It seems to me that the philosophical significance of language dependence (à la Goodman’s “grue” problem) has been seriously underestimated. In this article I argue that:

- The trouble caused by language dependence is not confined to formal analyses of evidential support; language dependence concerns apply to any story about how we should draw conclusions from evidence.
- This is because language dependence reveals a deep problem: evidential propositions do not possess enough information to substantively favor some conclusions over others.
- Introducing a distinction between natural and nonnatural properties does not alleviate this problem.
- The problem is not equally a problem for everyone—it makes some views of evidential favoring much harder to maintain than others.

The special victims of the problem I will discuss are views that posit an evidential favoring relation: an objective three-place relation between two hypotheses and a body of evidence that obtains when the evidence favors one hypothesis over the other. Such relations are objective in the sense that they are not relative to particular features of the subject judging the favoring. Subjective facts about an agent may help determine what counts as his evidence, but once it is established what the evidence is the question of which hypotheses that evidence favors is independent of subjective considerations.²

A wide variety of contemporary philosophical views maintain the existence of an evidential favoring relation, though they don’t always call it by that name. Some epistemologies make it an objective fact that an agent’s evidence supports one hypothesis over another, or provides more justification to believe one hypothesis. Epistemologists may make this more precise by suggesting that each hypothesis has a specific evidential, logical, or objective probability relative to a given body of evidence.

¹Besides the people mentioned at specific points in this text, I am grateful to audiences at the Australian National University, the University of Melbourne, and the University of Sydney. I am also grateful to Fabrizio Cariani for teaching me about language independence and the structure of propositional languages; to Ted Sider for a question-period rant (during the question period for someone else’s paper!) and subsequent conversation on the epistemological significance of reference magnetism; to Jake Ross for extensive, careful written feedback; for a particularly well-timed snow day in Madison, Wisconsin; and to Branden Fitelson for conversations that helped me develop many of the views expressed here.

²I am interested in evidential favoring relations that are purely epistemic; if evidence can give an agent pragmatic reason to believe one hypothesis over another such pragmatic favoring will lie outside our purview.
of evidence. The evidence then favors one hypothesis over another just in case it renders the former more probable than the latter.

In a different area of philosophy, metaethicists consider whether an agent’s evidence gives him more reason to believe one hypothesis than another. A widespread metaethical view maintains that there are objective reason relations—that there are objective facts about which evidential propositions provide reasons to believe which hypotheses. We could then say that a body of evidence favors one hypothesis over another when it provides reason to believe the former but not the latter. (Or more strongly, when it provides reason to believe the former and disbelieve the latter.)

What Goodman’s grue problem made vivid is that if there is such an evidential favoring relation, it treats some properties differently from others—we might say the relation treats some properties as “special.” This makes possible the following epistemic argument against the existence of an evidential favoring relation:

1. If there is an evidential favoring relation, agents can (at least in principle) determine which bodies of evidence favor which hypotheses.
2. In order to determine which bodies of evidence favor which hypotheses, agents must be able to determine which properties are special (or something equivalent).
3. Hypotheses about which properties are special are empirical hypotheses that must be determined from an agent’s evidence.
4. So in order to determine which properties are special (or something equivalent), agents must be able to determine which bodies of evidence favor which hypotheses.
5. Because of the circularity in (2) and (4), such a determination cannot be made.
6. So there is no evidential favoring relation.

This is hardly the first challenge that has been raised to evidential favoring positions such as the objective reasons theory. Philosophers have raised both metaphysical questions (What is this objective reasons relation?) and epistemic questions (By

Williamson (2000, Chapter 10) writes, “Given a scientific hypothesis \(h\), we can intelligibly ask: how probable is \(h\) on present evidence? We are asking how much the evidence tells for or against the hypothesis.”

One version of this view follows Carnap in maintaining that the objective probability of a hypothesis on a body of evidence equals the degree of belief a rational agent would assign that hypothesis were the evidence his total evidence. Objective probability defenders are not required to accept this claim, though.

I should also note that the text follows (the early) Carnap in discussing a “firmness” approach to evidential favoring rather than an “increase in firmness” approach. The arguments to follow, however, apply equally well to both. (For further discussion of the firmness/increase in firmness distinction and references to the Carnap, see (Fitelson 2006).)

Allegiance to this position has spread to the point that Simon Blackburn recently (at the 2009 AAP meeting) characterized it as “the current Oxford view.” He counted among its adherents Raz, Broome, Parfit, Dancy, Scanlon, Wallace, Shafer-Landau, Kolodny, and Williams. [PUT CITES ON ALL THESE]

I have decided to work with a three-place evidential favoring relation (“the evidence favors this hypothesis over that one”) instead of a two-place relation (“the evidence favors this hypothesis”) to accommodate positions (such as Likelihoodism) according to which evidential favoring is always contrastive. Views about two-place relations can be worked into this scheme in the manner just demonstrated for the two-place relation of evidence’s providing reason to believe a hypothesis: we use the two-place facts to generate a three-place relation.
what *faculty* do we discern when it obtains?) about the view. But the epistemic argument above is new: setting aside questions of what faculty would detect evidential favoring, it focuses on what that faculty would have to be able to do to determine that a body of evidence favored one hypothesis over another.

The rest of this article explains and defends individual steps in the epistemic argument above. Section 1 concerns step (2). There I describe a result (proven in Appendix A) that generalizes Goodman’s grue argument and make its lesson more precise. This general result demonstrates that any process that detects evidential favoring must have a bias towards certain properties (or something equivalent) that *precedes* the influence of the evidence. Section 2 uses this result to generate the circularity problem (step (5)) that is our main concern. Section 3 rebuts attempts to show that the circle does not bite: arguments that the circle is virtuous rather than vicious or that agents can be saved from it by Lewisian “reference magnetism.” Once these attempts are set aside, we are left with the conclusion that if the special property list is empirical, agents cannot determine when evidential favoring relations hold. Assuming this conditional is correct, the existence of evidential favoring can be maintained only by denying its antecedent (giving agents *a priori* discernment of special properties and rejecting step(3) above) or by accepting the antecedent while denying that evidential favoring relations need be discernible (rejecting step (1)). While both maneuvers are available, I argue (in Sections 4 and 5 respectively) that their adherents face a difficult road. The alternative (described in Section 6) is to abandon objective, three-place evidential favoring relations and admit that support facts are relative to subjective features of the agent.

1. The General Result

Goodman’s discussion in his (1979) passes from what he admits is an appraisal of “*current* confirmation theory” to a conclusion that “lawlike or projectible hypotheses cannot be distinguished on any merely syntactical grounds.” (pp. 81 and 82, emphases mine) Goodman bases a very general conclusion on the examination of a handful of contemporary formal theories of confirmation, and it’s not even clear that his arguments succeed against those.

In attempt to do better, let’s start afresh. Suppose there is an objective, three-place favoring relation that holds of two hypotheses and a body of evidence just in case the evidence favors the first hypothesis over the second. We will take the hypotheses to be propositions and the evidence to be a proposition as well. (If you prefer to think of a body of evidence as a set of propositions, let the third relatum be a proposition that is the conjunction of that set.) But if this presence of this relation is to be detected by a formal theory, the hypotheses and evidence must first be represented in a formal language. If $h_1$ is a sentence in a formal language representing the first hypothesis, $h_2$ a sentence in that language representing the second

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7[CITATES]

8In the first sentence of his (1946) Goodman lists as his targets Hempel, Carnap, Oppenheim, and Helmer.

9For instance, Goodman claims Hempel’s theory yields “the intolerable result that anything confirms anything.” (Goodman 1979, p. 75) Yet Hempel proves that on his theory of confirmation the same evidence cannot confirm contradictory hypotheses (see discussion of the “Consistency Condition” in (Hempel 1945)), so something is clearly wrong with Goodman’s argument against Hempel.
hypothesis, and \( e \) a sentence representing the evidence, we will write \( f(h_1, h_2, e) \)
when the evidence favors the first hypothesis over the second.\(^{10}\)

What should we assume about the relation \( f \)? We will assume that relative
to a given \( e \) the relation is antisymmetric: for any \( h \) and \( e \), \( f(h, h, e) \).
(After all, how could evidence favor a hypothesis over itself?) We will not, however,
assume that relative to a given \( e \) the relation \( f \) introduces a total ordering
over hypotheses. That is, we will not assume that for any \( e, h_1, \) and nonequivalent \( h_2 \)
it’s the case that either \( f(h_1, h_2, e) \) or \( f(h_2, h_1, e) \). We want to allow the possibility
that evidence can support nonequivalent hypotheses equally, or that there may be
incommensurate favorings. My current total evidence might favor the proposition
that the Lakers will win this year’s NBA championship over the proposition that
the Celtics will, and it might favor the proposition that Sarah Palin will run for
President in 2012 over the proposition that she won’t. But there may be no fact of
the matter about whether my total evidence favors the proposition that the Lakers
will win the championship over the proposition that Palin will run for President.\(^{11}\)

The defender of objective evidential favoring relations should agree to a further
requirement on \( f \). I cannot dispute that there are some trivial cases in which a
body of evidence supports one hypothesis over another: for instance cases in which
the evidence deductively entails one hypothesis but not the other, or in which
the evidence deductively refutes one hypothesis but not the other. But as Hume
taught us, if evidential relations are to be anything like those we rely on in daily
life, they must obtain in a myriad of cases in which no special entailment relations
are involved. For example, your current total evidence favors the proposition
that the sun will come over the horizon tomorrow morning over the proposition
that a giant Cadillac will.\(^{12}\) For a more precise example, if your evidence is that a
number between 1 and 10 was drawn in a perfectly random fashion and the result
was between 1 and 5, this favors the hypothesis that the number is odd over the
hypothesis that it is between 4 and 7.\(^{13}\) These examples and countless others like
them demonstrate that the evidential favoring relation must be substantive; it must

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\(^{10}\)Note that “\( f \)” is not a symbol in the imagined formal language. “\( f(h_1, h_2, e) \)” is something
we say in the metalanguage to indicate that the proposition represented by \( e \) favors the proposition
represented by \( h_1 \) over the proposition represented by \( h_2 \). (Here \( “h_1”, “h_2”, \) and \( “e” \) are being
used as metalinguistic variables.)

\(^{11}\)In fact, we won’t assume that relative to a given \( e \) the relation \( f \) introduces any kind of
ordering at all. That’s because we won’t assume that evidential favoring by a given body of
evidence is transitive. (We won’t assume that for any \( e, h_1, h_2, \) and \( h_3 \) if \( f(h_1, h_2, e) \) and
\( f(h_2, h_3, e) \) then \( f(h_1, h_3, e) \).) Our result is consistent with the possibility that \( f \) introduces a
ordering (or even a total ordering), but doesn’t require that. (For Sorites-style concerns about
transitivity and favoring relations, see (Novack 2009).)

\(^{12}\)I’m assuming that the set consisting of your total evidence and both these hypotheses is
logically consistent.

\(^{13}\)Mentioning “randomness” in the evidence might beg the question in some way, so technically
the evidence in this example should be something like “I drew a ball from a thoroughly-shaken
urn containing balls numbered 1 through 10 and it came up between 1 and 5” and the hypotheses
should be something like “I drew a ball from a thoroughly-shaken urn containing balls numbered
1 through 10 and it came up odd” and “I drew a ball from a thoroughly-shaken urn containing
balls numbered 1 through 10 and it came up between 4 and 7.” (This example works on both
“firmness” and “increase in firmness” approaches to favoring—see note 4 above.)
go beyond special cases in which there are logical dependencies among evidence and hypotheses.\textsuperscript{14}

The conditions listed so far come just from thinking about the evidential favoring relation ("$f$") itself. Now suppose this relation can be captured by a formal theory. The idea would be that the theory could take $h_1$, $h_2$, and $e$—sentences in a formal language representing hypotheses and evidence—and discern just from the arrangement of the symbols in those sentences whether $f(h_1, h_2, e)$. The theory would not have to invoke anything about the meanings of the language's predicates or the referents of its constants; it would work on syntactic considerations alone.

Even for a defender of formal theories of evidential favoring, the job description in the last paragraph is a bit too demanding. The theory cannot be expected to pick up on evidential favoring relations when hypotheses and evidence are expressed in just \textit{any} formal language. For instance, we might have a propositional language in which the hypotheses and evidence are represented with three atomic sentences. (Imagine a language that represented "The first 1000 emeralds have been green," “the next emerald will be green,” and “the next emerald will be a chicken” with the atomic sentences “$p$”, “$q$”, and “$r$” respectively.) Even if an evidential favoring relation held among the hypotheses and evidence, their representations in this language would not reveal enough of their internal structure for the formal theory to properly analyze. So we should demand only that a formal theory detect evidential favoring when hypotheses and evidence are represented in an \textit{adequate} language—a language rich enough to express the structural features of those propositions relevant to any favoring relations between them.

To get the result we want we need not say much about which languages are adequate for which hypotheses and evidence. All we need is that the adequacy concern is a concern for representational \textit{paucity}—a concern that a language will not have \textit{enough} formal structure to reveal evidential relations. We will assume that if one language is at least as expressive as another, the former is adequate for any hypotheses and evidence that the latter is adequate for.

Finally, if the theory in question works purely syntactically—purely on the order in which symbols appear in sentences—it must treat predicate permutations identically. That is, if in an adequate language we can swap predicates around so that $h_1$ becomes $h_2$ and $h_2$ becomes $h_1$ while $e$ continues to represent the same proposition, then our theory must treat $h_1$ and $h_2$ identically. For the theory to treat them differently would be for it to pick up on something more than their syntactical form.\textsuperscript{15} So if $h_1$ and $h_2$ are predicate permutations the theory will not

\textsuperscript{14}In Appendix A I precisely define all technical terms introduced in this section and prove the result to be described below. Appendix B considers objections to and extensions of that result. Among other things, Appendix B shows how to loosen the substantivity requirement to accommodate the position (maintained by some philosophers of science) that evidential favoring occurs only between mutually exclusive hypotheses. Our general result can still be proven in this case.

\textsuperscript{15}As an audience at the University of Sydney pressed me to make clear, this statement isn’t quite right. The fact that $h_1$ contains, say, the predicate symbol “$F$” where $h_2$ contains the predicate symbol “$G$” is a syntactic fact. So we could have a purely formal theory—one that works exclusively with strings of symbols—that treats such such an $h_1$ differently than it treats $h_2$. As I clarify in Appendix A, however, the definitions given so far entail that $f$ is \textit{language invariant}: if $f(h_1, h_2, e)$ and $h_1'$, $h_2'$, and $e'$ re-express $h_1$, $h_2$, and $e$ (respectively) in a different adequate language, then $f(h_1', h_2', e')$. In the case under consideration, if we had a formal theory that treated hypotheses containing the symbol “$F$” differently than it treated hypotheses containing
suggest that $e$ favors $h_1$ over $h_2$. And since we are supposing that our formal theory accurately detects the presence of evidential favoring, it must actually be the case that $\sim f(h_1, h_2, e)$.

To recap: We have supposed that there is an evidential favoring relation, and we have described some conditions on it. We have also supposed that this relation’s presence can be detected by a formal theory. This entails the identical treatment of predicate permutations: for any $h_1$, $h_2$, and $e$ in an adequate language, if a predicate permutation interchanges $h_1$ and $h_2$ while leaving $e$ intact then $\sim f(h_1, h_2, e)$. Appendix A proves the following simple result:

**General Result:** Substantivity and the identical treatment of predicate permutations are inconsistent.

The proof proceeds by showing that given any $h_1$, $h_2$, and $e$ in an adequate language with no special entailment relations, there exists another adequate language in which the same propositions are expressed by an $h_1'$, $h_2'$, and $e'$ such that a predicate permutation swaps $h_1'$ with $h_2'$ while leaving $e'$ equivalent. By the identical treatment of predicate permutations, $e'$ cannot favor $h_1'$ over $h_2'$. But $h_1'$, $h_2'$, and $e'$ represent arbitrarily selected propositions with no special entailment relations. So there can be no evidential favoring among such propositions, and the evidential favoring relation cannot be substantive.

The proof in Appendix A is constructive; it shows exactly how to build the required language when given an $h_1$, $h_2$, and $e$. And unlike proofs that are sometimes used to refute Principles of Indifference and the like, it doesn’t rely on any curious features of infinite sets; all the languages involved have finite atomic sentence sets.¹⁶

This result is very bad news for formal theories of three-place evidential favoring. If the evidential favoring relation is to capture anything like our normal notion of evidence, it must be substantive—we make correct evidential inferences all the time that do not involve entailments. Yet this general result tells us that if the evidential favoring relation is substantive, it cannot treat predicate permutations identically and therefore cannot be captured by a formal theory of evidence.

But maybe formalizing evidential support was an unattractive prospect to begin with. Evidential relations are enormously complex—we might have suspected from the start that their vast subtleties cannot be adequately captured by a theory that pushes symbols around, no matter how inventively it does so. Many philosophers think that grue’s significance lies entirely in its confirmation of this suspicion—as we already saw, Goodman’s takeaway was a condemnation of theories that operate on “merely syntactical grounds.”¹⁷ But I think there is much more to be learned from our general result.

¹⁶In fact, the result works exclusively with first-order languages containing only constants, predicates applying to constants, and truth-functional connectives. (No quantifiers or higher-order predicates are allowed.) In Appendix B I argue that this simplication does not undermine the significance of the result.

¹⁷The discussion of language dependence with regards to evidential favoring that has followed “grue” parallels in many ways the language dependence discussion in the versimilitude literature. (Miller 2005, Ch. 11) provides a nice summary, and approvingly quotes the comment in (Niiniluoto
We arrived at most of the conditions described above simply by thinking about evidential favoring. The only place where we invoked the idea that favoring could be detected by a formal theory was in motivating the identical treatment of predicate permutations. But if we look at that condition itself (setting aside for a moment its motivation), the condition doesn’t mention formal theories at all. It says that if two hypotheses and a body of evidence can be represented in an adequate language such that a predicate permutation interchanges the hypotheses while leaving the evidence intact, then the body of evidence doesn’t favor one of the hypotheses over the other. Our general result tells us that if the evidential favoring relation is substantive, it must satisfy this condition.

What kind of favoring relation treats predicate permutations identically, and what kind of favoring relation does not? A favoring relation that fails to treat predicate permutations identically plays favorites among properties. That is, it responds differently to evidence involving one property than it does to evidence that is identical except that it involves a different property. For instance, suppose we have a piece of evidence that mentions greenness and grueness in exactly the same ways, but that evidence favors a hypothesis involving the property of being green over a hypothesis that involves the property of being grue in structurally identical ways. If the evidential favoring relation behaves in this way, it fails to treat predicate permutations identically. And notice that this property favoritism precedes the influence of the evidence. It’s not that the difference occurs because the evidence indicates that greenness is a property worthy of special evidential consideration; we stipulated that the evidence says exactly the same things about (or using) greenness that it says about (/using) grueness. If we could stare at the $f(\cdot,\cdot,\cdot)$ relation by itself before any evidence had been plugged in, we could already see that plugging in evidence and hypotheses involving certain predicates would cause it to react differently than plugging in evidence and hypotheses that differed only in the predicates that appeared.

Incidentally, this explains why formal theories of evidence repeatedly ran into language-dependence problems over the course of the 20th century. From the point of view of a theory working with the syntax of formal languages, working within a particular language is a way of privileging particular properties, such as the ones that are represented by predicates in that language. To take a silly example, you might have a formal theory holding that hypotheses that affirm more predicates are always favored over hypotheses that affirm fewer. Applying this theory to a language with a predicate-letter “$O$” for open would favor hypotheses asserting the existence of open doors over hypotheses suggesting closed ones; applying the theory to a language with a predicate-letter “$C$” for closed would have the opposite effect.

Our general result tells us that in order to capture a substantive favoring relation, a formal theory must privilege certain properties in some way, and an easy way to
do this would be for the theory to apply only to designated “special languages”—those languages that represent the underlying “special” properties in the right way. The trouble is that designating special languages is a non-syntactical affair. Being purely formal, the theories in question have no way to separate the good languages from the bad; every language with the same syntactical structure looks the same to a syntactical theory.

Yet ultimately this is not a point about formal theories of favoring. What we have learned is that a body of evidence is not sufficient in itself to substantively favor some hypotheses over others. It must work in concert with something (a preferred language, a property list, etc.) that does the work of privileging some properties over others. By itself, the informational content of a body of evidence is insufficient to yield a substantive evidential favoring relation.

2. Why Natural Properties Won’t Help

To some, all of this will be old hat. We’ve understood this problem for a long time (they’ll say), and we already know what the solution is. There are in fact special properties; following Lewis (1983) (and borrowing the relevant adjective from Quine (1969)) we can call them the “natural properties.” These natural properties have a special metaphysical status and play a distinctive role in evidential favoring. For example, when some evidence indicates that all the observed objects have displayed a particular natural property, that evidence favors the hypothesis that the next object will display that property over the hypothesis that it won’t. In Goodman’s terminology, the natural properties are “projectible.”

I can’t deny that this is possible. But even if there are natural properties, and even if they determine which which properties get special attention from the evidential favoring relation, we are left with an epistemic problem: How are we to determine which are the natural properties?

On the view under consideration determining the natural properties list is central to the project of determining which bodies of evidence favor which hypotheses. The natural properties list (we suppose for now) is an empirical fact about our world; it must be determined from our evidence. And yet our evidence doesn’t carry the natural properties list on its sleeve; nothing we observe ever entails that such-and-such is a natural property while such-and-such is not. So selecting the correct natural properties list is a matter of determining which of a number of hypotheses is favored by our evidence.

Now consider an agent (call him Pedro) who has some hypotheses about something, none of which is entailed or refuted by his evidence. He wants to determine whether his total evidence favors one particular hypothesis over another. Pedro has absorbed the lessons of our general result, but believes that the evidential favoring relation works with a combination of one’s total evidence and the list of natural properties. Still, he knows he won’t be able to determine any favorings from his evidence until he has the list of natural properties. So he sets out to determine the list of natural properties. Since the contents of that list is an empirical fact (we assume for now), he decides to determine the list using his total evidence. But he knows he can’t determine what his evidence favors until he has the list of natural properties.

We can make this circularity problem more precise. Imagine that somehow there were a process (or set of processes) by which Pedro could take his evidence, work
out the list of natural properties from it, and then determine (relative to that set of
natural properties) which of two hypotheses was favored by that same evidence. We
can capture the outputs of this process by a three-place relation: we will say that
\( np(h_1, h_2, e) \) holds just in case the natural properties list Pedro’s process works out
from the evidence represented by \( e \) generates a favoring relation on which \( e \) favors
the hypothesis represented by \( h_1 \) over the hypothesis represented by \( h_2 \).

I’ve described Pedro’s process as if it works sequentially, first determining the
natural properties list from the evidence and then determining a favoring relation
from that. But this was simply an illustrative device; it makes no difference if
the process works “all at once,” taking evidence and a pair of hypotheses and
yielding a favoring judgment in one fell swoop. It also makes no difference whether
the process employs a formal theory, or a group of informal heuristics; whether
it works with general principles or is unavoidably particularistic; whether it works
through conscious, deliberate reasoning or whether it relies on cognitive virtues and
judgment calls. The process might take into account a variety of considerations:
it might generate the simplest possible theory consistent with the evidence and
evaluate hypotheses according to that; it might infer the best possible explanation
of the evidence and go from there; it might use any subtle process you like from
epistemology, statistics, the philosophy of science, or wherever else. However the
process works, ultimately it will have to take a pair of hypotheses and some evidence
as inputs and produce a favoring judgment as output.

And here the generality of our result kicks in: the net effect of that process,
captured as the relation \( np(\cdot, \cdot, \cdot) \), will satisfy the conditions we listed earlier for
\( f(\cdot, \cdot, \cdot) \) and so be susceptible to our theorem. \( np \) will certainly be asymmetric for
a given \( e \). And we certainly want it to be substantive—if Pedro’s process works it
should give him more than just what he could get from strict entailment relations.
But our general result tells us that if \( np \) is substantive, it does not treat predicate
permutations identically. So it displays a bias towards certain properties that is
prior to and independent of the influence of any evidence. But that was the role the
natural properties were supposed to fill! In order for the list of natural properties
to play its envisioned role in shaping the evidential favoring relation, it cannot be
determinable from an agent’s evidence.

Proponents of a three-place evidential favoring relation often advise an agent
to be guided solely by his evidence in choosing which hypotheses to believe. Our
general result tells us that a body of evidence cannot substantively favor one hypoth-
esis over another without the help of an additional element (a preferred language, a
special properties list, etc.). That additional element cannot be determined by the
evidence; it needs to be supplied from outside the agent’s evidence, by something
else entirely. Put another way: an evidential proposition does not have enough
information content in itself to favor one hypothesis over another. To paraphrase
Gertrude Stein, there’s not enough there there.\(^{19}\)

\[^{19}\text{There are by now a number of formal measures of the information content of a proposition,
and of course a body of evidence can have an arbitrarily large information content as calculated
by one of those measures. When I say that a body of evidence does not have enough information
content to favor one hypothesis over another, I mean roughly what a judge means when he says,}
\[^{19}\text{“There’s not enough here for an indictment.” It does no good for the prosecutor to respond, “But
Your Honor, I’ve supplied over a thousand pages of evidence, each of which contains multiple
logically independent facts!”}

I'll conclude this section by illustrating the point with a diagram. Historically, one popular strategy (epitomized by Carnap’s approach) for analyzing evidential favoring has been to suppose that a body of evidence favors certain possible worlds over others. Possible worlds are described in a formal language by state-descriptions; once we work out which state-descriptions are favored by a given body of evidence the favoring relations among other propositions can be constructed from those.

In Figure 1 I have depicted the space of all possible worlds as a rectangle; I’ve marked some of those possible worlds with names for convenience. Figure 2 shows the effects of a particular evidential proposition, depicted as a circle. What the evidence does is rule out some possible worlds (those outside the circle) while leaving others in contention. The crucial thing we learn from our general result is that that’s all the evidence can do. The evidence does not first rule some of the possible worlds out and then rank those that remain within the circle. To the extent that some of the remaining possibilities bear a special relation to others once the evidence arrives, that is only because they bore a special relation before the evidence was introduced. To continue the geometric metaphor, we might think that when the circle appears the remaining possibilities that are closer to its center (such as \( w_5 \)) are somehow rendered more probable than the ones near the edge (like \( w_1 \)). But proximity to the edge of the circle is determined not just by the circle, but also by the geometric arrangement of the worlds before the circle was introduced. Shuffle the original arrangement, and this “favoring” relation would be different entirely.

3. Reference Magnets and Virtuous Circles

To this point, we have argued first that if there is a substantive three-place evidential favoring relation, it must be determined by something like a list of special properties, and second that such a list of special properties cannot be uncovered on an empirical basis. In this section I will examine two positions that try to undermine that argument; in the sections to follow I will examine positions that accept the argument but nevertheless maintain the existence of an objective, three-place evidential favoring relation.
First, it might be suggested that Pedro’s predicament can be solved by a feature David Lewis attributed to natural properties: their so-called “reference magnetism.” Natural properties played a role not only Lewis’s metaphysics, but also in his philosophy of language. Briefly, Lewis thought that among the considerations that determine the meanings of terms in a language is a preference for assigning natural properties as the extensions of predicates. The thought would then be that given reference magnetism, a predicate like “green” is likely to pick out a natural property, and since part of the metaphysical role of natural properties is to play a part in physical laws, we can be confident that “green” will be projectible as well.

I’ve explained Lewis’s view very quickly, without taking into account complexities of his position such as the suggestion that naturalness may come in degrees. Still, I think that even if we grant Lewis both his metaphysics of natural properties and his philosophy of language, and build in all the complexities he proposes, reference magnetism will not solve our epistemic problem.

The basic issue is that a speaker of a language needs some way to determine which of that language’s predicates are going to be assigned the more natural properties. Suppose Nigel speaks a language we’ll call ENGLISH that sounds exactly like English and is even spelled identically except that all the letters are capitalized. Nigel needs to figure out whether “GREEN” or “GRUE” is assigned a more natural property under the theory of reference magnetism. According to Lewis, Nigel can determine this by seeing which is more simply definable in the terms employed by the best-supported scientific theory. The trouble is, Nigel then needs to determine which of the scientific theories currently available is best supported by his (or his society’s) total evidence. And according to our general result, in order to do that he first has to know which predicates in his language pick out natural properties.

I am grateful to Andrew McGonigal and Jonathan Schaffer for discussing this suggestion with me.

Here I think it’s significant that despite the fact that Lewis published multiple articles describing the philosophical “work” he thought natural properties could accomplish (such as (Lewis 1983) and (Lewis 1984)), and despite the fact that green/grue was one of his most frequent examples of a natural/unnatural property contrast, he never once suggested that natural properties would solve Goodman’s projectibility problem.
One might think that Nigel can simply determine which predicate has been in his language longer—perhaps “GRUE” was very recently introduced by troublesome philosophers—and assume that by the magic of reference magnetism that one identifies a natural property and so is projectible. But the well-established predicate need not be the one that picks out the natural property. Consider Lavoisier’s late-18th-century introduction of the term “oxygen” as part of a theory of heat meant to displace the phlogiston theory. A chemist of the time might have genuinely wondered whether “phlogiston” or “oxygen” carved nature at its joints, featured in genuine scientific laws, and could be reliably employed in making projections about future experiments. Here it would do no good to point out that “phlogiston” had been in the lexicon longer. The crucial issue would be whether “phlogiston” or “oxygen” played a central role in the scientific theory best supported by the evidence available. But if determining which theory was best supported by the evidence depended on ascertaining the correct list of natural properties, our chemist would be stuck. Even if he were somehow provided with (and believed) the full Lewisian story about reference magnetism, he would be unable to determine which of the predicates in his language that story applied to.

Setting reference magnetism aside, one might decline to participate in our argument’s “cyclophobia": In philosophy some circles are virtuous, and the one involved in Pedro’s process might just be one of those. Our 6-step argument in the introduction claimed that an agent can’t determine a favoring relation unless he can determine a special properties list, and he can’t determine a special properties list unless he can determine a favoring relation. But maybe there is a way for Pedro to determine both at the same time. After all, Pedro (or any of us) will not start from scratch in trying to determine which properties are preferred and where the evidential favoring relations lie. He will have some set of properties he tends to think of as fundamental, or he will speak some natural language that employs certain predicates instead of others. He will also have opinions about which bodies of evidence favor which hypotheses over which others. Perhaps he can engage in some sort of reflective equilibrium process by which he develops an evidential favoring relation from his list of preferred properties, compares it to what he thinks he knows about the true evidential favoring relation, then adjusts his preferred properties list, adjusts his opinions about favoring, etc. The idea would be that by a process of mutual adjustment Pedro could somehow bootstrap his way to a properties list and evidential favoring relation that line up correctly.

I have sketched this idea vaguely because—despite the fact that a number of people have suggested it to me in the abstract—I really have no idea how the details would go. It’s important to notice here that we are not discussing the kind of process (familiar to us) in which an agent gains evidence over time and gradually adjusts his views of the world to fit. There are reasons to think that processes like that can gradually hone in on accurate results in the long run, even if they start from a point that’s far from the truth. But in the bootstrapping process we’re imagining Pedro keeps his total evidence fixed throughout; the only things that change over the course of the process are his special properties list and his views on evidential favoring.

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22[SOMETHING ABOUT GOODMAN AND ENTRENCHMENT?]
23I am grateful to Malcolm Forster for suggesting the example.
24Mark Colyvan introduced me to this term; he attributed it to Adam Elga.
The key question to ask about this bootstrapping process—however it might work—is whether it is guaranteed to wind up at the same point no matter where it starts. That is, would any agent who employed the process starting from any property list and set of assumptions about evidential favoring ultimately wind up with the same relation? If not, then there are two possibilities: either (i) there is a true, unique evidential favoring relation and the bootstrapping process is not a means of determining its extension; or (ii) the bootstrapping process is picking up on the truth about evidential favoring, but whether an agent’s total evidence favors one hypothesis over another depends not just on the evidence and hypotheses but also on subjective factors that supply the agent with a bootstrapping starting point, such as the native language with which they were raised. To embrace the latter possibility is to deny that there is an objective three-place evidential favoring relation at all.

This last option brings up an important consequence of our discussion of objective favoring. Consider Roger White’s “Uniqueness Thesis”:

**Uniqueness:** Given one’s total evidence, there is a unique rational doxastic attitude that one can take to any proposition.\(^{25}\)

If there is an objective, three-place evidential favoring relation this will not guarantee that Uniqueness is true. We have already admitted that the evidential favoring relation may not introduce a total ordering among hypotheses relative to a given body of evidence, in which case rationality may allow for differing doxastic attitudes where there are gaps. And even if the evidential favoring relation does introduce a total ordering, it may be that only an ideal reasoner would be capable of governing its doxastic attitudes perfectly by that ordering. The first objection most people have to Uniqueness is that it just seems too demanding to maintain that if two agents with identical evidence disagree on anything, at least one of them is failing to be rational. An everyday agent might make a few mistakes here and there, diverge from what the ideal reasoner would do given his evidence, and still clear the bar for rationality.

So the existence of an objective, three-place evidential favoring relation does not entail Uniqueness. On the other hand, if we reject an evidential favoring relation on the grounds that evidential favoring must be relative to some subjective feature that varies from agent to agent, this seems to me fatal to Uniqueness. It must always be at least rationally permissible to align one’s doxastic attitudes with the favoring relations resulting from one’s total evidence. There will then be cases in which two agents with the same evidence vary in the subjective features on which evidential favoring depends, making it rationally permissible for them to take different attitudes towards particular hypotheses (because the evidence favors different hypotheses for one agent than for the other).

Now suppose on the other hand that the bootstrapping process being considered ends up at the same evidential favoring relation and list of special properties no matter where it begins. Then there’s an important sense in which the starting point and whatever empirical factors determined it are immaterial. Conditions in the actual universe might determine the history of how the bootstrapping evolved, but they would have no influence on its endpoint; the list of special properties ultimately achieved would not supervene on empirical facts. Put another way:

\(^{25}\) (White 2005). White, in turn, attributes the thesis (in slightly different form) to (Feldman 2007).
Under the current supposition, a hypothetical agent who had no idea about which
properties were special or about the content of the evidential favoring relation
would need only pick an arbitrary view at which to start, and could then apply
the bootstrapping process and be guaranteed to wind up with the right answers.
In other words, the list of special properties could be determined completely a
priori. So let’s consider whether a list of special properties determinable a priori
is a plausible alternative.

4. A Priori Special Properties

In its broadest outlines, our epistemic problem for the evidential favoring relation
suggests that something we thought we could determine by reasoning from empirical
evidence cannot be determined in that way after all. At this level of description it
resembles a number of familiar philosophical skepticisms (concerning induction, the
existence of an external world, the existence of other minds, etc.) and it is tempting
to answer our problem using what have become familiar responses to skepticism:
one argues either that agents can acquire what is sought entirely a priori, or that
they need not acquire it at all (the externalist response). We will take up these
responses one at a time.

The first thing to note is that our problem is not general inductive skepticism. It
has recently become more acceptable to suggest that agents have a priori warrant
to believe the universe is regular and some properties projectible.26 Our concern is
that even a priori warrant to believe in Regularity is available, that does no good
in helping agents discern which are the projectible properties.

In the metaethics literature, most of those who hold that there is an objective
evidential favoring relation (typically, an objective reasons relation) assume that
its extension can be determined a priori. I have no way of showing that that is
impossible. But our general result shows how difficult a position this is to main-
tain.27 Our arguments to this point indicate that there can be a single, objective
evidential favoring relation whose extension is determinable only if it is possible to
work out a list of preferred properties a priori.28

Now it certainly may feel like an a priori fact that there is something wrong
with predicates like “grue” and that such predicates cannot be projected from
past observations onto future predictions. Perhaps our intuition enables us to rule
out gruesome predicates as unnatural; perhaps we can just perceive that sharing
particular features make some objects more similar than others; or perhaps the light
of reason reveals to us that some possible arrangements of the universe are more
uniform and therefore more likely than others. But any attempt to fill out these

26 See, for instance, (Wright 2004) and the final chapter of (Fumerton 1995).
27 I am grateful to David Chalmers for discussion of this position.
28 One might object that in order to determine what his evidence favors an agent need not form
 beliefs about certain properties’ having special status; he need only draw conclusions about his
evidence that match up with the biases that would follow from a particular property list. (Keep in
mind that if the evidential conclusions drawn are substantive, our general result tells us that there
must be such biases in the favorings.) But presumably if an agent can determine which evidence
favors which hypotheses he is at least capable of noticing that these favorings are treating some
properties differently from others. Thus if it is possible to determine evidential favoring relations
a priori is it also possible to work out on an a priori basis which properties are preferred. This
justifies the claim in the main text.
proposals even slightly runs into immediate problems, and it’s worth reiterating a few well-worn points about where those problems lie.

First, while it may seem that our intuition immediately rejects “disjunctive” or “logically complex” predicates like “grue,” we are happy to work with predicates like “bilaterally symmetrical” whose definition in terms of “has a fin on the left” and “has a fin on the right” is logically complex. It is sometimes suggested that intuition rejects logically complex predicates whose definition involves a spatio-temporal property in a disjunctive way. Yet for centuries the dominant Aristotelian physics held that the natural (phusei) motion of an inanimate object was linear if it was in the sublunar realm or circular if the object dwelt in the heavens. Some who take the Bible literally hold that “snake” applied to legged creatures before the Fall but has applied to legless creatures ever since. The predicate “at home” applied for me to a particular location during my first year of graduate school, then to a different location for the next few years, then finally to a third location near the end of my studies. Yet it was highly projectible that at the end of each day I could be found at home.

Moreover, the property picked out by “grue” isn’t really disjunctive. Assuming (with Lewis) that for every set of objects there exists a property of belonging to that set, “grue” picks out a set that is no more or less “disjunctive” than any other set of objects. What’s disjunctive is the definition of “grue” in terms of our more standard color predicates, but that’s relevant only if those predicates are already privileged for other reasons. Even more importantly, ruling out “grue” and its other quirky kin is not really what the project of a priori property prioritization is about. “Grue” was Goodman’s expedient counterexample intended to demonstrate that the formal evidential theories of his day lacked a particular general feature. Some philosophers respond to Goodman’s puzzle (usually in private) by saying that we need not worry, because in real life there’s no threat that any of us is going to try to project a predicate like “grue.” But that’s like responding to Gôdel’s First Incompleteness Theorem by saying that we weren’t really worried about whether things like the Gôdel sentence could be proved in our formal systems. In both cases, the point of the admittedly odd counterexample is that it exemplifies the lack of a general feature we might have otherwise assumed obtained. In the case at hand, predicates like “grue” help establish that a three-place favoring relation requires a list of preferred properties and that that list cannot be determined from our evidence.

This opens up a broad challenge of explaining how any property does or doesn’t get placed on the list on an a priori basis, not just how properties like grueness can be excluded.

And this is a serious challenge, whatever one’s theory of the a priori. A list of preferred properties is not going to be achieved simply through analysis of the

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29If we are observing objects that may only be green or blue, “x is grue” can be defined as “x is green just in case x has been observed already.”

30There are those who hold that the term “property” should only (properly speaking) be used for the subset of properties we have described as “natural”. Throughout this article I have followed Lewis in being liberal about properties and then designating some of them as “natural” or “special”, but to avoid terminological conflict one could replace all my uses of “property” as the sort of item denoted by a predicate with uses of “set”.

31Hand-tailored, “gruesome” predicates play an important role in the proof of our general result in Appendix A.

32Compare Goodman’s discussion at (1979, p. 80).
concepts “evidence,” “similarity,” or “uniformity.” The a priori theorist needs to explain not only the mechanism by which we assemble a special properties list, but also why that mechanism has epistemic validity. After all, explaining how and why we intuitively take some properties to be more natural than others does not explain whether or why our intuition is thereby latching on to properties that are projectible.

For example, it might be suggested that some objects just obviously go together phenomenologically, and that the favoring relation should be analyzed using a language whose predicates capture that phenomenological grouping. In response to this suggestion, we should first note that it’s unclear whether real human languages respect phenomenology all that closely—every evening as the light fades green objects come to look very different than they did during the day. Second, many features of our phenomenology are determined by contingent facts about our sensory faculties. The way humans group objects by color has a great deal to do with particular facts about our retinas and visual processing units, including the fact that we cannot perceive most wavelengths of light at all! To take another example, the predicate “odorless” might for a great deal of human history have seemed intuitively to express a natural, projectible property. But the set of chemicals that can be detected by human olfaction proves to be a hodgepodge grouping with almost no underlying scientific unity.

Now it may simply be a nonstarter to try to understand “true” similarity in terms of human phenomenology. But even when we turn to apparently a priori similarity judgments made by our higher rational faculties, we should remember that many of these have changed over the course of human history. Nowadays it would seem silly to group two objects as belonging to a fundamental kind on the grounds that they occupy some particular spatial or temporal region. But a good explanation of Aristotle’s “disjunctive” theory of natural motion for inanimate objects is that he thought each kind of object had a proper motion and that objects farther from Earth than the Moon were of a different kind than objects closer in. Newton and others had to discover that the same physical laws apply throughout the universe, and that spatio-temporal location is irrelevant to grouping into physical kinds.

Again, my point is not that it is impossible that we have the ability to discern a priori the list of special properties that underwrites the evidential favoring relation. It’s just that anyone who believes there is a determinable fact of the matter about which hypotheses are favored by which evidence is thereby committed to a very strong conception of the a priori. After all, the proposal is that given two situations in which one’s total evidence says identical things about two predicates and says identical things using those predicates we may nevertheless be able to determine on a priori grounds that in one situation the predicate is projectible while in the other it is not. I think that philosophers often interpret Goodman’s problem as showing that there’s something difficult and complex we do with our evidence, and that it’s very mysterious how we manage to do it. The thought is that by some subtle and abstract yet still perfectly general procedures, we manage to draw out

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33See (Aristotle 1984, Bk. 1, Ch. 3). I am grateful to Jessica Gelber for discussion of this point and help with the reference.

34A priori judgments about the uniformity of various possible arrangements of the universe are also suspect. It might seem intuitive that the most uniform possible universe would be one in which all particles had identical velocities and were exactly the same distance from their nearest neighbor. But a priori considerations from thermodynamics deem this a highly unlikely arrangement.
(at least reasonably well) from our evidence which are the projectible properties. But our general result shows that this isn’t what we do at all; any such general procedures would wind up in Pedro’s predicament. If we do somehow determine the list of projectible properties, we do it not by relying on our evidence but by some process that is capable of ranking particular properties over others entirely prior to that evidence. No one has put forward a serious story about how it is we do this or about what the “specialness” of the special properties might consist in such that it is detectable in this fashion.

Of course, we still have the datum that our natural faculties and cultural heritage emphasize certain properties over others. It may be that while our intuitions fall short of identifying some objective truth about a list of special properties underling an evidential favoring relation, we nevertheless have a priori warrant to take them as a starting point for reasoning on the basis of our evidence as we work to improve our understanding of the world. For example, it might be suggested that in their scientific investigation of the world humans were initially justified in grouping objects by phenomenological similarity, and that our subsequent investigations have justifiably altered those groupings over time. But this is another view that makes evidential favoring relative to a subjective factor (the agent’s starting point), as is revealed by the way it violates Uniqueness. For instance, consider a rational species with a different phenomenology from our own. Early in this species’s scientific development, its members will still categorize the world in a very different way than we do, and so the same evidence will favor different hypotheses (and justify different doxastic attitudes) for them than it will for us.

5. Hard Externalism

We have established that if there is an evidential favoring relation, agents will be able to determine when it obtains only if they can determine a list of special properties (or something equivalent) a priori. We have argued that it is very implausible that they can do so. But perhaps agents cannot, and need not, determine when the evidential favoring relation holds. Perhaps it is enough that there is such a relation out there in the world, and that it is possible to reason in ways that match up with what it recommends.

To be clear: the position we will now consider concedes that it is impossible even in principle for agents to work out whether their evidence favors one hypothesis over another (except in special cases of entailment). That is why I call this position “hard externalism.” My guess is that many philosophers who believe in a version of an evidential favoring relation will find it immediately unpalatable. The concern will be that evidential favoring relations play a central role in guiding rational deliberations, and if those relations were not even accessible in principle they could not play this guiding role. Philosophers convinced by this point will pursue the current line no farther.

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35In calling our natural property-detection procedures “general,” I mean to suggest that they work at a level of abstraction from which all properties look the same, not that they are necessarily capturable using general principles. As we noted in Section 2, our arguments apply just as well to particularists who hold that agents determine the list of natural properties from their evidence using a faculty of judgment whose operations are not expressible in principles. Our general result shows that this judgment faculty must have a disposition to treat some properties differently than others antecedent to its encountering any evidence.

36Or different subsets of early humans, if their phenomenology was not uniform.
But for the committed externalist, let’s press on. The externalist’s first impulse will be to respond to our epistemic problem in a manner analogous to his approach to skepticism about the existence of the external world we perceive. The general strategy is to delineate a Good Case and a Bad Case and to argue that even if agents cannot tell that they are in the Good Case, the fact that they are in the Good Case confers the desired epistemic property upon them. For external world skepticism, the Good Case is actually existing in an external world like the one we perceive (as opposed to being a brain in a vat, etc.); the externalist argues that if we actually live in such an external world, we have knowledge/justification for believing that we do whether we can detect that positive epistemic status or not.

The problem with this analogy is that it is designed to explain why agents in the Good Case achieve a particular epistemic status, yet when it comes to evidential favoring all of us are almost certainly in the Bad Case. The externalist story will be that there is an objective evidential favoring relation (out there among the propositions, so to speak) and that it does treat certain properties in a special fashion. The most plausible explanation for this will be that these properties have a special metaphysical status, play a role in the laws of nature, and so are projectible—they are what we usually think of as natural properties.\[^{37}\] The trouble is that whatever the true list of natural properties is, humans in the early 21st century are almost certainly wrong about at least some of its entries. Our scientific knowledge of how the universe carves up has drastically improved, but is surely not yet perfect. If we were in the Good Case—if we had the natural properties list correct and reasoned according to an evidential favoring relation that tracked it—then the fact that we were in the Good Case would put our reasoning practices in harmony with the universe in just the ways the externalist wants.\[^{38}\] But we are not in the Good Case, and the standard externalist response to external-world skepticism offers nothing to Bad Case denizens.

The externalist response to this point is to change the analogy somewhat. Instead of focusing on whether the broad-brush suggestions of our perceptions (such as “there is an external world”) are accurate, focus instead on individual deliverances of our perceptual faculties. There is a skepticism available about whether those individual deliverances can be trusted: the only way we have to check whether individual deliverances of perception are accurate is by comparing them with other deliverances of perception, but then to check that those are accurate. . . . The externalist response here is to argue that because our perceptual faculties are generally reliable, when their deliverances about the world are accurate those deliverances yield knowledge. Note that this strategy does not require perception to be perfectly reliable; it is possible to be slightly in the Bad Case and still achieve one’s epistemic goals much of the time. The new analogy, then, is that while contemporary humans

\[^{37}\]This story is compatible with both Humean and non-Humean stories about the laws of nature; in the former case the “special metaphysical status” of the natural properties just is the fact that they play a particular role in the laws of nature. I should also mention that this story can take or leave reference magnetism as it likes.

\[^{38}\]The externalist may say that all there is to reasoning correctly and deserving various epistemic plaudits is reasoning in accordance with the way the objective evidential favoring relation actually stands. In the externalist’s sense, agents in the Good Case might even count as being “guided” by the favoring relation out there in the world. Still, I don’t think establishing that agents are guided by evidential favoring in this sense of “guidance” will be enough to convince philosophers who jumped ship at the initial suggestion of hard externalism to climb back aboard.
do not have a perfect understanding of the natural properties list, we have it largely right, and this is enough that a large proportion of our beliefs about evidential favoring relations are correct. Thus most of the time we reason in accordance with what our evidence favors, and that is all the externalist wants.

Unfortunately, the evidential favoring case has a wrinkle that disrupts even the improved analogy. We tend to think that the reliability of our perceptual faculties has not changed much over time. Yet the accuracy of our natural properties list has changed over time, as is obvious from the fact that the list itself has changed a great deal over the course of human history. In every area of our understanding of the world, our view of where its “joints” lie has changed at least a little, and in many areas (such as the physical sciences) our views have changed repeatedly, rapidly, and recently. The externalist analysis of the reliability of perception does not have to deal with how one generation of perceivers makes sense of the perceptions of another, but when it comes to natural properties and evidential favoring such inter-generational considerations create considerable problems.

Consider the debates between Galilean and Ptolemaic astronomers about their respective models of the universe. At some point the Galileans judged that a heliocentric theory was favored by the available evidence over the Ptolemaic options, and we think the Galileans were correct in their assessment of that evidence. Yet both parties in that debate had serious misconceptions about the fundamental properties and categories of astronomy. On the externalist story about evidential favoring, to understand what the evidence actually favored in the Ptolemaic/Galilean debate we would have to consult our list of what the relevant natural properties actually are, determine what evidential favoring relation they give rise to, then judge that the Galileans had the evidence on their side according to that relation. But this is an anachronistic way to proceed: the Galileans not only had the evidence on their side, they knew the evidence was on their side, and that knowledge did not come from their using the evidential relation determined by the modern natural property list.39

One might suggest that the Galileans did not actually know that the evidence was on their side. The evidential favoring relation, as judged by the natural properties list they thought was correct, apparently favored heliocentrism, but they were not in a position to judge the truth of the matter because their natural properties list was incorrect. What makes it the case that their evidence actually favored heliocentrism was the true evidential favoring relation determined by the actual natural properties in the universe. But this introduces a strange discontinuity between our view of reasoning in times past and our view of reasoning in our own. Possessed of a natural properties list that we take to be correct, we think that while they in the past proceeded with a false understanding of what their evidence favored, we (because we have the true property list) are under no such illusions. Our evidential reasoning is correct, while theirs just seemed to be so.

39It might be suggested that the natural property list in use at the time was close enough to correct that the Galileans could be on to the real evidential favoring relation. In that case, we can change the example to imagine Anaximenes arguing against Thales that material things are ultimately constituted of air rather than water. When Anaximenes argued that evidence involving condensation favored his theory over Thales’s, the philosophers were able to judge whether Anaximenes had presented good evidence for his view despite the fact that they were far, far off about the actual natural properties in the area.
Matters worsen when we come to worry that reasoners a short time from now are apt to think about us just the way we think about the Galileans. Our current natural properties list has its own flaws, so in point of fact we may not know that the Galilean’s evidence supported heliocentrism either. It seemed to them that it did, it seems to us that it did, and we can be confident only that God (in possession of the actual natural properties list) knows the truth of the matter.

This strikes me as nonsense. Past some point the astronomical evidence favored heliocentrism over the Ptolemaic theory; the Galileans knew that, we know that, we know that they knew that, and we know that we know that. Moreover, the fact that the Galileans’ evidence favored heliocentrism plays an important role in explaining why astronomy developed the way it did. An objective evidential favoring relation that we seek yet do not find threatens to become explanatorily inert. At each historical stage agents reckon what they have to reason to believe by their current understanding of the world. At the current stage, the only natural properties list we can appraise evidence and hypotheses with respect to is the list we have before us (not some objective list to which we lack access). And this is the list we should use. While there may be an objective evidential favoring relation somewhere out there of the sort the hard externalist envisions, it is difficult to see what normative or explanatory role that relation could play in the ongoing story of human evidential reasoning.

None of this is to deny the suggestion that, as a matter of empirical fact, 21st-century humans’ evolutionary and scientific history has gotten us very close to an accurate understanding of the natural properties across a wide variety of disciplines.

Yet once we admit that our understanding is not perfect the crucial question becomes: In those cases in which our understanding of the natural properties happens to be wrong, does our evidence actually favor the hypotheses we think it does? Those who answer “no” adopt the hard externalist position, and are subject to the complaints just raised. If we answer “yes,” on the other hand, we are admitting that evidential favoring is relative to a subjective factor, the understanding of natural properties with which an agent’s evolutionary and scientific history has endowed him. According to this view two species (or human cultures) with natural properties lists that slightly diverged but were both very close to the truth could disagree on which hypotheses a given body of evidence favored and both be correct. Uniqueness would be denied once more.

6. Subjectivism

Philosophers often think of Goodman’s grue problem in much the way they think of the Liar Paradox: as something that no one has managed to resolve satisfactorily but that is equally a problem for all of us. However our discussion has repeatedly suggested an option that relieves the pressure language-dependence results put on views maintaining the existence of an objective, three-place evidential favoring relation. That option admits that evidential favoring is relative to a fourth relatum: a subjective factor beyond the agent’s evidence that does the work of favoring some properties over others. That subjective factor may be a subject’s understanding

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40 The suggestion that without a roughly correct understanding of which properties are projectible our species could not have survived for long dates back at least to (Quine 1969).
41 Here we are using “subjective” in both the vernacular sense (on which something is “subjective” if it varies from subject to subject) and the more traditional philosophical sense (on which
of the natural properties in the world, it may be the predicates contained in the subject’s native language, or it may be something else.\textsuperscript{42} It may depend on the subject’s society, his upbringing, his biology, or any of a number of contingent factors. It might work by bringing certain pragmatic interests to bear, by highlighting certain questions as more important than others, or by prioritizing the ruling out of certain alternatives. But the crucial point is that this subjective factor is accessible to the agent, thereby solving the problem of how he is able to use it to determine an evidential favoring relation.

The relevance of such subjective factors is sometimes tacitly acknowledged by proponents of various formal theories of evidence. For example, philosophers who urge scientists to employ tools like maximum entropy in ranking hypotheses will respond to complaints that those tools are language-dependent by saying that the scientists should just use “whatever scientific language they are working with.” On the present view that is entirely right, but one needs to recognize that which language a scientist is working with is not a matter entirely determined by past experiments. Moreover, one needs to understand the costs of a view that relativizes evidential favoring to a fourth, subjective relatum. As we have seen, one consequence of this view is the violation of Uniqueness: two agents with the same total evidence may be rationally permitted to have different beliefs. In fact, if the relevant subjective factors differ enough they may be rationally \textit{required} to have different beliefs.

The subjectivist position may also require us to rethink our view of scientific reasoning.\textsuperscript{43} Carnap thought of scientific reasoning as an argument in the sense of “argument” we teach in deductive logic classes: flowing from a set of premises to a conclusion. He imagined that a complete scientific novice with substantial powers of reasoning could be given the results of all the experiments conducted up to the present and discern from them which scientific theory was favored. But the present position suggests that we think of science as being more like an “argument” in the everyday sense: an activity that carries on through time, over the course of which positions change, information is introduced, and new views develop. Understanding science that way, our total evidence at a time doesn’t tell us where we should \textit{be}; instead, each piece of evidence as it accumulates tells us, given where we are \textit{now}, where we should go \textit{next}.

A few paragraphs back I left open the possibility that a subjective factor other than a list of properties or a language choice might do the work of biasing evidential favoring towards some properties over others. One popular candidate for that subjective factor is a personal probability distribution. The view known as “Subjective Bayesianism” models an agent as assigning an initial numerical distribution of credences over propositions (called a “prior”) that is not determined by something is “subjective” if it depends in part on features of the analyzer/perceiver and not just on features of the object being analyzed/perceived).

\textsuperscript{42}Notice that it \textit{cannot} be just a set of further propositions representable in the formal language used to express the subject’s total evidence and the rival hypotheses. Our general result could quickly be extended to show that if the evidential favoring relation determined with the help of this extra set of propositions is substantive, it must involve a set of properties that is privileged \textit{prior} to the influence of either the evidence or the extra set of propositions. (To get a shortcut sense of why, imagine that the extra propositions functioned by being added to the agent’s total evidence.) This reinforces the point made in (Sober 1988, Section 2.5) that evidential favoring must be relative to a background theory that is stronger than just a set of propositions.

\textsuperscript{43}I am grateful for a conversation with Kevin Kelly on this point.
his evidence. Though priors vary from person to person, they are subject to par-
ticular internal consistency constraints such as the laws of probability. Subjective
Bayesianism then requires the agent to modify his credence distribution as evidence
comes in according to particular diachronic laws. At any given time, favoring
relations are determined by the agent’s current credences. Whether “green” or “grue”
is more projectible for the agent at a given time becomes a question of whether a
particular subset of his credences meet various mathematical conditions that allow
green evidence to favor green hypotheses differently than grue evidence favors grue
hypotheses. The credences in question are available to the agent; if he is rational
they will drive his reaction to evidence of greenness as he follows the diachronic
Bayesian rules going forward.

Historically, Subjective Bayesianism was a response to Objective Bayesian the-
tories such as those of Keynes (1929) and Carnap (1950). We might think of the
Objective Bayesians who tried to give recipes for calculating probabilities relative
to bodies of evidence as trying to work out the details of a view on which there is
an objective fact of the matter about what any agent has reason to believe given his
evidence. Understood that way, I don’t think the dramatic shift towards Subjective
Bayesianism among philosophers of science in the late twentieth century was
a coincidence. I think that as they worked through the details of the objectivist
project, Bayesians came to sense that there simply isn’t enough information in an
evidential proposition to support something as strong as a probability distribution
over a hypothesis space. This article began in my attempts to determine whether
there might be an objective way to achieve something weaker, like a partial order-
ing over the hypotheses. It turns out there isn’t enough information in a body of
evidence to do even that.

A key has no logic to its shape. Its logic is: it turns the lock.
—G.K. Chesterton

References

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44 If evidential favoring can vary from person to person, why does our reasons talk often sound
so objective? One possibility is that in most conversations the agents have so much in common
among their credence distributions that a wide variety of favoring relations are effectively objective
among them. Our common talk makes the typical error of mistaking the intersubjective for the
objective.

45 For a precise set of such mathematical conditions see (Eells 1982).

46 As a number of people I know like to say, if Carnap couldn’t make it work then we aren’t
going to either.
References


**Appendix A. Proof of the General Result**

**Appendix B. Responses to Technical Objections**