

Critical Thinking Notes

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Revised September 2000

1 Arguments and Non-arguments

An **argument** is a series of statements that offers reasons or evidence intended to support a conclusion.

An argument must have at least one **premise** supplying reasons or evidence for accepting that the conclusion of the argument is true.

Often an argument will rely on the hearer's knowing something obvious or implied. Such knowledge is said to be contained in an **unstated** or **missing** premise.

The first step in analyzing arguments is to distinguish **arguments** from **assertions**.

1.1 Assertions:

No statement is presented as a conclusion whose truth is supported by any others.

- [1] Dr. Jack Kevorkian has become known as “Dr. Death” because of his willingness to assist patients in committing suicide. Most medical professionals have refused to sanction his activities, and some have equated assisted suicide with murder. A majority of the public, on the other hand, believe that assisted suicide is permissible in some cases, and a court recently found Kevorkian “not guilty” of criminal wrongdoing in a key case.

1.2 Arguments:

The truth of one statement is (supposedly) established by other statements.

[2] Dr. Jack Kevorkian was trained as a pathologist and legally licensed by the state to practice medicine. His “assisted suicide” is thus a legitimate medical practice.

[3] Dr. Jack Kevorkian should not be seen as a monster or criminal, but rather as a medical revolutionary. His “assisted suicide” is a valuable service that certainly extends the traditional role of the physician in end-of-life care. It does not, however, violate the basic duty of the physician to provide for the patient’s well-being and quality of life.

2 Strength and Validity of Arguments

An argument is considered **strong** if its premises in fact support the conclusion. This has nothing to do with whether the premises are true or not, but only with the relevance of the premises to the conclusion. **Argument 2** is not strong, while **Argument 3** is.

Certain argument forms are such that *if the premises are true, the conclusion is necessarily true*. These are said to be **valid** argument forms.

[4] The following is a valid argument in form, even though it is made of nonsense words:

Premise 1 All glubs are sputs.

Premise 2 William is a glub.

Conclusion Therefore, William is a sput.

There is no way that William could *not* be a sput, if the two premises were true.

3 Soundness of Arguments

For an argument to establish that its conclusion is true, its premises must also be true. A bad argument may thus have weak form, one or more false premises, or both. *An argument is **sound** if it has both good form and true premises.*

Argument 2 has true premises but weak form. **Argument 3** has good form. In order to refute the truth of the conclusion in Argument 3, one would have to show that one (or both) of its premises is untrue.

4 Practice: Argument Identification

Determine whether each of the following passages contains an argument. For those passages that do contain an argument, identify the premises (including unstated premises) and the conclusion of the argument. Cross through statements that are not a part of the argument.

- [5] You should stop killing every spider you see. Spiders help keep down the insect population, and most of them pose no threat to people.
- [6] The snow is making driving conditions very dangerous. But I must still go out and vote even though my candidate has no chance of winning.
- [7] A meter is longer than a yard. Therefore, since this ship is one hundred meters long, it is longer than a football field.
- [8] People who study history are wiser than those who do not. Studying history makes a person less likely to repeat the mistakes of the past, and not repeating past mistakes is a sign of wisdom. It is a sign of what J. Glenn Gray calls “practical wisdom,” in fact. Since a primary aim of education is producing wisdom, all universities should teach history.

5 Inductive Arguments

In a strong inductive argument, the premises introduce examples, a relevantly similar analogy, or past experiences to establish a causal connection. If the conclusion matches the pattern, it is reasonable to believe it is probably true.

There is always at least a bit of uncertainty in even the strongest inductive argument.

5.1 Argument by Example

[9] My friend got out of a speeding ticket one time. When the officer saw from her license that it was her birthday, he gave her a warning and wished her a happy birthday. Today is my birthday, so I won't get a ticket if I speed.

5.2 Argument by Analogy

[10] Be polite when you present your complaints to the manager.
It's easier to catch flies with honey than with vinegar.

5.3 Appeal to Past Experience

[11] The sun has always risen in the East in the morning. The sun will rise in the East tomorrow.

6 Inductive Fallacies

6.1 Incomplete information / Too few examples

Induction from past experience or from specific examples requires experience or examples to establish a reliable general pattern.

Argument 11 is **strong** because it is based on a large number of past experiences, with no known exceptions to the pattern.

Argument 9 is **weak** for two reasons:

- *First*, its conclusion is based on only one example. There are no doubt a great number of examples that would establish a different pattern.
- *Second*, no plausible explanation is offered for why an officer would not issue a ticket on one's birthday.

6.2 Overlooking alternative explanations

6.2.1 False cause

Some of the most common inductive fallacies arise even where there are relevant points of similarity between pattern and conclusion, and where the information is fairly extensive.

[12] Numerous studies indicate that students who sit in the front row of a classroom tend to get better grades than those who sit further back. This semester Professor Snape is requiring all students to sit in the front row, so they will get better grades.

Is it correct to say that sitting in the front row causes better grades? Maybe, or maybe not. It may be that the front row location somehow affords better comprehension of course material. Or it may be that those students who ordinarily prefer to be in front are usually more conscientious about studying.

The point is that we aren't told what the connection is. The studies show a *correlation* between grades and seating location; the argument assumes a certain *causal connection* that is not explained in the premises and which may be incorrect.

6.2.2 *Post hoc, ergo propter hoc*

Most good inductive arguments provide a reasonable explanation for why the conclusion fits the general pattern established in the premises. Sometimes the causal connection is indeed obvious enough *not* to need stating: Being hit by a moving train will cause bodily injury, and we all know it.

Be careful, though, of any inductive argument that assumes rather than states a causal explanation. People often assume that a chronological succession of events amounts to causal connection among them.

[13] In Coleridge's *Rime of the Ancient Mariner*, the ship came into bad weather after a sailor killed an albatross. The other sailors blamed the albatross-killer for causing their bad luck.

The Latin phrase for this pattern of thinking is *post hoc, ergo propter hoc* ("after this, therefore because of this"). *Post hoc, ergo propter hoc* is a common form of the false cause fallacy.

7 Deductive Arguments

In a strong deductive argument, the premises introduce facts or evidence that, when taken together, necessarily imply the truth of the conclusion. The following are examples of deductive arguments:

- [14] Whenever my brother Dan comes home, he leaves the mail on this table. The mail was still outside in the mailbox when I got here, so I knew he hadn't come home yet.
- [15] I always knew that Jones was either a fraud or a genius. His latest work shows he is no fraud. He must be a genius after all.
- [16] Everyone who graduates from GVSU with a Bachelor's of Science degree is required to pass a course in statistics. Wilson must have passed his statistics course, because he has a B.S. in engineering from GVSU.
- [17] All values are relative, but some things are obviously wrong no matter what the situation. Either we identify stealing as one of those things that are always wrong, or I am the Queen of England. The suspect in this case clearly believed stealing to be right, though, so we cannot say that it was wrong relative to her value system. So we can't identify stealing as one of those things that are always wrong. Therefore, I am the Queen of England.

7.1 A Very Cool Trick for Expert Logicians (and Overly Clever Salespersons) to Consider ...

Argument 17 demonstrates how any arbitrarily chosen statement can be deduced from a contradiction:

| | | |
|-----|---|---|
| P1. | “All values are relative” and “no values are relative”. | [a contradiction] |
| P2. | If someone believes something is right, then it is not wrong. | [a simple definition of “all values are relative,” from P1] |
| P3. | The suspect believed stealing is right. | [given] |
| | | |
| C1. | It is not the case that “stealing is wrong”. | [from P2 and P3] |
| P4. | Either “stealing is wrong” or “I am the Queen of England”. | [arbitrary disjunction] |
| | | |
| C2. | “I am the Queen of England”. | [from C1 and P4] |

8 Additional Fallacies

Strictly speaking, there are only a handful of simple and valid deductive argument forms. Any deductive argument is either composed of these simple forms, or it involves a **fallacy**. Some fallacies are so common, however, that they have received names.

See chapter 10 in Weston's *Rulebook for Arguments* for descriptions of the following deductive fallacies:

ad hominem

Appeal to personality (or attack on personalty)

ad ignorantium

Appeal to ignorance, using what is *not* known as evidence

ad misericordiam

Appeal to pity, looking for agreement out of sympathy

ad populum

Appeal to majority. "Everyone's doing it!"

petitio principii

Begging the question (using the conclusion, usually stated differently, as a premise)

composition

division

Two Especially Confusing Pairs of Argument Forms

Two common fallacies closely resemble two of the most common valid deductive forms:

—A—

A Valid Form: *Modus Ponens*

| | |
|--------------|-------------------|
| a implies b | Cats eat fish. |
| a | Copper is a cat. |
| <hr/> | |
| Therefore, b | Copper eats fish. |

An Invalid Form: Denying the Antecedent

| | |
|------------------|-------------------------|
| a implies b | Cats eat fish. |
| Not a | Humans are not cats. |
| <hr/> | |
| Therefore, not b | Humans do not eat fish. |

—B—

Another Valid Form: *Modus Tollens*

| | |
|------------------|---|
| a implies b | If Dan were home, the mail would be in. |
| Not b | The mail is not in. |
| <hr/> | |
| Therefore, not a | Dan is not home. |

Another Invalid Form: Affirming the Consequent

| | |
|--------------|---|
| a implies b | If Dan were home, the mail would be in. |
| b | The mail is in. |
| <hr/> | |
| Therefore, a | Dan is home. |