Carnap and the Rationality of Theory Choice

Mátyás (Matthias) Brendel

Budapest University of Technology and Economics, Hungary, Ph.D. program "History of Technology, Engineering and Science"

Supervisor: Márta Fehér

Currently living in Oulu, Finland

The goals of this presentation

- I investigate Irzik's and Friedman's view on this question.
- I intend to show some problems related to their arguments.
- I will present some quotes from Carnap, which underline my concerns.
- I wish to point out that these quotes are relevant and have to be considered.
- I point out some conceptual questions and problems as well.
- I show some direction to solve these issues.
- I suggest to continue the investigation and discussion, since I have not reached a satisfactory final view on these questions.

Outline

- **Re-evaluation of Carnap's philosophy**
- **Rationality of theory acceptance**
- **The argument based on linguistic framework relativity**
- **Carnap's concept of language**
- **Critique of the argument based on linguistic frameworks**
- **Rationality and under-determination**
- **Rationality and conventionalism**
- **Carnap on theory acceptance**
- **Conceptual questions**
- **Conclusions**

Re-evaluation of Carnap's philosophy

- Reisch, Earman, Friedman, Irzik
- Received view: Kuhn refuted Carnap
- Re-evaluated view: Kuhn and Carnap's philosophy is closer than thought before
- Differences in some details
- How far do we go in re-evaluation? Arch enemies or allies?
- Oliveira's critique
- My opinion: re-evaluation is needed.
- Neither enemies, nor allies, but something in-between. (We go not into details on this in this presentation.)
- The rationalist-question is probably the most important sub-topic in re-evaluation.

Rationality of theory acceptance

- Irzik & Friedman agrees in criticizing the standard account:

  - "Thus, Putnam, Kuhn, and others are incorrect when they claim that according to logical empiricism the scientific method exhausts rationality, at least in so far as Carnap's philosophy is concerned." (Irzik 2003, p. 335).

- Irzik criticizes Friedman 1998 claiming logical empirism not to meet rationality:

  - "So far, our interpretation agree; but then Friedman adds that the choice between different systems of rules and logics is purely conventional, governed by 'pragmatic - as opposed to rational – criteria", meaning that a pragmatic choice cannot be rational." (Irzik 2003, p. 333)

- Irzik claims Carnap to be instrumentally rational:

  - "... the adoption of a linguistic framework is instrumentally rational if it serves a predetermined goal efficiently." (Irzik 2003, p. 335.)

- Friedman 2002 is close to Irzik:

  - "And the reason for this have nothing to do with doubts about the incontrovertible predicative success of the scientific enterprise – they do not call into question, that is the instrumental rationality of this enterprise. What has been called in question, rather, is what Jürgen Habermas calls communicative rationality." (Friedman 2002., pp. 184.)

The argument based on linguistic framework relativity

- Irzik refers to „Empiricism, Semantics, and Ontology":

- C1: "The acceptance or rejection of abstract linguistic forms, just as the acceptance or rejection of any other linguistic forms in any branch of science, will finally be decided by their efficiency as instruments, the ratio of the results achieved to the amount of complexity of the efforts required. (Carnap, "Empiricism, Semantics, and Ontology", p. 221)

- Irzik (and Reisch) refers to "The Philosophy of Rudolf Carnap":

- C2: "... a change in language, and a mere change in or addition of, a truth-value ascribed to an indeterminate statement. ... A change of the first kind constitutes a radical alteration, sometimes a revolution, and it only occurs at certain historically decisive points in the development of science. ... A change of the first kind constitutes, strictly speaking, a transition from a language L_n to a new language L_{n+1}. (Carnap in Schilpp 1963, page 921).

- The argument reconstructed:
    - P0: External questions may only be solved in an instrumentally rational way. (assertion of Irzik and Friedman, partly included in C1?)
    - P1: Accepting a linguistic framework is an external question (C1)
    - P2: Scientific revolutions go with linguistic framework changes (C2)
    - Consequently: Theory acceptance may only be instrumentally rational.

Carnap's concept of language

- Carnap: the range of definition of a language is conventional (see also PoT):

  - C3: "Whether in the construction of a language S we formulate only L-rules or include also P-rules, and, if so, to what extent, is not a logico-philosophical problem, but a matter of convention and hence, at most, a question of expedience." (Carnap Syntax, p. 180)

- Carnap: there is a complete syntactical framework for science:

  - C4: "For everyone who takes the point of view of physicalism, it follows that our Language II forms a complete syntactical framework for science." (Syntax, p. 151)

- Contradiction?

  - P3: Scientific revolutions go with linguistic framework changes (C2)
  - P4: There exists a universal linguistic framework for science (C4)
  - P5: There will be always scientific revolutions. (I assume, there is a consensus on this)

- Solution: there are different types of linguistical frameworks. Wide, syntactical frameworks and narrower frameworks.

Critique of the argument based on linguistic frameworks

- Modified theses:
  - P6: Accepting a wide linguistic framework is an external question.
  - P7: Scientific revolutions go with narrower linguistic framework changes
  - Irzik's inference does not apply.
- "Language change" ≠ "accepting or rejecting a framework" (change is not necessarily rejection)
- Summary of critique:
  - Scientific revolutions do not necessarily go with linguistic change (see example later).
  - If they go with a linguistic change, this is a question of changing the language, not of accepting a total language, nor rejecting another. (see example later)
  - The linguistic framework, which may change with a scientific revolution, is not necessarily the kind of wide linguistic framework, of ESO, but a narrower one.

Rationality and under-determination

- Carnap about equivalent theories (under-determination):
- "It may recalled that, in our previous discussion of the flat world, we imagined two physicists who held two different theories about the nature of the world. It became apparent that these two theories were really equivalent, differing only in that they were two different ways of describing the same totality of facts. (...) One description, which we will call T, is non-Euclidean. The other, T is Euclidean. If the language of T, the non-Euclidean language is chosen, the laws of mechanics and optics remain the same as in pre-Einsteinian physics." (Carnap, "An introduction to the Philosophy of Science ", p.153.)
- Consequently: The Einsteinian revolution would have been possible without language change
- Consequently, framework choice is not always theory-choice
- It is meaningless to decide equivalent theories:
- "On the other hand, if we are dealing with the space of our universe, a space we cannot observe as something embedded in the space of a universe of higher dimension, then it is meaningless to ask whether space is non-Euclidean or whether our laws have to be modified to preserve Euclidean geometry. The two theories are merely two descriptions of the same facts. We can call them equivalent expression because we make exactly the same prediction about observable events in both theories". (Carnap, "An introduction to the Philosophy of Science", p. 150.)
- Conclusion: there are choices, which are meaningless. i.e. the rational decision is not a question here.

Rationality and conventionalism

- Carnap: PoT is only for structure, not for content:
- Cohen believes that my so-called principle of tolerance in the logical syntax contains a 'doctrine of conventionally chosen basic truth'. But this is not the case. The principle referred only to the free choice of the structure of the language, and not to the content of synthetic sentences. I emphasized the non-conventional, objective component in the knowledge of facts, (...)" (Carnap in Schilpp 1991., p. 864.)

- The analytic-synthetic distinction is essential. Do we accept this distinction? Is this the question?

- Conventionality goes for analytic part. That is why it is pragmatical.

- The synthetical part is non-conventional.

- Consequently: Carnap's conventionalism does not threaten rationality.

- Irzik: Carnap never stated that Theory of Relativity is confirmed.

- "I am not aware of any passage in Carnap's writings where he says that relativity theory is cognitively better than classical mechanics"(Irzik, ibid., p. 338.)

- Carnap actually stated this:

- "The first measurement of these displacements were made by Finlay Freundlich, in the Einstein Tower in Postdam, (..) the tests proved to be a dramatic confirmation of Einstein's theory". (Carnap, "An introduction to the Philosophy of Science ", p. 159.)

- This may be a contradiction or a development in the last years of Carnap.

Carnap on theory acceptance

- Irzik: degree of confirmation is framework relative (several citations in Irzik, ibid.)

- Carnap: There is inductive machine for degree of confirmation.

- "I agree that there cannot be an inductive machine if the purpose of the machine is to invent new theories. I believe, however, that there can be an inductive machine with much more modest aim. Given certain observations e and hypothesis h (...), then I believe it is in many cases possible to determine, by mechanical procedures, the logical probability, or degree of confirmation, of h on the basis of e." (Carnap, "An introduction to the Philosophy of Science ", p. 34)

- Carnap rejects decision completely for theoretical questions:

- "'Among the given hypotheses h1, h2, etc., I chose the hypothesis h1,' it would be better to say: 'I assign to the hypothesis h1 a high probability' (and if in more exact terms: 'the probability with the numeric value h1), 'to the hypothesis h2 a smaller probability' (and again if possible: 'the numerical value q2),and so on. For X to pick up one of the hypotheses and to declare that he accepts it would give only a crude indication of the knowledge that X possesses with respect to the matter in question." (Carnap, "Probability and Content Measure ")

- Conclusion: Carnap is rational, decision about theories is not rational (at least for Carnap).

- Do we accept this as rational? Do we accept this thesis? Which one is the question?

Conceptual questions

- Are these distinctions the same?
    - theoretical versus instrumental rationality
    - internal versus external justification
    - validation and vindication
    - algorithmic computability versus un-computability
    - methodological versus non-methodological viewpoint
    - pragmatical and theoretical questions
    - True-false questions and questions of degree
    - Questions of realism versus non-reality questions (analytical-synthetical distinction)
- There may be different cases:
    - We agree with certain views Carnap hold.
    - Independently of the first choice, we may find the consequences to be rational or not.
    - Is it possible to agree with Carnap, but find the consequences irrational?

Hierarchy of Frameworks

- Carnap did not develop a hierarchy, but a hierarchy helps to clarify the question.
- Friedman's hierarchy:
    - Theories
    - A priori principles
    - Philosophical meta-paradigms or meta-frameworks
- My hierarchy:
    - Not so strict.
    - There are smaller frameworks of theories, bigger, synthactical frameworks, mathematical frameworks, natural languages, framework of scientific methodology, etc.
    - A question can be decided rational, if a framework can be set to define the question and solve it.
    - For every meaningful question there should be, and can be a framework defined.
    - The top of the hierarchy is not developed, only as needed that is why it is practical.
- If we assume that Carnap implicitly assumed such a hierarchy that would clarify some contradictions.

Conlcusions

- Carnap's concept about theory choice is complex
  - "… the complexity of his views about justification makes it difficult to label him" (Irzik 2003, p. 326).
- It is not easy to put together different quotes and different views of Carnap
- There may be contradictions, Carnap may not have put together the details
- Carnap's view may have been changed in time. A further change between 1960-70 is likely,
- Carnap's views may be incomplete
- A lot of conceptual clarification is needed even for us
- Carnap's view may be developed further with a hierarchical solution, which he missed to develop himself. The hierarchical view however helps to clarify Carnap's view if we assume that he was implicitly thinking something like this.
- The investigation and discussion on these questions should be continued.
- We may find that Carnap was as rational as possible relative to the views he hold to be true.
- It is not easy to answer questions in the name of Carnap, which he did not face.

Appendix: Algorithmic computation

- An inductive method of theory acceptance would be:
  - Algorithmic
  - Methodological
  - External to theories
  - But internal to scientific method
  - A yes-no question, but based on a question of degree.
- A decision based on "simplicity, efficiency and fruitfulness "(or other aspects)
  - May be algorithmic, or not.
  - An algorithmic version could be developed on definition and calculation of the factors, and an algorithm for making decision based on the factors.
- Conclusion: it seems that a decision is practical until some meta-framework and method is fixed to solve it.

Appendix: The witch-doctor example

- A witch-doctor probably has no framework at all. So for Carnap this view-point would not be scientific at all.

- A witch-doctor's "theory" is probably metaphysical for Carnap.

- A witch-doctor's suggestion for treatment is probably not deducible from his "theory". Its not a hypothetic-deductive system.

- A witch-doctor's goal is probably pleasing the gods (Irzik), i.e. different framework

- If a witch doctor would have a meaningful, empirical theory, then it is scientific, and a degree of confirmation may be established.

- If a witch-doctor has an empirically equivalent, alternative theory, it is undecidable, but this is not a meaningful question for Carnap, so it is OK, not irrational.

- If a witch-doctor has a competing, empirically distinguishable theory, which is highly improbable, then it may be true, that Carnap would say we only have to decide in practical questions, based on utility, which is connected to degree of confirmation. We do not have to decide the theory.