Philosophy and Research

- Traditional Divisions
  - Ethics - “What is the GOOD?”
  - Aesthetics - “What is the BEAUTIFUL?”
  - Epistemology - “What is the TRUE?”
- Modern Addition
  - Semantics - “What do you MEAN?”

Epistemology

- Two Classes of Knowledge
  - Invented Knowledge
  - Discovered Knowledge
- Three Types of Knowledge
  - Intentional (or Deontic)
  - Analytic
  - Contingent

Methods of Fixing Belief

- Authority (or Authoritarian Mode)
- Intuition (or Perseverance or Mystical Mode)
- Rationality (or Rationalistic Mode)
- Science (or Scientific Mode)

The Method of Authority

The Method of Authority involves deriving beliefs based upon the opinions of a respected source. Under this method, knowledge is sought from people who are socially or politically defined as qualified knowledge producers.

The Method of Intuition

The Method of Intuition (or Tenacity or Perseverance) involves adherence to beliefs because one simply feels that they must be so. It involves knowing because it has always been known. Mystical knowledge obtained from transcendental sources falls in this category.
The Method of Rationality

The Method of Rationality involves adherence to beliefs because they are derived according to the rules and forms of logic. In its more extreme form, this method holds that matter is not basically real, but simply a manifestation of some underlying principle. All that is needed to understand the underlying principle is logic.

The Method of Science

The method of Science involves a process of systematically observing events to collect evidence about relationships among these events so as to develop and test beliefs; conclusions derived using the scientific method are probabilistic and contingent.

Values and the Scientific Method

It is sometimes asserted that “Science is value-free.” This is NOT true on a number of levels. The most important one is there is an explicit positive value placed upon understanding events in their context. This is a value that is not shared by the methods of Authority, Intuition, or Rationality.

Inductive & Deductive Reasoning

- **Inductive Argument**
  - conclusion is probably, but not necessarily true.

- **Deductive Argument**
  - conclusion follows necessarily from the premises.

Inductive vs. Deductive Argument

**INDUCTIVE**
- These students are a random sample of members of that class.
- All these students are fine people.
**THEREFORE**
- It is likely that all students in that class are fine people.

**DEDUCTIVE**
- All students in this class are fine people.
- Mary is in this class.
**THEREFORE**
- Mary is a fine person

Deductive Syllogism

- All humans have hearts.
- All lawyers are human.
**THEREFORE**
- All lawyers have hearts.

- All mammals are animals.
- All cats are mammals.
**THEREFORE**
- All cats are animals.
Fallacies

- **Valid Arguments**
  - contain no formal mistakes

- **Invalid Arguments**
  - contain formal mistakes

Argument Schemata - Barbara

- All B are C.
- All A are B.
- **THEREFORE**
- All A are C.

Other Valid Arguments

- Hypothetical Syllogism
  - If A, then B.
  - If B, Then C.
  - **THEREFORE**
  - If A, then C.

- Disjunctive Syllogism
  - Either A or B.
  - Not A.
  - **THEREFORE**
  - B.

Still More Valid Arguments

- **Modus Ponens**
  - If A, then B.
  - A.
  - **THEREFORE**
  - B.

- **Modus Tollens**
  - If A, then B.
  - Not B.
  - **THEREFORE**
  - Not A.

Sound Arguments

- Sound Arguments
  - Valid with true premises

- Unsound Arguments
  - Formally Fallacious
    - Invalid form
    - Misapplication of a valid form
  - Informally Fallacious
    - Valid form with false premises
    - Irrelevant
    - Circular

Formal Fallacies: Denying the Antecedent

- A → B.
- If Moni is a registered voter, then she is over 18.
- ~A.
- Moni is not a registered voter.
- **THEREFORE**
- ~B.
- Moni is not over 18.
Formal Fallacies: Affirming the Consequent

- A → B.  
  - If Rush is on the radio, an idiot is on the radio.
- B.  
  - An idiot is on the radio.

**Therefore**  
- A.
  - Rush is on the radio.

Formal Fallacies: Composition

- A is part of M.  
- B is part of M.  
- C is part of M.  
- D is part of M.  
- A, B, C, and D each have quality X

**Therefore**  
- M has quality X.

- Social Worker is a member of the multidisciplinary team.  
- Attorney is a member of the multidisciplinary team.  
- Pediatrician is a member of the multidisciplinary team  
- Child Psychologist is a member of the multidisciplinary team  
- Each does their job well

**Therefore**  
- The team does its job well.

Formal Fallacies: Division

- M has quality X.  
- A is part of M.  
- B is part of M.

**Therefore**  
- A and B each have quality X.

- The Burns-Allen couple are fun to have around.
- George is part of the Burns-Allen couple.
- Gracie is part of the Burns-Allen couple.

**Therefore**  
- George is fun to have around; Gracie is fun to have around.

Informal Fallacies

- Appeal to Authority  
  (argumentum ad verecundiam - argument to modesty)
- Irrelevant Appeals  
  (ignoratio elenchi - ignorant refutations)
- Confusion
- Faulty Classification
- Begging the Question  
  (petitio principii - begging of the principle)

Two Types of Inductive Argument

- Statistical Arguments – do not require an assumption that the universe is consistent
  - Statistical Syllogism
  - Statistical Generalization
- Consistency Arguments – based in the assumption that the universe is consistent
  - Induction by Enumeration
  - Induction by Analogy

Statistical Syllogism

- p of A is B
- x is A
- Therefore
- x is B
- Where
  - A is a group
  - p is the proportion of A having characteristic B, and
  - x is an element of A
**Statistical Generalization**
- \( p \) of \( n \) randomly selected \( A \) is \( B \)
- Therefore
- About \( p \) of all \( A \) is \( B \)
- Where
  - \( n \) is the size of a sample,
  - \( A \) is the group from which the sample was randomly drawn, and
  - \( p \) is the proportion of a sample with characteristic \( B \)

**Induction by Enumeration**
- \( p \) of \( n \) observed \( A \) is \( B \)
- Therefore
- About \( p \) of all \( A \) is \( B \)
- Where
  - \( n \) is the size of a sample,
  - \( A \) is the group from which the sample was non-randomly drawn, and
  - \( p \) is the proportion of a sample with characteristic \( B \)

**Induction by Analogy**
- \( C_1x \quad \& \quad C_2x \quad \& \quad C_3x \)
- \( C_1y \quad \& \quad C_2y \quad \& \quad C_3y \)
- \( D_y \)
- Therefore
- \( D_x \)
- Where
  - \( C_1, C_2, \) and \( C_3 \) are characteristics known to be held in common by entities \( x \) and \( y \)
  - \( D \) is a characteristic known to be held by entity \( y \)

**Inductive Fallacies**
- Fallacy of Exclusion
- Questionable Analogy
- Hasty Generalization
- Unrepresentative Sample

**Fallacy of Exclusion**
- This fallacy occurs when information that would affect a conclusion is left out of the argument.
- This decreases the relevance of the premise to the conclusion, reducing the inductive probability of the argument.
- The exclusion of evidence does not in itself constitute a fallacy. It must be relevant evidence.

**Questionable Analogy**
- This is a misuse of the Induction by Analogy argument
- An analogical argument fails when the similarities between two objects are not relevant to the property under consideration.
Hasty Generalization

- This is a misuse of the Statistical Generalization and Induction by Enumeration arguments
- This fallacy occurs when one reaches a conclusion before enough data have been collected to justify the conclusion.

Unrepresentative Sample

- This is a misuse of the Statistical Generalization and Induction by Enumeration arguments
- This fallacy occurs when one draws a conclusion based upon a sample that there is good reason to believe is biased.