STRUCTURAL REALISM

Time and Place: Thursdays 14:30-16:00, 23.21/02.26
Instructor: Dr. Ioannis Votsis
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Office hours (Room Geb. 23.21/04.86): Thursdays 11:00-12:00

Recent years have seen the resurgence of a view in the scientific realism debate that has its roots in the early twentieth century. Structural realism, as its name suggests, is a realist view that qualifies its realism on structural terms. It comes in two main flavours, epistemic and ontic structural realism, each with its own variations. According to a broad conception of the epistemic flavour, our best scientific theories can only inform us about structural features of the unobservable world. This amounts to the idea that objects and properties can only be specified through the relations they instantiate. In more precise terms, they can only be specified up to isomorphism. According to a broad conception of the ontic flavour, the reason why our best scientific theories can only inform us about structural features of the unobservable world is that only such features exist. That is, objects are either deflated to mere nodes or they are eliminated altogether – depending on the version of ontic structural realism advocated. This seminar aims to throw light on the discussions surrounding this very influential family of views. Among other things we will examine the various forms structural realism takes, the arguments put forth in their support and the central objections against them.

Surveys:

Frigg, R. And I. Votsis (2011) 'Everything You Always Wanted to Know about Structural Realism but Were Afraid to Ask', *European Journal for the Philosophy of Science*, vol. 1:227–276

Ladyman, J. (2009) 'Structural Realism', Stanford Encyclopedia of Philosophy, http://plato.stanford.edu/entries/structural-realism/

Coursework:

- One presentation (about 20 minutes) on one of the main readings. [3 credits]
- One essay (about 2,500 words), **deadline 14/07/11**. [3 credits]

NB: Presentations will be assigned on the second week. Suggested essay topics will be distributed in May.

WEEK 1: Introduction

WEEK 2: Epistemic Structural Realism

Worrall, J. (1989) 'Structural Realism: The Best of Both Worlds?', *Dialectica*, vol. 43(1-2): 99-124.

Further Reading:

Stump, D. (1989) 'Henri Poincaré's Philosophy of Science', *Studies in History and Philosophy of Science*, vol. 20(3): 335–363.

Worrall, J. (1994) 'How to Remain (Reasonably) Optimistic: Scientific Realism and the "Luminiferous Ether" ', in D. Hull, M. Forbes & R. M. Burian (Eds.), *PSA 1994*, vol. 1 (pp. 334–342), East Lansing: Philosophy of Science Association.

Zahar, E. (1996) 'Poincaré's Structural Realism and his Logic of Discovery', in J.-L. Greffe, G. Heinzmann & K. Lorenz (Eds.), *Henri Poincaré*: *Science and philosophy*, Berlin: Academie Verlag and Paris: Albert Blanchard.

WEEK 3: The Historical Argument Elaborated

Redhead, M. (2001) 'The Intelligibility of the Universe', in A. O'Hear (ed.) *Philosophy at the New Millennium*, Cambridge: Cambridge University Press, pp. 73-90.

Further Reading:

Post, H. (1971) 'Correspondence, Invariance and Heuristics', *Studies in the History and Philosophy of Science*, vol. 2(3): 213–255.

Redhead, M. (2001) 'Quests of a Realist', review article of Stathis Psillos's Scientific Realism: How Science Tracks Truth, *Metascience*, vol. 10(3): 341–347.

Votsis, I. (2011) 'Structural Realism: Continuity and its Limits', in A. Bokulich & P. Bokulich (Eds.), *Scientific Structuralism* (Boston Studies in the Philosophy and History of Science), Dordrecht: Springer, pp. 105–117.

WEEK 4: The Standard Realist Challenge

Psillos, S. (1999) *Scientific Realism*: *How Science Tracks Truth*, London: Routledge, ch. 7.

Further Reading:

Chakravartty, A. (2004) 'Structuralism as a Form of Scientific Realism', *International Studies in Philosophy of Science*, vol. 18: 151–171.

Psillos, S. (2000) 'Carnap, the Ramsey-sentence and Realistic Empiricism', *Erkenntnis*, vol. 52: 253–279.

Votsis, I. (2007) 'Uninterpreted Equations and the Structure-Nature Distinction', *Philosophical Inquiry*, vol. 29(1–2): 57–71.

WEEK 5: The Empiricist Challenge

Van Fraassen, B.C. (2006) 'Structure: Its Shadow and Substance', *British Journal for the Philosophy of Science*, vol. 57(2): 275-307.

Further Reading:

Bueno, O. (2011) 'Structural Empiricism, Again', in A. Bokulich & P. Bokulich (Eds.), *Scientific Structuralism* (Boston Studies in the Philosophy and History of Science), Dordrecht: Springer, pp. 81–103.

Stanford, K. (2003) 'Pyrrhic Victories for Scientific Realism', *Journal of Philosophy*, vol. 100(11): 553–572.

Votsis, I. (forthcoming) 'The Prospective Stance in Realism', *Philosophy of Science.*

WEEK 6: The Ramsey Sentence Approach and the Newman Problem

Demopoulos, W. and M. Friedman (1985) 'Critical Notice: Bertrand Russell's The Analysis of Matter: Its Historical Context and Contemporary Interest', *Philosophy of Science*, vol. 52: 621-639.

Further Reading:

Ketland, J. (2004) 'Empirical Adequacy and Ramsification', *British Journal for the Philosophy of Science*, vol. 55(2), 287–300.

Newman, M. (1928) 'Mr. Russell's "Causal Theory of Perception" ', Mind, vol. 37: 137–148.

Votsis, I. (2003) 'Is Structure not Enough?', *Philosophy of Science*, vol. 70(5): 879–890.

WEEK 7: Worrall to the Rescue

Worrall, J. (2007) 'Miracles and Models: Why Reports of the Death of Structural Realism May Be Exaggerated', in: Anthony O'Hare (ed.) *Philosophy of Science* (Royal Institute of Philosophy 61), Cambridge: Cambridge University Press, pp. 125-154.

Further Reading:

Magnus, P. D., & Callender, C. (2004) 'Realist Ennui and the Base Rate Fallacy', *Philosophy of Science*, vol. 71: 320–338.

Votsis, I (2011) 'How *Not* to be a Realist', in D. Rickles (Ed.), *Structure, Objects and Causality* (Western Ontario Series in Philosophyof Science). Dordrecht: Kluwer ch. 3.

Worrall, J. (2011) 'Underdetermination, Realism and Empirical Equivalence', *Synthese*, vol 180: 157–172.

WEEK 8: The Forgotten Epistemic Structural Realism

Votsis, I. (2005) 'The Upward Path to Structural Realism', *Philosophy of Science*, vol. 72(5): 1361-1372.

Further Reading:

Maxwell, G. (1970) 'Theories, Perception and Structural Realism', in R. Colodny (Ed.), *The Nature and Function of Scientific Theories* (University of Pittsburgh Series in the Philosophy of Science: Volume 4), Pittsburgh: University of Pittsburgh Press, pp. 3–34.

Psillos, S. (2001) 'Is Structural Realism Possible?', *Philosophy of Science*, 68(Supplement): S13–S24.

Russell, B. (1927) *The Analysis of Matter*, London: George Allen & Unwin.

WEEK 9: A Third Way?

Chakravartty, A. (2007) *A Metaphysics for Scientific Realism*: *Knowing the Unobservable*, Cambridge: Cambridge University Press, ch. 2.

Further Reading:

Chakravartty, A. (1998) 'Semirealism', *Studies in History and Philosophy of Science*, vol. 29(3): 391–408.

Saatsi, J. (2008) 'Eclectic Realism—The Proof of the Pudding: A Reply to Busch', discussion paper, *Studies in History and Philosophy of Science*, vol. 39(2): 273-276.

Votsis, I. (2009) Review of A. Chakravartty's A Metaphysics for Scientific Realism, *Analysis*, vol. 69(2):378-380.

WEEK 10: Ontic Structural Realism

Ladyman, J. (1998) 'What is Structural Realism?', *Studies in History and Philosophy of Science*, vol. 29: 409-424.

Further Reading:

Cao, T. (2003) 'Structural Realism and the Interpretation of Quantum Field Theory', *Synthese*, vol. 136: 3–24.

French, S. (1998) 'On the Withering Away of Physical Objects', in E. Castellani (Ed.), *Interpreting Bodies*: *Classical and Quantum Objects in Modern Physics*, Princeton: Princeton University Press, pp. 93–113.
French, S., & Ladyman, J. (2003) 'Remodelling Structural Realism: Quantum Physics and the Metaphysics of Structure', Synthese, vol. 136: 31–56.

WEEK 11: Conceptual Problems I
Busch, J. (2003) 'What Structures Could Not Be', *International Studies in the Philosophy of Science*, vol. 17: 211–225.

Further Reading:
Ladyman, J. (2007) 'On the Identity and Diversity of Objects in a Structure', *Proceedings of the Aristotelian Society* (Supplementary Volume), vol. 81(1): 23–43.
Landry, E. (2008) 'Shared Structure Need not be Shared Set-Structure', *Synthese*, vol. 158(1): 1-17.
Van Fraassen, B. (2007) 'Structuralism(s) about Science: Some Common Problems', *Proceedings of the Aristotelian Society* (Supplementary Volume), vol. 81(1): 45–61.

WEEK 12: Conceptual Problems II
Chakravartty, A. (2003) 'The Structuralist Conception of Objects', *Philosophy of Science*, vol. 70(5): 867-878.

Further Reading:
Brading, K. and E. Landry (2006) 'Scientific Structuralism: Presentation and Representation', *Philosophy of Science*, vol. 73(5): 571-581.
Morganti, M. (2004) 'On the Preferability of Epistemic Structural Realism', *Synthese*, vol. 142(1): 81–107.
Psillos, S. (2006) 'The Structure, the Whole Structure and Nothing but the Structure?', *Philosophy of Science*, 73(5): 560–570.

WEEK 13: Ontic Structural Realism and Physics
Ladyman, J. and D. Ross (2007) *Every Thing Must Go*: *Metaphysics Naturalised*, Oxford: Oxford University Press, ch. 3.

Further Reading:
Muller, F. A. (2011) 'Withering Away, Weakly', *Synthese*, vol. 180: 223–233.
Pooley, O. (2006) 'Points, Particles and Structural Realism', in D. Rickles, S. French, and J. Saatsi (Eds.), *Structural Foundations of Quantum Gravity*, Oxford: Oxford University Press, pp. 83–120.
Saunders, S. (2003) 'Structural Realism Again', *Synthese*, vol. 136: 127–133.

WEEK 14: Identity and Mathematical Structuralism
Leitgeb, H. and J. Ladyman (2008) 'Criteria of Identity and Structuralist Ontology', *Philosophia Mathematica*, vol. 16(3): 388–396.

Further Reading:
Button T. (2006) 'Realist Structuralism's Identity Crisis: A Hybrid Solution', *Analysis*, vol. 66: 216-222.
Ladyman, J. (2005) 'Mathematical Structuralism and the Identity of Indiscernibles', *Analysis*, vol. 65: 218-221.

Shapiro, S. (2008) ‘Identity, Indiscernibility, and Ante Rem Structuralism: The Tale of i and –i’, *Philosophia Mathematica*, vol. 16: 285-209.

WEEK 15: Revisiting Ontic Structural Realism

French, S. and J. Ladyman (2011) ‘In Defence of Ontic Structural Realism’, in A. Bokulich and P. Bokulich (eds.), *Scientific Structuralism* (Boston Studies in the Philosophy and History of Science), Springer, ch. 2.

Further Reading:

Esfled, M. and V. Lam (2011) ‘Ontic Structural Realism as a Metaphysics of Objects’, in A. Bokulich and P. Bokulich (eds.), *Scientific Structuralism* (Boston Studies in the Philosophy and History of Science), Springer, ch. 8.

Lyre, H. (2011) ‘Is Structural Underdetermination Possible?’, *Synthese*, vol. 180: 235–247.

Muller, F. A. (2010) ‘The Characterisation of Structure: Definition versus Axiomatisation’, in F. Stadler et. al. (Eds.), *The Philosophy of Science in a European Perspective*, vol. 1, Dordrecht: Springer, pp. 399–416.