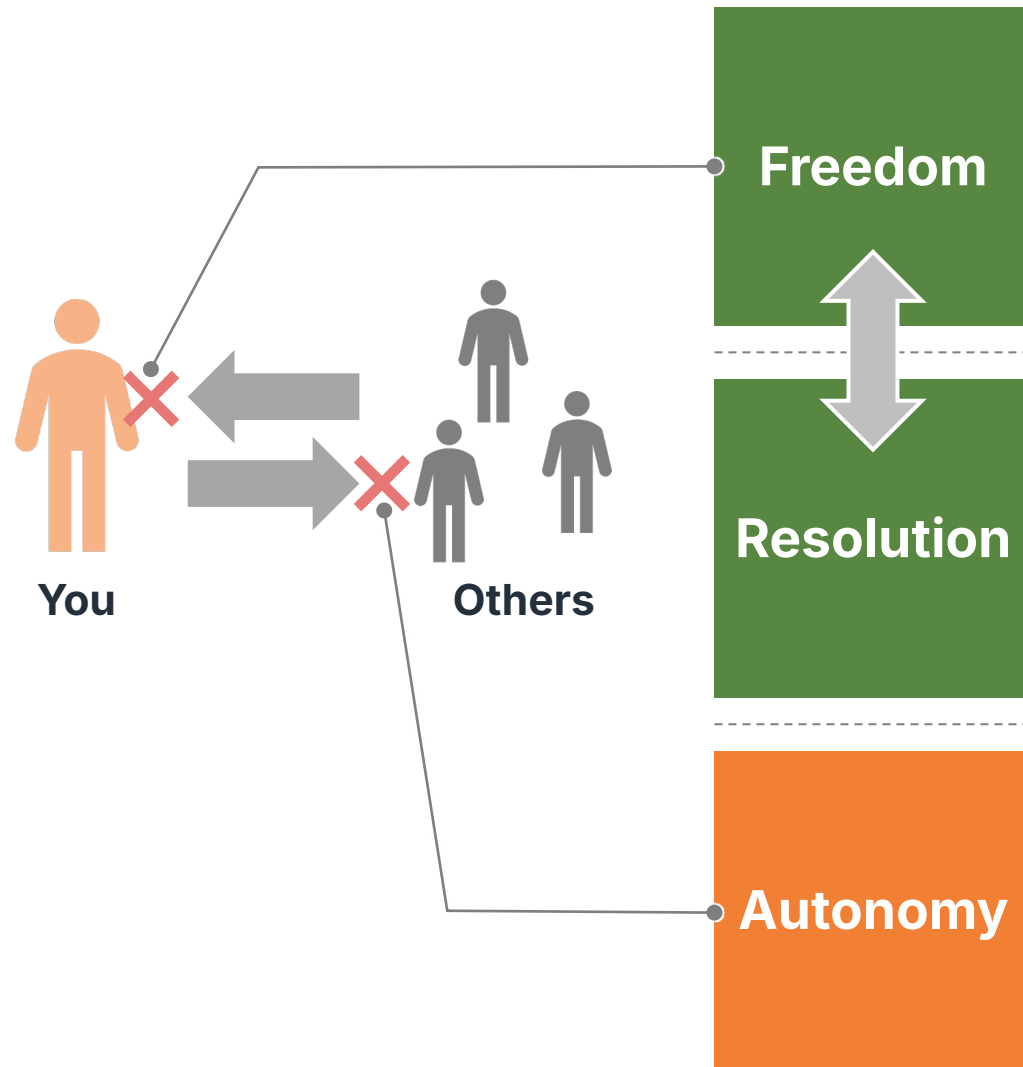
# World Population Over Time

Total Population (100 mil.)



- Starting from the time rational thinking was discovered, humanity has developed rapidly
  - Descartes (1596–1650)
  - Galileo (1564–1642)

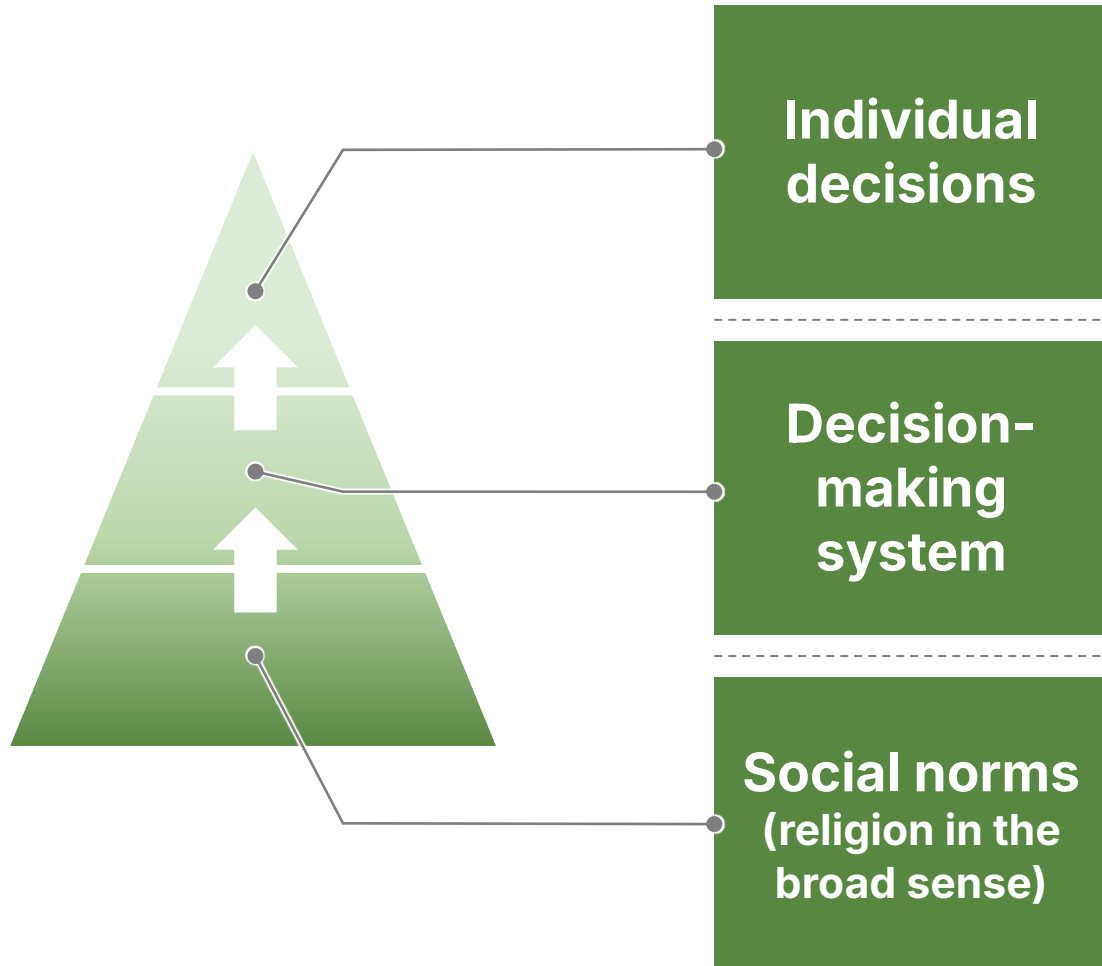
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# The Relationship Between Decision-Making and Social Norms

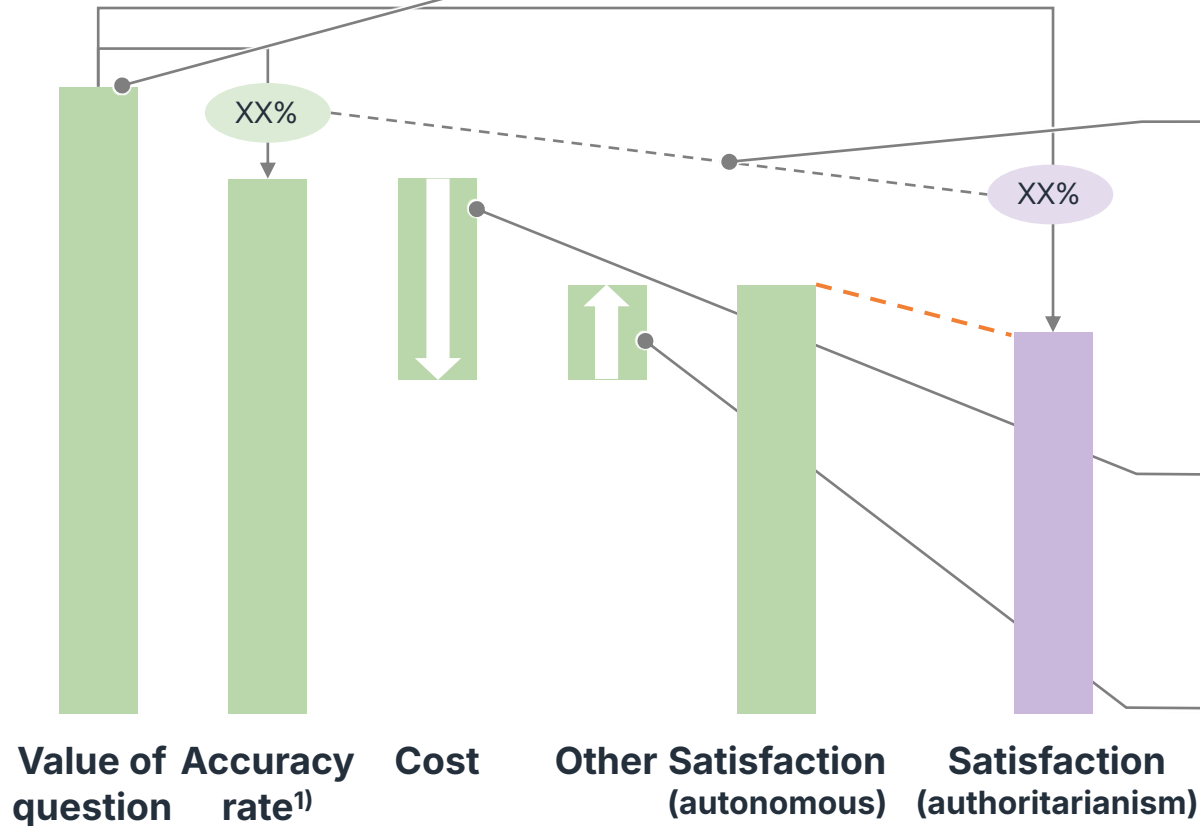
- Our decision-making is influenced by underlying social norms
  - Social norms shape the decision-making system, which in turn produces individual decisions



- Specific questions and their corresponding conclusions
  - Conclusions are derived by the decision-making system that has been adopted
- A patterned way of making decisions
  - Broadly divided into the Ape System and the Human System
  - Within the Human System, there are further individual tendencies
- Values shared by members of a society (group) that form the society's foundation
  - Without aligned values, society cannot be stable
  - Not limited to explicit religions (such as Christianity)

# Prerequisites and Conditions for Thinking Autonomously

## Satisfaction Model for Decision-Making (Conceptual)



- **The question is valuable**

- Thinking autonomously has a cost
- Unless the question is valuable, the additional cost is not worth it

- **You have confidence in your own reasoning ability**

- If you cannot believe you are above (or at least equal to) the authority, final satisfaction will be lower

- **You enjoy learning or are good at it**

- The subjective cost of acquiring knowledge is small

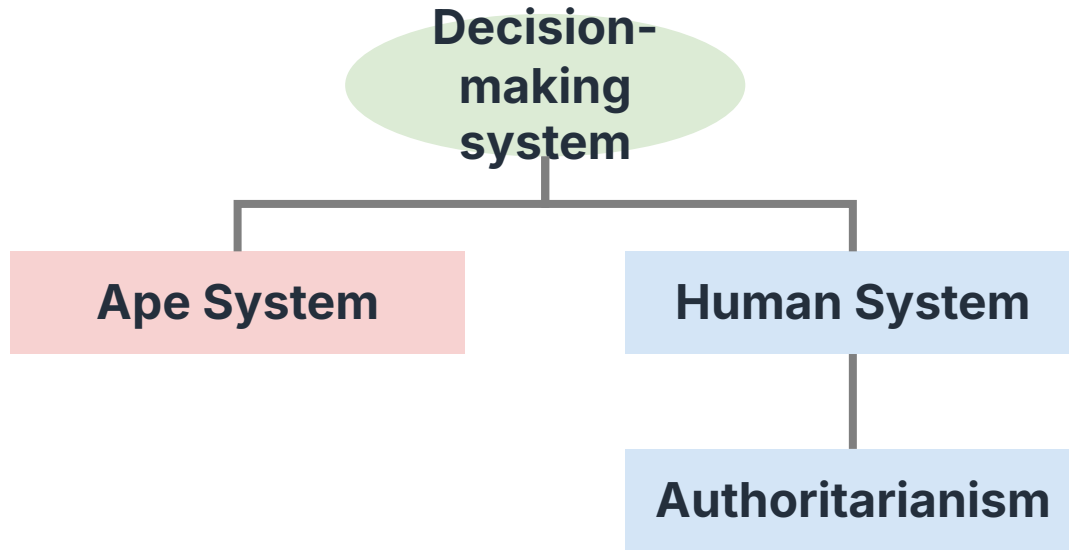
- **You value thinking autonomously**

- If you value deciding autonomously regardless of the outcome, satisfaction should rise

1. The likelihood that the conclusion is right. This is a figurative expression; since there is no correct answer in actual decision-making, no accuracy rate truly exists.

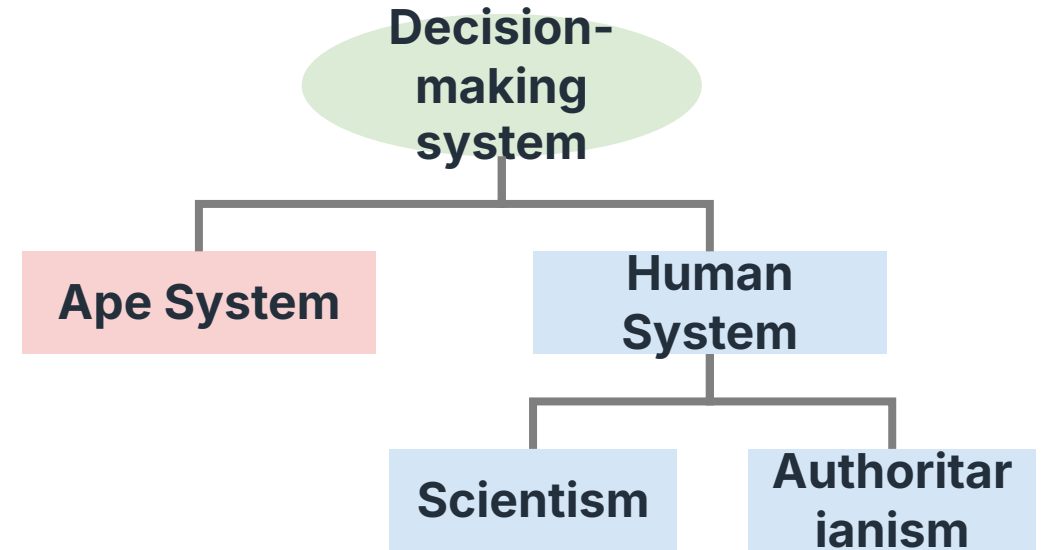
# The Desirable Structure of the Decision-Making System

## Poor system configuration



- Under this configuration, there is zero chance of thinking autonomously
  - You cannot choose a decision-making method that is not an option

## Desirable system configuration



- Switch between scientism and authoritarianism as needed
  - For some questions, being authoritarian is not a problem

# The Structure of Premises

