Feyerabend: “How to be a good empiricist”

Critique of Nagel’s model of reduction within a larger critique of the logical empiricist view of scientific progress.

Logical empiricism:

- associated with figures like Hempel, Reichenbach, Carnap
- characterized by:
  - rejection of ‘dogmatic’ metaphysical principles (e.g., uniformity of nature)
  - models of confirmation, explanation, reduction, etc. based on experience and logic/mathematics
- Scientific progress appears cumulative: evidence stays evidence, meanings don’t change, theoretical achievements are preserved.

Example: Bayesian account of confirmation. Fixed vocabulary and fixed prior probabilities. [Problem of old evidence reveals the difficulty in handling novelty.]

Example: Nagel’s model of reduction (and Hempel’s D-N explanation) as derivation. Nagel-style reduction is conservative: new ‘reducing’ theories must be consistent with old ‘reduced’ ones; new meanings of concepts are consistent with old ones.

Nagel’s theory is F’s target because he sees Nagel-style reduction as the primary form of scientific progress for logical empiricists.

Feyerabend’s criticism:

- sometimes scientific change is more radical than this
- and it ought to be more radical than this

Feyerabend’s alternative: create counterweights.

Empiricists ought to encourage the proliferation of rival theories. That is the best way to criticize/test currently accepted theories.
I. Nagel on Reduction: brief review

- Reduction: a relation between reduced (higher-level) theory S and the reducing (lower-level) theory T. [Use S and T to avoid differences between Nagel and Feyerabend.]

- The relation is explanation; and explanation for Nagel means logical derivation. Statements of T are [some of] the premises, a statement of S is the conclusion, and the argument is valid.

- Homogeneous case: concepts of S also belong to T, with same meaning. The laws of S are directly derivable from the laws of T (plus boundary conditions).

  Amended to: approximately derivable.

- Inhomogeneous case: S has concepts not belonging to T, or with different meaning. The laws of S are derivable from the laws of T, boundary conditions, and a set of correspondence rules or bridge laws that express relations between concepts of S and T.

  Status of bridge laws:
  
  a) Identity statements (empirically discovered)

  Morning star = evening star
  water = H₂O

  b) Empirical hypotheses specifying the conditions under which an attribute of S occurs, in terms of concepts of T.

  Temp. t occurs when avg. kinetic energy is E
  Pain occurs in brain state B₁ or B₂ or …
II. Outline of Feyerabend

§2: Two conditions applied to theory change (including reduction)
   • consistency and meaning invariance
   • both required by Nagel’s account

[Descriptive criticism]
§3: The conditions are not actually required by science.

[Philosophical/normative criticism]
§4-6: Consistency condition ought to be rejected

§7: Meaning invariance ought to be rejected

§8-9. Consequences and Feyerabend’s alternative
III. The two conditions

1) **Consistency condition.** If S is to be reduced to T, then S and T must be *logically consistent.* (That is, S cannot contradict T.)

   Nagel must accept it:
   - homogeneous case — follows if S is logically *derivable* from T.
   - non-homogeneous — S cannot contradict T plus bridge laws (since it’s derivable from T plus bridge laws)

Initial criticism:
- Feyerabend extends this from reduction to: any proposed new theory must be consistent with old theory
- intolerant of theoretical novelty (e.g., Copenhagen interpretation of QM)

**Objections to Feyerabend:**

- *Consistency:* only meant to apply to cases of reduction
- *approximate derivability:* don’t require perfect consistency
- *Kuhn:* science needs a certain amount of intolerance.

2) **Meaning invariance condition.** If S reduces to T (homogeneous case), then terms of S and T must have the *same meanings.* For non-homogeneous case, meanings must be *comparable* via bridge laws.

   Nagel must accept it:
   - If not, there can be no logical derivation.

**Objection:**

Distinguish between *meaning* and *extension.* For inhomogeneous case, we only require that bridge laws match *extensions* of concepts in S and T.

[Nagel on entropy: ‘common domain of application’]

By appealing to *approximate derivability* and *overlapping extensions,* Nagel can deflect many of the criticisms.
IV. Descriptive criticism: violations in actual science

1) Violations of consistency condition.

Example: Galileo/Kepler’s laws ‘reduce’ to Newton’s laws, but not consistent.

Nagel: enough to get a close approximation.

2) Violations of the meaning-invariance condition.

Example: classical and relativistic mass. Consider a relativistic explanation of conservation of classical mass.

Note: there’s a violation of consistency condition here [but approximately derivable].

- \( m_c \) (classical mass) is a property and \( m_r \) (relativistic mass) is a relation (involving a coordinate system). They can’t mean the same thing. Hence, not homogeneous reduction.

- Nor can there be a bridge law (p. 930): inconsistent with relativity theory

Nagel:

a) Perhaps it’s homogeneous (with approximate derivability).

b) Perhaps it is a case of replacement rather than reduction – but you can still explain why the classical law is approximately true.

3) Scientific revolutions

Aristotelian physics \( \rightarrow \) Newtonian physics

The new theory can “explain” portions of the old theory, but there is neither consistency nor meaning invariance.

Nagel: again, this is a case of replacement. And for explanation, you only need overlapping extensions.

4) Extension to observational terms

These too violate meaning-invariance. [Omit]
V. Normative criticism: the consistency condition

1) Arbitrary discrimination (favouring established theories on the basis of age)

- Any new theory T* has to be consistent with the old one T.
- If T and T* agree in implying given data but diverge on some unobserved result, then T* is unreasonably rejected just because it is not consistent with T and new.

Response:
- this goes beyond reduction: not implied by Nagel’s theory
- there is no demand of consistency if T is rejected
- if T is doing well: why waste time on T*? [Kuhn]
- focus instead on testing T with facts

2) Alternative theories bring new facts to light

Theoretical advances come from fresh empirical facts. Fresh facts emerge when we contemplate alternative theories.

Example: Brownian motion ‘refutes’ 2nd law of thermodynamics. This ‘fact’ only emerged in development of a rival point of view.

Hence, development of alternatives is an essential part of testing. The consistency condition hinders this, so it hinders progress (and fosters dogmatic science). It must go.

[cf. Kuhn: ‘new facts’ (anomalies) emerge most readily within the highly focused research of a single paradigm]

3) Without alternatives, current theory becomes self-perpetuating myth.

Potentially refuting facts never ‘surface’.
- strong version: success of T is ‘altogether fabricated’
- weak version: current theories tend to be accepted dogmatically.

Feyerabend suggests that quantum theory has these characteristics. How is it any better than belief in witchcraft and demonic possession?
VI. Normative criticism: meaning invariance

Tolerance of different theories requires tolerance of alternative meanings (not relatable by bridge laws).

i. We need alternative theories. [from preceding arguments]

ii. Meanings of terms depend upon their theoretical context.

Hence, we need to allow alternative meanings. The requirement of meaning invariance should be dropped.

Further:

Sometimes scientific change is not the result of new observation, but rather of conceptual innovation (example: impetus theory).

On behalf of Nagel:

a) If two proposed theories are totally incommensurable, then they cannot be either compatible or inconsistent.

b) Nothing here seems to rule out bridge laws (see point c).

c) By focusing on extension of terms, rather than intensions or meanings, there is no trouble with terms preserving (a portion of) their meaning across theories (Nagel’s example: entropy)
VII. Consequences of Feyerabend’s new empiricism

1. Pluralism of theoretical viewpoints required.
   
   Note. A less radical view is also possible: we should encourage pluralism within a paradigm of acceptability. But this won’t suit Feyerabend.

2. Restored role for metaphysics.

   Even empiricists concede that metaphysics can play a role in early stages of inquiry – but it should give way to evidence.

   Feyerabend argues: metaphysics provides essential tools for constructing alternatives (every theory starts out as metaphysics – e.g., ancient atomism)

3. Induction is a pseudo-problem.

   Empirical knowledge is a pseudo-concept! Knowledge leads to stability, and that leads to calcification. Any solution to the problem of induction is a problem for pluralism, so the problem of induction should be rejected.

   [Question: Who sounds dogmatic now?]

4. Rejection of synonymy arguments.

   For example: pain is not synonymous with any brain state, so pain can’t be given a material explanation

   Such arguments pre-suppose meaning invariance, so they are invalid. [The idea is that any concepts must be compatible with fundamental physical theory.]

   Lack of synonymy with accepted concepts is a virtue for Feyerabend.

   Question: Again, aren’t overlapping extensions enough?
**Conclusion: how to be a good empiricist**

**Critical metaphysics.**

Don’t rest content with ‘testing’ the accepted theory. Strive to invent alternatives.

- Initial step: broad general principles (metaphysics)
- Elaboration into detailed theories and predictions.

**Questions**

- Evolutionary parallels/disanalognes (proliferation of alternative forms)
- Kuhnian considerations: this kind of pluralism is appropriate in early stages or at times of crisis, but not otherwise.
- Kuhn again: reality is enough of a check on dogmatism. The efforts of ‘normal science’ will generate anomalies and ‘novel facts’ eventually.
- Independent of whether Feyerabend’s recommendation is appropriate: proliferation of theories **will not** occur if things are going well.
- On the other hand: it’s arguably an apt strategy for philosophy, where there is no guarantee of any “external friction” from reality.