Methodological Naturalism Reconceived (or Elided?)

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A central, controversial concept

- Methodological Naturalism (MN) is a (if not the) central notion in many discussions about the relationship between creationism and evolution, and science and theology more broadly today
- While central, MN is also controversial, in terms of its meaning and application, its relationship to philosophical naturalism, and its uniqueness to scientific reasoning

A jack of all trades...

- MN is central in part because it is asked to function in many different roles
- As an epistemological ground rule of explanation and inquiry in science
- As a historical explanation for the emergence of contemporary, professionalized science
- As a sociological fence to determine what is and isn't taught in public school contexts
- As a mediating principle that facilitates dialogue on how to relate scientific inquiry to questions of faith and spirituality
- MN is controversial because of how the details get worked out on these and other fronts (every role has its own debate)
- It might not be so surprising that paradoxical results emerge when a concept is expected to serve these diverse and not necessarily complementary functions (a problem of wearing too many hats)
- Others have started to comment on this as well (e.g., Boudry 2011)

Narrowing the field

- There are many things that can be said about MN because of its centrality and the various ways in which it is controversial
- I want to focus on one aspect that is of special interest to philosophers of science - the role of MN in understanding scientific reasoning
- With potentially wider consequences...

Overview

- A paradox - MN is essential to science; MN is not needed to understand science
- How we got here - the rise and fall of general methodological principles for understanding science
- A way out - from formal to material inferences (going 'local')
- An objection (MN elided?) and consequences: the advantages of reconceiving MN as localized inferential capacities in particular sciences

A paradox

- If we consider the discussions of MN with a focus on scientific reasoning, then we discover two claims in tension with each other
- MN is often taken to be constitutive of all scientific inquiry and explanation. (If you don't adopt MN, you can't be doing science.)
- MN is rarely if ever mentioned in the philosophical analysis of specific sciences and seems unnecessary to comprehend their reasoning. (If you don't mention MN, no one notices.)

MN as essential

- "Methodological naturalism is the label for the required assumption of philosophical naturalism when working with the scientific method. Methodological naturalists limit their scientific research to the study of natural causes, ... scientists assume that all causes are empirical and naturalistic; which means they can be measured, quantified and studied methodically" (http://rationalwiki.org/wiki/Methodological_naturalism)
- "Methodological naturalism is not a "doctrine" but an essential aspect of the methodology of science, the study of the natural universe. If one believes that natural laws and theories based on them will not suffice to solve the problems attacked by scientists - that supernatural and thus nonscientific principles must be invoked from time to time - then one cannot have the confidence in scientific methodology that is [a] prerequisite to doing science" (http://chem.tufts.edu/AnswersInScience/MethodologicalNaturalism.htm)

- "Methodological naturalism is a "ground rule" of science today which requires scientists to seek explanations in the world around us based upon what we can observe, test, replicate, and verify" (Kitzmiller; citing Miller and Pennock - see also Pennock 2011).

MN not needed

- *British Journal for Philosophy of Science*: Never invoked to account for scientific reasoning practices. Closest cognate is "philosophical naturalism" (esp. physicalism), but never about understanding how science works (more about the interpretation of scientific findings)
- *Philosophy of Science*: Only mentioned when intelligent design is discussed (one specific exchange); never invoked to account for scientific reasoning practices. Closest cognate is "normative naturalism" as a thesis about whether philosophy is distinct from the sciences (debates over 'naturalized philosophy of science'); also some discussion of physicalism
- *Biology & Philosophy*: Only mentioned at one juncture, surrounding intelligent design debates (Pennock 1996; Nelson 1996); never invoked to account for scientific reasoning practices

Quick resolutions?

- Reject or modify one of the claims
- MN is often taken to be constitutive of all scientific inquiry and explanation - if you don't adopt MN, you can't be doing science. **Simply false...**
- MN is rarely if ever mentioned in the philosophical analysis of specific sciences and seems unnecessary to comprehend their reasoning - if you don't mention MN, no one notices. **Not mentioned because of ubiquity ('a tacit rule')...**
- Problem: both of these resolutions should be rejected because they mask prima facie reasons that underlie the claims

***Prima facie* reasons**

- MN is often taken to be constitutive of all scientific inquiry and explanation - if you don't adopt MN, you can't be doing science. *There is a phenomenology to scientific inquiry and explanation that seems congruent with this claim; appeals to 'non-natural' factors are rare or non-existent. Needs to be accounted for.*
- MN is rarely if ever mentioned in the philosophical analysis of specific sciences and seems unnecessary to comprehend their reasoning - if you don't mention MN, no one notices. *Methodological aspects of science may not be mentioned routinely but it seems odd to claim they can be wholly invisible, even to philosophers looking at these aspects. If ubiquity generates invisibility, then how do scientists actually use MN to evaluate anything? Epistemic accessibility seems important.*
- Therefore, these quick resolutions don't seem promising

How we got here

- "Ground Rules": A key feature of MN: it is taken as a fully general, methodological principle, meant to apply across all sciences (i.e., 'Science')
- As an epistemological ground rule of explanation and inquiry in science

(Some) history of philosophy of science

- In philosophy of science, general, methodological principles have (for the most part) been abandoned as illuminating of how all scientific reasoning operates. Falsification, inference to the best explanation, research programmes, Kuhnian paradigms, etc.
- The degree to which any of these is applicable turns on local factors; i.e., which science is being considered, what historical period, what particular hypotheses or concepts are in view, etc.
- Current analyses of particular sciences rarely invoke general methodological principles to account for the operation of scientific reasoning (good or bad); the common strategy is to look at the specific details of what is going on in the relevant science

(Some) history of 'methodological naturalism'

- The term was coined in 1983 by Paul de Vries. Subsequently published in 1986 as "Naturalism in the Natural Sciences," *Christian Scholar's Review* 15: 388-396.
- The philosophical context of this period was the demarcation problem and debates over general methodological principles. These are intertwined because a general methodological principle (e.g., falsification) could be used to address demarcation

- NB: Although a variety of issues related to what is discussed under the heading MN can be tracked earlier in history, I'm concentrating on this recent historical pattern and the specific term 'methodological naturalism'

An interpretation

- Developments in philosophy of science over the past few decades suggest that the role of MN as a general, epistemological ground rule of explanation and inquiry for all of science is overstated (it just doesn't do this work in the sciences). It is a relic from a now defunct debate (with respect to scientific reasoning)
- Other roles for MN arguably have been more predominant anyway; these help explain why an epistemological relic survives
  - As a historical explanation for the emergence of contemporary, professionalized science
  - As a sociological fence to determine what is and isn't taught in public school contexts
  - As a mediating principle that facilitates dialogue on how to relate scientific inquiry to questions of faith and spirituality

Remaining Dilemma

- But we cannot say that the claim of MN as essential to science is simply false...We rejected this quick resolution because it failed to account for what seemed to be prima facie reasons for invoking MN. There is a phenomenology to scientific inquiry and explanation that seems congruent with this claim; appeals to 'non-natural' factors are rare or non-existent

Going the wrong way...

- DeWeese 2011: Characterizing science by appeal to general methodological principles: Lakatos and the methodology of research programmes
- And then hyper-generalized: "So what does the "the scientific method" come to? ...it is simply an instance of a more general theoretical methodology"
- But the direction of illumination is the opposite in current philosophical analyses of science - focus on local, particularities of different sciences - Not more general, but more specific.

A way out

- Revisiting the other side of the paradox: MN is rarely if ever mentioned in the philosophical analysis of specific sciences and seems unnecessary to comprehend their reasoning - if you don't mention MN, no one notices
- Methodological aspects of science may not be mentioned routinely but it seems odd to claim they can be wholly invisible, even to philosophers looking at these aspects. If ubiquity generates invisibility, then how do scientists actually use MN to evaluate anything? Epistemic accessibility seems important.
- What if we gave up on ubiquity (recall the accepted difficulties with general methodological principles)—going in the direction of specificity—and emphasize epistemic accessibility?

Giving up on ubiquity...

- General methodological principles are usually "formal" in the sense that they seek a universality of application (for some particular domain) through the absence of empirical content. Conformation to a universal template (e.g., deductive validity)
- For MN, this is what makes the content of 'natural' so vexed (also applicable to 'methodological', though less attention has been devoted to this)
- 'Going local': understand scientific reasoning in terms of the conceptual content involved in the reasoning practices of particular sciences (see, e.g., Norton 2003 on induction)
- Material inferences are justified in virtue of their content, not their form (Sellars 1953; Brigandt 2010). Analyses in terms of material inferences are driven by different criteria of adequacy - e.g., successful functioning, specificity, avoidance of imported problems (Love 2012a)

More on Material Inference

- A material inference is licensed by the empirical content embodied in the concepts contained in the premises and conclusion - 'licensing' is a matter of degree (not an all or nothing property)
- This brings the meaning of different concepts within the sciences to the fore, and links up with other philosophical issues (e.g., conceptual change). The locality involved in material inference arises from the fact that the empirical content of concepts differs across the sciences and exhibits domain restrictions
- Caveats...Material inference involves commitments about semantics (e.g., conceptual role/inferential semantics; Block/Brandom); I'm not attempting to defend this here...Material inference can be understood as more

fundamental than formal inference; deductively valid inferences = class of inferences that remain materially valid under non-logical vocabulary substitutions; this is another thing I'm not defending here...

Epistemic Accessibility

- Woodward (2003) has questioned the value of abstract, formal principles that postulate hidden structure not present in scientific discourse to account for those reasoning practices; they obscure how scientists access this structure to evaluate the reasoning. It also insulates philosophers from features of scientific practice that deviate from the hidden structure sought (i.e., counterexamples)
- Material inference makes explicit how scientists working in specific domains are able to evaluate reasoning - it isn't hidden, but is accessible to all competent conceptual users. It provides a normative philosophical perspective about what makes scientific inference rational and facilitates making this explicit in the philosophical evaluation of scientific reasoning. Bad inferences are often visible when disciplinary boundaries are transgressed
- It also plays out descriptively...Psychological studies show that induction tasks are subject to prior knowledge effects; competent conceptual use is the outcome of substantial training. Not all of this substantial training is embedded in textbook-type propositional content (e.g., conceptual use with respect to experimental practices or the epistemic and social values of different disciplines - cf. Polanyi)

Thus...

- The concerns traditionally collected underneath the label MN ('only appealing to natural causes') take on their meaning and significance in concrete, circumscribed communities of empirical inquiry and cannot be understood apart from the conceptual content found in particular sciences. They are material inferences…
- As a consequence, there is no meaningful sense in which MN is a global characteristic of Science—it is not usefully construed as a general methodological principle; there are only 'local' versions of MN in different sciences
- Since the combination of material inferences found within the conceptual content of a science form a capacity to discover, confirm, and explain in restricted domains, we can label these as material inferential capacities (MICs). These will have different dimensions, such as depth and breadth
- Therefore, instead of a single MN for all of Science, we have many, localized MICs for different sciences

Objection & Consequences

- Objection: MN elided? To elide: to suppress or alter; to strike out; to leave out of consideration (omit). This reconceptualization of MN as localized MICs appears to eliminate some of the standard functions that a 'global' MN serves, such as generally demarcating scientific and religious educational domains in controversies over intelligent design.
- If reconceiving is essentially eliding, then this seems like too high of a price, doesn't it? Yes and no...

Yes (but that's okay)

- MICs do a poor job as the primary historical explanation for the emergence of contemporary, professionalized science. Interestingly, theological commitments in the early modern period - and earlier - (e.g., rationality of a created universe) might better explain this emergence, and be relatively general principles
- MICs do a poor job as a sociological fence to determine what is and isn't taught in public school contexts. But these discussions are infused with a tangled skein of historical, institutional, and other factors; expecting a skeleton key from philosophy of science seems naive
- Resisting the jack of all trades expectation that saddles MN construed as a general methodological principle...

No (and we gain)

- The MICs of evolutionary biology offer no solace to a proponent of intelligent design. In fact, they explain the failure of many intelligent design claims - an inability to recognize the relevant MICs. This is the structure of the (cogent) rebuttals offered by biologists to these claims; they often involve reminders of depth or breadth considerations of the MIC that are being overlooked (not an appeal to MN as a general methodological principle)
- MICs as mediating principles that facilitates dialogue on how to relate scientific inquiry to questions of faith and spirituality. Maybe...puts the focus on pair-wise comparisons of conceptual content from theology and the sciences

Advantages follow from this reconception of MN...

Consequences - 1

- An increased precision for comprehending the architecture of empirical inquiry. MICs go a long way toward actually making sense of the sciences; for philosophers of science, this is a primary goal (and reason to hesitate before deploying a general MN). Also offers ways of characterizing interdisciplinary scientific endeavors
- This precision extends to possible interactions with the conceptual content from different sciences. Due to differences in MICs, discussions of Big Bang Theory, multiverses, and the anthropic principle are not a variant on discussions of Darwinian evolution, bacterial flagella, and intelligent design (or vice versa). MN should not be invoked as a common cause defeater in these discussions
- This perspective also shows the divergence of common sense from scientific inference (radically divergent, if not contradictory MICs) - an important point with ramifications for science education

Consequences - 2

- A 'global' MN stumbles more notably in some sciences rather than others. Bishop (2007, 2009) highlights how there are important differences among the sciences in how MN is construed (e.g., between natural and social sciences). Psychological sciences and accounts of human behavior/experience: the inability to see meaning affirmations or religious apprehension, and latent tendencies toward philosophical naturalism
- MICs help to explain this locally; they can be marshaled to understand why there might be incongruencies between particular phenomena and the sciences that purport to study them ('measurement tool mismatches'). And characterizing the MICs, which is a prerequisite for doing this, is a task for philosophers of science

Consequences - 3

- MICs circumvent worries that a 'global' MN is indefensible as a pre-stipulated, inviolable norm (e.g., Ratzsch 2004). Conceptions of 'nature' under theistic assumptions might differ from conceptions of 'nature' under non-theistic assumptions, but the level of evaluation has shifted from Science as a whole to MICs, and therefore we're no longer talking about nature writ large. This might be a source of the possible advantages of MICs as mediating principles
- No globally dubious claims about what counts as "natural" are involved (and thus there is no tendency to collapse into an implicit form of philosophical naturalism); there is no argument for (or against) demarcation being advocated here; demarcation is simply not the issue in view (cf. Pennock 2011, Sarkar 2011). Nor are other standard justifications for MN implicitly invoked (e.g., scientific laziness, definitional maneuvers, the non-uniformity of supernatural agency, etc.),
- Importantly, the prospects for characterizing MICs seem good (that is what philosophers of science are often doing) compared to global attempts to characterize all of Science (which have all foundered)

Recap

(1) A paradox - MN is essential to science; MN is not needed to understand science. (2) How we got here - the rise and fall of general methodological principles to understand science. (3) A way out - from formal to material inferences (going 'local'). (4) Objection and Consequences - MN elided? The advantages of reconceiving MN as localized inferential capacities in specific sciences

Open Questions

- MICs cohere well with (but do not logically imply) a pluralist interpretation of the metaphysical implications of various sciences. E.g., different MICs have divergent commitments to distinct conceptions of hierarchical levels in nature (Love 2012b). This clashes with standard views that are derived from a 'critical realism' perspective (e.g., Polkinghorne), as well as some approaches to naturalized metaphysics: "There is a legitimate role for metaphysics just insofar as the world is unified" (Ladyman et al. 2007).
- Pluralism does not necessitate anti-realism, but it does raise questions about how to relate the sciences to metaphysics: is "reality an integrated unity" (Ratzsch 2004)? What does this mean, and how might it be answered in light of the diversity and complexity of the sciences, which constitute a "patchwork" structure?

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