UNIT 14: ANALOGY

UNIT STRUCTURE

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14.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- define the meaning of analogy
- discuss the different uses of analogy
- explain the structure and nature of argument from analogy
- discuss logical appraisal of analogical arguments
- explain the method of refutation by analogy
- describe upamana as a source of knowledge of similarity.

14.2 INTRODUCTION

The word 'analogy' is derived from Greek term *'analogia'* which is synonymous with 'proportion' in its original sense. Afterwards from the original sense of mathematical proportionality it acquired the use of identity of relation between any two ordered pairs in other context. In current usage the term has acquired significance which is different from its etymological meaning

of proportion. To draw an analogy is to express similarity in one or more aspects between two or more entities or processes. Analogy is a comparison that highlights the likeness between things, entities, processes, situations etc. Analogy may be either literal or figurative. Literal analogy is between items or processes that are logically or factually similar. Figurative analogy is also called metaphorical analogy and it is based on comparison of imagined similarity.

14.3 USE OF ANALOGY IN DIFFERENT CONTEXTS

Analogy is drawn in different contexts for different purposes. We can describe or explain characteristics of certain things, events or processes by drawing analogy with certain other similar things events or processes with which we are already familiar. Often writers use analogy in the form of simile or metaphor to make the topic of their writing more clear and vivid for those who read their work. Simile is a figure of speech involving the comparison of one thing with another thing of a different kind, used to make a description more emphatic or vivid. Metaphor is another kind of figure of speech in which a word or phrase is applied to an object or action to which it is not literally applicable. These analogies strike our imagination and usually make things and situations more easily intelligible. Their uses also make literary work more enjoyable.

	Literary Analogy		**Figurative Analogy**
1)	Constitution of India is similar to that of the UK, both endorses parliamentary democracy, rule of law and human rights.	1)	Constitution of a nation is like the foundation of a superstructure because it holds the nation together like the foundation that holds the superstructure.
2)	Roadways of Shillong are similar to those of Shimla both are zig-zagged and with sharp gradient.	2)	Roadways are like arteries, through them essential commodities are transported like blood being circulated through the arteries.



CHECK YOUR PROGRESS

Q.1: Fill up the blanks:

a) 1 : 4 :: 9 : ..... b) Hand : Palm :: Foot : .....



ACTIVITY 14.1

Is comparison the essential feature of analogy? Discuss.

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14.4 USE OF ANALOGY IN LOGIC

Analogy is also used in inferences. Argument from Analogy or Analogical Argument signifies logical use of analogy as distinguished from the other uses. It is argued that since things are similar in some aspects they are likely to be similar in some more aspects. In its wider sense analogy signifies either the process of transferring information from one source or subject to another subject or target, or the expression of such a transfer of information in language. In logic analogical reasoning is regarded to be a kind of inference which is distinguished from deduction and other form of non-demonstrative inferences. Analogical reasoning has wide range of use in both our everyday life in making decisions and solving problems and in different branches of studies. When we face a problem the solution of which does not easily appear to our mind, we often look for a similar problem and its solution. This is a process of analogical reasoning.

14.4.1 Nature and Structure of Analogical Arguments

Argument from analogy is a kind of inductive or non-demonstrative inference. Like any other non-demonstrative inference its premises do not logically imply its conclusion. Analogical arguments

cannot be classified as valid or invalid. Their conclusions have degrees of probability.

Structure of an analogical argument may be stated as follows:

Premise 1. Both A and B have the characteristics *u.*

Premise 2. A is known to have the characteristic *s*.

Conclusion: Therefore, B is likely to have characteristic *s*.

Stated in another way analogical argument may also have the following forms:

Premise1. P is similar to Q in aspects a, b, c, d.

Premise 2. Q is known to have the aspect e.

Conclusion: P probably has the characteristic e.

Such analogical arguments have some source and target. The source is the information that a person making inference is familiar with and uses as the ground for drawing conclusions. Target is the less familiar information that the person wants to infer. Source is also termed as basic similarity and the target is called inferred similarity. In the first of the above forms of analogical argument the characteristic u is the source or basic similarity and s is the target or inferred similarity.

Let us take some concrete example of an analogical argument with this structure:

a) Both cows and buffalo eat grass, herbs and leaves.
   Cows are ruminating animals.
   Therefore, buffalo is likely to be ruminating animal.

b) Both humans and rats are mammals with similar digestive, respiratory and circulation systems.
   Rats are observed to have developed cancer after prolonged use of metronidazole.
   Therefore, humans are also likely to develop cancer if they take prolonged doses of metronidazole.

c) “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 of 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 order of living beings. There is some probability in this conclusion."(Quoted from Thomas Reid's *Essays on the Intellectual Powers of Man)*

Usually in analogical arguments premises are particular instances and the conclusion is also a particular instance. It involves a move from observed instances to something unobserved in the conclusion. Therefore, it has the distinguishing characteristic of inductive reasoning.



CHECK YOUR PROGRESS

Q.2: Can analogical arguments be classified into valid and invalid arguments?

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Q.3: Is there a move from observed premise or premises to unobserved instance in the conclusion in analogical reasoning?

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ACTIVITY 14.2

In the following passages there are both analogical arguments and non-argumentative use of analogy. State which of these are arguments and which are not–

a) Consciousness would appear to be related to the mechanism of the body simply as a collateral product of its working and to be completely without any power of modifying that working, as the steam whistle which accompanies the working of a locomotive is without influence upon its machinery.

b) One sure thing is that melting sea ice cannot be implicated in the coastal flooding that many global warming models have projected. Just as melting ice cube do not cause a glass of water to overflow, melting sea ice does not increase oceanic volume. Any future rise in sea level would result from glaciers melting on land.

c) Wittgenstein used to compare thinking with swimming: just as in swimming our bodies have a natural tendency to float on the surface so that it requires great physical exertion to plunge to the bottom, so in thinking it requires great mental exertion to force our minds away from the superficial, down into the depth of philosophical problem.

d) Suppose someone tells me that he had a tooth extracted without an anaesthetic, and I express my sympathy, and suppose I am then asked, "How do you know that it hurt him?" I might reasonably reply, "well, I know it would hurt me. I have been to the dentist and know how painful it is to have a tooth filled without an anaesthetic, let alone taken out. And he has the same sort of nervous system as I have. I infer, therefore, that in these conditions he felt considerable pain, just as I should myself.

14.4.2 Appraisal of Analogical Arguments

Since analogical arguments are not demonstrative arguments, their appraisal is a matter of determining to what extent the truth of premises of such arguments makes the conclusion probable. Accordingly some analogical arguments are cogent while others are weak relative to the strength of evidence. A cogent analogical argument is sometimes called **good analogy** while the weak

analogical argument is called **bad or false analogy**. No statistical or mathematical formula can be constructed to determine the probability of diverse range of analogical arguments in different domains of discourse. However there are general principles or guidelines to follow to make an assessment of any analogical argument devised by different logicians.

I M Copi, C Cohen and K McMahon have offered six criteria to determine the strength of analogical argument:

1) **Number of Instances Cited as Similar:** The larger the number of instances in which the subject of analogical inference is observed to be similar the stronger the argument is.

   Consider the following two arguments:

   a) I bought a pair of shoes of a particular brand of manufacturer and found it comfortable and durable. So, I conclude that if buy another pair of shoes from the same manufacturer it will be comfortable and durable.

   b) I bought three pairs of shoes of a particular brand of manufacturer and found all of those comfortable and durable. So, I conclude that if I buy another pair of shoes from the same manufacturer it will be comfortable and durable.

   Here, conclusion of argument (b) is more probable than that of the (a) because number of instances is greater in (b).

2) **Variety of the Instances in the Premises:** The more dissimilar from each other the instances with which the subject of analogical argument is observed to be similar are, the stronger is the argument.

   Consider the argument (b) above again. Here the instances of shoes purchased may be either from the same retailer or may be one from a retailer, another from a departmental store and the third an online purchase. In the latter case the argument will be more cogent than the former.

3) **Number of Similar Aspects**: The greater the number of aspects in which the subject is similar, the greater is the probability of the conclusion.

In case of the above argument if the three instances of the shoes are of the same design, material and in the same price range and instance of shoes in the conclusion is also of same design, material and price range, then argument is more probable than in the case of an instance in the conclusion not similar to those in the premises in these aspects.

4) **Relevance of Aspects of Similarity:** Greater number of aspects will make the argument stronger if aspects are relevant to the target. Similarity of single relevant aspect may make the argument more probable than similarities which are irrelevant. One attribute is relevant to another if they bear a causal relation between them.

Suppose all three pairs of shoes were purchased on Tuesdays and now I am going to purchase it on Tuesday. This similarity is not relevant to its being comfortable and durable. But if all the instances of past and the present instance are similar in being manufactured from the same kind of leather than it will be a relevant similarity which increases its probability.

5) **Disanalogies or Points of Differences:** A disanalogy is a point of difference between the target in the conclusion from the source in the premises on the basis of which target is asserted in the conclusion. The greater the quantity of difference and greater their relevance to the target of analogical argument, the weaker is the argument from analogy.

Suppose shoes in the example above, the earlier purchases were instances which had passed strict quality control measures and present instance passed relaxed quality control mechanism, earlier instances were made from different kind of leather than obviously the probability of the conclusion will be of lesser degree. If it had to pass same quality control measure and was made of same material, the conclusion would have gained greater degree of probability.

However the points of differences in dis-analogy have to be relevant to the target of analogical argument in order to weaken

the argument. Differences in irrelevant aspects or differences of attributes with no causal relation between them will not reduce the strength of analogical argument.

6) **Claim that the Conclusion Makes:** Lesser the claim that the conclusion of an analogical argument makes relative to its premises, greater is the strength of the argument. A modest claim on the basis of less and not so relevant similarity is not going to yield high degree of probability.

For example if three pairs of shoes I purchased earlier lasted for almost one year. Now if I conclude that the new pair of shoes will last for at least ten months, the claim will be moderate. But If I assume that it will also last one complete year than it will be less modest claim and strength of the argument will be less.



CHECK YOUR PROGRESS

Q.4: What are the different kinds of analogy?

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Q.5: Are analogical reasoning demonstrative?

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14.4.3 Usages of Analogical Arguments

1) **Everyday Problem Solving:** Analogical argument is widely employed in our everyday problem solving. If we cannot easily think out the solution is any problem we search for some other similar problems that have already been solved. Then we think out a similar solution to it. In different other professional areas also analogical reasoning is widely used.

2) **Judicial Proceedings:** It is widely used in judicial proceedings when lawyers cite a precedent in pleading a case. A precedent is the judgment of a court in a similar legal dispute. Here the pleader has to identify a case or cases which are relevantly similar to the present case and hence prays for a similar judgment. The

lawyer has to establish that the similarity between the present case and the precedents is relevant enough so that similar judgment may be pronounced here.

3) **Policy Decisions:** Important policy making by the government is done by analogical reasoning of the success of similar policies in similar situation by another government. Suppose improvement in healthcare services in a country has enhanced the productivity in the economy in a developing nation A. Considering that the government in another developing nation B is making a policy decision to make more budgetary provision to achieve the goal of increasing productivity in the way nation A has achieved.
4) **Medical Research:** Analogical reasoning is widely used in medicine. When a new medicine is prepared for the benefit of human beings it is tested on rats, guinea pigs, monkeys or chimpanzees. If it is observed to be effective, and no adverse side effect is reported, then it is concluded that the medicine is likely to be having beneficial effects without adverse side-effects if administered to human beings on the ground that humans are biologically significantly similar to these animals.
5) **Archaeological Research:** When prehistoric tools and other man-made objects are discovered in excavation, archaeologists observe that these objects were used in the way people now use similar other objects. This is the use of analogical reasoning between present use of certain present objects and the objects of pre-historic time.
6) **Moral Reasoning:** Many moral judgements are based on analogical reasoning. That is, when we judge that a certain act is morally wrong, we may justify it by showing that the act is relevantly similar to other actions that are quite clearly classified as morally wrong.



ACTIVITY 14.3

How is analogy used in legal proceedings? Describe.

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14.5 REFUTATION BY ANALOGY

Analogy is also used to refute arguments. This is a method of refuting argument by citing an argument of similar form whose premises are known to be true while conclusion is known to be either false or highly improbable. Refutation by analogy is often used in deductive argument. This can also be used in case of inductive reasoning.

Consider the following deductive argument:

All liberals are proponents of national health insurance.

Some members of the administration are proponents of national health insurance.

Therefore, some members of the administration are liberal.

This argument is invalid. Its invalidity becomes clear if we construct the following argument which has the same form but whose invalidity is obviously understood, that is, having known to be true premises and false conclusion:

All rabbits are fast runners.

Some horses are fast runners

Therefore, some horses are rabbits.

Refutation by analogy can effectively be used to refute inductive arguments as well. Here we have to construct an argument with similar form but have a conclusion which is known to be false or commonly believed to be improbable.

Examples of refutation by analogy:

Argument: Poverty and injustices cannot be regarded to be amongst the root causes of Islamic terrorism because Osama Bin Laden, the leading figure of this terrorism is a multimillionaire.

Refuting Argument: Slavery could not be regarded to be amongst the root causes of American Civil War because Abraham Lincoln, the leading figure of this war was not a slave.



CHECK YOUR PROGRESS

Q.6: Can refutation by analogy be used against inductive arguments?

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14.6 UPAMANA: A SOURCE FOR KNOWLEDGE OF SIMILARITY

According to MīmāAsā and Vedānta tradition of Philosophy, there is an independent source of valid knowledge by which similarity between perceived objects and objects known earlier is recognised. This source of knowledge is neither perception nor inference. Suppose someone goes to a forest and perceives a *gavaya* (wild cow). He comes to know that this animal is similar to the domestic cow. This knowledge of similarity is not perceptual because the domestic cow's similar features are not perceived now. It is not an inference because in the purported inference of cow's likeness to *gavaya*, the *paksa* term will be cow and the likeness with gavaya is the mark which should be perceived to be present in the *paksa* (*paksa-dharmatā*). Therefore, the necessary conditions of inference are not fulfilled here. Hence, knowledge of similarity has to be caused by a different source of knowledge. However, the Naiyāyikas does not recognise *upamāna* as an independent source of knowledge. For them it can be explained to be the joint function of present perception and memory of the similarity of some other object which is not perceived now.

Both *upamāna* and analogical reasoning have a common feature. Both of these are significantly related to similarity or comparison. They analyse and ascertain the similarity between things or events. While *upamāna* is the knowledge of similarity, argument from analogy is knowledge from some similarity to further similarity.



14.7 LET US SUM UP

- Analogy is comparison that highlights the likeness between things, entities, processes, situations etc. Analogy may be either literal or figurative.
- Explain characteristics of certain things, events or processes by drawing analogy with certain other similar things events or processes with which we are already familiar
- Analogy is also used in inferences. Argument from Analogy or Analogical Argument signifies logical use of analogy as distinguished from the other uses. It argues that since things are similar in some aspects they are likely to be similar in some more aspects.
- Argument from analogy is a kind of inductive or non-demonstrative inference. Like any other non-demonstrative inference its premises do not logically imply its conclusion. Analogical arguments cannot be classified as valid or invalid. Their conclusions have degrees of probability.
- Usually analogical arguments premises are particular instances and the conclusion is also a particular instance. It involves a move from observed instances to something unobserved in the conclusion. Therefore, it has the distinguishing characteristic of inductive reasoning.
- Some analogical arguments are cogent while others are weak relative to the strength of evidence. A cogent analogical argument is sometimes called good analogy while the weak analogical argument is called bad or false analogy.
- In appraisal of analogical arguments the following points have to be taken into consideration: 1) Number of instances cited as similar, 2) Variety of the instances in the premises, 3) Number of similar aspects, 4) Relevance of aspects of similarity, 5) Disanalogies or points of differences and 6) How moderate the Claim is in the conclusion.

- In MīmāAsā and Vedānta tradition knowledge of similarity is recognised to be an independent source of knowledge different from inference and perceptions.



14.8 FURTHER READING

1) Chakraborti, Chhanda (2006); *Logic: Informal, Symbolic and Inductive*; New Delhi: Prentice Hall of India Limited.

2) Copi, I. M.; Cohen, C., McMahon (2012); *Introduction to Logic*; New Delhi: Dorling Kindersly India Pvt Ltd.



14.9 ANSWER TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: a) 16, b) sole

Ans. to Q. No. 2: No. Since analogical arguments are non-demonstrative, these cannot be classified as valid or invalid.

Ans. to Q. No. 3: Yes, the inferred similarity is the target of inference which is not observed.

Ans. to Q. No. 4: Good analogy and bad analogy.

Ans. to Q. No. 5: No. These are inductive arguments.

Ans. to Q. No. 6: Yes, this can be used against inductive arguments to refute them.



14.10 MODEL QUESTIONS

A) Very Short Questions:

Q.1: What is the etymological meaning of analogy?

Q.2: What is a metaphor?

Q.3: Define argument from analogy.

Q.4: How are analogical arguments classified?

Q.5: Does dissimilarity weaken arguments from analogy?

B) Short Questions: (Answer each question in about 100-150 words)

Q.1: Distinguish between literary and figurative analogy.

Q.2: What is simile?

Q.3: How is analogy used in logic?

Q.4: What is the structure of analogical argument?

Q.5: Distinguish between good and bad analogy.

Q.6: Do differences between the compared things affect the value of analogical argument?

C) Short Notes:

Q.1: Literary analogy

Q.2: Refutation by analogy

Q.3: Upamāna

Q.4: Good and bad analogy.

D) Long Questions: (Answer each question in about 300-500 words)

Q.1: How is analogy used in reasoning? Discuss.

Q.2: What is the structure of analogical reasoning? Give illustrations.

Q.3: How are analogical reasoning evaluated? Discuss the criteria for appraisal.

Q.4: Explain the procedure for refutation by analogy.

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