How Do You Know What the Right Logic Is?

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Introduction

1 Some Crucial Distinctions

Pure and Applied

- Geometry

Pure and Applied

- Geometry
- Logic

2 A Little History

Darapti

All *A*s are *B*s
All *A*s are *C*s
So:
Some *B*s are *C*s

Explosion

No *A*s are *B*s
Some *B*s are *A*s
So:
All *A*s are *A*s

3 A Model of Theory Choice

Criteria of Goodness

- adequacy to the data
- simplicity
- consistency
- power
- avoidance of *ad hoc* elements

A Formal Model; Components

- Criteria: $\{c_1, ..., c_n\}$.
- Measuring scale: $[-10, +10] \subseteq \mathbb{Z}$.
- Measure function: μ_c
  - for any theory, T, $\mu_c(T) \in [-10, +10]$.
- Weights: w_c
  - for any criterion, c, $w_c \in [-10, +10]$.

A Formal Model. Definitions

- Rationality index: ρ
  - $\rho(T) = w_{c_1}\mu_{c_1}(T) + \ldots + w_{c_n}\mu_{c_n}(T)$

A Formal Model. Definitions

- Rationality index: ρ
  - $\rho(T) = w_{c_1}\mu_{c_1}(T) + ... + w_{c_n}\mu_{c_n}(T)$
- If the theories on the table are T_1, ..., T_k, the rationally preferable one is that with the highest rationality index.

An Example

- From traditional logic to classical logic

4 Comments on the Model

Comments

- Rational reconstruction

Comments

- Rational reconstruction
- Fallibilism

Comments

- Rational reconstruction
- Fallibilism
- Situatedness

Comments

- Rational reconstruction
- Fallibilism
- Situatedness
- Data

Data

John is in Rome.
If John is in Rome he is in Italy.

John is in Italy.

John is either in Rome or in Florence.
If John is in Rome he is in Italy.
If John is in Florence he is in Italy.

John is in Italy.

Intuitively Invalid Inferences

John is either in Rome or in Florence.
John is in Rome.

If John is in Rome he is in Italy.
John is not in Rome.
John is not in Italy.

Another Intuitively Valid Inference

Mary is taller than John.
John is taller than Betty.

Mary is taller than Betty.

Another Intuitively Valid Inference

Mary is taller than John.
John is taller than Betty.

Mary is taller than Betty.

- For all people, x, y, and z, if x is taller than y and y is taller than z, then x is taller than z.

5 A Problem for the Model?

A Problem?

- Logic is required to revise logic

A Problem?

- Logic is required to revise logic
- How much logic?

A Problem?

- Logic is required to revise logic
- How much logic?
- What can go wrong?

Conclusion

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How do you know what the right epistemology of logic is?