

Analological Reasoning in Ethics and Law

Understanding Structure, Strength, and Applications

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Introduction to Logic

Introduction: What is Analogical Reasoning?

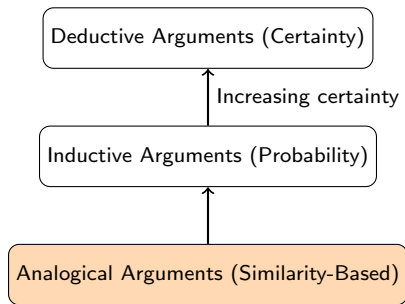
- **Analogical reasoning** is the process of drawing connections between two different situations based on relevant similarities.
- Analogies allow us to use knowledge about familiar cases to understand or make judgments about unfamiliar cases.
- Analogical reasoning is pervasive in human cognition and appears across disciplines including ethics, law, science, and everyday problem-solving.
- Unlike deductive reasoning, analogical reasoning does not guarantee certainty but provides plausible conclusions.

Key Insight

Analogical reasoning bridges the gap between what we know and what we seek to understand by identifying meaningful patterns across different domains.

Analogical Arguments as Inductive Reasoning

- **Inductive reasoning** involves drawing probable conclusions based on patterns and evidence rather than logical necessity.
- Analogical arguments are a specific type of inductive reasoning where conclusions are based on relevant similarities between cases.
- While deductive arguments aim for certainty, analogical arguments aim for plausibility and probability.
- The strength of an analogical argument depends on the quality and relevance of similarities, not just their quantity.



The Basic Structure: Source, Target, and Relevant Similarities

- Every analogical argument has a **source domain** (the familiar case about which we have knowledge) and a **target domain** (the unfamiliar case we're reasoning about).
- The argument identifies specific similarities between the source and target domains that are deemed relevant.
- Based on these similarities, we infer that what is true in the source domain is likely true in the target domain as well.
- The basic form is: "A is to B as C is to D" or "A is like B in relevant ways, B has property P, therefore A likely has property P."

Example

Source: A parent's responsibility to their child

Target: A government's responsibility to its citizens

Similarities: Power relationship, caretaking role, protection duties

Inference: Like parents, governments have an obligation to ensure basic welfare

From Known to Unknown: The Cognitive Leap in Analogies

- The **cognitive leap** in analogical reasoning involves transferring knowledge from a well-understood domain to an unfamiliar one.
- This process involves recognizing structural patterns rather than merely superficial similarities.
- Analogical reasoning allows us to navigate novel ethical and legal situations by connecting them to established precedents or principles.
- The cognitive leap is both the strength and potential weakness of analogical reasoning, as it may obscure important differences.

Benefits of the Cognitive Leap	Risks of the Cognitive Leap
Enables reasoning about new situations Builds on established knowledge Creates intuitive understanding Facilitates creative problem-solving	May overlook critical differences Can import irrelevant assumptions May simplify complex issues Can lead to false equivalences

The Formula: 'A is to B as C is to D'

- The classic formulation of an analogy follows the pattern '**A is to B as C is to D**', creating a proportional relationship.
- This structure highlights that it's not just objects that are similar, but the relationships between objects.
- In ethical and legal reasoning, we often use this structure to transfer moral or legal principles from established cases to new ones.
- Understanding this formula helps us identify when an argument is explicitly or implicitly using analogical reasoning.

Mathematical Expression

If we denote the relation between A and B as $R(A,B)$, the analogical claim is:

$$R(A, B) \approx R(C, D) \quad (1)$$

Where \approx indicates similarity rather than strict equality.

Everyday Analogies: How We Navigate New Situations

- **Everyday analogies** are common mental shortcuts we use to understand new situations based on past experiences.
- When faced with a new electronic device, we apply knowledge from similar devices we've used before.
- In social situations, we often navigate unfamiliar relationships by comparing them to familiar relationship patterns.
- Medical decisions frequently rely on analogies to previous health situations we've experienced or learned about.



Case Study - Medical Analogy: The Body as Machine

- The **mechanistic view of the body** became dominant in Western medicine following the Scientific Revolution.
- This analogy compares the human body to a complex machine with interconnected systems and parts.
- The heart is analogized to a pump, the lungs to bellows, the brain to a control center, and so on.
- This analogy profoundly shaped medical practice, focusing attention on physical causation and structural dysfunction.

Strengths and Limitations

Strengths of the mechanistic analogy:

- Facilitated anatomical understanding and surgical interventions
- Promoted systematic analysis of cause and effect in disease
- Enabled engineering approaches to medical problems (prosthetics, devices)

Limitations of the mechanistic analogy:

- Downplayed holistic and psychosomatic aspects of health
- Emphasized treating "broken parts" over systemic prevention
- Struggled to account for emergent properties of living systems

Strength Factor: Relevance of Similarities

- Not all similarities between cases are equally important; the **relevance** of similarities is crucial to argument strength.
- Relevant similarities are those that have a causal or logical connection to the property being projected from source to target.
- Irrelevant similarities may be numerous but contribute nothing to the strength of an analogical argument.
- Strong analogical arguments focus on structural and functional similarities rather than superficial or coincidental ones.

Example: Relevance in Medical Analogies

A patient with symptoms X, Y, and Z is compared to past patients:

- Patient A: Shares symptoms X, Y, Z and had disease D (relevant similarities)
- Patient B: Shares height, hair color, and birth month (irrelevant similarities)

The analogy to Patient A provides stronger support for diagnosis D despite having the same number of similarities as Patient B.

Strength Factor: Number of Similarities

- While relevance is primary, the **number of relevant similarities** does contribute to an analogy's strength.
- More points of relevant comparison generally create a stronger inferential bridge between source and target.
- The relationship between number of similarities and argument strength is not linear but shows diminishing returns.
- A few highly relevant similarities often outweigh many tangentially relevant ones.

Analogy Type	Few Similarities	Many Similarities	Determining Factor
Scientific	Potentially Strong	Very Strong	Causal relevance
Legal	Potentially Strong	Strong	Precedent relevance
Moral	Often Weak	Potentially Strong	Principle relevance
Everyday	Usually Weak	Moderately Strong	Practical relevance

Strength Factor: Disanalogies and Counterexamples

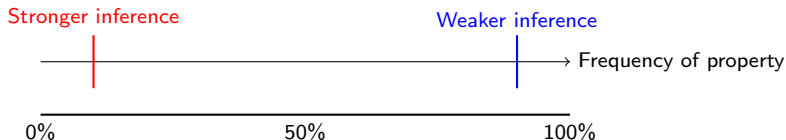
- **Disanalogies** are relevant differences between the source and target that weaken an analogical argument.
- The impact of a disanalogy depends on whether it affects the specific property being projected from source to target.
- A single critical disanalogy can undermine an otherwise strong analogical argument with many similarities.
- Identifying disanalogies is a key technique for challenging analogical arguments in ethical and legal contexts.

Warning: Strong Disanalogies

When evaluating an analogy, always ask: "Is there a difference between these cases that undermines the very property or principle being transferred from source to target?"

Strength Factor: The Base Rate Problem

- The **base rate problem** refers to how common the projected property is in the general category that includes both source and target.
- Analogical arguments are stronger when they project rare or unusual properties rather than common ones.
- If a property is common across many cases (high base rate), the specific similarities between source and target become less important.
- This factor is often overlooked in everyday analogical reasoning but is crucial in scientific and legal contexts.



As the property becomes more common in the general population, analogical arguments become weaker

Case Study - Computer Analogies for the Mind: The Brain as Hardware

- The **computational theory of mind** relies on an analogy between brains and computers.
- This analogy maps computer hardware to brain physiology and software to mental processes.
- The analogy has been enormously productive in cognitive science and artificial intelligence research.
- However, critics argue that biological brains differ fundamentally from digital computers in organization and processing.

Comparison Point	Computer	Brain
Processing units	Transistors and logic gates	Neurons and synapses
Organization	Serial processing with parallel elements	Massively parallel processing
Memory storage	Discrete, addressable locations	Distributed, content-addressable
Programming	Explicit algorithms	Learning from experience
Error handling	Brittle, vulnerable to small errors	Robust, degrades gracefully

Evaluating an Analogical Argument: A Step-by-Step Process

- Step 1: Clearly identify the source domain, target domain, and the property being projected.
- Step 2: List all relevant similarities between the source and target, focusing on those related to the projected property.
- Step 3: Identify potential disanalogies, especially those that might undermine the projection of the property.
- Step 4: Consider the base rate of the property in the general category that includes both source and target.

Evaluating Process Example

Argument: "Artificial intelligence should have legal rights because humans have legal rights, and both can reason and make decisions."

- ① **Source:** Humans; **Target:** AI; **Property:** Deserving legal rights
- ② **Similarities:** Decision-making capacity, reasoning ability
- ③ **Disanalogies:** Consciousness, biological needs, vulnerability, autonomy origin
- ④ **Base rate:** Legal rights are rare among entities in general

Common Fallacies in Analogical Reasoning

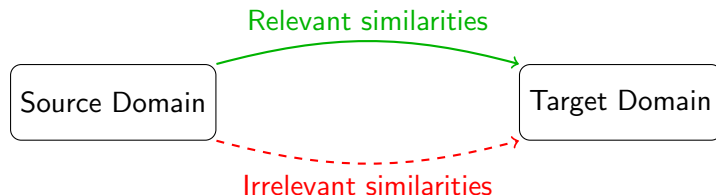
- The **False Analogy Fallacy** occurs when an argument relies on similarities that are irrelevant to the conclusion being drawn.
- The **Hasty Generalization** combines weak analogical reasoning with insufficient evidence.
- **Appeal to Tradition** often uses analogies to past practices without considering relevant differences in context.
- **Confirmation Bias** leads us to notice similarities that support our preferred conclusion while ignoring disanalogies.

Example Fallacies

- **False Analogy:** "Running a government is just like running a business, so a business leader will be a good president."
 - Ignores crucial differences in goals (profit vs. public good) and stakeholder relationships
- **Hasty Generalization:** "My friend's diet worked for them, so it will work for everyone."
 - Overlooks individual biological differences and contexts

The False Analogy: When Comparisons Mislead

- A **false analogy** occurs when the similarities between source and target are superficial or irrelevant to the property being transferred.
- False analogies are particularly common in political and moral debates where emotional resonance can mask logical weakness.
- The persuasive power of false analogies often stems from their intuitive appeal rather than their logical merit.
- Recognizing false analogies requires focusing on whether the similarities genuinely support the conclusion being drawn.



False analogies rely on the dashed red path,
while strong analogies follow the solid green path

Competing Analogies in Bioethics: The Abortion Debate

- The abortion debate features competing analogies that fundamentally shape moral reasoning on both sides.
- Each side employs analogies that highlight different aspects of pregnancy and fetal development.
- These analogies influence intuitions about the moral status of the fetus and the permissibility of abortion.
- Analyzing these analogies reveals how analogical reasoning can frame complex ethical questions.

The Role of Analogies in Moral Status Questions

Analogies are especially powerful in bioethics because they help us apply familiar moral categories to entities with unclear moral status. The strength of these analogies significantly impacts the persuasiveness of each position.

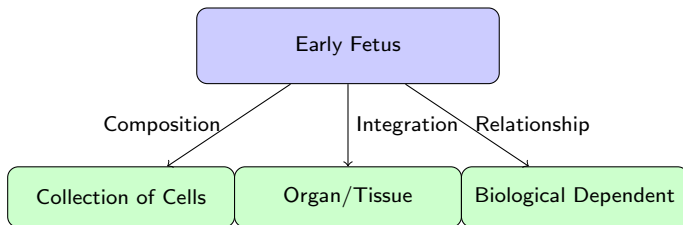
Pro-Life Analogies: Fetus as Developing Person

- Pro-life arguments often employ the **Child Development Analogy**, comparing a fetus to a newborn, infant, or young child.
- This analogy emphasizes the continuity of human development along a single biological trajectory.
- The analogy suggests that differences between a fetus and child (size, location, development stage) are morally irrelevant.
- Like the "acorn is to oak tree" comparison, this analogy focuses on natural potential and inherent nature.

Analogy Used	Key Similarity	Moral Implication
Fetus as sleeping person	Temporarily inactive but will naturally "awaken"	Killing is wrong despite temporary unconsciousness
Fetus as young child	Same entity at different stages	Developmental stage doesn't affect moral worth
Fetus as human with disability	Limited current capacities	Capacities don't determine human rights

Pro-Choice Analogies: Fetus as Biological Entity

- Pro-choice arguments often use the **Organ or Tissue Analogy**, comparing a fetus (especially early-stage) to biological material.
- This analogy emphasizes the biological integration with and dependence on the pregnant person's body.
- The analogy suggests that, like other body tissues, the fetus lacks independent moral status separate from the person carrying it.
- These analogies focus on current capabilities rather than future potential.



Pro-choice analogies focus on biological characteristics and dependency

Case Study: Singer's Drowning Child Analogy

- Peter Singer's **Drowning Child Analogy** argues that our moral duties to distant strangers are similar to our duties to those nearby.
- The source domain involves a child drowning in a shallow pond whom you could save at minor cost (ruined clothes).
- Singer argues that distance is not morally relevant, so our duty to save lives through charitable donations is analogous to saving the drowning child.
- This analogy challenges the common intuition that we have stronger obligations to those physically near us than to distant strangers.

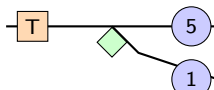
Singer's Argument Structure

- 1 If you can prevent something bad without sacrificing anything of comparable moral importance, you ought to do it.
- 2 Death from poverty-related causes is bad.
- 3 By donating to effective charities, you can prevent such deaths without sacrificing anything of comparable moral importance.
- 4 Therefore, you ought to donate to effective charities.

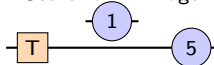
The Trolley Problem: A Study in Moral Analogies

- The **Trolley Problem** involves comparing two scenarios to explore moral intuitions about causing harm versus allowing harm.
- In the first scenario, diverting a trolley from five people to one seems morally permissible to many.
- In the second scenario, pushing a large person off a bridge to stop the trolley seems impermissible to most, despite the same numerical outcome.
- The comparison reveals that factors beyond simple utilitarian calculus influence our moral judgments.

Scenario 1: Switch



Scenario 2: Bridge



Analogies in Ethics: From Intuition to Principle

- Ethical analogies often help bridge the gap between moral intuitions about specific cases and general moral principles.
- The process of **reflective equilibrium** involves adjusting both our intuitions about cases and our moral principles until they align.
- Strong analogies in ethics reveal morally relevant features that might be obscured in complex real-world situations.
- Competing analogies in ethical debates often reflect different underlying moral frameworks (e.g., consequentialist vs. deontological).

Case-Based Reasoning in Law: The Concept of Precedent

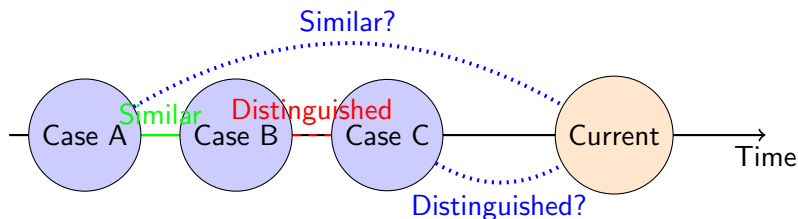
- **Precedent** is the legal principle that similar cases should be decided similarly, making legal reasoning inherently analogical.
- The doctrine of **stare decisis** ("to stand by decisions") requires judges to respect prior rulings in analogous cases.
- Legal analogical reasoning involves identifying relevant similarities between a current case and precedent cases.
- Unlike scientific analogies, legal analogies operate within an institutionalized system that formally requires consistency.

The Structure of Legal Reasoning By Analogy

- 1 Case A was decided in a certain way.
- 2 Case B resembles Case A in relevant respects.
- 3 Therefore, Case B should be decided the same way as Case A.
- 4 *Or:* Case B differs from Case A in relevant respects.
- 5 Therefore, Case B should be distinguished from Case A and decided differently.

The Role of Disanalogies in Legal Arguments

- **Distinguishing** cases is the legal practice of identifying relevant differences that justify different legal treatment.
- Effective legal advocacy often involves emphasizing similarities when precedent favors your position and disanalogies when it doesn't.
- Courts must determine whether disanalogies are legally significant enough to justify departing from precedent.
- The ability to identify meaningful disanalogies allows the law to evolve while maintaining consistency.



Historical Example: Brown v. Board and 'Separate but Equal'

- In **Brown v. Board of Education** (1954), the Supreme Court had to address the precedent of **Plessy v. Ferguson** (1896).
- Plessy had established the "separate but equal" doctrine, allowing racial segregation if facilities were equal.
- The Court in Brown identified a crucial disanalogy: education has unique social importance not present in railway cars (the context of Plessy).

Analogical Reasoning in Brown v. Board

The Court effectively argued:

- 1 Plessy allowed segregation in the context of public transportation.
- 2 Education differs fundamentally from transportation because of its importance to citizenship and social development.
- 3 This difference is legally relevant to the question of equality under the Fourteenth Amendment.
- 4 Therefore, the ruling in Plessy should not control the outcome in Brown.

Legal Case: Gideon v. Wainwright and the Right to Counsel

- In **Gideon v. Wainwright** (1963), the Supreme Court used analogical reasoning to extend the right to counsel.
- The Court drew an analogy between capital cases (where counsel was guaranteed) and non-capital felony cases.
- The Court reasoned that the complexity of legal proceedings and the stakes of potential imprisonment made these cases fundamentally similar.
- This analogy established that the Sixth Amendment right to counsel applies to all felony defendants regardless of financial means.

The Analogical Argument

Source Domain: Capital cases requiring legal counsel

Target Domain: Non-capital felony cases

Key Similarity: The layperson's inability to navigate complex legal proceedings

Disanalogy Rejected: The difference in potential punishment severity was deemed insufficient to justify different treatment

Result: The right to appointed counsel was extended to all felony prosecutions

Legal Case: Carpenter v. United States on Digital Privacy

- **Carpenter v. United States** (2018) addressed whether obtaining cell phone location data requires a warrant.
- The Court had to consider competing analogies: was this data more like phone records (no warrant required) or GPS tracking (warrant required)?
- The majority found that cell phone location data was more analogous to GPS tracking due to its comprehensive and revealing nature.
- This case illustrates how courts use analogical reasoning to apply constitutional principles to new technologies.

Factor	Phone Records Analogy	GPS Tracking Analogy
Information revealed	Limited, discrete data	Comprehensive movement data
Nature of disclosure	Business records voluntarily shared	Unavoidable in modern life
Expectation of privacy	Lower (third-party doctrine)	Higher (revealing personal habits)
Historical treatment	No warrant required	Warrant required
Court's Decision:	More like GPS tracking; warrant required	

The Problem of 'Slippery Slope' Analogies

- A **slippery slope argument** is a form of analogical reasoning that connects a current case to hypothetical future cases.
- The core claim is that allowing A will inevitably lead to B, C, and eventually to some clearly unacceptable outcome Z.
- The strength of slippery slope analogies depends on whether there is a genuine causal or logical connection between the steps.
- These arguments often rely on analogical claims about the similarity between current and future decision-making contexts.

Evaluating Slippery Slope Analogies

To assess a slippery slope argument, ask:

- 1 Is there an actual mechanism connecting each step to the next?
- 2 Are there meaningful disanalogies between the initial case and the feared outcome?
- 3 Do social or institutional safeguards exist to prevent sliding down the slope?
- 4 Does empirical evidence from similar situations support the claimed progression?

Godwin's Law: When Nazi Analogies Derail Reasoning

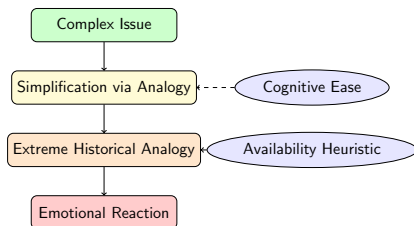
- **Godwin's Law** states: "As an online discussion grows longer, the probability of a comparison involving Nazis or Hitler approaches 1."
- The phenomenon highlights a common pattern in analogical reasoning: the tendency to invoke extreme historical analogies.
- Nazi comparisons represent a form of analogical argument that equates current policies or people with historical atrocities.
- These analogies are typically problematic because they obscure important disanalogies and short-circuit rational debate.

Anatomy of a Godwin's Law Violation

- **Step 1:** Identify a superficial similarity between a current policy/person and Nazi Germany/Hitler.
- **Step 2:** Suggest that this similarity is sufficient to establish moral equivalence.
- **Step 3:** Conclude that, since Nazism was evil, the current case must also be evil.
- **Step 4:** Ignore crucial disanalogies in historical context, scale, intent, and outcomes.

The Psychology Behind Godwin's Law in Arguments

- Extreme analogies like Nazi comparisons are psychologically appealing because they tap into well-established moral judgments.
- Such analogies exploit the **availability heuristic** by using easily recalled, emotionally charged historical examples.
- These comparisons often serve to short-circuit careful evaluation by triggering immediate emotional responses.
- Understanding this psychological appeal helps explain why poor analogies persist despite their logical weaknesses.



Competing Analogies: How to Weigh Them Against Each Other

- In many debates, multiple competing analogies are proposed for the same situation or concept.
- Evaluating competing analogies requires identifying which one captures the morally or legally relevant features of the case.
- The strength of an analogy depends not just on the number of similarities but on whether it highlights the features essential to the normative question.

Framework for Evaluating Competing Analogies

- 1 Identify the question or issue the analogies are meant to address.
- 2 For each analogy, list the relevant similarities and differences with the target case.
- 3 Determine which similarities and differences are most relevant to the underlying question.
- 4 Consider whether any proposed analogy might obscure important unique features of the target case.
- 5 Evaluate whether empirical evidence supports the assumptions built into each analogy.

Cultural Differences in Analogical Reasoning

- Research suggests that the patterns and prevalence of analogical reasoning vary across cultures.
- Some East Asian philosophical traditions emphasize relational analogies and correlative thinking more prominently than Western traditions.
- Cultural background influences which analogies seem intuitive or persuasive to different audiences.
- Awareness of cultural differences in analogical reasoning is important for cross-cultural ethics and legal discussions.

Examples of Cultural Variations

- **Confucian Ethics:** Emphasizes family-based analogies, extending familial relationships to social and political contexts.
- **Buddhist Reasoning:** Often uses analogies of illusion and impermanence drawn from natural phenomena.
- **Western Traditions:** Often emphasizes rule-based analogies and categorical similarities.
- **Indigenous Knowledge Systems:** Frequently employ ecological analogies that highlight interconnections between human and natural worlds.

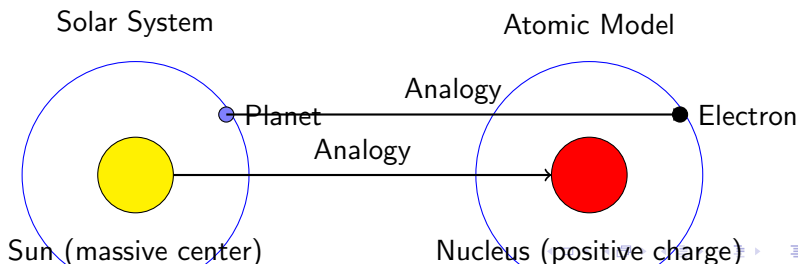
Analogies in Political Discourse: Persuasion or Manipulation?

- Political discourse relies heavily on analogies to frame issues, simplify complex policies, and evoke emotional responses.
- Effective political analogies connect abstract policies to concrete experiences that resonate with voters.
- The line between persuasive analogical reasoning and manipulative oversimplification is often blurred in political rhetoric.
- Critical evaluation of political analogies requires identifying both their legitimate insights and their misleading simplifications.

Political Domain	Common Analogies	Rhetorical Function
Economic Policy	Government budget as household budget	Simplify macro concepts
Foreign Policy	International relations as schoolyard dynamics	Humanize complex relationships
Social Policy	Society as family/team/machine	Frame value priorities
Environmental Policy	Earth as patient/home/resource	Frame relationship to nature

Scientific Analogy: Rutherford's Solar System Model of the Atom

- Ernest Rutherford's **Solar System Model** (1911) compared atomic structure to our solar system.
- In this analogy, the nucleus corresponds to the sun, and electrons to planets orbiting around it.
- The analogy was based on structural similarities: central mass with smaller bodies in orbit, held by attractive forces.
- This model represented a significant advance over previous "plum pudding" models of atomic structure.



Scientific Analogy: Limitations of Rutherford's Model

- Rutherford's solar system analogy eventually revealed important disanalogies that led to quantum models.
- Classical physics predicts that orbiting electrons would spiral into the nucleus, unlike stable planetary orbits.
- The analogy failed to account for quantum behaviors that have no classical counterparts.
- This case illustrates how scientific analogies often serve as stepping stones rather than final explanations.

The Evolution of Scientific Analogies

Scientific analogies typically follow a pattern:

- 1 Initial analogy highlights structural similarities between known and unknown domains
- 2 Experimental evidence reveals disanalogies and limitations of the original model
- 3 More sophisticated analogies or entirely new models replace the original
- 4 The process advances scientific understanding incrementally

The Limits of Analogical Reasoning in Complex Systems

- Analogical reasoning faces significant challenges when applied to highly complex systems with emergent properties.
- In domains like climate science, economics, or artificial intelligence, simple analogies often fail to capture crucial system dynamics.
- The **complexity limitation** reflects how analogies necessarily simplify by focusing on specific features while ignoring others.
- Awareness of these limits helps prevent overconfidence in conclusions drawn from analogical reasoning about complex systems.

Warning Signs of Analogy Breakdown

The usefulness of an analogy may be compromised when:

- The system exhibits emergent properties not present in any of its components
- Non-linear relationships dominate the system behavior
- Multiple feedback loops create unpredictable dynamics
- Scale differences between source and target fundamentally change relevant properties
- The system adapts or evolves in response to interventions

Conclusion: Analogical Reasoning as a Bridge Between Experience and New Territory

- Analogical reasoning serves as a cognitive bridge from familiar experiences to novel situations and abstract concepts.
- Strong analogical arguments focus on relevant similarities, account for significant disanalogies, and consider base rates.
- In ethics and law, competing analogies often illuminate different aspects of complex issues and embody different normative commitments.
- Developing skill in creating and evaluating analogies enhances critical thinking across disciplines and contexts.

