

Hempel, "Empiricist Criteria of Cognitive Significance" (1950, 1951)

Project: Implement testability criterion meaning, or surrogate in logical formulation of scientific theories



Outcome: Failure.

Cognitive significance comes in degrees.

Appraise theories by characteristics
clarity, explanatory power, simplicity,
empirical support

Stages

capture cognitive significance in:

- "sentences" → • Logical relation to observation sentences.
(verifiability, falsifiability)
- "terms" → • Cognitively significant terms
- "systems" → • Cognitive significance requires interpreted systems.

Sentences

complete
verifiability
in principle

S is significant iff
S is not analytic
&
entailed by finitely
many observation
sentences

Fails: Universally
quantified
sentences
"SI"
fail

Significance not
closed under logical
operations

SI vs ~SI

$S \Rightarrow S \vee N$
↑ significant ↑ not significant

complete
falsifiability
in principle

S is significant
iff
~S is not analytic &
~S is entailed by finitely
many observation sentences

Fails: Existential
sentences
fail

Significance not closed
under logical operations

SI vs ~SI

$S \& N \Rightarrow S$
Not falsifiable falsifiable

Ayer's
weakening

S & auxiliaries \Rightarrow observation
sentences

Terms

3.1 Requirement of definability

Define fragile

struck breaks

↓ ↓ ↓

$Fx \equiv (t) (Sxt \supset Bxt)$



Fails. $\sim S \Rightarrow (S \supset B)$

Unstruck objects are fragile

Carnap's reduction sentences

$(x)(t) [Sxt \supset (Fxt \equiv Bxt)]$

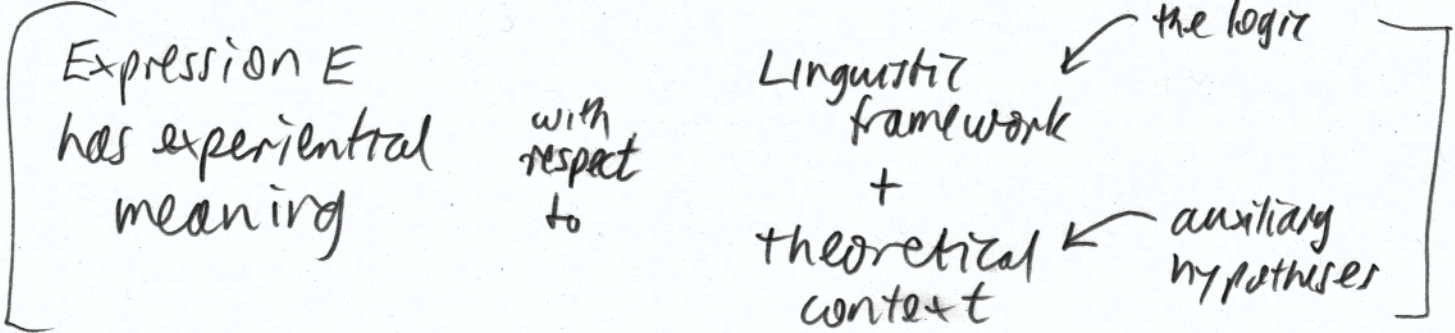
Fails. Cannot introduce theoretical predicates

e.g. Irrational lengths $\sqrt{2}$

cannot discriminate

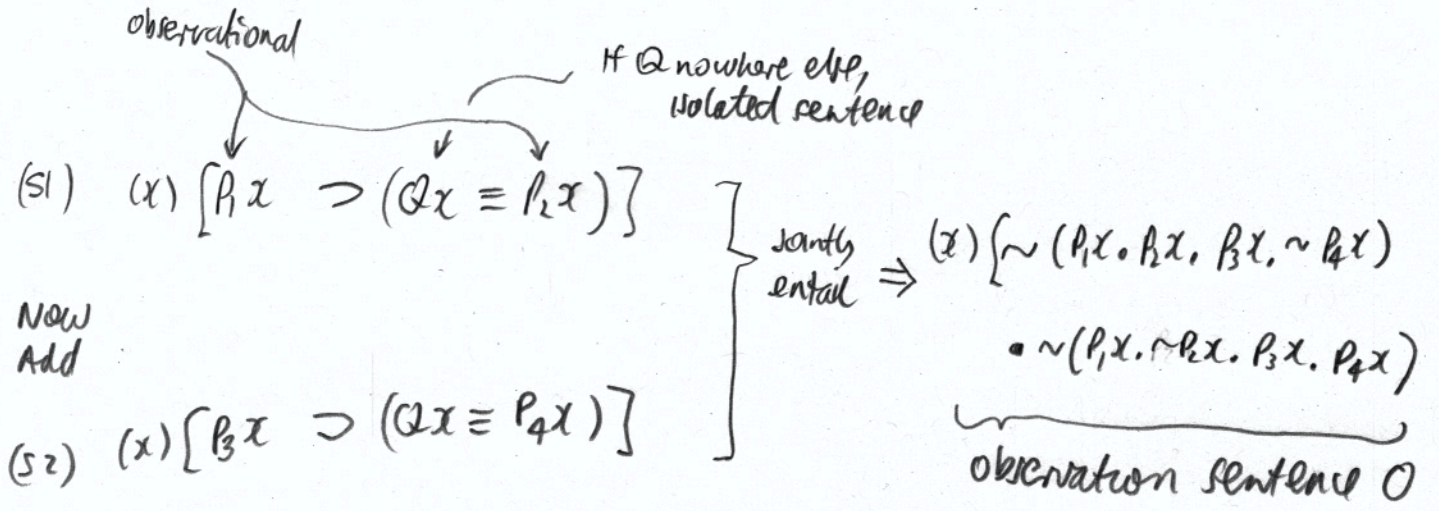
$\sqrt{2}$ vs $\sqrt{2} + 10^{-100}$ cm

System



(scientific theory & speculative metaphysics) → "isolated sentences" must be banned (4.1)

omission has no effect on observable consequences



Hence: (S1), (S2) alone can be analytic (partial definition of Q)

(S1), (S2) together - significant -- entail O

What is analytic is system dependent.

Sneak in isolated sentences?

T1 = I, S, S', ...
↑
isolated

T2 = I&S, S', ...

same observational consequences

∴ (4.2) system is cognitively significant iff partially interpreted and no system equivalent to it has isolated sentences

from earlier

Failure: S1, S2, 0 equivalent to 0

∴ (4.2) precludes introducing theoretical terms.

Collapse of project

"cognitive significance in a system is a matter of degree"

- Appraise systems by
- clarity,
 - explanatory & predictive power
 - simplicity
 - confirmation

Gems

- Clarity, simplicity, austerity of Hempel's writing.
- "conditions of adequacy"
- Devastating demolition of falsifiability