

Schedule of Lectures for “The Structure and Semantics of Scientific Theories”

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course website:

<http://strangebeautiful.com/lmu/2016-winter-sems-theors.html>

Winter, 2016

Thursdays, 14:00–16:00 C.T.

Ludwigstr. 31, 021

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6 FINAL PAPER DUE: 31. Mar **9**

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N.b.: many of the required and suggested readings are available online at the course’s website, though they may not be listed as such in the bibliography:

<http://strangebeautiful.com/lmu/2016-winter-sems-theors.html>

1 Weeks 1–2: Introduction and Historical Background (20–27 Oct)

1.1 Week 1: Introduction (20 Oct)

Required Reading

1. [Curiel \(2011\)](#), “Notes on Learning Philosophy”

Suggested Reading

1. [Suppe \(1974a\)](#), “The Search for Philosophic Understanding of Scientific Theories”
2. [Suppe \(2000\)](#), “Understanding Scientific Theories: An Assessment of Developments, 1969–1998”

1.2 Week 2: Russell, Ramsey and the Roots of Structuralism (27 Oct)

Required Reading

1. [Russell \(1927\)](#), *The Analysis of Matter*: chs. XVIII–XXIV (pp. 178–256)

Strongly Suggested Reading

1. [Ramsey \(1931c\)](#), “Theories”

Suggested Reading

1. [Demopoulos and Friedman \(1985\)](#), “Bertrand Russell’s *The Analysis of Matter*: Its Historical Context and Contemporary Interest”
2. [Demopoulos and Friedman \(1989\)](#), “The Concept of Structure in Russell’s *The Analysis of Matter*”
3. [Fraassen \(2008\)](#), *Scientific Representation: Paradoxes of Perspective*: ch. 9
4. [Newman \(1928\)](#), “Mr. Russell’s Causal Theory of Perception”
5. [Ramsey \(1931a\)](#), “Facts and Propositions”

2 Week 3: NO LECTURE, Dr. Curiel out of town (03 Nov)

3 Weeks 4–7: The Logical Empiricists, the “Received View”, and Its Discontents (10–25 Nov)

3.1 Week 4: Carnap I (10 Nov)

1. Carnap (1956b), “The Methodological Character of Theoretical Concepts”: §§I–VI (pp. 38–52)

Suggested Reading

1. Carnap (1936), “Testability and Meaning”
2. Carnap (1959), *The Logical Syntax of Language*: Part V
3. Carnap (1956b), “The Methodological Character of Theoretical Concepts”: §§VII–XI (pp. 52–75)
4. Carnap (1961), “On the Use of Hilbert’s ε -Operator in Scientific Theories”
5. Coffa (2008), *The Semantic Tradition Kant to Carnap: To the Vienna Station*
6. Demopoulos (2013b), “On Extending ‘Empiricism, Semantics and Ontology’ to the Realism-Instrumentalism Controversy”
7. Demopoulos (2013c), “On the Rational Reconstruction of Our Theoretical Knowledge”
8. Demopoulos (2013d), “Three Views of Theoretical Knowledge”
9. Friedman (2007), “Coordination, Constitution, and Convention: The Evolution of the A Priori in Logical Empiricism”
10. Friedman (2011a), “Carnap on Theoretical Terms: Structuralism without Metaphysics”
11. Hempel (2001a), “The Meaning of Theoretical Terms: A Critique of the Standard Empiricist Construal”
12. Lewis (1970), “How to Define Theoretical Terms”
13. Lutz (2014a), “Carnap on Empirical Significance”
14. Lutz (2014b), “Empirical Adequacy in the Received View”
15. Mormann (2007), “The Structure of Scientific Theories in Logical Empiricism”
16. Quine (1951), “On Carnap’s Views on Ontology”
17. Ramsey (1931c), “Theories”
18. Reichenbach (1965), *The Theory of Relativity and A Priori Knowledge*
19. Reichenbach (1936), “Logistic Empiricism in Germany and the Present State of its Problems”
20. Winnie (1967), “The Implicit Definition of Theoretical Terms”
21. Winnie (1971), “Theoretical Analyticity”

3.2 Week 5: Carnap II (17 Nov)

1. Carnap (1966), *An Introduction to the Philosophy of Science: Philosophical Foundations of Physics*: part V, chs. 23–26 (pp. 225–256)

Suggested Reading

1. Carnap (1936), “Testability and Meaning”

2. Carnap (1959), *The Logical Syntax of Language*: Part v
3. Carnap (1956b), “The Methodological Character of Theoretical Concepts”: §§VII–XI (pp. 52–75)
4. Carnap (1961), “On the Use of Hilbert’s ε -Operator in Scientific Theories”
5. Coffa (2008), *The Semantic Tradition Kant to Carnap: To the Vienna Station*
6. Demopoulos (2013b), “On Extending ‘Empiricism, Semantics and Ontology’ to the Realism-Instrumentalism Controversy”
7. Demopoulos (2013c), “On the Rational Reconstruction of Our Theoretical Knowledge”
8. Demopoulos (2013d), “Three Views of Theoretical Knowledge”
9. Friedman (2007), “Coordination, Constitution, and Convention: The Evolution of the A Priori in Logical Empiricism”
10. Friedman (2011a), “Carnap on Theoretical Terms: Structuralism without Metaphysics”
11. Hempel (2001a), “The Meaning of Theoretical Terms: A Critique of the Standard Empiricist Construal”
12. Lewis (1970), “How to Define Theoretical Terms”
13. Lutz (2014a), “Carnap on Empirical Significance”
14. Lutz (2014b), “Empirical Adequacy in the Received View”
15. Mormann (2007), “The Structure of Scientific Theories in Logical Empiricism”
16. Quine (1951), “On Carnap’s Views on Ontology”
17. Ramsey (1931c), “Theories”
18. Reichenbach (1965), *The Theory of Relativity and A Priori Knowledge*
19. Reichenbach (1936), “Logistic Empiricism in Germany and the Present State of its Problems”
20. Winnie (1967), “The Implicit Definition of Theoretical Terms”
21. Winnie (1971), “Theoretical Analyticity”

3.3 Week 6: Carnap III (24 Nov)

Required Reading

1. Carnap (1956a), “Empiricism, Semantics and Ontology”

Suggested Reading

1. Carnap (1936), “Testability and Meaning”
2. Carnap (1959), *The Logical Syntax of Language*: Part v
3. Carnap (1956b), “The Methodological Character of Theoretical Concepts”: §§VII–XI (pp. 52–75)
4. Carnap (1961), “On the Use of Hilbert’s ε -Operator in Scientific Theories”
5. Coffa (2008), *The Semantic Tradition Kant to Carnap: To the Vienna Station*
6. Demopoulos (2013b), “On Extending ‘Empiricism, Semantics and Ontology’ to the Realism-Instrumentalism Controversy”
7. Demopoulos (2013c), “On the Rational Reconstruction of Our Theoretical Knowledge”
8. Demopoulos (2013d), “Three Views of Theoretical Knowledge”
9. Friedman (2007), “Coordination, Constitution, and Convention: The Evolution of the A Priori in Logical Empiricism”
10. Friedman (2011a), “Carnap on Theoretical Terms: Structuralism without Metaphysics”

11. Hempel (2001a), “The Meaning of Theoretical Terms: A Critique of the Standard Empiricist Construal”
12. Lewis (1970), “How to Define Theoretical Terms”
13. Lutz (2014a), “Carnap on Empirical Significance”
14. Lutz (2014b), “Empirical Adequacy in the Received View”
15. Mormann (2007), “The Structure of Scientific Theories in Logical Empiricism”
16. Quine (1951), “On Carnap’s Views on Ontology”
17. Ramsey (1931c), “Theories”
18. Reichenbach (1965), *The Theory of Relativity and A Priori Knowledge*
19. Reichenbach (1936), “Logistic Empiricism in Germany and the Present State of its Problems”
20. Winnie (1967), “The Implicit Definition of Theoretical Terms”
21. Winnie (1971), “Theoretical Analyticity”

3.4 Week 7: Hempel and Putnam: Modifications to and Criticisms of the Received View (01 Dec)

Required Reading

1. Hempel (2001b), “On the ‘Standard Conception’ of Scientific Theories”
2. Demopoulos handout on Putnam’s “model-theoretic” argument (<http://strangebeautiful.com/lmu/readings/demopoulos-putnam-model-arg.pdf>)
3. Putnam (1977), “Realism and Reason”

Suggested Reading

1. Demopoulos (2013c), “On the Rational Reconstruction of Our Theoretical Knowledge”
2. Demopoulos (2013d), “Three Views of Theoretical Knowledge”
3. Feigl (1970), “The ‘Orthodox’ View of Theories: Remarks in Defense as Well as Critique”
4. Hempel (1965), “The Theoretician’s Dilemma: A Study in the Logic of Theory Construction”
5. Hempel (2001a), “The Meaning of Theoretical Terms: A Critique of the Standard Empiricist Construal”
6. Hempel (2001c), “On the Structure of Scientific Theories”
7. Lutz (2012), “On a Straw Man in the Philosophy of Science: A Defense of the Received View”
8. Lutz (2014b), “Empirical Adequacy in the Received View”
9. Lutz (2014c), “What’s Right with a Syntactic Approach to Theories and Models?”
10. Mormann (2007), “The Structure of Scientific Theories in Logical Empiricism”
11. Nagel (1979a), “The Cognitive Status of Theories”
12. Nagel (1979b), “Experimental Laws and Theories”
13. Przełęcki (1969), *The Logic of Empirical Theories*
14. Putnam (1979), “What Theories Are Not”
15. Putnam (1983e), “‘Two Dogmas’ Revisited”
16. Quine (1960), “Carnap and Logical Truth”
17. Quine (1980c), “Two Dogmas of Empiricism”
18. Stein (1992), “Was Carnap Entirely Wrong, After All?”

4 Weeks 8–9: The Semantic View (08–15 Dec)

4.1 Week 8: Tarskian Semantics and Suppes (08 Dec)

Required Reading

1. Suppes (1960), “A Comparison of the Meaning and Uses of Models in Mathematics and the Empirical Sciences”
2. Suppes (1962), “Models of Data”

Strongly Suggested Reading

1. Tarski (1956), “The Concept of Truth in Formalized Languages”: introduction, §§1–3, 6 (pp. 152–208, 265–268)
2. Tarski (1954), “Contributions to the Theory of Models. I”

Suggested Reading

1. Hodges (1997), *A Shorter Model Theory*
2. Muller (2011), “Reflections on the Revolution at Stanford”
3. Putnam (1983b), “Models and Reality”
4. Quine (1980b), “Notes on the Theory of Reference”
5. Suppes (1957), *Introduction to Logic*
6. Suppes (1969), *Studies in the Methodology and Foundations of Science: Selected Papers from 1951 to 1969*
7. Suppes (1974), “The Structure of Theories and the Analysis of Data”
8. Suppes (1988), “Philosophical Implications of Tarski’s Work”
9. Suppes (1993), *Models and Methods in the Philosophy of Science: Selected Essays*
10. Suppes (2002), *Representation and Invariance of Scientific Structures*

4.2 Week 9: van Fraassen; Critics of the Semantic View (15 Dec)

Required Reading

1. Fraassen (1980), *The Scientific Image*: ch. 3, pp. 41–69
2. Halvorson (2012), “What Scientific Theories Could Not Be”
3. Halvorson (2013), “The Semantic View, If Plausible, Is Syntactic”

Suggested Reading

1. Churchland and Hooker (1985), *Images of Science: Essays on Realism and Empiricism, with a Reply from Bas C. van Fraassen*
2. Curiel (2016), “Animadversions on the Semantic View of Theories”
3. Fraassen (2008), *Scientific Representation: Paradoxes of Perspective*
4. Monton (2007), *Images of Empiricism: Essays on Science and Stances, with a Reply from Bas C. van Fraassen*
5. Fraassen (2014), “One or Two Gentle Remarks about Hans Halvorson’s Critique of the Semantic View”
6. Frigg (2006), “Scientific Representation and the Semantic View of Theories”

7. [*** add Giere ***]
8. Glymour (2013), “Theoretical Equivalence and the Semantic View of Theories”
9. Lutz (2012), “On a Straw Man in the Philosophy of Science: A Defense of the Received View”
10. Lutz (2014c), “What’s Right with a Syntactic Approach to Theories and Models?”
11. Morrison (1999), “Models as Autonomous Agents”
12. Morrison (2000), *Unifying Scientific Theories: Physical Concepts and Mathematical Structures*
13. Putnam (1975a), “Explanation and Reference”
14. Putnam (1975b), “How Not to Talk about Meaning”
15. Putnam (1975c), “Is Semantics Possible?”
16. Putnam (1983a), “Introduction: An Overview of the Problem”
17. Putnam (1983d), “Reference and Truth”
18. Suárez and Cartwright (2008), “Theories: Tools versus Models”
19. Thomson-Jones (2006), “Models and the Semantic View”

5 Weeks 10–16: Contemporary Approaches (22 Dec–10 Feb)

5.1 Week 10: Neo-Structuralism I (22 Dec)

Required Reading

1. da Costa and French (2005), *Science and Partial Truth: A Unitary Approach to Models and Scientific Reasoning*: chs. 1–3 pp. 8–83; ch. 8 pp. 160–194

Suggested Reading

1. Brading and Landry (2006), “Scientific Structuralism: Presentation and Representation”
2. Brading and Landry (2004), “A Minimal Construal of Scientific Structuralism”
3. Bueno, French, and Ladyman (2012), “Models and Structures: Phenomenological and Partial”
4. Chakravartty (2010), “Informational versus Functional Theories of Scientific Representation”
5. da Costa and French (1990), “The Model-Theoretic Approach in Philosophy of Science”
6. da Costa and French (2005), *Science and Partial Truth: A Unitary Approach to Models and Scientific Reasoning*: chs. 5–9
7. Fraassen (2006), “Representation: The Problem for Structuralism”
8. Fraassen (2007), “Scientific Structuralism: Structuralism(s) About Science: Some Common Problems”
9. Fraassen (2008), *Scientific Representation: Paradoxes of Perspective*: ch. 11
10. Frigg (2002), “Models and Representation: Why Structures Are Not Enough”
11. Pincock (2005), “Overextending Partial Structures: Idealization and Abstraction”
12. Sneed (1971), *The Logical Structure of Mathematical Physics*
13. Stegmüller (1976), *The Structure and Dynamics of Theories*
14. Suárez and Cartwright (2008), “Theories: Tools versus Models”

5.2 Week 11: Neo-Kantianism (12 Jan)

Required Reading

1. [Friedman \(2001\)](#), *The Dynamics of Reason*: Part One (pp. 3–70); Part Two, §§1–2 (pp. 71–92)

Suggested Reading

1. [DiSalle \(2002\)](#), “Reconsidering Kant, Friedman, Logical Positivism, and the Exact Sciences”
2. [Domski and Dickson \(2010\)](#), *Discourse on a New Method: Reinvigorating the Marriage of History and Philosophy of Science*
3. [Fraassen \(2008\)](#), *Scientific Representation: Paradoxes of Perspective*: ch. 5, pp. 115–140
4. [Friedman \(2011b\)](#), “Extending the Dynamics of Reason”
5. [Friedman \(2012\)](#), “Reconsidering the Dynamics of Reason: Response to Ferrari, Mormann, Nordmann, and Uebel”

5.3 Week 12: NO LECTURE, Dr. Curriel out of town (19 Jan)

5.4 Week 13: Inferentialism (26 Jan)

Required Reading

1. [Suárez \(2004\)](#), “An Inferential Conception of Scientific Representation”

Suggested Reading

1. [Bolinska \(2013\)](#), “Epistemic Representation, Informativeness and the Aim of Faithful Representation”
2. [Chakravartty \(2010\)](#), “Informational versus Functional Theories of Scientific Representation”
3. [Contessa \(2007\)](#), “Scientific Representation, Interpretation, and Surrogate Reasoning”
4. [Giere \(2010\)](#), “An Agent-Based Conception of Models and Scientific Representation”
5. [Knuuttila \(2011\)](#), “Modelling and Representing: An Artefactual Approach to Model-Based Representation”
6. [Shech \(2015\)](#), “Scientific Misrepresentation and Guides to Ontology: The Need for Representational Code and Contents”
7. [Suárez \(2008\)](#), “Scientific Fictions as Rules of Inference”
8. [Suárez and Cartwright \(2008\)](#), “Theories: Tools versus Models”

5.5 Week 14: Neo-Carnapianism I (03 Feb)

Required Reading

1. [Stein \(1994\)](#), “Some Reflections on the Structure of Our Knowledge in Physics”
2. [Stein \(1992\)](#), “Was Carnap Entirely Wrong, after All?”: pp. 298–291 (from “Now, I have remarked that” on p. 289, to “in terms of the pragmatics of a Carnapian framework.” on p. 291)

Suggested Reading

1. Fraassen (1980), *The Scientific Image*, chs. 3–4
2. Fraassen (2008), *Scientific Representation: Paradoxes of Perspective*: chs. 6–7, pp. 141–190
3. Lakatos (1970), “Falsification and the Methodology of Scientific Research Programmes”
4. Stein (2004), “The Enterprise of Understanding and the Enterprise of Knowledge”

5.6 Week 15: Neo-Carnapianism II (10 Feb)

Required Reading

1. Curriel (2014), “On the Propriety of Physical Theories as a Basis for Their Semantics”

Required Reading

1. [*** GET ***]

6 FINAL PAPER DUE: 31. Mar

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- Carnap, R. (1961). On the use of Hilbert’s ε -operator in scientific theories. In Y. Bar-Hillel, E. Poznanski, A. Robinson, and M. Rabin (Eds.), *Essays on the Foundations of Mathematics, Dedicated to A. A. Frankel*, pp. 156–164. Jerusalem: Magnes Press, Hebrew University.
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- Chakravartty, A. (2010, January). Informational versus functional theories of scientific representation. *Synthese* 172, 197–213. Part of the special issue “The Ontology of Scientific Models”, guest ed. G. Contessa. doi:10.1007/s11229-009-9502-3.
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- da Costa, N. and S. French (2005). *Science and Partial Truth: A Unitary Approach to Models and Scientific Reasoning*. Oxford: Oxford University Press.
- Demopoulos, W. (2013a). *Logicism and Its Philosophical Legacy*. Cambridge: Cambridge University Press.
- Demopoulos, W. (2013b). On extending “Empiricism, semantics and ontology” to the realism-instrumentalism controversy. See Demopoulos (2013a), Chapter 3, pp. 46–67.

- Demopoulos, W. (2013c). On the rational reconstruction of our theoretical knowledge. See [Demopoulos \(2013a\)](#), Chapter 6, pp. 108–139.
- Demopoulos, W. (2013d). Three views of theoretical knowledge. See [Demopoulos \(2013a\)](#), Chapter 7, pp. 140–168.
- Demopoulos, W. and M. Friedman (1985). Bertrand Russell’s *The Analysis of Matter*: Its historical context and contemporary interest. *Philosophy of Science* 52(4), 621–639.
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- DiSalle, R. (2002, June). Reconsidering Kant, Friedman, Logical Positivism, and the exact sciences. *Philosophy of Science* 69(2), 191–211. doi:10.1086/341049.
- Domski, M. and M. Dickson (Eds.) (2010). *Discourse on a New Method: Reinvigorating the Marriage of History and Philosophy of Science*. LaSalle, IL: Open Court Press.
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- Friedman, M. (2007). Coordination, constitution, and convention: The evolution of the a priori in Logical Empiricism. See [Richardson and Uebel \(2007\)](#), pp. 91–116. doi:10.1017/CCOL0521791782.
- Friedman, M. (2011a, May). Carnap on theoretical terms: Structuralism without metaphysics. *Synthese* 180, 249–263. doi:10.1007/s11229-009-9604-y.
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- Friedman, M. (2012, March). Reconsidering the dynamics of reason: Response to Ferrari, Mormann, Nordmann, and Uebel. *Studies in History and Philosophy of Science Part A* 43(1), 47–53. doi:10.1016/j.shpsa.2011.10.006.
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- Giere, R. (2010, January). An agent-based conception of models and scientific representation. *Synthese* 172, 269–281. Part of the special issue “The Ontology of Scientific Models”, guest ed. G. Contessa. doi:10.1007/s11229-009-9506-z.
- Glymour, C. (2013, April). Theoretical equivalence and the semantic view of theories. *Philosophy of Science* 80(2), 286–297.
- Halvorson, H. (2012, April). What scientific theories could not be. *Philosophy of Science* 79(2), 183–206. doi:10.1086/664745.
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