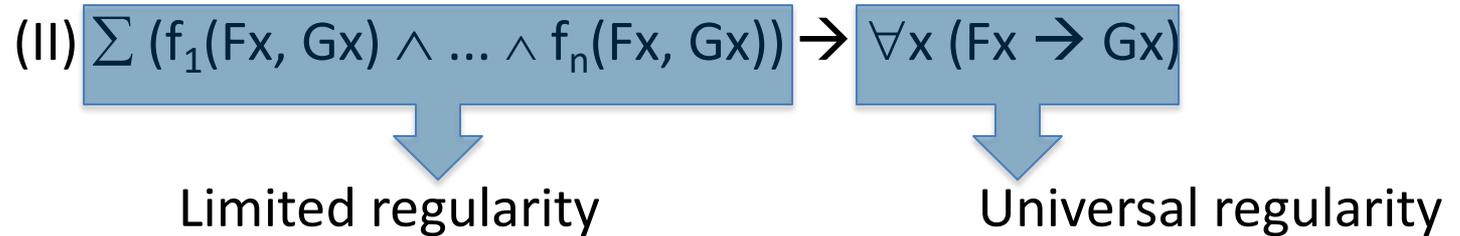


Kristina Engelhard

**Is the problem of induction
solvable by dispositionalism?**

The metaphysics of induction

Inductive Inference (more precisely: enumerative induction) (II)



Necessary condition: Uniformity Principle (UP)

What if we could argue independently for the truth of the uniformity principle?

Dispositionalism seems a good candidate → gives us robust natural necessity

Together with an appropriate theory of universals → universal regularities?

What are the prospects?

„There have been several attempts in the analytic philosophy of the twentieth century to find possible or improved ways of justifying induction. None of these attempts have been successful.“

(Schurz 2019, 7)

Aim of this talk

- supply a landscape to advance the topic
- find possible solutions
- explore difficulties and problems of possible solutions
- sort out the best candidate

Issues

1 Can a dispositional theory of laws of nature justify inductive inference?

2 Is a dispositional justification of inductive inference desirable?

Structure of Talk

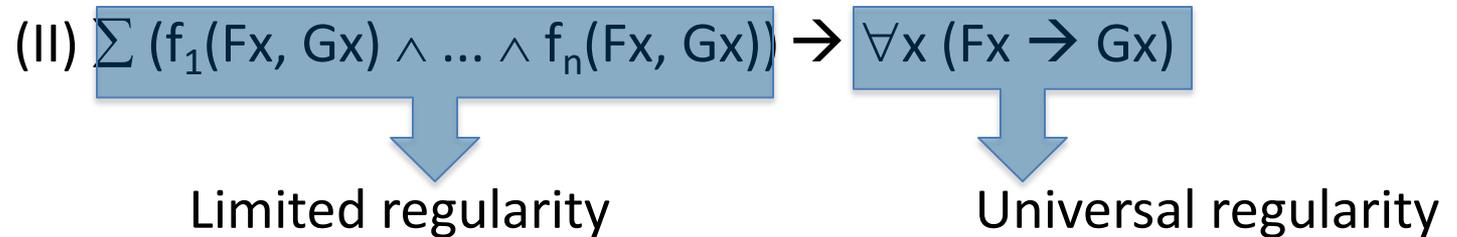
- 1 The problem of induction re-examined
- 2 A dispositional theory of laws of nature to the rescue?
- 3 Dispositionalism and the inference problem
- 4 How can we know that DTL is true?
- 5 Problems
- 6 Consequences

1 The problem of induction re-examined

The problem of induction

Concept of induction: Hume's problem → induction in the narrow sense

Inductive Inference (II)



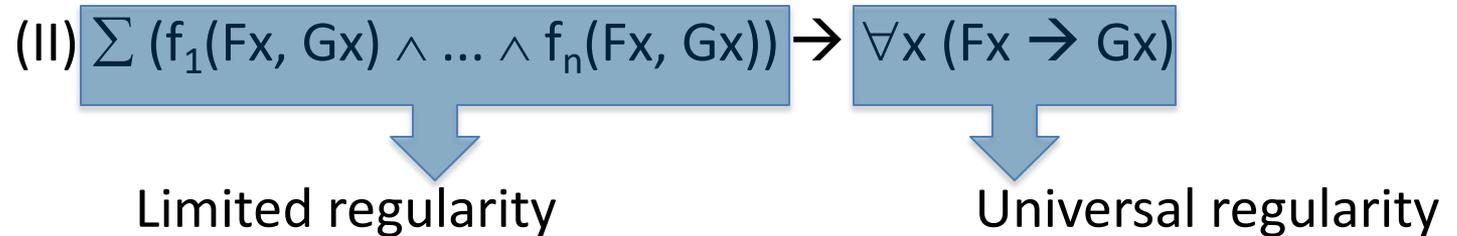
Necessary condition: Uniformity Principle (UP)

(UP) „[...] if Reason determin'd us, it would proceed upon that principle *that instances, of which we have had no experience, must resemble those, of which we have had experience, and that the course of nature continues always uniformly the same.*
(T. 1.3.6.4)

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Metaphysical Uniformity Principle (MUP)

The problem of induction - Two levels of the metaphysical and the epistemic dimensions

Three dimensions

Logical: problem of validity of the inference

Metaphysical: truth of the uniformity principle, truth of regularities and laws

Epistemic: Are the regularities, the laws knowable?

Two levels

- Specific level: specific regularities – specific laws
- General level: Are there regularities at all? Are there laws of nature at all?

The problem of induction – combining levels and dimensions

Different views with respect to their relation to the epistemic dimension:

(i) Can we know that (F, G) is a regularity or a law such that $R(F, G)$; $L(F, G)$?

(ii) Can we know that there are regularities or laws at all?

Possible views:

- We can have knowledge in the sense of (ii) only if we have knowledge in the sense of (i) → dependency of (ii) on (i)
→ empiricist view
- We may have good reasons to believe (ii), but also believe that we cannot have knowledge in the sense of (i) → mutual independence of (i) and (ii)
→ metaphysical realism

Hume's problem of induction – the metaphysical dimension

The trilemma:

1. No a priori solution:
Causation is not a conceptual relation (no analytic propositions)
2. No empirical solution by direct experience:
Hume's claim: Impossibility of direct experience of necessary connection
3. No empirical solution by inference from experience:
problem of circularity

Conditions for a solution

Possible alternatives

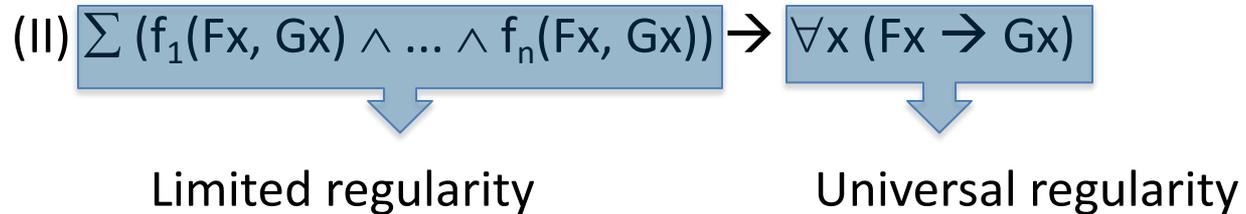
- tackling one horn of the trilemma
- arguing against the trilemma
- circumventing induction

Solutions to the problem of induction so far – the epistemic problem

- Kant's solution (tackling the 1st horn)
 - by showing that the principle of causation is synthetic a priori
 - justification of the objective validity of the categories (causation and necessity)
 - by introducing guiding a priori ideas (models) for inquiry
 - common view: too strong prior presumptions
- Argue for direct experience of necessity (tackling the 2nd horn; Shopenhauer, Schrenk 2014)
 - problem of counterfactuals
- Schurz' solution (tackling the third horn; Schurz 2019)
Justifying inductive inference by meta-induction with the resources of optimality of inductive inference via machine learning:
„application of induction to competing prediction methods“ (Schurz 2019, ix)
- Popper's solution (circumventing induction)
substitution by: 1 arbitrary logic of discovery, 2 method of falsification
 - unpersuasive concerning scientific practice – a guide to inquiry is needed

Solutions to the problem of induction – the metaphysical problem

A strategy for a solution: metaphysical grounding of MUP



Abductive inference: Fact, asking for explanation
Necessary laws as explanans

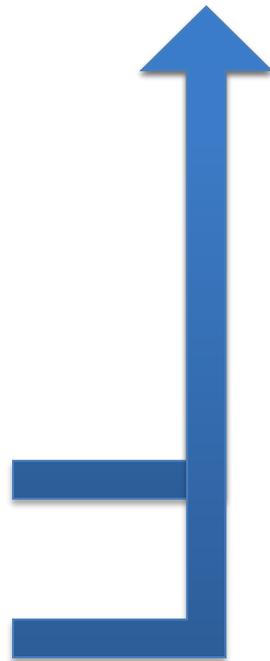


There are necessary laws



MUP

Inference to the best explanation (IBE)



Solutions to the problem of induction so far – the metaphysical problem

- Lewis' solution (tackling the 1st horn)

BSA → substitute induction by IBE

→ „fit to the phenomena“ as one criterion of the IBE poses a huge problem,

→ too Humean to solve Hume's problem? → Only possibility: biting the bullet?

- Anti-Humean solutions (circumventing induction)

- DTA-theory: N (F,G)

„With universals the possibility arises of construing laws as relationships between universals. In this conception of laws, the having of certain properties by a particular or particulars [...] *brings about* or has a certain probability of bringing about, a further state of affairs of a certain sort, the bringing about occurring in virtue of the antecedent properties. This is a very natural way to conceive of the operation of laws, and brings with it advantages, including some progress with the Problem of Induction.“ (Armstrong 1997, 24)

Solutions to the problem of induction so far – the metaphysical problem

- Anti-Humean solutions?
 - DTA-theory: $N(F, G)$
not a good candidate:
 - merely contingent necessity
 - inference problem
 - Dispositionalism
seems a better candidate because of stronger necessity

Dispositionalism takes dispositional properties as causal powers bringing about the regular behaviour of things in nature and hence ground the necessity of laws of nature.

2 A dispositional theory of laws of nature to the rescue?

Dispositions and powers in contemporary metaphysics and in the history of philosophy

Dispositionalism: theories about the nature of properties and laws of nature

Dispositions: structured intrinsically modal properties → directedness

Simple conditional analysis

(SCA) $D(x) := MC x \square \rightarrow Mx$

Dispositional essentialism

„Thus according to dispositional essentialism (DE), the real essence of some potency P includes a disposition to give some particular characteristic manifestation M in response to a characteristic stimulus S . Hence, in all possible worlds, any object that possesses P is disposed to yield M in response to S : $\square (Px \rightarrow D_{(S, M)}x)$.“ (Bird 2007, 45)

What makes dispositionalism a well suited candidate?

Laws of nature „drop out“ (Bird) of the dispositional natures of potencies:

$$(SCA) D(x) := Sx \Box \rightarrow Mx$$

$$(DE_p) \Box(Px \rightarrow D_{(S,M)}x)$$

$$(i) \Box(Px \rightarrow (Sx \Box \rightarrow Mx))$$

Given that (ii) is true in world w

$$(ii) Px \wedge Sx$$

$$(iii) Mx$$

$$(iv) ((Px \wedge Sx) \rightarrow Mx)$$

It follows that (v) is true in world w:

$$(v) \forall x((Px \wedge Sx) \rightarrow Mx)$$

(Bird 2007, 46; Jaag/Schrenk 2019, 143f.)

What are the prospects?

“[Scientific essentialism] promises to transform our thinking about scientific rationality and the theory of inductive reasoning. If one believes, as Hume did, that all events are loose and separate, then the problem of induction is probably insoluble. Anything could happen. But if one thinks, as scientific essentialists do, that the laws of nature are immanent in the world, and depend on the essential natures of things, then there are strong constraints on what could possibly happen.” (Ellis 2001, 283)

3 Dispositionalism and the inference problem

A severe threat – the inference problem

$$(II) \sum (f_1(Fx, Gx) \wedge \dots \wedge f_n(Fx, Gx)) \rightarrow \forall x (Fx \rightarrow Gx)$$

Limited regularity

Universal regularity

Abductive inference: Fact, asking for explanation
Necessary laws as explanans

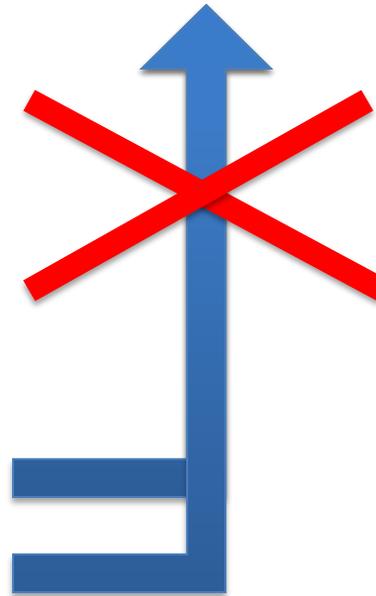


There are necessary laws



MUP

Inference to the best explanation (IBE)



The inference problem - Bird's account of laws of nature

(Barker/Smart 2012; Jaag 2014; Jaag/Schrenk 2020)

second order: $F(G \rightarrow H)$ (\rightarrow manifestation-relation)



first order: $f(Gx) \rightarrow f(Hx)$ but how?

„But in virtue of what does this necessitation between the second-order fact [...] and the first-order patterns of tendency hold?“

(Barker/Smart 2012: 719f.).

Possible solutions:

- Powerful qualities view (Martin, Heil, Jacobs)
- Qualitative dispositional essentialism (Tugby, ...)
- Identity theories of dispositions (Gianotti, ...)
- DM-identity theory

4 How can we know that DTL is true?

Alternatives: Transcendental Argument for DTL

Argument from Scientific Method (Corry 2019)

„What I would like to have done here is produce a transcendental argument for the existence of causal influences. Such influences, I would like to say, are necessary presuppositions of one of the most useful and successful (and I might suggest essential) methods we have for understanding the world. The difficulty, of course, is providing necessity.“
(Corry 2019, 42)

→ provides necessity only if

- transc. argument is an inference to the only possible explanation
- reductive method is a necessary requisite of science

Alternatives: Creative Abduction for DTL

Argument from Scientific Practice (Hüttemann 2014)

„Regularities are correlations between actually occurring events. Something like this: “All events of type F are followed by events of type G.” But laws do not only tell us what actually happens – laws tell us furthermore what might happen and what cannot happen. This modal aspect, I will argue, plays an essential role in understanding how we intervene into the course of nature or fail to be able to do so. Intervention is tied to aspects of scientific practice that the Humean cannot fully explain. The best explanation of our intervention- or manipulation-practice refers to necessary connections in nature.“ (Hüttemann 2014, 32)

➤ Inference to the best explanation for dispositional modality!

How can we know that dispositionalism is true?

Inference to the best explanation!

But before that: theory construction

Dynamic of metaphysical theory might be modelled analogously to scientific theory dynamics generally, e.g.

Lakatos' model of theory revision

Metaphysical theory construction analogously to the sciences

Lakatos' model of theory revision

Immunity

- distinguish between the **core** and the **periphery** of a theory
- be adamant about the core theorems
- make changes only in the periphery

cp-thesis

- make exclusive cp-hypothesis as aiding hypothesis to get from theorems to empirical hypotheses or explanatory hypotheses
- if there is a clash between theory and experiential phenomena or explanantia, change those cp-hypotheses only.

Metaphysical theory construction analogously to the sciences

Getting at cp-hypotheses by modelling

- accommodate the theory to groups of examples that are relevant for the theory (e.g. dispositional properties in the special sciences)
- take these examples and explain them by making use of different interpretations of the theory (taking them as models; e.g. biology: stemness. If stemness is a disposition, it best suits the model of extrinsic dispositions (Suarez-Diaz))
- vary the models to fit the examples

Parts of dispositionalism:

- single- vs. multi-track
- intrinsicness vs. extrinsicness
- determinable vs. determinate dispositions

5 Problems

Grounding the Uniformity Principle in dispositions?

1st problem :

Would the uniformity principle hold if dispositionalism were true?

Think of

- Goodman's „new“ riddle of induction → gruesome properties
- new properties being instantiated, old properties vanish → „new“ laws

Yes and no?

Grounding the Uniformity Principle in dispositions?

2nd problem :

Which condition must be met that we know that dispositionalism is true?

There has to be a more or less clear result in IBE reasoning at some point.

But when is that?

If the time has come not before the whole pattern of events is layed out to us (whatever this may mean), dispositionalism even converges with Humeanism because the pattern then is just a vast collection of facts.

6 Consequences

Theses

- Dispositionalism is a powerful tool to explain many phenomena of the sciences (those that science deals with as well as those that science provides)
- It would also be a powerful tool to deal with the metaphysical problem of induction.
- However, its success depends on its overall theoretical merits in competition to other accounts – those that we have and that which might yet come up.
- There is one reason to have good hope: its persistence through time: from Aristotle to our days with hardly any gap.
- Possibly this is due to our cognitive apparatus in dealing with the world.
- Probably there is a powerful transcendental argument still to be found without too strong Kantian presumptions?

Merci!

Postscriptum: The epistemic problem on the specific level

the easiest solution → leave it to the sciences

However:

Hume's argument against powers

„It has to be confessed that nature keeps us in a big distance to its secrets and merely enables us to achieve a few superficial properties of things, while it hides those powers and principles from us, on which the influence depends that the things have.“

(Section 4, 1st part)

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