

Logical Vocabulary

Before using logic to reach conclusions, it is helpful to know some important vocabulary related to logic.

Premise: Proposition used as evidence in an argument.

Conclusion: Logical result of the relationship between the premises. Conclusions serve as the thesis of the argument.

Argument: The assertion of a conclusion based on logical premises.

Syllogism: The simplest sequence of logical premises and conclusions, devised by Aristotle.

Enthymeme: A shortened syllogism which omits the first premise, allowing the audience to fill it in. For example, "Socrates is mortal because he is a human" is an enthymeme which leaves out the premise "All humans are mortal."

Induction: A process through which the premises provide some basis for the conclusion.

Deduction: A process through which the premises provide conclusive proof for the conclusion.

Reaching Logical Conclusions

Reaching logical conclusions depends on the proper analysis of premises. The goal of a syllogism is to arrange premises so that only one true conclusion is possible.

Example A:

Consider the following premises:

Premise 1: Non-renewable resources do not exist in infinite supply.

Premise 2: Coal is a non-renewable resource.

From these two premises, only one logical conclusion is available:

Conclusion: Coal does not exist in infinite supply.

Example B:

Often logic requires several premises to reach a conclusion.

Premise 1: All monkeys are primates.

Premise 2: All primates are mammals.

Premise 3: All mammals are vertebrate animals. **Conclusions:** Monkeys are vertebrate animals.

Example C:

Logic allows specific conclusions to be drawn from general premises. Consider the following premises:

Premise 1: All squares are rectangles.

Premise 2: Figure 1 is a square.

Conclusion: Figure 1 is also a rectangle.

Example D:

Notice that logic requires decisive statements in order to work. Therefore, this syllogism is false:

Premise 1: Some quadrilaterals are squares.

Premise 2: Figure 1 is a quadrilateral.

Conclusion: Figure 1 is a square.

This syllogism is false because not enough information is provided to allow a verifiable conclusion. Figure 1 could just as likely be a rectangle, which is also a quadrilateral.

Example E:

Logic can also mislead when it is based on premises that an audience does not accept. For instance:

Premise 1: People with red hair are not good at checkers.

Premise 2: Bill has red hair.

Conclusion: Bill is not good at checkers.

Within the syllogism, the conclusion is logically valid. However, it is only true if an audience accepts Premise 1, which is very unlikely. This is an example of how logical statements can appear accurate while being completely false.

Example F:

Logical conclusions also depend on which factors are recognized and ignored by the premises. Therefore, different premises could lead to very different conclusions about the same subject. For instance, these two syllogisms about the platypus reveal the limits of logic for handling ambiguous cases:

Premise 1: All birds lay eggs.

Premise 2: Platypuses lay eggs.

Conclusion: Platypuses are birds.

Premise 1: All mammals have fur.

Premise 2: Platypuses have fur.

Conclusion: Platypuses are mammals.

Though logic is a very powerful argumentative tool and is far preferable to a disorganized argument, logic does have limitations. It must also be effectively developed from a syllogism into a written piece.

Source: <https://owl.english.purdue.edu/owl/resource/659/02/>