LOGIC OVERVIEW: RULES

Definitions

Proposition: an either true or false statement about the world

Non-propositional Utterance: a verbal expression that conveys meaning, but is not true or false statement about the world (e.g., questions).

Premise Indicators: since, for, because, given that, for the reason that, in view of the fact that

Conclusion Indicators: therefore, thus, hence, so, accordingly, for this reason, consequently, it follows that

Argument Diagrams

Joint inference: 1+2 |→ 3

Independent inference: 1 |→ 3 and 2 |→ 3

Logical Connectives: conjunction (p and q), disjunction (p or q), conditional (if p then q), negation (not p)

Valid Argument: an argument that fits a valid argument form.

Sound Argument: (a) follows a valid argument form, and (b) has only true premises.

Deductive argument: an argument whose conclusion follows necessarily from its basic premises.

Inductive argument: an argument in which the premises provide reasons supporting the probable truth of the conclusion.

Fallacies

Argument against the Person (argumentum ad hominem): attacking a person's character instead of the content of the argument.

Argument from Ignorance (argumentum ad ignorantiam): concluding that something is true since you can't prove it is false.

Appeal to Pity (argumentum ad misericordiam): appealing to one's unfortunate circumstance to get someone to accept a conclusion.

Appeal to the Masses (argumentum ad populum): going along with the crowd in support of a conclusion.

Appeal to Authority (argumentum ad verecundiam): appealing to a popular figure who is not an authority in that area.

Irrelevant Conclusion (non sequitur): drawing a conclusion which does not follow from the evidence.

False Cause (post hoc ergo procter hoc): inferring a causal connection based on mere correlation.

Circular Reasoning: implicitly using your conclusion as a premise.

Equivocation: an argument which is based on two definitions of one word.

Composition: assuming that the whole must have the properties of its parts.

Division: assuming that the parts of a whole must have the properties of the whole.

Red Herring: introducing an irrelevant subject, thereby diverting attention from the main subject.

Straw Man: distorting an opposing view so that it is easy to refute.

Valid and Fallacious Argument Forms

Modus Ponens: (1) if P then Q; (2) P; (3) therefore, Q

Modus Tollens: (1) if P then Q; (2) not Q (3) therefore, not P

Disjunctive Syllogism: (1) P or Q; (2) not P (3) therefore, Q

Hypothetical Syllogism: (1) if P then Q (2) if Q then R (3) therefore, if P then R

MP fallacy of affirming the consequent: (1) if P then Q; (2) Q; (3) therefore, P

MT fallacy of denying the antecedent: (1) if P then Q; (2) not P; (3) therefore, not Q

DS fallacy of asserting an alternative: (1) P or Q; (2) P; (3) therefore, not Q

Induction

Inductive Probability: inductively very strong > strong > weak > very weak

Statistical Syllogism: (1) n percentage of a population has attribute A; (2) x is a member of that population. (3) Therefore, there is an n percent probability that x has A.

Fallacy of small proportion: a conclusion is too strong to be supported by the small population proportion with the attribute.

Statistical Induction: (1) n percent of a sample has attribute A; (2) Therefore, n percent of a population probably has attribute A.

Fallacy of small sample: a conclusion is too strong to be supported by a small sample number.

Fallacy of biased sample: a conclusion is too strong to be supported by a nonrandom sampling technique.

Argument from Analogy: (1) Objects x and y each have attributes A, B and C; (2) Object x has an additional attribute D; (3) Therefore, object y probably also has attribute D.

Fallacy of false analogy: comparing two items that have trivial points in common, but differ from each other in more significant ways.