Analogical Argument and *Tui Lei*

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March 23 2019

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Introduction

Introduction

Historically, the view that the ancient Chinese thinking is characterized by a predominance of analogical arguments could be traced back much earlier in 1950s to a modern Chinese philosopher, Zhang Dongsun. In one of his comparative studies on the relationship between logic and culture, Zhang has concluded by saying that:

> “西方传统逻辑的中心是三段论法，... 中国人虽不用三段论式，却并不是没有另外的方式。中国人所用的方式大概在西方可名之曰‘比附式’(*analogical reasoning*)。” *[22]*

Introduction

As a result, Zhang's claim has inspired many scholars to approach Chinese Logic by exploring the studies of analogy in classic Chinese discourses and texts.

Among them, Qingtian Cui has made a significant contribution in 1990s to fully develop this view. In general, Cui has tried to demonstrate that "推类是中国逻辑的主导推理类型" [21].

Introduction

And for J. Cikoski, it is an established fact :

> *It is [. . .] generally known that Chinese philosophy typically relies on analogical reasoning rather than propositional logic to validate its assertions. [5]*

Alexei Volkov claims that:

> *In ancient Chinese texts one finds many cases of "analogical reasoning" i.e. argumentation by comparison of the situation under discussion with another one which is similar to the former in some respect(s). One also finds cases of "demonstration by example" when some "general" situation is explained with one or several examples. [18]*

Analogical Argument

What Is Analogical Argument

The Latin term *analogia* is a loan word of the Greek noun ανάλογία (analogia), which originally referred to the mathematical concept of proportion—e.g., when it is said that 8 is to 2 as 4 is to 1.

However, philosophers soon extended the term *proportion* to mean any relation and the term *proportionality* to mean a similarity between relations of any kind; and it was this extended conception of analogy that became influential in the history of philosophical and theological reasoning [3].

Analogy is the common ground of our everyday inferences from past experience to what the future will hold. Here are two examples [6]:

What Is Analogical Argument

The many roles of analogy:

- *Heuristic role*:
- *Justificatory role*:

What Is Analogical Argument

Example 1 Some people look on preemployment testing of teachers as unfair—a kind of double jeopardy. “Teachers are already college graduates,” they say. “Why should they be tested?” That’s easy. Lawyers are college graduates and graduates of professional school, too, but they have to take a bar exam. And a number of other professions ask prospective members to prove that they know their stuff by taking and passing examinations: accountants, actuaries, doctors, architects. There is no reason why teachers shouldn’t be required to do this too.

What Is Analogical Argument

Example 2 We may observe a very great similitude between this earth which we inhabit, and the other planets, Saturn, Jupiter, Mars, Venus, and Mercury. They all revolve around the sun, as the earth does, although at different distances and in different periods. They borrow all their light from the sun, as the earth does. Several of them are known to revolve around their axis like the earth, and by that means, must have a like succession of day and night. Some of them have moons, that serve to give them light in the absence of the sun, as our moon does to us. They are all, in their motions, subject to the same law of gravitation, as the earth is. From all this similitude, it is not unreasonable to think that those planets may, like our earth, be the habitation of various orders of living creatures.

What Is Analogical Argument

Example 3 In a much-cited case, the United Kingdom House of Lords found the manufacturer of a bottle of ginger beer liable for damages to a consumer who became ill as a result of a dead snail in the bottle. The court argued that the manufacturer had a duty to take “reasonable care” in creating a product that could foreseeably result in harm to the consumer in the absence of such care, and where the consumer had no possibility of intermediate examination. The principle articulated in this famous case was extended, by analogy, to allow recovery for harm against an engineering firm whose negligent repair work caused the collapse of a lift. By contrast, the principle was not applicable to a case where a workman was injured by a defective crane, since the workman had opportunity to examine the crane and was even aware of the defects.

What Is Analogical Argument

- An analogy is a comparison between two objects, or systems of objects, that highlights respects in which they are thought to be similar.
- Analogical reasoning is any type of thinking that relies upon an analogy.
- An analogical argument is an explicit representation of a form of analogical reasoning that cites accepted similarities between two systems to support the conclusion that some further similarity exists. [2]

What Is Analogical Argument

As a very important way of reasoning, analogical reasoning has long been studied by scholars in logic, psychology, cognitive science, philosophy of science and technology, law and other fields.

What Is Analogical Argument

There is, however, disagreement among authors about the logical evaluation of analogical arguments.

The prevailing view is that analogical arguments are invalid [16, 17, 19]. Some proponents of this view take a conciliatory approach and hold that even though analogical reasoning is not deductively valid, it can be inductively strong [6]. Others, however, regard it as a logically flawed and defective type of reasoning.

There are only some writers who disagree with this majority opinion. They hold that analogical reasoning can be valid, like [12].

A General Schema for Analogical Argument

An analogical argument has the following basic form:

1. *S* is similar to *T* in certain (known) respects.
2. *S* has some further feature *Q*.
3. Therefore, *T* also has the feature *Q*, or some feature *Q** similar to *Q*.

S and *T* are referred to as the *source domain* and *target domain*, respectively. A *domain* is a set of objects, properties, relations and functions, together with a set of accepted statements about those objects, properties, relations and functions. More formally, a domain consists of a set of objects and an interpreted set of statements about them.

A General Schema for Analogical Argument

Formally, an analogy between S and T is a one-to-one mapping between objects, properties, relations and functions in S and those in T. Not all of the items in S and T need to be placed in correspondence. Commonly, the analogy only identifies correspondences between a select set of items. In practice, we specify an analogy simply by indicating the most significant similarities (and sometimes differences).

Tabular Representation

We can improve on this preliminary characterization of the argument from analogy by introducing the tabular representation found in [11].

Hesse offers a sharpened version of Aristotle's theory, specifically focused on analogical arguments in the sciences. We place corresponding objects, properties, relations and propositions side-by-side in a table of two columns, one for each domain. For instance, Example 2 can be represented as follows (using $\Rightarrow$ for the analogical inference):

Tabular Representation

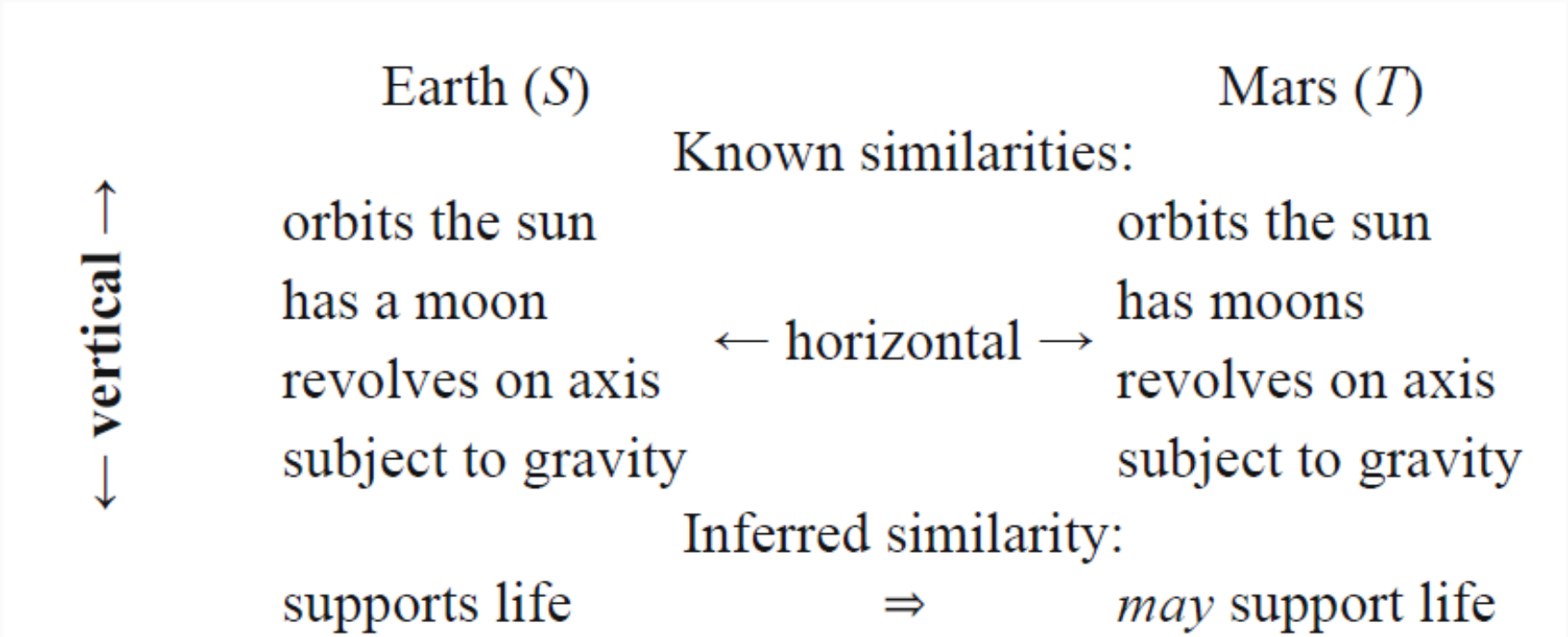

Figure 1:

Tabular Representation

Hesse introduced useful terminology based on this tabular representation.

The *horizontal relations* in an analogy are the relations of similarity (and difference) in the mapping between domains, while the *vertical relations* are those between the objects, relations and properties within each domain.

The correspondence (similarity) between earth's having a moon and Mars' having moons is a horizontal relation; the causal relation between having a moon and supporting life is a vertical relation within the source domain (with the possibility of a distinct such relation existing in the target as well).

Augmented Tabular Representation

In an earlier discussion of analogy, [13] introduced some terminology that is also helpful.

- **Positive analogy.** Let P stand for a list of accepted propositions $P_1, \ldots, P_n$ about the source domain S. Suppose that the corresponding propositions $P_1^*, \ldots, P_n^*$, abbreviated as P^*, are all accepted as holding for the target domain T, so that P and P^* represent accepted (or known) similarities. Then we refer to P as the positive analogy.

Augmented Tabular Representation

- **Negative analogy.** Let A stand for a list of propositions $A_1, \ldots, A_r$ accepted as holding in S, and B^* for a list $B_1^*, \ldots, B_s^*$ of propositions holding in T. Suppose that the analogous propositions $A^* = A_1^*, \ldots, A_r^*$ fail to hold in T, and similarly the propositions $B = B_1, \ldots, B_s$ fail to hold in S, so that $A, \sim A^*$ and $\sim B, B^*$ represent accepted (or known) differences. Then we refer to A and B as the negative analogy.
- **Neutral analogy.** The neutral analogy consists of accepted propositions about S for which it is not known whether an analogue holds in T.

Augmented Tabular Representation

Finally we have:

- **Hypothetical analogy.** The hypothetical analogy is simply the proposition Q in the neutral analogy that is the focus of our attention.

An analogical argument may thus be summarized: It is plausible that Q^* holds in the target, *because* of certain known (or accepted) similarities with the source domain, *despite* certain known (or accepted) differences.

Augmented Tabular Representation

Augmented tabular representation

SOURCE (S)	TARGET (T)	
P	P^*	[positive analogy]
A	$\sim A^*$	[negative analogy]
$\sim B$	B^*	
Q		
	Q^*	(plausibly)

Figure 2:

Commonsense Guidelines

Logicians and philosophers of science have identified a number of “textbook” guidelines for evaluating analogical arguments. Variants of these principles have been around for a long time. Here are some of the most important ones (using “CS” to suggest common sense):

- (CS1) The more similarities (between the two domains), the stronger the analogy.
- (CS2) The more differences, the weaker the analogy.
- (CS3) The greater the extent of our ignorance about the two domains, the weaker the analogy.
- (CS4) The weaker the conclusion, the more plausible the analogy.
- (CS5) Analogies involving causal relations are more plausible than those not involving causal relations.

Commonsense Guidelines

- (CS6) Structural analogies are stronger than those based on superficial similarities.
- (CS7) The relevance of the similarities and differences to the conclusion (i.e., to the hypothetical analogy) must be taken into account.
- (CS8) Multiple analogies supporting the same conclusion make the argument stronger.

Commonsense Guidelines

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- (CS7) The relevance of the similarities and differences to the conclusion (i.e., to the hypothetical analogy) must be taken into account.
- (CS8) Multiple analogies supporting the same conclusion make the argument stronger.

There are some problems:

- They are frequently too vague to give us much insight.
- Sometimes the principles pull in different directions.

Tabular Representation

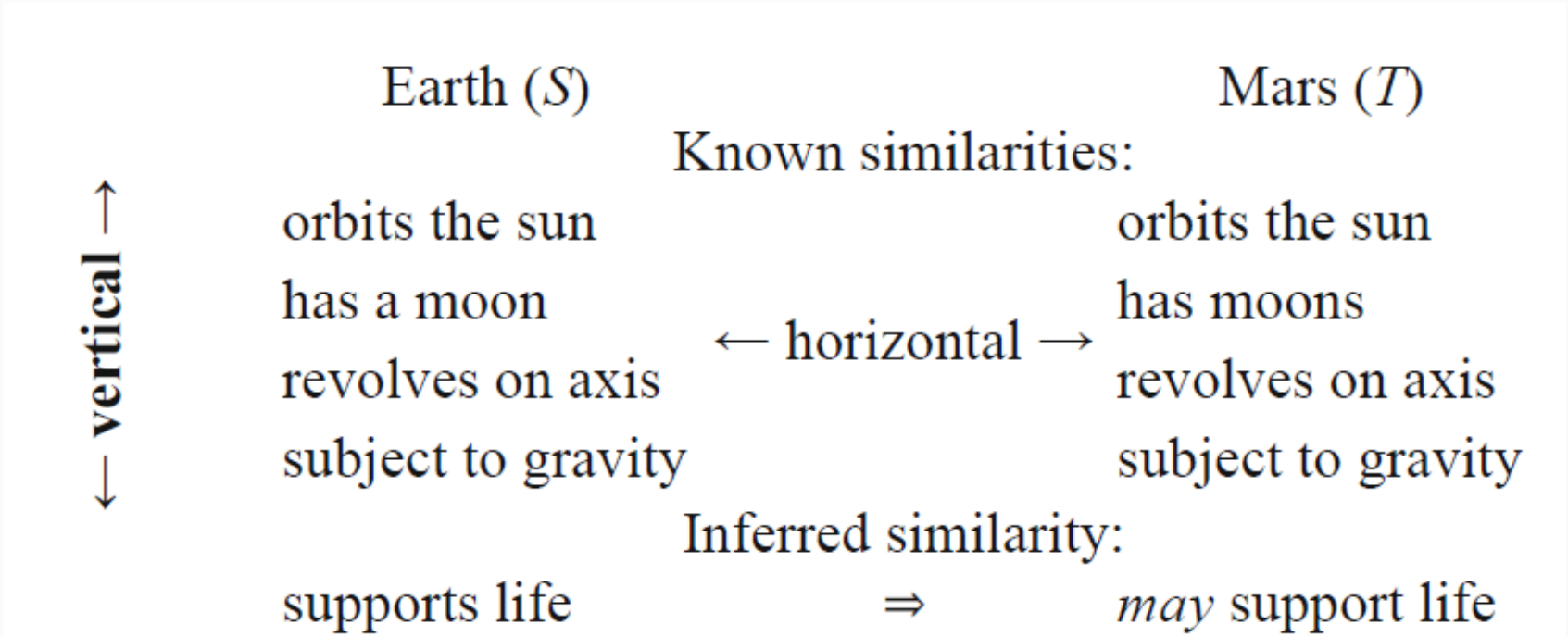

Figure 3:

Commonsense Guidelines

Philosophers disagree about the cogency of this argument. Stebbing (1933) finds Reid's argument "suggestive" and "not unplausible" because the conclusion is weak (CS4), while Mill (1843/1930) appears to reject the argument on account of our vast ignorance of properties that might be relevant (CS3). This debate is far from over. Scientists still use analogical reasoning to support the conjecture that, even if Mars is now dead, it might once have supported life (McKay 1993). The Rover expeditions of 2003–04 bolstered this argument with the finding that ancient Mars possessed liquid water in abundance.

Aristotle's Theories of Analogy

Although Aristotle employs the term analogy (*analogia*), he never talks about analogical reasoning or analogical arguments *per se*.

He does, however, identify two argument forms, the *argument from example (paradeigma)* and the *argument from likeness (homoiotes)*, both closely related to what would we now recognize as an analogical argument [1].

Argument From Example (Paradeigma)

The *argument from example (paradeigma)* is described in the *Rhetoric* and the *Prior Analytics* :

> *Enthymemes based upon example are those which proceed from one or more similar cases, arrive at a general proposition, and then argue deductively to a particular inference. (Rhetoric 1402b15)*

Argument From Example (Paradeigma)

Example 4

Let A be evil, B making war against neighbours, C Athenians against Thebans, D Thebans against Phocians. If then we wish to prove that to fight with the Thebans is an evil, we must assume that to fight against neighbours is an evil. Conviction of this is obtained from similar cases, e.g., that the war against the Phocians was an evil to the Thebans. Since then to fight against neighbours is an evil, and to fight against the Thebans is to fight against neighbours, it is clear that to fight against the Thebans is an evil. (Pr. An. 69a1)

Argument From Example (Paradeigma)

It has the following structure (using $\supset$ for the conditional):

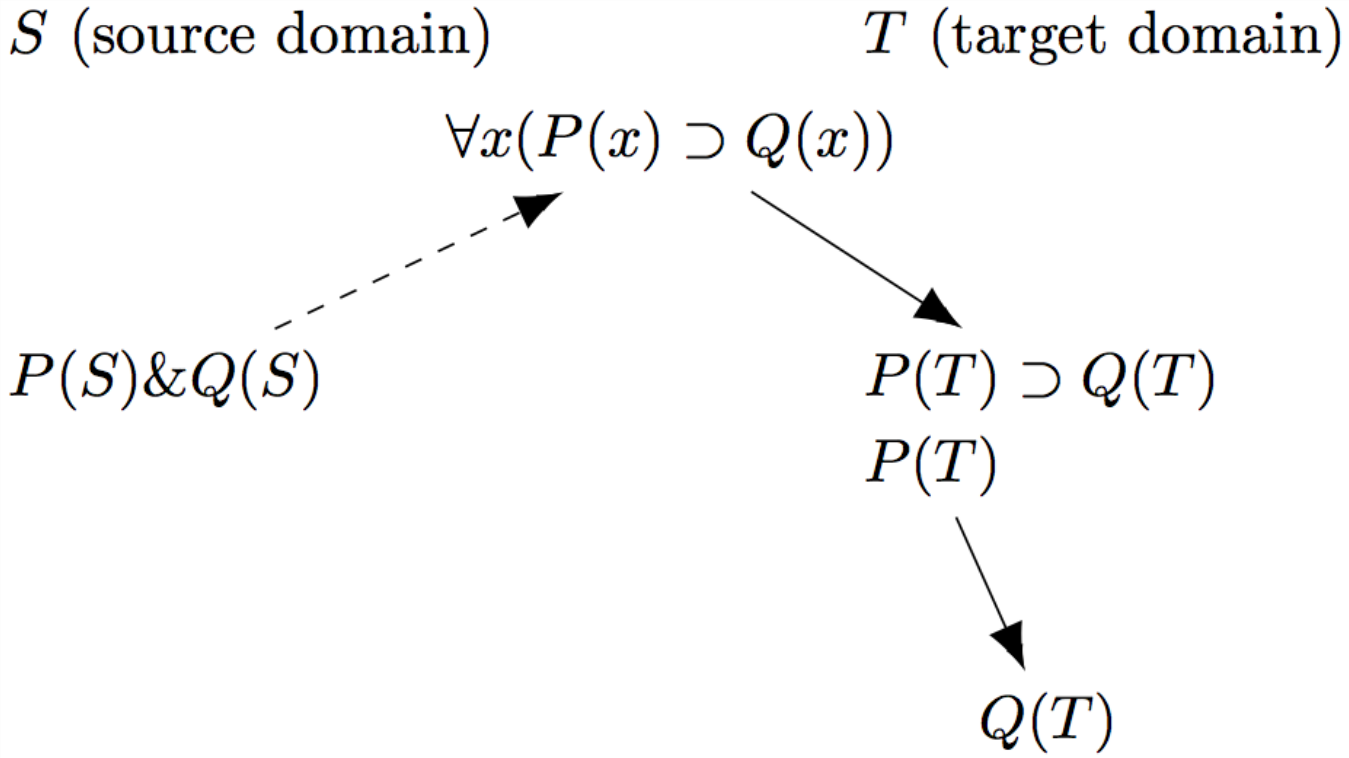

Figure 4: Argument from example.

Argument From Example (Paradeigma)

Aristotle notes two differences between this argument form and induction (69a15ff.):

- it "does not draw its proof from all the particular cases" (i.e., it is not a "complete" induction)
- it requires an additional (deductively valid) syllogism as the final step.

The *argument from example* thus amounts to single-case induction followed by deductive inference.

Argument From Likeness (Homoiotes)

The *argument from likeness (homoiotes)* seems to be closer than the paradeigma to our contemporary understanding of analogical arguments.

This argument form receives considerable attention in Topics I, 17 and 18 and again in VIII, 1. The most important passage is the following:

Argument From Likeness (Homoiotes)

Try to secure admissions by means of likeness; for such admissions are plausible, and the universal involved is less patent; e.g. that as knowledge and ignorance of contraries is the same, so too perception of contraries is the same; or vice versa, that since the perception is the same, so is the knowledge also. This argument resembles induction, but is not the same thing; for in induction it is the universal whose admission is secured from the particulars, whereas in arguments from likeness, what is secured is not the universal under which all the like cases fall. (Topics 156b10–17)

Argument From Likeness (Homoiotes)

- 再者，要努力通过相像性得到认同；因为这样的认同是具有可能性的，而其中的普遍性就不那么显而易见了，例如，正如“关于反对项的知识与无知”是一样的，“关于反对项的感知”也是一样的；或反之，既然其感知是一样的，其知识也是一样的。这种论证类似于归纳，但不是一种东西；因为在归纳时，所要从特殊获得认同的是普遍，而在基于相像性的论证中，所要寻找的并非所有相像情形都归于其下的那种普遍性。
- 再有，通过相同性的类比来提问。因为这是一种巧辩方法，而且，普遍的命题更不会引起注意。例如，既然知识和相反者的无知相同，相反者的感受也就相同；或者倒过来，既然相反者的感觉相同，相反者的知识也就相同。这个方法相似于归纳，但并不相同。因为归纳是从特殊的东西确立普遍命题，而在相同性的类比方面，确立的却是一切相同性所归属的普遍性。

Argument From Likeness (Homoiotes)

The argument from likeness is clearly distinct from the *paradeigma*, where the universal proposition plays an essential role as an intermediate step in the argument.

The argument from likeness, though logically less straightforward than the *paradeigma*, is exactly the sort of analogical reasoning we want when we are unsure about underlying generalizations.

It is much better suited than the *paradeigma* to assessing the conjectures that we might entertain in the early stages of an inquiry.

Argument From Likeness (Homoiotes)

To understand the argument from likeness more fully, note that Aristotle defines likeness in terms of shared attributes.

> *Those things are called like which have the same attributes in every respect, and those which have more attributes the same than different, and those whose quality is one; and that which shares with another thing the greater number or the more important of the attributes . . . in respect of which things are capable of altering, is like that other thing.(Met 1018a15)*

Argument From Likeness (Homoiotes)

In Topics I 17, Aristotle states that any shared attribute contributes some degree of likeness.

Argument From Likeness (Homoiotes)

In Topics I 17, Aristotle states that any shared attribute contributes some degree of likeness. It is natural to ask when the degree of likeness between two things is sufficiently great to warrant inferring a further likeness. In other words, when does the argument from likeness succeed?

Argument From Likeness (Homoiotes)

In Topics I 17, Aristotle states that any shared attribute contributes some degree of likeness. It is natural to ask when the degree of likeness between two things is sufficiently great to warrant inferring a further likeness. In other words, when does the argument from likeness succeed? Aristotle does not answer explicitly, but a clue is provided by the way he justifies particular arguments from likeness. As [14] has observed, Aristotle typically justifies such arguments by articulating a (sometimes vague) causal principle which governs the two phenomena being compared.

Argument From Likeness (Homoiotes)

For example, Aristotle explains the saltiness of the sea, by analogy with the saltiness of sweat, as a kind of residual earthy stuff exuded in natural processes such as heating. The common principle is this:

> *Everything that grows and is naturally generated always leaves a residue, like that of things burnt, consisting in this sort of earth. (Mete 358a17)*

From this method of justification, we might conjecture that Aristotle believes that the important similarities are those that enter into such general causal principles.

Aristotle's Theory

Aristotle's theory provides us with important and influential criteria for the evaluation of analogical arguments. Four stand out:

1. The strength of an analogy depends upon the number of similarities.
2. Similarity reduces to identical properties and relations.
3. Good analogies derive from underlying common causes or general laws.
4. A good analogical argument need not presuppose acquaintance with the underlying universal (generalization).

Hesse's Theory

Hesse formulates three requirements that an analogical argument must satisfy in order to be acceptable:

- 1. *Requirement of material analogy.* The horizontal relations must include similarities between observable properties.
- 2. *Causal condition.* The vertical relations must be causal relations "in some acceptable scientific sense".
- 3. *No-essential-difference condition.* The essential properties and causal relations of the source domain must not have been shown to be part of the negative analogy.

In addition, Hesse makes an important simplifying assumption: *Similarity-identity reduction.* All similarities can be resolved into relationships of identity and difference.

Analogy as Deduction

An early version of the deductivist approach is exemplified by Aristotle's treatment of the argument from example, the *paradeigma*.

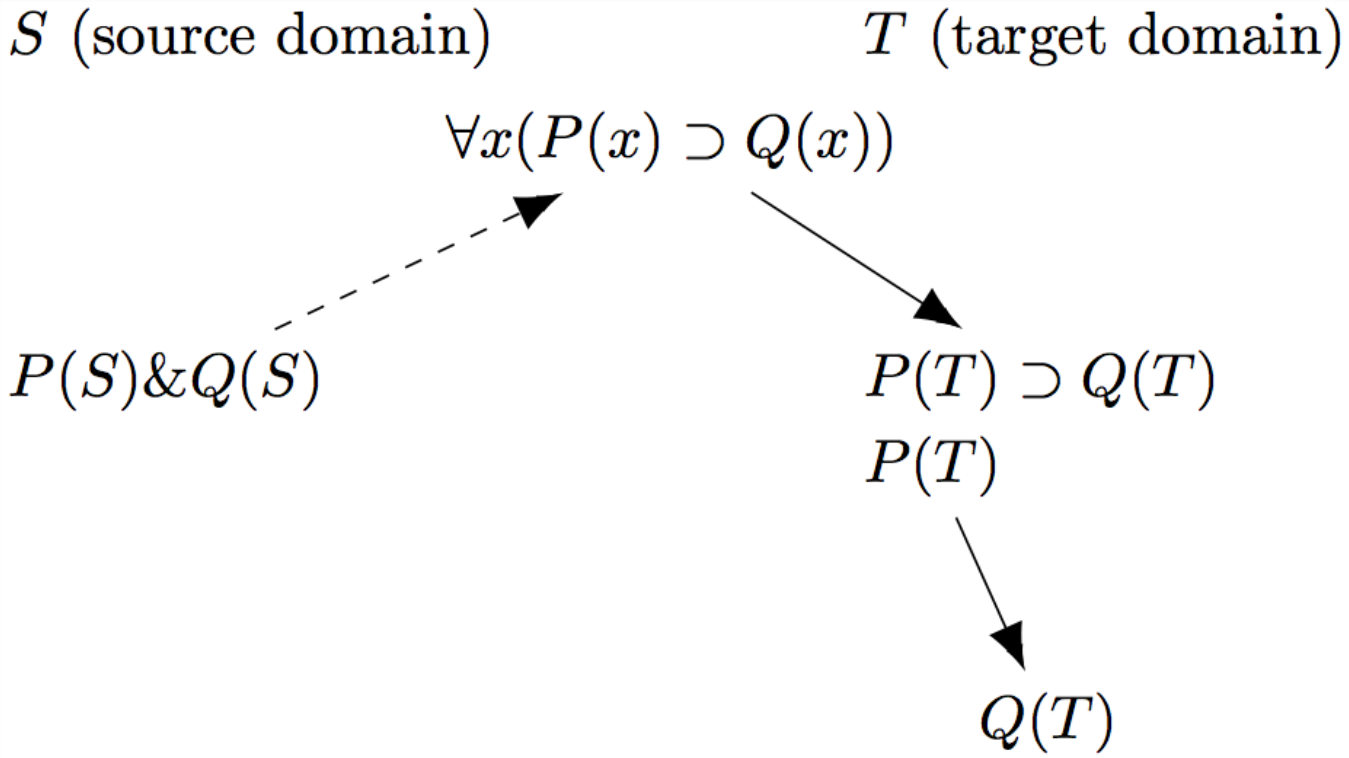

Figure 5: Argument from example.

Analogy as Deduction

Davies and Russell introduce a version that relies upon what they call *determination rules* [8, 7]. Suppose that Q and $P_1, \ldots, P_m$ are variables, and we have background knowledge that the value of Q is determined by the values of $P_1, \ldots, P_m$. In the simplest case, where $m = 1$, this reduces to

$$\forall x(P(x) \supset Q(x)) \vee \forall x(P(x) \supset\sim Q(x)),$$

i.e., whether or not P holds determines whether or not Q holds. More generally, the form of a determination rule is

$$Q = F(P_1, ..., P_m),$$

i.e., Q is a function of $P_1, \ldots, P_m$. If we assume such a rule as part of our background knowledge, then an analogical argument with conclusion $Q(T)$ is deductively valid.

Analogy as Deduction

The “determination rule” analysis provides a clear and simple justification for analogical reasoning. Note that, in contrast to the Aristotelian analysis via the generalization $\forall x(P(x) \supset Q(x))$, a determination rule does not trivialize the analogical argument. Only by combining the rule with information about the source domain can we derive the value of $Q(T)$.

Analogy as Deduction

Do determination rules give us a solution to the problem of providing a justification for analogicalarguments?

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In general: no.

Analogy as Deduction

Do determination rules give us a solution to the problem of providing a justification for analogicalarguments?

In general: no. Analogies are commonly applied to problems where we are not even aware of all relevant factors, let alone in possession of a determination rule.

Analogy as Enumerative Induction

Some philosophers have attempted to portray, and justify, analogical reasoning in terms of some well-understood inductive argument pattern.

Analogy as Enumerative Induction

Single-case induction:

A single instance can sometimes lead to a justified generalization. [4] argues that we can sometimes generalize from a single careful experiment. Cartwright thinks that we can do this, for example, in experiments with compounds that have stable “Aristotelian natures”.

Sampling arguments:

On the sampling conception of analogical arguments, acknowledged similarities between two domains are treated as statistically relevant evidence for further similarities. For instance, agreement of A and B in 9 out of 10 properties implies a probability of 0.9 that B will possess any other property of A:

Analogy as Enumerative Induction

Are these theories good enough?

Analogy as Enumerative Induction

Are these theories good enough?

No.

For the single-case induction, even if we accept that there are such cases, the objection to understanding all analogical arguments as single-case induction is obvious: the view is simply too restrictive.

For the sampling arguments, how are we to count similarities and differences?

The Structure-Mapping Theory

The most influential structuralist theory has been Gentner's structure-mapping theory.

In its original form [10], the theory assesses analogies on purely structural grounds. Gentner asserts:

> *Analogies are about relations, rather than simple features. No matter what kind of knowledge (causal models, plans, stories, etc.), it is the structural properties (i.e., the interrelationships between the facts) that determine the content of an analogy.[9]*

The Structure-Mapping Theory

Consider the sentence,“Gravitational attraction between the sun and a planet,and the fact that the mass of the sun is much greater than that of the planet,causes the planet to orbit the sun.” Gentner represents this in the following form:

CAUSE(AND [ATTRACTS(sun, planet),
GREATER(MASS(sun), MASS(planet)],
REVOLVE-AROUND(planet, sun)).

Example 5 The hydrogen atom is like our solar system.

The Structure-Mapping Theory

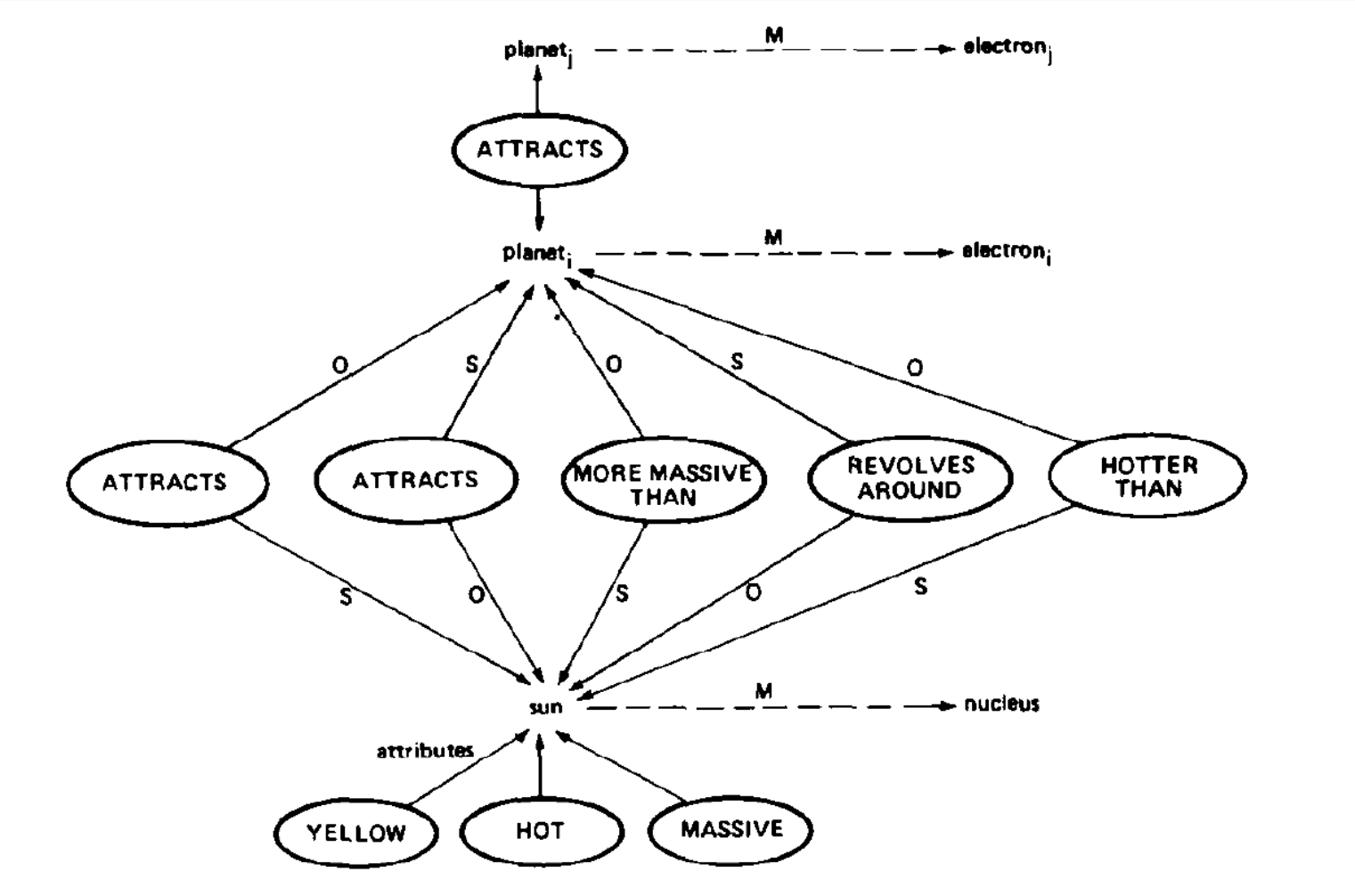

Figure 6:

The Structure-Mapping Theory

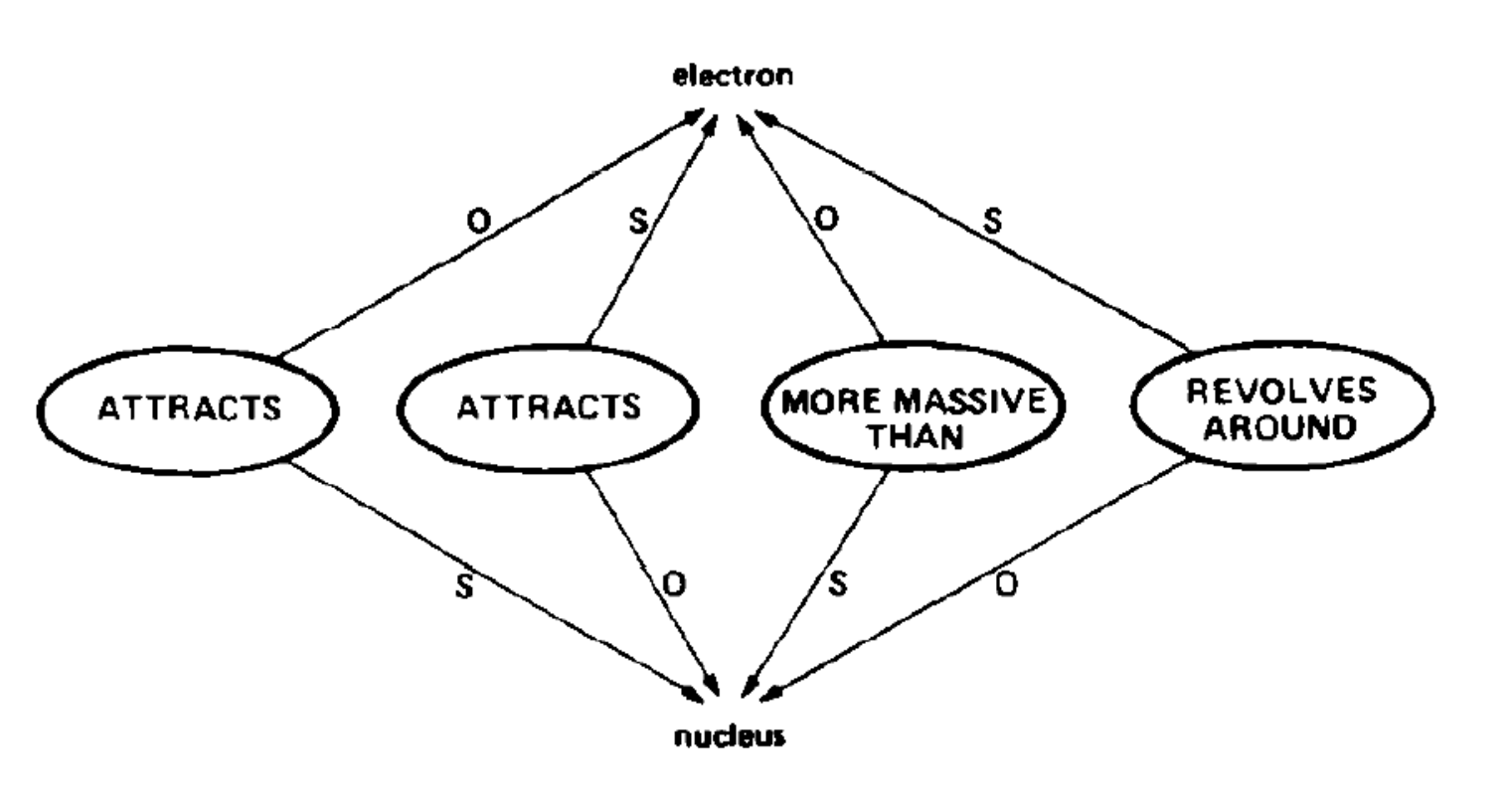

Figure 7:

Tui Lei (推类) in Ancient China

The Debate Over Human Nature

例 6 告子曰：“性犹湍水也，决诸东方则东流，决诸西方则西流。人性之无分于善不善也，犹水之无分于东西也。”孟子曰：“水信无分于东西。无分子上下乎？人性之善也，犹水之就下也。人无有不善，水无有不下。今夫水，搏而跃之，可使过颡；激而行之，可使在山。是岂水之性哉？其势则然也。人之可使为不善，其性亦犹是也。”（《孟子・告子上》）

The Debate Over Human Nature

Gaozi's Argument:

Water(S)	Human Nature(T)
Known Similarities	
can flow east/west	can become good/bad
Inferred Similarities	
can flow indifferently	can become indifferently
either east or west	either good or bad

The Debate Over Human Nature

Mengzi's Argument:

Water(S)	Human Nature(T)
Known Similarities	
can flow up/down	can become good/bad
there are some nature tendencies	there are some nature tendencies
Inferred Similarities	
has the tendency to flow down	has the tendency to become good

The Debate Over Human Nature

Volkov claims that in the “language of mappings” it can be interpreted as pointing to some new predicate IMMANENT such that [18]:

- IMMANENT (WATER, FLOWS_DOWN) holes in the source domain and IMMANENT (WATER, FLOWS_WEST) does not.
- It is supposed that both disputers discuss with this example some immanent property of human nature, so the example of Gaozi is not a good one because the property IMMANENT does not hold in the mapping WATER < - > HUMAN_NATURE.

What Is *Tui Lei* (推类)

- 子曰：‘不愤不启，不悱不发。举一隅而不以三隅反，则不复也’。（《论语·述而》）
- 子曰：‘夫仁者，己欲立而立人，己欲达而达人。能近取譬，可谓仁之方也已’。（《论语·雍也》）
  - “譬”，《说文》解为“喻”，徐铉、徐锴注为“犹匹也，匹而喻之也”。
  - “能近取譬”意为，求仁的方法在于就近选取相配、相耦、相合的事例，以明晓并实践仁。

What Is *Tui Lei* (推类)

- 告子曰：“性犹杞柳也，义犹杯棬也；以人性为仁义，犹以杞柳为杯棬。”孟子曰：“子能顺杞柳之性而以为杯棬乎？将戕贼杞柳而后以为杯棬也？如将戕贼杞柳而以为杯棬，则亦将戕贼人以为仁义与？率天下之人而祸仁义者，必子之言夫！”（《孟子·告子上》）
- 挟太山以超北海，语人曰：“我不能。”是诚不能也；为长者折枝，语人曰：“我不能”，是不为也，非不能也。故王之不王，非挟太山以超北海之类也。王之不王，是折枝之类也。（《孟子·梁惠王上》）

What Is *Tui Lei* (推类)

- 辩异而不过，推类而不悖。(《荀子·正名》)
  - 辩说首先要求，辨别不同事物不发生错误，根据类的关系进行推理不产生悖乱。荀子认为，同类相推是正确的，“类不悖，虽久同理”。
- 以类行杂，以一行万。(《荀子·王制》)
  - 从类推知杂多事物，从统一的普遍原理推知千变万化的事物。
- 有法者以法行，无法者以类举，听之尽也。(《荀子·王制》)
  - 有法令规定的，就照法令去办；没有法令规定的，就可以依法以类推之。可见，在荀子看来，同类者一定同法，同一法令条文一定适用于同类对象和现象。因此，对于尚无法令条文规定的，就可以按照“类”的关系同类相推。

What Is *Tui Lei* (推类)

推类的依据：

- 三物必具，然后辞足以生。
  夫辞，以故生，以理长，以类行者也。立辞而不明于其所生，妄也。今人非道无所，唯有强股肱而不明于道，其困也，可立而待也。夫辞以类行者也，立辞而不明于其类，则必困矣。(《墨经・大取》)
  - 立辞，相当于推理或论证；故、理、类“三物”是实现立辞不可或缺的三个要素。要言之，“故是用以立辞的理由；理是故与辞联结应循的准则；类则是故与理得以提出的依据。可以说，立辞的全过程是以类为基础和根据进行的，这即是《大取》所说，辞‘以类行’。类是立辞的依据，也是推类的依据。”所谓“类是推类的依据”，更确切的表述则是“类同是推类的依据”。

What Is *Tui Lei* (推类)

- 同，重、体、合、类。(《墨经・经上》)
  (同) 二名一实，重同也。不外于兼，体同也。俱处于室，合同也。有以同，类同也。(《墨经・经说上》)

What Is *Tui Lei* (推类)

推类的四种模式：

- 辟也者，举也物而以明之也。
  - 辟，是举别的事物来说明这一事物。
- 侔也者，比辞而俱行也。
  - 侔，是两个结构相同的命题可以由此推彼。
- 援也者，曰：“子然，我奚独不可以然也？”
  - 援，是说“你正确，我为什么偏不可以正确呢？”
- 推也者，以其所不取之同于其所取者，予之也。是犹谓也者同也，吾岂谓也者异也。
  - 推，是用对方所不赞同的命题，相同于对方所赞同的命题，以此来反驳对方的论点。

例 7　…且出门，非出门也；止且出门，止出门也。世相与共是之。若若是，…“有命”非“命”也；非执“有命”，“非命”也，无难矣。此与彼同类，世有彼而不自非也，墨者有此而众非之，无它故焉，所谓内胶外闭与？必毋空乎？内胶而不解也。此乃不是而然者也。

崔清田认为墨者所用推类的程序可表示如下 [21]：

1. A 与 B 具有属性 p，A 与 B 同类；
2. A 有属性 q；
3. 所以，B 也有属性 q。

黄朝阳对推类理论所论及的推类原则以及推类的逻辑本质进行了更为深入的解读，其要点有四 [24]：

1. 推类原则包括正面表述的“同类相推”与反面表述的“异类不推”两条原则，前者要求“以类取，以类予”，后者强调“异类不比”。
2. 就“同类相推”而言，“以类取”的含义是：若 a、b 两个对象同类，那么 a 具有/不具有什么属性，b 也具有/不具有相同的属性。我们对 b 的看法来自对 a 的看法。“以类予”的含义则是：若 a、b 同类，那么对方承认 a 具有什么属性，对我们提出的 b 也具有相同的属性就不得不承认。

3. 由推类原则可知，推类指的是：当且仅当两个对象类同，从某个对象具有什么属性，可以推知另一个对象也具有该属性。其中，“类同”指两个对象同属一类，而非相互之间具有类属关系；“异类”则指两个对象不属于同一类，而非彼此之间没有类属关系。
4. 根据对推类的上述概括和总结，“中国古代的推类是并且只能是类比”，不应包括从个别到一般的演绎，也不应包括从一般到个别的归纳。

Tui Lei (推类) in Ancient China

According to Xie, there are some differences between *Tui Lei* and analogical reasoning [20]:

- It is the notion of kind, instead of likeness or similarity, that plays the pivotal role in the ancient Chinese theory of analogy.
- Unlike Aristotle who emphasizes the causal links between attributes in the physical world, ancient Chinese thinkers prefer to justify analogical argument by appealing to the metaphysical and epistemological principles that are thought to be normative in nature.

Tui Lei (推类) in Ancient China

例 8 所谓贵良宝者，为其可以利也。而和氏之璧、隋侯之珠、三棘六异，不可以利人，是非天下之良宝也。《墨子・耕柱》

例 9 君臣朋友，以义相与，皆正也。推类而观之，凡巨细之举，必廓然而大公，物来而顺应，皆正也。（杨爵《周易辩录》卷三）

- 按杨爵之见，“以义相与”之举与“廓然而大公，物来而顺应”之举同类。由此出发，他从该类中的部分对象“君臣朋友之以义相与”具有“正”这种品格，推断该类的全体对象“所有廓然而大公、物来而顺应的巨细之举”也具有“正”的品格。

晋荣东 [23] 认为：推类在类同原则的制约下可以具体化为演绎、归纳、类比等形式各异的推理类型，故其逻辑本质不可归于任何单一的推理类型。“推类”就是中国古代思想家对推理本身的称呼。

Tui Lei (推类) in Ancient China

1. 中国古代的“推类”是不是类比推理?

Tui Lei (推类) in Ancient China

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Tui Lei (推类) in Ancient China

2. 能否借用 analogical argument 的理论解释或评价中国古代的“推类”?

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  - 相似性少
  - 因果关系不明确
- 原因
  - 理论的初级阶段?
  - 本质不同?

Summary

Summary

- Analogical Argument
  - 定义
  - 推理模式
  - 评价标准
- 推类
  - 定义
  - 研究现状
  - 比较

Questions?

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