Scientific Structuralism Does Not Necessitate Modal Realism

Ilmari Hirvonen & Ilkka Pättiniemi
(both authors have contributed equally to this paper)

University of Helsinki
Ontic Structural Realism (OSR)

**Scientific structuralism:** science tracks structures rather than entities.

**Modal realism (MR):** OSR takes these structures to be fundamental. Further, these structures are modal structures understood as Dennettian (1991) real patterns.
What Exactly Are Ladyman and Ross Selling?

• Unfortunately, it is not at all clear what \textit{MR} amounts to \cite{1}.

• Dennett, for instance, does not say anything about primitive modality.

• Michael Esfeld has suggested that \textit{MR} should be conceived through causal powers \cite{1}.

• Ladyman and Ross do not themselves give any clear analysis of \textit{MR}. 
Weak and Strong Metaphysics

Weak metaphysics: Building a worldview based solely on science by unifying different scientific theories [2].

Strong metaphysics: A practise of forming and aiming to justify claims about the world that go beyond what the sciences tell us or imply [3].

On Ladyman and Ross’s view strong metaphysics is unjustified.
Principle of Naturalistic Closure (PNC)

• Any metaphysical claim should be taken seriously only insofar as it unifies specific scientific hypotheses in a way that explains more than those hypotheses separately. At least one of the hypotheses has to be from fundamental physics. (*ETMG*: 37–38.)

• Further only those hypotheses that current science takes to be confirmable in principle are to be taken seriously (*ibid.*).

• Thus the PNC is a form of institutional verificationism that sees metaphysics as unification.
**Fundamental Physics?**

**Fundamental physics:** That part of physics that is testable everywhere in the universe.

**Special sciences:** Sciences that have a more narrow scope.
According to Ladyman and Ross, one of the main motivations behind strong metaphysics is to promote explanations simply because they would make something feel less mysterious.

Ladyman and Ross claim that there are “reasons to doubt that it promises anything but temporary psychological satisfaction at the expense of truth” [4].
Arguments for Modal Realism

The main arguments for MR in ETMG are the following:

1. The usage of modal language in science
2. Explaining novel prediction
3. Justifying induction
The No-Miracles Argument

“It is true that we must not insist, a priori, that the instrumental success of science can be explained. But we should surely accept an explanation, rather than preferring to believe in recurrent miracles, if one can in fact be provided without violation of the PNC.” [5].
Novel Prediction

“Since some theories have achieved novel predictive success our overall metaphysics must explain how novel predictive success can occur, and the explanation we favour is that the world has a modal structure which our best scientific theories describe” [6].
“That we are so often able to identify regularities in phenomena and then use them for prediction needs to be explained. In a world without nomic connections all our inductive knowledge would be lucky knowledge, which is to say not knowledge at all. On the other hand, if we believe that there are real necessary connections between phenomena, then we are positively justified in making inductive inferences provided we are careful in doing so. What being careful means is something we learn by induction based on sometimes bitter experience. Of course, IBE cannot be used to defend infallibilism about inductive knowledge.” [7]
“That we are so often able to identify regularities in phenomena and then use them for prediction needs to be explained. In a world without nomic connections all our inductive knowledge would be lucky knowledge, which is to say not knowledge at all. On the other hand, if we believe that there are real necessary connections between phenomena, then we are positively justified in making inductive inferences provided we are careful in doing so. What being careful means is something we learn by induction based on sometimes bitter experience. Of course, IBE cannot be used to defend infallibilism about inductive knowledge.” [7]
“That we are so often able to identify regularities in phenomena and then use them for prediction needs to be explained. In a world without nomic connections all our inductive knowledge would be lucky knowledge, which is to say not knowledge at all. On the other hand, if we believe that there are real necessary connections between phenomena, then we are positively justified in making inductive inferences provided we are careful in doing so. What being careful means is something we learn by induction based on sometimes bitter experience. Of course, IBE cannot be used to defend infallibilism about inductive knowledge.” [7]
Justifying Induction

• If your goal is to justify induction, in the way Lady-man and Ross are trying to, then you are trying to justify the inductive generalisations *that will hold* – not every single possible one.

• This presupposes that you are able to separate the stable generalisations from the unstable ones.

• The whole point, or at least one of the main points, of Hume’s critique is that one cannot do this *a priori*, one cannot know for sure which of the generalisations will hold. *MR* does not seem to be helpful here.
Skepticism about Induction

“Realism requires rejecting both revisionary philosophical versions of scientific theories and philosophical arguments for any skepticism that goes beyond the scientific community’s healthy epistemic caution[.].” [8]

(Berenstain & Ladyman 2012: 152)

Possible danger of a vicious circle:
Induction is a requirement for realism and realism is used to justify induction!
The Modal Realist’s Dilemma

Modal realists have to face the following dilemma:

(1) Either their weak metaphysics is so weak that it is fully compatible with empiricism.

(2) Or they will end up with strong metaphysics that is not – and cannot be – the subject of any of the special sciences or fundamental physics.
Weak or Strong Metaphysics?

• Maybe *MR* just amounts to the acceptance of inductive generalisations?

• If so, then *MR* is fully compatible with empiricism.

• Anyway, *MR* does not appear to unify anything. Thus, it is not a form of weak metaphysics.

• Induction is already needed when one is doing fundamental physics. So, apparently, *MR* is already required before any unificationary work between fundamental physics and special sciences can be done.
Escaping the Horns?

• Maybe *MR* is a scientific theory.

• If it is, then it cannot be a theory of a special science, because *MR* is taken to hold everywhere and always. Otherwise we could not explain the success of fundamental physics.

• So, *MR* should be a part of fundamental physics. (Perhaps this is even implied in Ross 2014.)

• But is this not *revisionary* physics done to make things more intelligible?
An Alternative View of Modalities

There are roughly two ways how modal terminology comes into scientific theorisation:

(1) Interventions
(2) Relative modality
Conclusions

• Ladyman and Ross end up with similar problems as the original positivists: they are unable to comply with their own rules.

• *MR* appears to be too close to unempirical philosophy and too far from empirical science.

• We believe that the justification of inductive claims is an on-going process.

• However, we have not argued against structuralism as such.

• Ladyman and Ross have two options: either adopt even stronger scientism or embrace strong metaphysics.


