5.7 Validity in inductive, conductive & abductive arguments

REMEMBER – as explained in an earlier section

formal language is used for expressing relations in abstract form, based on clear and unambiguous terms;

natural language is used for communication and expressing relations in terms which may be ambiguous and open to wide interpretation.

Certain arguments expressed in natural language can be expressed in formal language by using, for example, negation, conjunction, disjunction and condition.

HOWEVER

Many of our arguments are not (cannot be) expressed in the formal language of symbolic logic.

Some arguments given in natural language rely more on assessing the truth of the conclusion in the light of evidence and/or the persuasive power of words, phrases and sentences to establish their validity. These are often described as 'informal' arguments.

INFORMAL ARGUMENTS takes place in natural language and rely on logical relations and evidence as well as the power of persuasion – sometimes known as 'rhetoric'.

Although such arguments can convince through the power of persuasion, they are sometimes fallacious (*false, not true)*.

Such arguments are called informal fallacies and can often be difficult to recognize. We will consider some informal fallacies in more detail in the next section.

Three important forms of informal argument are:

1. **INDUCTIVE ARGUMENT** – an argument which is based on experience and/or observation, and where the conclusion is probably (but not necessarily) true

2. **CONDUCTIVE ARGUMENT** – an argument where separately relevant premises add up to a convincing conclusion

3. **ABDUCTIVE ARGUMENT** – an argument which involves a kind of pragmatic guessing, where there is sufficient (but not necessary) reason to allow the guess to be the least surprising conclusion.

5.7.1 Inductive Arguments

In an inductive argument, the premises and conclusion are derived from observation and experience. Inductive arguments claim that what is observed in a single case or number of cases, will probably also be observed in all subsequent cases. Science and most quantitative research (research which measures and counts) rely heavily on inductive argument.

Inductive argument can also be defined as:

> ***A form of argument in which, even if the premises are true, the conclusion is not necessarily true - but possibly or probably true.***

The structure of an inductive argument

(Premise 1)	In 98% of observed cases, where there is smoke, there is fire.	(the presence of X usually implies the presence of Y)
(Premise 2)	There is smoke on the mountain.	(X is present)
(Conclusion)	Therefore, there is probably a fire on the mountain.	(Y is probably the case)

As we can see from the above example, unlike deductive arguments (which must be valid if the premises are true and they logically entail the conclusion), in inductive arguments, ***the conclusion does not necessarily follow from true premises*.**

We use inductive reasoning regularly in our daily lives, and it used widely in scientific study and research. Philosophers still argue about the precise nature of inductive arguments. However, there are several kinds of inductive arguments which are worth considering when developing our critical thinking skills.

Four important types of Inductive argument are:

1. Inductive analogy

An inductive analogy draws comparisons between the features of similar cases in order to arrive at a conclusion.

Example

Case A has feature p.	(premise 1)
Case B has a number of features similar to case A.	(premise 2)
Therefore, case B will probably have feature p.	(conclusion)

2. Enumerative inductive argument

In an enumerative inductive argument, a number of observed objects are described as having a particular feature. So, the generalisation is made that probably *all* members of this class will have that feature.

Example

All observed A's are p.	(premise)
Therefore, all A's are probably p.	(conclusion)

3. Statistical inductive argument

In a statistical inductive argument, the premises present a statistical relationship based on observation of a case, and it is inferred that a large number of subsequent cases will probably demonstrate approximately the same kind of relationship.

Example

X percentage of observed A's are p.	(premise)
Therefore, probably approximately X percentage of unobserved and observed A's are p.	(conclusion)

4. Causal inductive argument

A causal inductive argument proposes that one event or type of event causes another.

Example

A and B are events which often occur together.	(premise 1)
A often occurs before B.	(premise 2)
Common knowledge about A and B is that A is a cause of B.	(premise 3)
Therefore, A is probably a cause of B.	(conclusion)

Categories of informal fallacy in inductive arguments

There are several kinds of fallacy which often occur in inductive arguments.

1. Fallacies of ambiguity	A word or phrase has more than one meaning.
2. Fallacies of relevance	A premise/conclusion is unrelated to the argument.
3. Fallacies of presumption	False dilemma, begging the question.
4. Fallacies of defective induction	Reaches a conclusion from uncertain premises.

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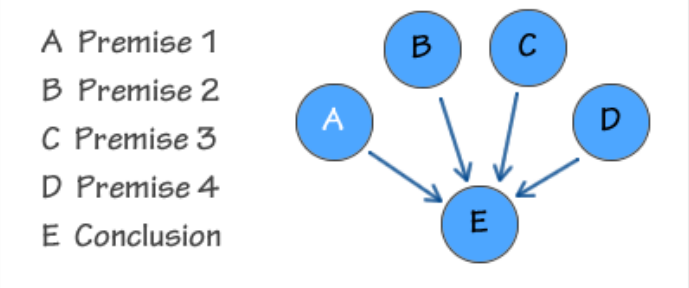
5.7.2 Conductive Arguments ('good reasons' argument)

Definition of Conductive Argument

An argument wherein each premise is separately relevant to the conclusion, and wherein these premises, taken together, provide good grounds in support of the conclusion.

Example

A Government road safety advertising has increased.	(premise 1)
B Wearing seatbelts has been made compulsory.	(premise 2)
C Road with heavy traffic have been widening.	(premise 3)
D Speed limits have been reduced	(premise 4)
E Therefore, government policy has clearly demonstrated a commitment to reducing traffic accidents and improving road safety.	(conclusion)

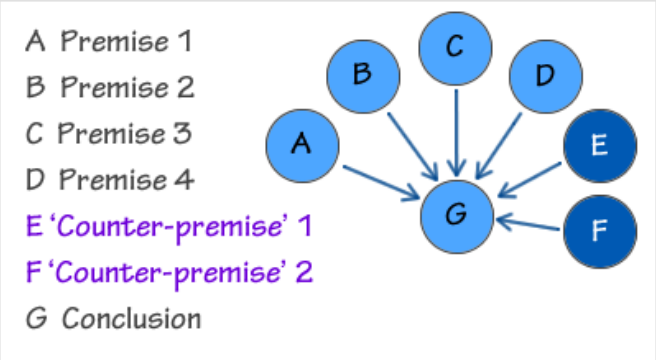


Govier, 2014 (p.90) suggests that in conductive arguments, the premises support the conclusion *convergently*, and this is shown in the diagram above. That is, the evidence offered seems to all point in the direction of the conclusion. See also Govier 2014 (p. 352).

Sometimes, however, there may be 'counter-premises' which seem to work against the conclusion. This kind of argument is very common, and it does not mean that the argument is invalid. Rather, the argument can be described as quite sound because, despite evidence to the contrary, there are still enough good reasons to reasonably support the conclusion.

Example

A Government road safety advertising has increased.	(premise 1)
B Wearing seatbelts has been made compulsory.	(premise 2)
C Some roads with heavy traffic have been widening.	(premise 3)
D Speed limits have been reduced	(premise 4)
E The number of traffic police have been reduced.	('counter-premise' 1)
F Spending on new speed-detection cameras has declined.	('counter-premise' 2)
G Therefore, government policy has clearly demonstrated a commitment to reducing traffic accidents and improving road safety.	(conclusion)



5.7.3 Abductive Arguments

An abductive argument involves a kind of pragmatic 'guessing'. In abduction, there is sufficient (but not necessary) reason to allow for the guess to be true. It is the most 'economical' explanation.

This kind of reasoning occurs very often in scientific research and practical applications of science such as in engineering, medicine and health sciences. It can also be very usual in some forms of creative or artistic practice. In abduction, if the premises are considered as true, then the conclusion is the least surprising – it seems to make sense. Abduction also enables practical action to be taken once a conclusion has been reached.

Example

1. You arrive at home and are surprised that the front door is open.	(X)
2. But if your husband had arrived home before you, this would be unsurprising.	(If Y, then unsurprisingly X)
3. Therefore, it is reasonable to conclude that your husband opened the door.	(therefore, presumably Z)

There is sufficient (but not necessary) reason to allow for the guess to be true. It is the most 'economical' explanation.

Abductive reasoning can often yield very creative and imaginative results, because it is not bound by purely 'logical' relations.

