

The mismatch problem is the chief challenge for the best system analysis

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1. Best System Analysis (BSA)

According to the BSA, laws are the axioms of a deductive system that achieves the best balance between simplicity and strength (Lewis, 1973). These axioms, however, must refer to Nature's own (system-independent) natural properties (Lewis, 1983)

2. Lewisian Natural Properties

Lewis holds that natural properties are metaphysically primitive and unanalysable, considering it highly plausible that physics can identify them: mass, momentum, and spin as strong candidates for perfectly natural properties.

$$F = \frac{Gm_1m_2}{r^2}$$

3. The problem of mismatch

The laws and the Lewisian distribution of natural properties identified may fail to align perfectly with the actual scientific laws (e.g., laws of physics) (Loewer, 2024): Why should Lewis' BSA metaphysical conception of laws and properties align with scientific practice?

4. Examples of mismatches

- 1 Metaphysical mismatches:** Scientific laws may not align with Lewis's Best System due to unknowable property quiddities.
- 2 Historical mismatches:** History of physics reveals multiple formulations with different fundamental properties, undermining Lewis's privileged natural properties.
- 3 Normative mismatches:** Lewis provides no normative justification for prioritizing natural properties over legitimate scientific predicates.

5. Better Best System (BBSA)

BBSA holds that each special science constructs its own best systematization, employing its own language in line with its pragmatic interests and explanatory aims. (Schrenk, 2017)

BBSA and mismatches

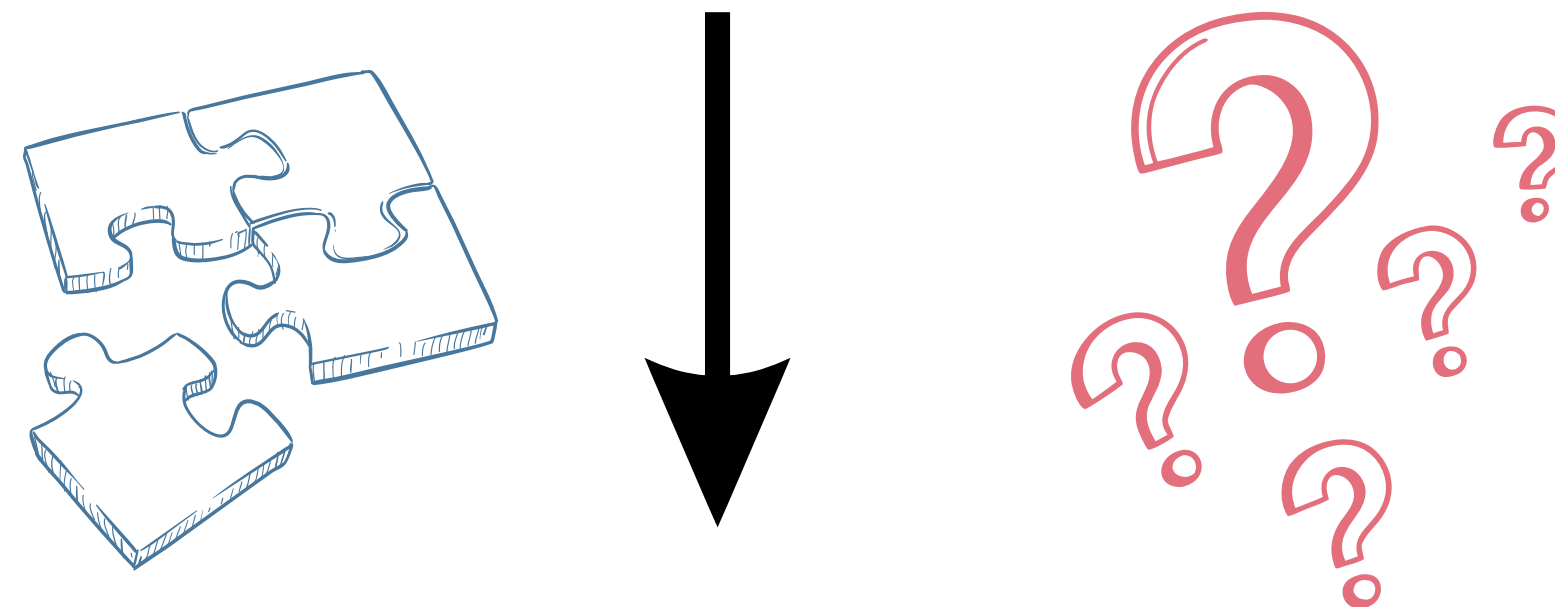
This dissolves the problem of mismatch entirely, as BBSA abandons the assumption of a fixed, elite set of properties. Instead, each discipline selects its own vocabulary (e.g., chemistry its own terms, biology its own predicates, economics its own language) tailored to its specific domain.

6. Pragmatic Best System Analysis (PBSA)

The Pragmatic Best System Analysis emphasizes the cognitive needs of scientific agents, viewing laws as generalizations tailored to enhance the cognitive efficiency of limited creatures with scarce resources – for instance, facilitating predictions about system behaviour (Jaag & Loew, 2018).

PBSA and mismatches

PBSA avoids the problem of mismatch by default, as its focus on cognitive usefulness shifts emphasis onto scientific agents themselves, who determine in which language or languages they wish to formulate their laws.



How can BSAs rule out mismatches?

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