Computing Research Project

Nature and use of argument

Objectives

- Three uses of language
- Statements: existent and relational
- Argument
- Deductive and inductive arguments
- Logic in argument
- Identify fallacies

Introduction

- We cannot develop critical skills unless we have developed a skill in handling language
  - investigating and defining meanings
  - appreciating the effects of grammatical forms
  - understanding the thread of an argument through an extended piece of text

Three uses of language

O, my Luve's like a red, red rose
That's newly sprung in June:
O, my Luve's like the melodie
That's sweetly play'd in tune!

- Informative
  - This is not to say that the information is true or th valid; misinformation is also included in this category.
  - The function of informative discourse is to describe the world and to reason about it
- Expressive
  - Poetry tends to exploit the expressive possibilities of language to the full
  - Emotive language of other, baser kinds can be included in this category
- Directive
  - The most obvious examples of directive discourse are commands and requests.
  - When a soldier is told to fire his gun, there is no informative or emotional content in the command.

Informative function of language

- We are primarily concerned with examining the characteristics of the informative function of language, of informative discourse
- In order to inform, it is necessary to assert a statement in such a manner as to evince or invite belief in it

Statements: existent and relational(1)

- Existence statements: state that a concept exists, and provide a typology or a description
  - That object is a cow.
  - That cow is brown and black
  - there are 40 or more individuals in group X

It provides a concept, identifies it by a term, and applies it to a thing or an event

- Existence statements can be ‘right’ or ‘wrong’ depending on the circumstances.
  - Example: It is 5 o’clock here.

Statements: existent and relational(2)

- Relational statements: impart information about a relationship between two concepts
  - If a person is an acrobat, then he will be agile.
- Relational statements form the bedrock of scientific knowledge.
- While existence statements can only provide a typology or a classification of objects or phenomena

Classifications of relational statements

- An association between two concepts
  - There are three types of correlation between two concepts
    - positive, e.g. strong people are muscular (and vice versa),
    - negative, e.g. grass at low altitudes grows longer
    - none, e.g. men and women have equal rights in a democracy
- Causal relationship between two concepts which describe what is sometimes called a ‘cause and effect’ relationship
  - ‘smoking a lot makes one ill’, where ‘smoking a lot’ is the independent variable and ‘ill’ is the dependent variable
  - Ex1: if you drop an apple, it will fall
  - Ex2:if parents are intelligent, their children are likely to be intelligent too

Argument

- Some of the statements are offered as reasons for others. This kind of discourse is termed an argument
- In the case of ordinary speech the term ‘argument’ is often used when referring to a dispute
- Or in a situation in which people who hold different views on some controversial subject try to bring the other person around to their way of thinking.
- By the process of reasoning, using the operation of logic, a conclusion is inferred from the statements given.

The minimal ingredients of an argument

1. At least one statement that is reasoned for (this is the conclusion of the argument)
2. At least one statement that is alleged to support it (this is the premise of the argument)
3. Some signal or suggestion that an argument is under way (where this is a word or phrase, we shall call it the logical indicator)

Note: Even with the use of this list of logical indicators, it is sometimes difficult to determine whether a discourse is an argument

Conclusion indicators:

therefore . . .
hence . . .
thus . . .
so . . .
implies that . . .
entails that . . .
which shows that . . .
proves that . . .
indicates that . . .
consequently . . .
allows us to conclude that . . .
we may deduce that . . .
points to the conclusion that . . .
suggests very strongly that . . .
leads me to believe that . . .
bears out my point that . . .
from which follows that. . . .

Premise indicators

for . . .
since . . .
because . . .
for the reason that . . .
in view of the fact that . . .
on the correct supposition that . . .
assuming, as we may, that . . .
may be inferred from the fact that . . .
may be deduced from . . .
as shown by . . .

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EXERCISE

Can you recognize an argument when you see one?

Which of the following sentences are *statements* and which are *arguments*? If statements, of what kind are they, and if associational, what type of correlation do they state? If arguments, what are the premise or premises, the conclusion, and the logical indicators (premise and conclusion indicators) in each?

1 Since Parliament increased the amount of taxation on petrol, the amount of traffic on the roads has decreased appreciably.
2 The criminal is not to blame for what he did. His sense of social responsibility was diminished by a deprived upbringing.
3 If it is true that the outcome of the vote was the result of bribes, then the election should be held again.
4 Why do I insist that London is still the best place in the world to live? Look at the unequalled variety of drama, music, art and educational opportunity there.
5 The train drivers have gone on strike because the railway company is not offering them a sufficient pay rise.
6 An informal atmosphere in the office environment is associated with low stress levels in the workforce.
7 The railway company could not be offering a sufficient pay rise to the train drivers, as they are threatening to go on strike.
8 In Western wedding celebrations the age of the couple and the extent of the wedding celebrations are associated; the greater the age of the couple, the smaller the celebrations tend to be, while the greater celebrations are enjoyed by the younger couples.
9 I do not regard Parliament as trustworthy, my reason being that its Members have misled us too often.
10 The ban on fishing lobsters has been continued, so it follows that lobsters will soon be unobtainable.

The use of arguments

- Argument is one of the basic elements in research. The quality of the argument used in
  - the introduction of the research problem
  - the examination and analysis of the problem
  - the presentation of the findings
  - the analysis and conclusions

Exercise

- Identify components in an argument

The most prominent political issues are those about which the press write the most. Therefore journalists have a great influence in the selection of political issues around which public debate revolves.

Deductive and inductive arguments

- Arguments are traditionally divided into two different types, deductive and inductive.
- Deductive and inductive arguments can be seen as seeking the truth from opposite directions
- Through *deductive argument we infer the particular from the general*, while through *inductive argument we infer general truths from the particular.*

Example of deductive argument

- All humans are mortal.
- Socrates is human.
- Therefore Socrates is mortal.

Example of inductive argument

- Socrates is human and is mortal.
- Xanthippe is human and is mortal.
- Sappho is human and is mortal.
- Therefore probably all humans are mortal.

Deductive argument

- If we take a valid deductive argument, we find that its conclusion follows unequivocally from its premises regardless of what may be added
- The argument remains valid no matter what additional premises may be added to the original pair.

Inductive arguments

- By adding new premises to the original pair we can either strengthen or weaken the resulting argument

Most rich people drive large cars.
John Smith drives a large car.
Therefore John Smith is probably rich.

Strengthen the resulting argument

John Smith belongs to the Millionaires' Club.
Only rich people can belong to the Millionaires' Club.

Weaken the resulting argument

John Smith has filed for bankruptcy.
Bankrupt people suffer from a shortage of money

Excercise

- Determine which of the following arguments are deductive and which are

1. I read about a boy who played professional soccer from the age of 16. He must have been a good junior player.
2. The car was priced at £5000, and I paid £500 in deposit; according to my calculation I still owe £4500.
3. The Minister of Industry looked pale as he emerged from the meeting with the General Workers' Union; it looks as if they gave him an ultimatum.
4. She will probably die soon; she is definitely getting weaker all the time.
5. There are traces of non-permitted chemicals in his blood; he has obviously been taking stimulants.
6. A car is a vehicle, so a car's wheel is a vehicle's wheel.
7. There are more people in the world than there are hairs on any one person's head; it follows that there must be at least two people with the same number of hairs on their heads.
8. Reptiles are cold blooded; so lizards must be cold blooded.
9. This vase is ancient, has been found in a tomb by the Nile, is covered in hieroglyphics; it must be an Ancient Egyptian artifact.
10. The referee said he infringed the rules; so he did infringe the rules.

Logic in argument

- Hodges (1977, p. 13) defined logic as the study of consistent sets of beliefs
- He added that some people preferred to define logic as the study of the validity or the correctness of arguments.

Consistency

- Hodges sums it up in this way

> a set of beliefs is called *consistent* if these beliefs could all be true together in some possible situation. The set of beliefs is called *inconsistent* if there is no possible situation in which all the beliefs are true. (1977, p. 13)

Which of the following sets of beliefs do you think are consistent?

Which of the following sets of beliefs do you think are consistent?

1 I've never sat on a horse in my life. But if I mounted one now, it would only take me two minutes to become an expert horseman and be able to win a showjumping competition.
2 I knew I would never get ill. But somehow I just caught a disease.
3 There is no financial crisis in Britain today – it is just a rumour that is put about by politicians who want to increase taxation in order to pay for the rapidly increasing national debt.
4 Peter joined the sports club three years ago, and has become its most generous member. Last year he paid for the travel expenses of all the teams.
5 So many people travel abroad for their holidays. The English seaside resorts are not as popular as before.
6 I think that killing animals is immoral and should be stopped. We should therefore not export live animals for slaughter.

Venn diagram

- Provides us with a clear and untechnical method of checking the validity of **deductive arguments**
- An argument is made up of a series of statements, and the Venn diagram is based on a number of overlapping circles which represent classes in each statement

Venn diagram examples

- A circle representing the class of engineers is drawn, and another circle to the right, overlapping the first, representing the class of females is then drawn

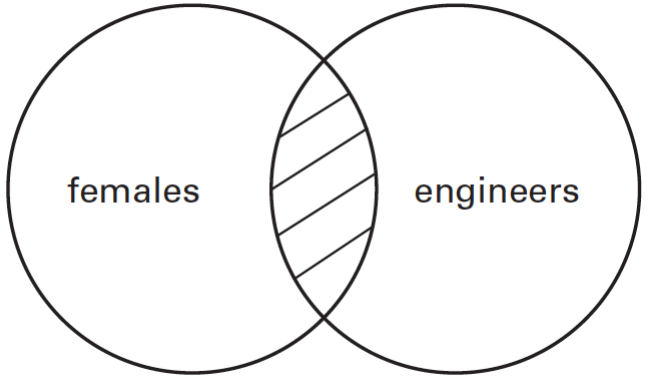


Diagram 4.1 **Venn diagram: some engineers are females**

Venn diagram examples(2)

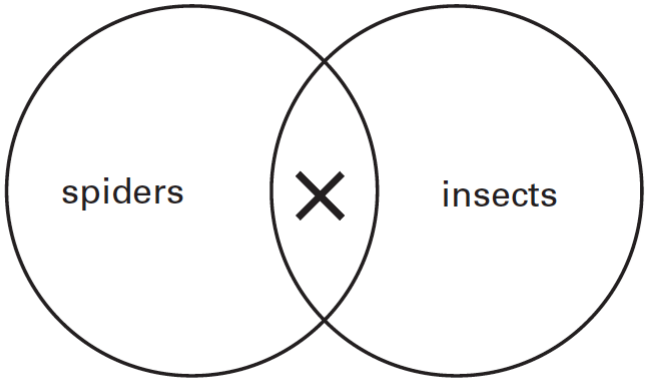


Diagram 4.2 **Venn diagram: no spiders are insects**

Exercise

Make a Venn diagram for the following statements, crossing out the impossible areas:

1 All men are human.
2 Some apples are green.
3 No whales are fishes.
4 Some cats are not long-haired.

Arguments are not often stated quite so succinctly in books or research papers, so it is usually necessary to read the text very carefully to distil the argument down to a series of simple statements. Determine first if the argument is inductive or deductive. If it is deductive, and there is any doubt about the validity of the argument, you can devise your own Venn diagram, or even series of Venn diagrams, to test out the overlaps in the statements and determine where the invalidity occurs. This provides you with a very powerful source of criticism!

Fallacies in argument

- Mistakes are possible and even frequent in applying forms of logical argument
- These mistakes are termed fallacies.

The end of life is death.
Happiness is the end of life.
So, death is happiness.

a. Every member of the investigative team was an excellent researcher.
b. It was an excellent investigative team.

– Ex2:

Identify fallacies

- If I dance too much, I'll be tired. Since I have not danced too much, I will not be tired.
- The ship of government, like any other ship, works best when there is a strong captain in charge of it. This is why government by dictatorship is more effective.
- Look, you're a lecturer. Your university decided to increase your working hours because they knew it will be good for lecturers. It must therefore be good for you.
- I'm not going to get a job. There will be all that extra responsibility, not to mention the loss of my freedom. Think of the costs of travelling to work and buying suitable clothing. Then there are the increased worries about status.

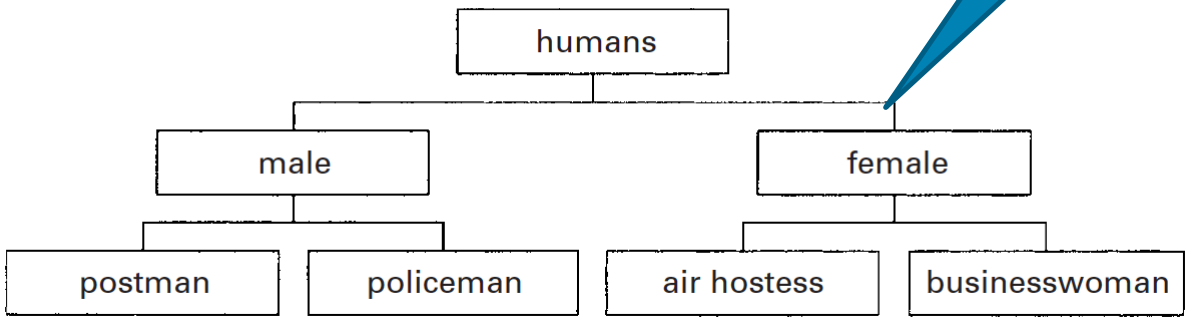
Class

- There are two ways of forming a class
  - **By collection**: we class things which share a common property (or properties), e.g. ‘having four legs’.
  - **Through division**, we can further divide this collection into subclasses, e.g. ‘brown quadrupeds’, ‘red quadrupeds’, ‘grey quadrupeds’

Class example

- The first rank the basis of division is se
- The second rank the basis of division is p ofession

What if first rank are: ‘men; women and children’?



Analogy

- Sometimes it is very useful to compare two things of widely different categories
- The carrying out of medical experiments on animals is a common manifestation of this argument
- It must be remembered that in dealing with an argument from analogy, as with other forms of inductive argument, there is no way of proving that the argument is correct in all instances, or even exactly to what extent it is reliable

Reference

- Dr Nicholas Walliman 2010 Your Research Project, A step By step guide for the first time researcher