

Formal Epistemology: What are the rules of the game and why bother playing it?

Seamus Bradley

TiLPS/Leeds

September 11, 2018

My goal is to say something about the methodology of formal epistemology.

My goal is to say something about the methodology of formal epistemology.

This isn't a topic that is explicitly discussed a lot, so there is still some "low-hanging fruit" here.

My goal is to say something about the methodology of formal epistemology.

This isn't a topic that is explicitly discussed a lot, so there is still some "low-hanging fruit" here.

More clarity on method helps us to make progress on some first-order questions in FE.

Warming up

Formal epistemology as theory building

Applications

Warming up

Formal epistemology as theory building

Applications

The core question



What are we claiming when we say “The agent’s credence in X is p ”?

A (hopefully) uncontroversial claim



FE typically involves talking in terms that are:

- ▶ Abstract

A (hopefully) uncontroversial claim



FE typically involves talking in terms that are:

- ▶ Abstract
- ▶ Approximate

A (hopefully) uncontroversial claim



FE typically involves talking in terms that are:

- ▶ Abstract
- ▶ Approximate
- ▶ Idealised

A (hopefully) uncontroversial claim



FE typically involves talking in terms that are:

- ▶ Abstract
- ▶ Approximate
- ▶ Idealised

Theorising in science involves talking in terms that have that same character.

Warming up

Formal epistemology as theory building

Applications

Formal epistemology as theory building



Think of formal epistemology as theory building. Take the analogy to scientific theory building seriously.

Formal epistemology as theory building



Think of formal epistemology as theory building. Take the analogy to scientific theory building seriously.

Theories are assessed by their fit with the facts, but also by their simplicity, their fit with other theories, and various other *theoretical virtues*.

Formal epistemology as theory building



Think of formal epistemology as theory building. Take the analogy to scientific theory building seriously.

Theories are assessed by their fit with the facts, but also by their simplicity, their fit with other theories, and various other *theoretical virtues*.

I propose we explicitly think of formal epistemology along the same lines.

Credences as theoretical tools

When we say “Agent has credence p in proposition X ”, we are building a theory.



Credences as theoretical tools

When we say “Agent has credence p in proposition X ”, we are building a theory.

Empirical adequacy is important in science, but even there we have underdetermination and pragmatic tradeoffs.



Credences as theoretical tools

When we say “Agent has credence p in proposition X ”, we are building a theory.

Empirical adequacy is important in science, but even there we have underdetermination and pragmatic tradeoffs.



Other theoretical virtues we want to accommodate include simplicity, scope, fit with other theories (perhaps in economics or psychology).

Credences as theoretical tools

When we say “Agent has credence p in proposition X ”, we are building a theory.

Empirical adequacy is important in science, but even there we have underdetermination and pragmatic tradeoffs.



Other theoretical virtues we want to accommodate include simplicity, scope, fit with other theories (perhaps in economics or psychology).

We have to see formal epistemology as a practice of tradeoffs between these virtues.

Data in formal epistemology

How important is empirical data to formal epistemology? It obviously has some role to play, but since FE is normative, the fact that people suck at probabilistic reasoning is not a reason to abandon probabilistic analyses of credence.



Data in formal epistemology

How important is empirical data to formal epistemology? It obviously has some role to play, but since FE is normative, the fact that people suck at probabilistic reasoning is not a reason to abandon probabilistic analyses of credence.

There is also a distinctive kind of “data” that formal epistemologists appeal to: normative facts in specific idealised cases.



Data in formal epistemology

How important is empirical data to formal epistemology? It obviously has some role to play, but since FE is normative, the fact that people suck at probabilistic reasoning is not a reason to abandon probabilistic analyses of credence.

There is also a distinctive kind of “data” that formal epistemologists appeal to: normative facts in specific idealised cases.

We know these facts through intuition?
Through argument? Through derivation from some uncontroversial principle (e.g. avoid sure loss)? By convention?



Knowing what to infer from a model

The population ecologist builds models that treat population levels as real numbers. But, of course, she knows that she can't infer from her model that there will be $\frac{1}{3}$ of a donkey in the wild.



Knowing what to infer from a model

The population ecologist builds models that treat population levels as real numbers. But, of course, she knows that she can't infer from her model that there will be $\frac{1}{3}$ of a donkey in the wild.



Inferring facts about the real world from your model is not straightforward and requires judgement. The same is true of models in FE.

Knowing what to infer from a model

The population ecologist builds models that treat population levels as real numbers. But, of course, she knows that she can't infer from her model that there will be $\frac{1}{3}$ of a donkey in the wild.



Inferring facts about the real world from your model is not straightforward and requires judgement. The same is true of models in FE.

A “disconfirming instance” of your model is an anomaly to be accommodated, not a devastating counterexample that sends you back to the drawing board.

Further consequences



This is primarily a methodological view, but we can make use of the rich nuanced philosophy of science literature on what metaphysical attitude (realism, instrumentalism etc) to take to our theories.

Further consequences



This is primarily a methodological view, but we can make use of the rich nuanced philosophy of science literature on what metaphysical attitude (realism, instrumentalism etc) to take to our theories.

That is, this is not an instrumentalist view of FE: it is perfectly consistent with everything I claim about method that one take a (suitably sophisticated) realist view towards the models we build.

Further consequences



This is primarily a methodological view, but we can make use of the rich nuanced philosophy of science literature on what metaphysical attitude (realism, instrumentalism etc) to take to our theories.

That is, this is not an instrumentalist view of FE: it is perfectly consistent with everything I claim about method that one take a (suitably sophisticated) realist view towards the models we build.

We can distinguish different methodological traditions or subgroups by their preference for certain kinds of theoretical virtues: logicians are distinguished by their valuing of metalogical principles like soundness and completeness; economists and RC theorists by their desire for representation theorems. . .

Take-home messages



- ▶ We are building a model, not producing a literally true description of the phenomenon

Take-home messages



- ▶ We are building a model, not producing a literally true description of the phenomenon
- ▶ Model-based inference requires judgement

Take-home messages



- ▶ We are building a model, not producing a literally true description of the phenomenon
- ▶ Model-based inference requires judgement
- ▶ Counterexamples are not devastating

Take-home messages



- ▶ We are building a model, not producing a literally true description of the phenomenon
- ▶ Model-based inference requires judgement
- ▶ Counterexamples are not devastating
- ▶ We should think in terms of trading off theoretical virtues: more than one model can be appropriate

Take-home messages



- ▶ We are building a model, not producing a literally true description of the phenomenon
- ▶ Model-based inference requires judgement
- ▶ Counterexamples are not devastating
- ▶ We should think in terms of trading off theoretical virtues: more than one model can be appropriate
- ▶ This is more a way of looking at any kind of theorising than it is an attempt to say something distinctive about method in FE

An optional detour into metaphysics



So what positions within the (philosophy of science) realism/anti-realism debate make sense in the context of FE?

An optional detour into metaphysics



So what positions within the (philosophy of science) realism/anti-realism debate make sense in the context of FE?

Perhaps some form of constructive empiricism, a sophisticated sort of instrumentalism/behaviourism? There might still be deep questions about what the observables are, here.

An optional detour into metaphysics



So what positions within the (philosophy of science) realism/anti-realism debate make sense in the context of FE?

Perhaps some form of constructive empiricism, a sophisticated sort of instrumentalism/behaviourism? There might still be deep questions about what the observables are, here.

Philip Kitcher defends “modest realism”, which, if you squint, has some commonalities with Daniel Dennett’s “moderate realism” (which he discusses in *Real Patterns*. Part of what determines which theoretical virtues you take to be important is the purposes you have in mind in developing the model.

Warming up

Formal epistemology as theory building

Applications

Full vs. partial belief



Are our belief states fundamentally graded or fundamentally categorical? What is the relationship between our partial and full beliefs? How do we deal with things like the preface paradox?

Full vs. partial belief



Are our belief states fundamentally graded or fundamentally categorical? What is the relationship between our partial and full beliefs? How do we deal with things like the preface paradox?

The full and partial belief models are two distinct theories of belief (both with their domains of applicability). Just like stat mech and thermodynamics are distinct theories with distinct (perhaps overlapping) domains of applicability.

Full vs. partial belief



Are our belief states fundamentally graded or fundamentally categorical? What is the relationship between our partial and full beliefs? How do we deal with things like the preface paradox?

The full and partial belief models are two distinct theories of belief (both with their domains of applicability). Just like stat mech and thermodynamics are distinct theories with distinct (perhaps overlapping) domains of applicability.

That there is conflict between the *models* doesn't tell us anything particularly deep about the nature of our mental states.

Defending imprecise probabilities



People who criticise IP often seem to view the debate as if IP and precise probabilism are somehow rival views, in conflict with each other.

Defending imprecise probabilities



People who criticise IP often seem to view the debate as if IP and precise probabilism are somehow rival views, in conflict with each other.

This is like thinking that propositional and predicate logic are conflicting views about logic. Or that Newtonian and Relativistic theories of spacetime are in conflict.

Defending imprecise probabilities



People who criticise IP often seem to view the debate as if IP and precise probabilism are somehow rival views, in conflict with each other.

This is like thinking that propositional and predicate logic are conflicting views about logic. Or that Newtonian and Relativistic theories of spacetime are in conflict.

It's about picking a tool that is appropriate for the job.

Defending imprecise probabilities




People who criticise IP often seem to view the debate as if IP and precise probabilism are somehow rival views, in conflict with each other.

This is like thinking that propositional and predicate logic are conflicting views about logic. Or that Newtonian and Relativistic theories of spacetime are in conflict.

It's about picking a tool that is appropriate for the job.


The interesting debate is really about what jobs IP might do better.

Spotting degenerating research programmes in philosophy



That so much of post-Gettier epistemology is about finding a theory that accommodates some frankly weird edge cases is puzzling to me. The “justified true belief” model of knowledge is pretty good, adequate for most purposes. (In any case, it’s *belief* that has the interesting connection to inference and action, not knowledge)

Spotting degenerating research programmes in philosophy



That so much of post-Gettier epistemology is about finding a theory that accommodates some frankly weird edge cases is puzzling to me. The “justified true belief” model of knowledge is pretty good, adequate for most purposes. (In any case, it’s *belief* that has the interesting connection to inference and action, not knowledge)

The focus in FE on weird sci-fi cases like Sleeping Beauty or Newcomb’s Problem is also strange. Scientists focus on weird toy models too, but always with the goal of saying something general. What general lessons about rational belief or decision do we learn from studying these weird FE examples?

The end



I think we would do better formal epistemology if we explicitly thought of what we are doing in analogy to model building in science: models are only ever partially true (and that's OK!) and we should be thinking in terms of tradeoffs between theoretical values.

- ▶ Nearby theories
- ▶ Normativity
- ▶ What am I trying to do?
- ▶ Why bother?

- ▶ Mike Titelbaum's view of methodology in *Quitting Certainties* is similar

- ▶ Mike Titelbaum's view of methodology in *Quitting Certainties* is similar
- ▶ Timothy Williamson suggests but doesn't really develop the view that some areas of philosophy involve model-building

- ▶ Mike Titelbaum's view of methodology in *Quitting Certainties* is similar
- ▶ Timothy Williamson suggests but doesn't really develop the view that some areas of philosophy involve model-building
- ▶ Carnap's "explication" is somewhat like model building, except that an explication is supposed to *replace* the explicandum in discourse, which is not what models are really for

- ▶ Mike Titelbaum's view of methodology in *Quitting Certainties* is similar
- ▶ Timothy Williamson suggests but doesn't really develop the view that some areas of philosophy involve model-building
- ▶ Carnap's "explication" is somewhat like model building, except that an explication is supposed to *replace* the explicandum in discourse, which is not what models are really for
- ▶ Reflective equilibrium is a kind of model building where the values being traded off are "empirical adequacy" as regards cases and general principles

- ▶ Mike Titelbaum's view of methodology in *Quitting Certainties* is similar
- ▶ Timothy Williamson suggests but doesn't really develop the view that some areas of philosophy involve model-building
- ▶ Carnap's "explication" is somewhat like model building, except that an explication is supposed to *replace* the explicandum in discourse, which is not what models are really for
- ▶ Reflective equilibrium is a kind of model building where the values being traded off are "empirical adequacy" as regards cases and general principles
- ▶ "Metaphysics as modelling" is a popular view in meta-ontology (the difference is that FE is normative)

- ▶ Mike Titelbaum's view of methodology in *Quitting Certainties* is similar
- ▶ Timothy Williamson suggests but doesn't really develop the view that some areas of philosophy involve model-building
- ▶ Carnap's "explication" is somewhat like model building, except that an explication is supposed to *replace* the explicandum in discourse, which is not what models are really for
- ▶ Reflective equilibrium is a kind of model building where the values being traded off are "empirical adequacy" as regards cases and general principles
- ▶ "Metaphysics as modelling" is a popular view in meta-ontology (the difference is that FE is normative)
- ▶ One can see Elijah Millgram's *Hard Truths* as a book arguing that much philosophical work should be thought of as model-building rather than finding the literal truth

One disanalogy between scientific theorising and formal epistemology model-building is that science is typically merely descriptive, whereas formal epistemology has a normative component.

We are not merely describing how agents reason: we are analysing how they ought to reason.

One disanalogy between scientific theorising and formal epistemology model-building is that science is typically merely descriptive, whereas formal epistemology has a normative component.

We are not merely describing how agents reason: we are analysing how they ought to reason.

This descriptive/normative tension is not unique to formal epistemology:

- ▶ Behavioural economics

One disanalogy between scientific theorising and formal epistemology model-building is that science is typically merely descriptive, whereas formal epistemology has a normative component.

We are not merely describing how agents reason: we are analysing how they ought to reason.

This descriptive/normative tension is not unique to formal epistemology:

- ▶ Behavioural economics
- ▶ Psychology of reasoning/choice

One disanalogy between scientific theorising and formal epistemology model-building is that science is typically merely descriptive, whereas formal epistemology has a normative component.

We are not merely describing how agents reason: we are analysing how they ought to reason.

This descriptive/normative tension is not unique to formal epistemology:

- ▶ Behavioural economics
- ▶ Psychology of reasoning/choice
- ▶ Rational choice theory

One disanalogy between scientific theorising and formal epistemology model-building is that science is typically merely descriptive, whereas formal epistemology has a normative component.

We are not merely describing how agents reason: we are analysing how they ought to reason.

This descriptive/normative tension is not unique to formal epistemology:

- ▶ Behavioural economics
- ▶ Psychology of reasoning/choice
- ▶ Rational choice theory
- ▶ Generative grammar


One disanalogy between scientific theorising and formal epistemology model-building is that science is typically merely descriptive, whereas formal epistemology has a normative component.

We are not merely describing how agents reason: we are analysing how they ought to reason.

This descriptive/normative tension is not unique to formal epistemology:

- ▶ Behavioural economics
- ▶ Psychology of reasoning/choice
- ▶ Rational choice theory
- ▶ Generative grammar
- ▶ Normativity of logic

What am I trying to do?



Much like (first-order) formal epistemology, there is a normative/descriptive tension in my project.

End

What am I trying to do?



Much like (first-order) formal epistemology, there is a normative/descriptive tension in my project.

I want to rationalise the behaviour of formal epistemologists, but I also want to have room to criticise certain aspects of what they do.

End

Why bother?



Decision making under severe uncertainty is a topic of huge importance. Likewise, how best to score uncertain forecasts. Various bits of formal epistemology can be seen as the very theoretical end of a spectrum of methods and theories that address these questions.

Why bother?



Decision making under severe uncertainty is a topic of huge importance. Likewise, how best to score uncertain forecasts. Various bits of formal epistemology can be seen as the very theoretical end of a spectrum of methods and theories that address these questions.

Perhaps other aspects of the topic can be motivated by connections to computer science.

Why bother?



Decision making under severe uncertainty is a topic of huge importance. Likewise, how best to score uncertain forecasts. Various bits of formal epistemology can be seen as the very theoretical end of a spectrum of methods and theories that address these questions.

Perhaps other aspects of the topic can be motivated by connections to computer science.

Other parts of formal epistemology are perhaps harder to motivate. How important is it that our theory of rationality deal with weird edge cases like Sleeping Beauty or the wackier end of the Newcomb problem kind of cases?

End