Analogical Induction

Definition

- An Analogy is a comparison of two or more things that are alike in specific respects

Literary Example:

Out, out brief candle!
Life's but a walking shadow, a poor player
That struts and frets his hour upon the stage
And then is heard no more. It is a tale
Told by an idiot, full of sound and fury,
Signifying nothing.

(Macbeth, Act V)

In Logic:

- Analogical Induction: An analogy that is used to argue inductively for a conclusion.

- Analogical Induction is to reason in the following way:
  - Because two or more things are similar in several respects, they must be similar in some additional respect

Example:

- **Humans can move about, solve mathematical equations, win chess games, and feel pain.**
- **Robots are like humans in that they can move about, solve mathematical equations, and win chess games.**
- **Therefore, it's probable that robots can also feel pain.**

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Form:

- **Thing 'A' has properties 'P1', 'P2', 'P3' plus the property 'P4'.**
- **Thing 'B' has properties 'P1', 'P2', and 'P3'.**
- **Therefore, thing 'B' most likely (probably) has property 'P4'.**

Structural Form:

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- **Thing ‘B’ has properties ‘P1’, ‘P2’, and ‘P3’.**
- **Therefore, thing ‘B’ most likely (probably) has property ‘P4’.**

More Clearly:

- **Premise: Thing ‘A’ has properties ‘P1’, ‘P2’, and ‘P3’**
- **Premise: Thing ‘B’ has properties ‘P1’, ‘P2’, and ‘P3’**
- **Premise: Thing ‘A’ also has property ‘P4’**

- **Therefore: Thing ‘B’ also has property ‘P4’**

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What to look for (in brief): The greater the degree of similarity (the stronger the similarity) the more probable the conclusion

Enumerative Vs. Analogical

- Enumerative argues from some members of a group to the group as a whole
- Analogical induction reasons from something about one or more individuals to something further about one of those individuals

Or …

- Analogical induction reasons from the properties of one or more individuals to the properties of another individual

Analogical Example #1

- Mice are mammals, have a mammalian circulatory system, have typical mammalian biochemical reactions, respond readily to high blood pressure drugs, and experience a reduction in blood cholesterol when given the new Drug Z. Humans are mammals, have a mammalian circulatory system, have typical mammalian biochemical reactions, respond readily to high blood pressure drugs. Therefore, humans will most likely also experience a reduction in blood cholesterol when given the new Drug Z.

Analogical Example #2 (Weak)

Premise 1: Birds have two legs, two eyes, breathe air, and fly.

Premise 2: Humans have two legs, two eyes, and breathe air.

Conclusion: Therefore, humans can also fly.

Evaluation Criteria:

- 5 different methods or criteria:
  - 1) Relevant Similarities
  - 2) Relevant Dissimilarities
  - 3) The number of instances compared
  - 4) Diversity among cases
  - 5) How narrow is the conclusion

Evaluation Criteria:

1) Relevant Similarities - The more similarities between members in the Sample Group, the stronger the argument

Analogical Example #3

Premise 1: Mark's friend Jean owns a 1990 Honda motorcycle that developed an oil leak.

Premise 2: Jean's friend John also owns a 1990 Honda motorcycle that developed an oil leak.

Premise 3: John's friend Chris also owns a 1990 Honda motorcycle that developed an oil leak.

Premise 4: Mark just bought a 1990 Honda motorcycle.

Conclusion: Therefore: Mark's 1990 Honda motorcycle will probably develop an oil leak.

Evaluation Criteria:

- 2) Relevant Dissimilarities: Often, one significant dissimilarity will weaken the argument.
- For example:
  - What if I added to the argument about Drug Z the fact that drugs that work in mice rarely work in humans?

Relevant Dissimilarity

- Mice are mammals, have a mammalian circulatory system, have typical mammalian biochemical reactions, respond readily to high blood pressure drugs, and experience a reduction in blood cholesterol when given the new Drug Z. Humans are mammals, have a mammalian circulatory system, have typical mammalian biochemical reactions, respond readily to high blood pressure drugs. **However, drugs that work in mice rarely work in humans.** Therefore, humans will most likely also experience a reduction in blood cholesterol when given the new Drug Z.

Analogical Example #4: The Argument from Design

A watch is a mechanism of exquisite complexity with numerous parts precisely arranged and accurately adjusted to achieve a purpose – a purpose imposed by the watch's designer. Likewise, the universe has exquisite complexity with countless parts – from atoms to asteroids – that fit together precisely and accurately to produce certain effects as though arranged by plan. Therefore, the universe must also have a designer.

Relevant Dissimilarities: Looking Back

- Previous Honda Motorcycle argument:
  - If 2 out of the 3 friend's 1990 Honda motorcycles developed oil leaks but Chris's bike did not, does this weaken the probability that the conclusion is true?

Rule:

- As long as 50 or more percent of the sample items have the relevant property in question then we can be *sufficiently* confident to say that it is probable that target group.

Evaluation Criteria:

3) The number of instances compared

Fewer relevant similarities = less the chance that the conclusion is true.

The more relevant examples that you have, the stronger the analogical inductive argument will be.

Evaluation Criteria:

4) Diversity among cases: The more diverse the sample, the more strength the argument has.

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For example: The greater the variety in the sizes of bikes that have oil leaks, the more likely it is that Mark's motorcycle will get an oil leak (whatever size it happens to be).

Evaluation Criteria:

5) How narrow is the conclusion: The more narrow the conclusion is, the less probable that it will be true – the harder it will be to establish

Summary of Rules:

1) Is the sample size large enough? (The larger the sample, the better the probability that the conclusion will be true.)
2) What percentage of the sample has the property in question? (Relevant similarities – the larger the percentage, the stronger the argument.)
3) How similar to the target group are the members of the sample? (Relevant dissimilarities – the greater the similarity, the stronger the argument, the stronger the counterexample the weaker the argument.)
4) How diverse is the sample? (If there is an aspect of the target group that is unknown, the more diverse the sample is the stronger the argument.)
5) How precise (or narrow) is the argument? (The more possibility the conclusion allows – the more general the conclusion – the stronger the argument is.)