A PRIORI PRINCIPLES OF REASON

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1. Introduction

As my title indicates, I would like to present various a priori principles of reason: a basic empiricist principle, as I would like to call it, some coherence principles, principles about the connection between truth and reason, etc. They are familiar, indeed venerable. What my paper will add are precise explications of those principles and rigorous relations between them. Just in order to make you curious, I will at last derive a weak principle of causality from a principle characteristic of pragmatic truth. This connection sounds surprising, and in view of the recent persistent silence on the principle of causality this result is certainly alerting. Let me work up to those principles and relations.[1]

2. Reasons and Apriority

We have first to focus on the two basic notions in my title: apriority and reasons. Let me take up the latter first. The word "reason" has certainly various uses. We might say, though, that reason – without a determiner – is the capacity to reason, i.e., to have, give, and accept reasons. So, the principles to be presented will in fact be about reasons – more precisely, about theoretical reasons or reasons to believe, not about practical reasons or reasons to act.

What are reasons to believe? I find, our basic notion is that an assumption or a belief, i.e., a belief type or belief content, i.e., a proposition, *A* is a reason for another assumption, belief, or proposition, *B*, if *A* supports or confirms *B*, if *A*

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[1] This paper is essentially an attempt at informally summarizing chapter 6 and sections 17.2 – 4 of Spohn (2012).

speaks in favor of *B* – we have many words for the same thing –, that is, if *A* strengthens the degree of belief in *B*, or if *B* is more credible given *A* than given non-*A*, in short: if *A* is positively relevant to *B*.[2]

If we want to make this idea precise, we obviously have to refer to degrees of belief. In fact, we have to refer to conditional degrees of belief. Let them be represented by some belief function β. Then the basic notion of reasons is this:

Definition 1: *A* is a reason for *B* w.r.t. the belief function β if and only if $β(B \mid A) > β(B \mid \overline{A})$. I call this the *positive relevance notion* of a reason.

Of course, all rigorous theorems depend on a precise specification of that belief function β. Various proposals might work. The first idea is that β is a probability measure. My subsequent considerations work best, I find, when β is interpreted as a ranking function; cf. Spohn (2012, ch. 6). Perhaps there are further alternatives. In this paper I will remain informal, and we need not bother. The important message is that the notion of a reason presupposes some workable account of conditional degrees of belief.

The positive relevance notion of a reason is entirely subjective, i.e., relative to some belief function β, which characterizes the belief state of some subject. Most philosophers are not satisfied thereby; they strive for a more objective notion of a reason. This is a most delicate issue. There is intersubjective pressure and agreement; relative to my belief function your reasons may appear unreasonable, and if so, I will criticize you and you might agree. Often, only true reasons count as reasons and false reasons at best count as would-be-reasons. This is one objectifying move, and there may be others. I will not pursue this issue here. In any case, I am convinced that all more objective notions of a reason build – indeed must build – on the basic subjective positive relevance notion of a reason. This basic notion will do for the rest of my paper.

Other notions of a reason may come to your mind. The most salient one certainly is that of a deductive reason: *A* is a deductive reason for *B* if *A* deductively entails *B*. However, according to the afore-mentioned main interpretations of the belief function β, this entails that *A* is positively relevant to,

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[2] The literature abounds in more or less vague notions of a reason, of a deductive, or a computational, or a causal, or in some way inductive kind. In Spohn (2001) I have argued the positive relevance notion to be the basic one.

and thus a reason for, *B*. Hence, the positive relevance notion encompasses the deductive notion. And it allows also for non-deductive or inductive reasons, as it obviously must do.

The positive relevance notion has a simple, but important consequence. Belief change or revision usually proceeds by conditionalization; the posterior degrees of belief we move to are the prior ones conditional on the given evidence. This means that belief change or revision is driven precisely by reasons in the positive relevance sense. Evidence provides reasons, and only those propositions unaffected by the evidence keep their prior degrees of belief.

In fact, we may distinguish here a weaker and a stronger sense of revisability. The cause of revising the attitude towards a certain proposition may lie in any other proposition whatsoever one gets informed about, or it may more specifically lie in an evidential or experiential proposition. Let me state this a bit more precisely:

Definition 2: A proposition *B* is *weakly revisable* relative to a belief function β if $\beta(B \mid A) \neq \beta(B \mid \overline{A})$ for some proposition *A*; otherwise, *B* is *strongly unrevisable* relative to β. And *B* is *strongly revisable* relative to β if $\beta(B \mid A) \neq \beta(B \mid \overline{A})$ for some experiential proposition *A*; otherwise, *B* is *weakly unrevisable* relative to β.

Partially, this definition is still indeterminate because I have not said what experiential propositions are. We will have to return to this later on.

Are there any strongly unrevisable propositions? Yes, certainly. According to any belief function logical truths must receive maximal certainty or the maximal degree of belief (which must therefore exist), and they are strongly unrevisable. In fact, we may easily prove that a proposition *A* is strongly unrevisable relative to β if and only if *A* or $\overline{A}$ is maximally certain in β. This has the important consequence that maximally certain propositions and in particular logical truths have no reasons in the positive relevance sense – and are no reasons for other propositions, since positive relevance is always symmetric. This is not to be criticized. It only means that this positive relevance notion is not made for mathematical reasoning and that maximal certainties are inductively barren.

Do the weakly unrevisable propositions extend beyond the strongly unrevisable ones? This is something we have to carefully discuss. First, however, we should attend to our second central notion: that of apriority.

Traditionally, a proposition, belief, or judgment is a priori if it is independent of all experience. This is ambiguous. It may mean that a belief is a priori if it is maintained given any experience whatsoever. Then I call it *unrevisably a priori*. Or it may mean that a belief is a priori if it is held given no experience whatsoever or prior to any experience. Then I call it *defeasibly a priori*.

The traditional notion[3] is too restrictive in another way. It is not only a belief that may be a priori; any feature of a doxastic state may be a priori. So, my preferred explication is the following:

Definition 3: A doxastic feature is *unrevisably a priori* if and only if each rational doxastic state has it. And a doxastic feature is *defeasibly a priori* if and only if each initial rational doxastic state has it.

Since holding a certain belief is also a feature of a doxastic state, this definition generalizes the traditional notion in its ambiguity.

Of course, it is still obscure what initial rational doxastic states are. Only by explaining that initiality will the notion of defeasible apriority be filled with substance. I believe the demand can be met. However, I shall not pursue this issue here, since defeasible apriority is only of secondary relevance in my paper.

An important consequence of my generalization is this: All normative principles of epistemic rationality, whatever they are, are unrevisably a priori in my sense, since they are supposed to hold for all rational epistemic states. Of course, we argue about what those principles are; the normative issues are by no means settled. Still, these are arguments about the a priori constitution of our mind.

In particular, the formal shape of the belief function β is unrevisably a priori. There are various rational justifications of the axioms of subjective probability; they thus attempt to show that those axioms are unrevisably a priori. Similarly, there are various rational justifications of the axioms of ranking theory. And any alternative proposal for the form of rational degrees of belief must come up with a corresponding justification.

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[3] One may well say that the traditional notion is only unrevisable apriority; at least this is the notion Kant continuously pondered about. However, defeasible apriority has historic precedent as well; in any case, a priori probabilities were always taken to be defeasible.

In contrast to these examples for unrevisable apriority, which are usually not discussed under that heading, contemporary discussion predominantly focuses on the conceptual as a source of the a priori. This seems still to be an unfortunate heritage of logical empiricism and its strict denial of synthetic principles a priori. In the meantime, we have learned to distinguish analyticity and apriority. But, somehow, it is still only conceptual considerations that are seen to lie at the bottom of both, analyticity and apriority. Even with conceptual apriority, though, matters are more complicated. There are not only analytic conceptual truths and, with Kripke, contingent a priori conceptual truths. There also are defeasibly a priori claims of a purely conceptual nature, for instance reduction sentences for dispositional predicates. However, I will not argue the point here; cf. Spohn (2012, sect. 17.1).

Rather, I would like to discuss further a priori principles, neither of a conceptual nature, nor merely about the formal shape of rational doxastic states, but having some substantial content. It is certainly not the least of my intentions to thereby revive Kant's wider conception of the a priori as conditions of the possibility of experience, though I shall continue proceeding in quite un-Kantian ways.

3. The Basic Empiricist Principle and Some Consequences

In order to work up to the principles I have in mind we have first to take a look at the propositions which are possibly grasped by our doxastic states. They form an algebra that is closed under Boolean operations. I shall consider the universal algebra of all propositions whatsoever, even though it is unintelligibly large and possibly threatened by paradox, just as the universal set. However, let us not bother about such points. We may instead consider more intelligible, restricted subalgebras of that universal algebra. Again, though, there is no place here for such subtleties.

This universal algebra first contains unrevisably a priori propositions, e.g., those which are logically or analytically true. Unrevisably a priori propositions are strongly unrevisable in the sense defined and hence maximally certain.

There is a second class of exceptional propositions, namely possible contents of consciousness, as they may be called. They, too, can only have extreme degrees

of belief. Which contents of consciousness one actually has, is obviously contingent. But if such a content is given to one, one is maximally certain of it; and if another such content is not given to one, one is maximally certain not to have it. This is a traditional view that seemed obvious for a long time; only recently philosophers have become more cautious about it. However, it is correct, I think, and indeed derivable from an adequate explication of the nature of contents of consciousness; cf. Spohn (2012, sect. 16.4).

Let us give a label to all the other propositions:

Definition 4: A proposition is *empirical* if and only if it is neither unrevisably a priori true or false nor a possible content of consciousness.

These are traditional distinctions to be found, e.g., in the old empiricists.[4]

Having discussed the epistemic status of the exceptional propositions, the issue I am now interested in is: What is the epistemic status of those empirical propositions? So far, we can only say that different doxastic states may take different attitudes towards them, since they are not unrevisably a priori; so much is true by definition.

However, more interesting is whether one and the same subject should be able to change her attitude towards empirical propositions. This may be taken to require that rational belief functions be such that empirical propositions are weakly revisable relative to those belief functions. This is not true by definition, but almost, as it were. It means that belief functions have to be regular, i.e., that only unrevisably a priori propositions and possible contents of consciousness are maximally certain and that all empirical propositions are less than maximally certain.

However, the ability to change one's degree of belief in empirical propositions may be given a stronger reading; we may require that empirical propositions are even strongly revisable, i.e., that their epistemic status can be changed through experiential propositions – where I still owe an explanation of the latter, even though we have an intuitive grasp of them. This is indeed my first principle:

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[4] See, e.g., Hume (1748), who, in the first paragraph of section IV, distinguishes between relations of ideas that are "intuitively or demonstratively certain" and matters of fact that "are not ascertained in the same manner".

The Basic Empiricist Principle: For each rational belief function β and each empirical proposition *A*, *A* is strongly revisable relative to β.

Why should we accept this principle as an unrevisably a priori rationality postulate? The way I have introduced it shows that it is only a slight strengthening of what is true by definition; so it looks convincing, at the least. However, I have no deeper justification; basic principles must start somewhere.

The grand label I have chosen suggests, though, that most philosophers and most scientists have taken it for granted for centuries. If we put to one side the two exceptional cases, unrevisably a priori propositions (which comprise all of mathematics) and contents of consciousness, it says that the entire rest should be under the control of evidence, where evidential control means here finding reasons among experiential propositions. The principle can only be criticized if one interprets control too strongly, say, as verifiability of falsifiability – as the logical positivists have done – or through an inadequate account of confirmation. The principle may also be called a basic principle of learnability; our mind must be open to learn about *all* empirical matters.

The Basic Empiricist Principle still looks weak. It has, however, some significant consequences which I will call the Special and the General Coherence Principle. Very roughly, they say that all our empirical beliefs must cohere in the sense of being tightly connected by reason relations. This is vague, and we have first to work up to their intended precise formulation. Only afterwards I can sketch their derivation from the Basic Empiricist Principle.

As a first step, recall my observation that non-empirical propositions, i.e., unrevisably a priori propositions and contents of consciousness, have no reasons, since they are maximally certain. In analogy to my introduction of the Basic Empiricist Principle we may hence postulate the reversal, i.e., that all empirical propositions do have reasons and, by symmetry, are reasons for other empirical propositions. However, this is entirely trivial; empirical propositions, being weakly revisable, always have or are deductive reasons.

So, the idea should rather be that each empirical proposition has at least one inductive, i.e., non-deductive reason. However, even this is entirely trivial; it is provably satisfied for each belief function taking at least four different degrees of belief; cf. Spohn (2012, p. 530, assertion 17.5).

Hence, the coherence produced by reasons must receive a stronger reading. For this purpose I would like to give a bit more structure to the universal algebra of propositions. That is, I want to take this algebra to be generated by variables. Formally, a variable is simply a function from the underlying space of possibilities or possible worlds into some set of values. The atomic propositions associated with a variable then state that the variable takes a specific value or some value within a specific set of possible values. For instance, a variable may represent the velocity of a certain particle at a certain time and thus map the space of possible worlds into the space of three-dimensional vectors, i.e., each world to the velocity the particle has at that time in this world. Another variable may represent the temperature in Nancy at noon of July 20, 2011 taking values between -273°C and, say 1000°C. (If it gets hotter, Nancy does no longer exist.) These variables generate atomic propositions, for instance the proposition that this particle moves at that time with 10-20 meters per second into eastern direction or the proposition that it is 25°C in Nancy at noon of July 20, 2011. And so on. In this way, each variable produces a set of atomic propositions, and all other propositions are Boolean combinations of those atomic propositions. Thus, we may conceive of the universal algebra of propositions as being generated by the universal manifold of variables.

Now, the idea is this: We saw that each empirical proposition trivially has some deductive or inductive reasons. Hence, the way to be more restrictive is to require that each atomic proposition about a given variable has a reason which is not about that variable and which must then be an inductive reason, since variables are logically independent. This requirement is not trivially satisfied.

In order to state it more precisely, let U be the manifold of all *empirical* variables which generates all empirical propositions. We presently need not look at variables generating unrevisably a priori propositions or contents of consciousness and may restrict attention to the empirical variables in U. Moreover, for any subset $V \subseteq U$ let us call A to be a V-proposition if A is only about, or generated by, the variables in V. Then we have:

The Special Coherence Principle: For each rational belief function β, each empirical variable $X \in U$, and each empirical X-proposition A there is a $U - \{X\}$-proposition that is a reason for A relative to β.

This principle certainly has the same empiricist credentials as the Basic Empiricist Principle, and we shall see in a moment how it derives from the latter. The Special Coherence Principle may even appear to be a semantic principle. If we weaken the verifiability theory of meaning to a confirmability theory, as it were, then, it seems, the Special Coherence Principle must hold in order for each atomic proposition to be meaningful.

However, I would like to stay away from that semantic perspective. One reason is that all attempts at a verifiability or confirmability theory of meaning have stayed programmatic.[5] Another reason is that the Special Coherence Principle is plausibly generalized to another principle that has no semantic appearance whatsoever.

For, what is so special about the partition $\{X, U - \{X\}\}$ to which the Special Coherence Principle refers? Nothing. It looks just as convincing if it is stated in terms of any binary partition:

The General Coherence Principle: For each rational belief function β, each non-empty proper subset V of U, there is a V-proposition A and a $U - V$-proposition B such that A is a reason for B relative to β.

The general principle is much stronger than the special principle. We may arrange all the empirical variables in U in a huge graph, where the nodes represent the variables and the edges or vertices between the nodes represent the dependencies between the variables according to the belief function β. Then the special principle says that each node is connected to at least one other node, whereas the general principle says that the entire graph is connected, i.e., there is a path from each node to each other node. This may be properly called coherence.

If one is prone to grand labels, one may say that the General Coherence Principle affirms something like the unity of science or the unity of our world picture. No part of science or our world picture can be completely isolated from the other parts; reason relations directly or indirectly connect each part with each other part.

I claimed that the two coherence principles follow from the Basic Empiricist Principle. How do they do so? At least the proof of the Special Coherence

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[5] This is a strong claim. However, a close look at the relevant literature, for instance Brandom (1994), would reveal that it is justified.

Principle seems quite straightforward: Let *A* be an empirical proposition about the single variable *X*. Because of the Basic Empiricist Principle *A* is at least weakly revisable and hence less than maximally certain according to the given belief function. How can *A* be strongly revisable as well? Suppose the variable *X* would be independent from all other empirical variables, then no information about those other variables could change the degree of belief in the *X*-proposition *A*. But all experiential variables generating the experiential propositions are among those other variables. Hence, experience could not change the degree of belief in *A*, and *A* would not be strongly revisable. End of proof?

Not really. Note that I have still not explained what experiential variables and propositions are; so far I did not need to say this. However, this causes the argument I just gave to have a gap. *X* may itself be an experiential variable and *A* an experiential proposition. And the experience may change the degree of belief directly and not through the mediation of reasons. Moreover, *A* may not be a reason for propositions about other variables. In this strange case *A* would be an exception to the Special Coherence Principle.

In order to close that gap we have to scrutinize what those experiential propositions might be. This seems to be a hopeless task. Haven't the logical empiricists despaired of characterizing observation sentences? The claim of the so-called theory-ladenness of observation language is still around, and many philosophers gave up this distinction. In the old phenomenalist spirit one might say that our sense impressions provide the experiential base. But aren't they contents of consciousness, and didn't I say that they are excluded from the circle of reasons?

I don't think that the situation is so desperate. We certainly must acknowledge propositions of the form: it appears to *s* at *t*, or to me now, as if *A*. Here "appear" is a sense-neutral expression which stands for "look", "sound", etc. And it must be taken in the comparative or the phenomenal reading, not in the epistemic reading, in which it would mean something like "I now tend to believe *A*"; for these distinctions see Chisholm (1957, ch. 4). In that epistemic reading anything can appear to me; it can even appear to me as if the continuum hypothesis were true. But this is not so in the non-epistemic comparative or phenomenal reading. It is still quite indeterminate then what we might substitute for *A*, for which propositions *A* it makes sense to say "it now appears to me as if *A*". However,

there is no need to resolve the indeterminacy. Certainly, though, the meaningful substitution for *A* is heavily restricted.

The next important point is that propositions of the form "it now appears to me as if *A*" are not contents of consciousness, but empirical propositions. This point would require a longer argument; cf. Spohn (2012, sect. 16.3). But the gist of the matter is that by saying "it now appears to me as if *A*" I am already subsuming my sense impressions under public concepts involved in the proposition *A*, and then all kinds of things may go wrong, and uncertainty creeps in. I may even be in error when I say: this now appears red to me! Therefore, such propositions are not contents of consciousness. The latter are in a way ineffable, expressible by "it now appears *thus* to me" accompanied, as it were, by an inner pointing. The step from there to the proposition "it now appears to me as if *A*" is the step from consciousness into the circle of reasons.

We can indeed be more specific about the latter. I just said that "it now appears to me as if *A*" makes sense for not so many propositions *A*. But if it makes sense, there is a close epistemic relation to the proposition *A* itself. That relation is stated in what I like to call:

The Schein-Sein-Principle: It is unrevisably a priori that, given that the subject *s* attends at time *t* to a certain external situation and given normal conditions, the proposition that it appears to *s* at *t* as if *A* is a reason (for *s'* at *t'*) for the proposition *A*, and vice versa. This holds even if *s* = *s'* and *t* = *t'*.

Again, this principle would require a longer argument; again see Spohn (2012, sect. 16.3). Basically, I think it is a conceptual truth about appearances or secondary qualities, which are a special case of dispositions. Then the Schein-Sein-Principle looks like a reduction sentence for a disposition qualified by normal conditions. Take the following instantiation: Given normal conditions, the assumption that something looks red to me is a reason to believe that it is red, and vice versa. This sounds most plausible, indeed. The qualification by normal conditions is certainly in need of clarification. However, there is again no place for going into details.

The point why I am explaining all this should be obvious, though. We may either take experiential propositions to be of the form "it now appears to me as if *A*". Or we may take those *A* itself to be experiential propositions. Either way is

fine, and we need not decide. However, either way it cannot be that experiential propositions are so isolated as to refute the Special Coherence Principle. This is prevented precisely by the Schein-Sein-Principle.

My argument for the General Coherence Principle is in the same spirit, but involves some further solvable complications which I cannot now explain; see, however, Spohn (1999). Let me simply summarize my findings so far:

Theorem 1: The Basic Empiricist Principle and the Schein-Sein-Principle entail the Special and the General Coherence Principle.

4. Reasons and Truth

In the second main part of my paper I would like to proceed to a second family of principles. So far I have discussed the a priori structure of reasons by itself, how propositions must be minimally connected by reasons in order to allow any learning from experience. However, these connections, our almost obsessive search for reasons is no idle play; they seem to serve a purpose, and the purpose obviously is to find out about the truth. In short, we should somehow account for the truth-conduciveness of reasons, and so far we have not said anything about it.

This is an extremely vexed topic, and I have to steer fairly directly to the results I would like to present. The topic is vexed also because it is not clear which notion of truth is involved here. One may say that there is only one notion of truth, the correspondence notion or its deflationary descendents. BonJour (1985, ch. 8) argues that this is the only interesting notion to apply here, and his metajustification attempts to show that stable coherent belief is likely to be true. However, I find his argument blatantly circular, as it relies on the inference to the best explanation and thus on our inductive practices the truth-conduciveness of which needs to be shown in the first place (though I do not see this as an objection; I think, any argument is bound to be circular at this point).

No, correspondence truth is truth from the third person perspective, and it seems to inevitably open the skeptical gap. The ornithologist can study the extent to which migrant birds succeed in finding their home, which is known to the ornithologist. Likewise, God, who knows all truths, can tell the extent to which humans find the truth with all their activities.

However, this is no perspective we can take. We cannot leave our first person perspective. In arguing with our fellow humans we pretend to take the third person perspective. However, the first person perspective is not the individual subjective one, it is that of the cognitive enterprise of the entire, not actually parochial, but counterfactually eternal mankind, and we have to think through our issue from that perspective. BonJour (1985, p 158) disagrees and thinks the issue is trivialized if it is only how coherent belief is conducive to truth in the coherentist sense. But it is very unclear what the trivial argument might be; I think there is none. In any case, let us think through the matter from the first person perspective.

Within the first person perspective we might say that reasons induce beliefs, and to believe something is to believe it to be true. Therefore, reasons bring me closer to the truth; this is what I have to think and say. So much is indeed trivial. However, this triviality does not exhaust the first person perspective. For, even if I think that my present beliefs are true, I know well enough that they might turn out false; if they are really true, they must survive all further learning. So, what truth is within the first person perspective shows up only in a dynamic setting.

In fact, within this perspective truth is Peircean pragmatic truth or Putnamian internal truth. In this sense, a belief is true if it is maintained in the limit of inquiry, after complete experience and fully considered judgment that can be reached only counterfactually. A belief must be true then, simply because there is no experience and no consideration left which could show it to be wrong.

For this notion of truth we must first claim that, rationally, each truth is believable, not in the static sense that there is some doxastic state in which it is believed – this is trivial –, but in the dynamic sense that each rational doxastic state must be able to come to believe it.[6] That is, a rational doxastic state must be open to reach this limit of inquiry, and each true belief must come to be believed on the way to that limit. Therefore we must secondly claim that for each truth there is a true reason. Let me spell out these ideas a bit more precisely.

Let U again be the manifold of all empirical variables generating all empirical propositions, among them maximal propositions or entire possible worlds. One of those worlds must be the actual one; let it be denoted by @. Then, a proposition A is true iff @ $\in A$; however, this is so far only a formal characterization of internal truth. It is also important to conceive of @ not as a rigid designator for the actual

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[6] Therefore I am not worried by the knowability paradox of Fitch (1963); cf. Spohn (2012, p. 542).

world; it is non-rigid or variable. For, we do not know which possible universe we live in, and the feasibility of reasons must not hold accidentally, only in the one actual universe, but in the actual world, whatever it might turn out to be.

Now, what should it mean that each truth is believable? As before, let me restrict attention to empirical truths about single variables in order not to trivialize the possibility of reason finding. Since such a truth is empirical and hence a posteriori, it need not be believed. Of course, it can be believed; but this is not the intended sense of believability. The intent rather is that each doxastic state should be able to come to believe that truth, i.e., that these possible experiences and, hence, revisions of that state result in believing this truth. This is still not specific enough, though. There should not only be some possible experiences and revisions with that effect. It must be possible to actually make the required experiences and revisions in the actual world @. This is the intended sense of "-able" in taking truth to be believable. This is summarized in:

The Basic Belief-Truth Connection: Let $X \in U$ be an empirical variable and A an empirical X-proposition with $@ \in A$. Then for any rational belief function β there exists a sequence of experiences available in $@$ such that β changes through those experiences into a belief function β' in which A is believed.

This is much stronger than the Basic Empiricist Principle that requires only the revisability of empirical propositions through some possible experiences. The present principle rather requires that true empirical propositions must be revisable through actually possible experiences so as to be believed.

A direct consequence is, again with the help of the Schein-Sein-Principle:

The Basic Reasons-Truth Connection: Let X and A be as before such that $@ \in A$. Then for each rational belief function β there is a $U - \{X\}$-proposition B such that $@ \in B$ and B is a reason for A relative to β.

For, if there were no true reason at all for A, there could not exist actual experiences moving us to believe A.

All in all, we have a nice square of entailments:

Theorem 2: Given the Schein-Sein Principle, the Basic Belief-Truth Connection entails both, the Basic Empiricist Principle and the Basic Reason-Truth Connection, each of which in turn entails the Special Coherence Principle.

Why should we accept the new principles? Well, they appear highly convincing, I think. But, again, I have no deeper justification; basic principles must start somewhere. There are two ways of looking at the two new principles, both of which are apt.

The first way is to take them as conceptual truths about truth, truth in the intended internal or pragmatic sense; this is how I have introduced them. Of course, they do not define this notion, but they provide at least a minimal characterization. Truth in that sense must be accessible to experience and reason, and the principles specify some minimal sense in which it is so accessible.

Indeed, they well fit the many ways in which Putnam characterizes internal truth; see in particular the papers collected in Putnam (1983). One way is his claim that the ideal theory must be true. If a proposition could not get believed after ever so many actually possible experiences that are all part of the ideal theory, then this proposition could not belong to the ideal theory and thus be true. And if a proposition finds no true reason, no support in any part of the ideal theory, it can again not belong to the ideal theory.

The second way to take the principles about the connection of belief and reason to truth is as substantial principles constraining rational belief functions. Indeed, I think that they should be taken both ways. The more we advance our account of epistemic rationality, the better we understand internal truth; and reversely, grasping internal truth helps us furthering our account of epistemic rationality. I do not claim that this entanglement is inescapable. But I presently see no better way of explaining the truth-conduciveness of reasons than this postulational approach. In want of alternatives the aim can only be to search for stronger principles, to work out their consequences, and to see whether they stand our critical normative examination. In virtue of the specificity of our formulations this is indeed a constructive program.

In fact, we have not yet exhausted the resources of our dynamic approach. So far, we have only stated that each truth must have a true reason. This allows for the possibility, however, that, given further evidence, that reason is no longer a reason for that truth. It also allows for the possibility that further evidence is taken

to overwhelmingly speak against that truth. The dynamic core idea of the believability of truth was certainly intended to exclude such scenarios. This opens a space of subtly different stronger principles. There is no place for more detailed discussion. Let me only give you the flavor of my favorite version.

The idea is that there should not only be a true reason B for the truth A, the reason B should also be stable in a suitable sense.

Definition 5: Let us call B an *ultimately @-stable* reason for A if and only if there is some true condition C (i.e., $@ \in C$) such that B is a reason for A given any true proposition stronger than C.

This ensures that B remains to be a reason for A in the course of inquiry and even in its limit. The believability of the truth A seems to be secured only if it has some reasons which are stable in this sense. This leads to

The Stable Reason-Truth Connection: Let X and A be as before with $@ \in A$. Then for any rational belief function β there is a $U - \{X\}$-proposition B that is an ultimately @-stable reason for A relative to β.

This principle is obviously stronger than the Basic-Truth Connection. In this spirit, we might constructively propose further principles, prove their relations, and thus a rich normative discussion might evolve; for more details see Spohn (2012, sect. 17.3). And to recall, this is a discussion about a priori principles of reason, grounding not in conceptual considerations, but in the normative structure of our ability to grasp the world through experience and reason.

5. Reasons and Causes

As a sort of appendix let me add a final line of thought. So far, my considerations were confined to pure epistemology; I only spoke about reasons and their structure. I am convinced, however, that the principles discussed so far have immediate implications for the structure of causation. Of course, this presupposes an analysis or theory of causation, which I cannot unfold here; see,

however, Spohn (2012, ch. 14) or already Spohn (1983). But a few sentences suffice for at least stating those implications.

First, I am deeply convinced that Hume is basically right: Causation needs to be explicated in a subjective way, relative to an observer, i.e., a doxastic state or belief function. This is deterringly counter-intuitive, but we need not be stuck with such a subjectivistic analysis. Rather, I believe that only on this basis we can develop an adequate objective understanding of causation; cf. Spohn (2012, ch. 15).

Secondly, I am prepared to fully defend the following analysis of causation, according to which causes are simply a special kind of conditional reasons:

Analysis of Direct Causation: The atomic X-proposition A is a direct cause of the atomic Y-proposition B in the world w relative to the belief function β if and only if $w \in A \cap B$, i.e., both A and B obtain in w, A (or X) precedes B (or Y), and A is a reason for B relative to β conditional on the entire past of B in w except A itself.

And then I would continue defending the analysis that causation *simpliciter* is the transitive closure of direct causation. In any case, if causes really are a special kind of conditional reasons, it is no surprise that the structure of reasons has implications for the structure of causes.

For instance, we may state

The Very Weak Principle of Causality: For each empirical variable $X \in U$ and each X-proposition A, A has some direct cause or direct effect in some world w relative to any rational belief function β.

And then we might prove that this principle to be equivalent with the Special Coherence Principle.

Or we may state

The Unity of the Causal Nexus: Each empirical variable is U is causally connected with each other empirical variable in U, i.e., there is a path from one to the other variable in the universal causal graph.

And then we might prove that this unity is equivalent with the General Coherence Principle.

Presumably, we would like to know about the causal structure of the actual world and not only of some possible worlds. Here, our Reason-Truth Connections do help. We may state

The Weak Principle of Causality: Let *X* and *A* be as before with @ ∈ *A*. Then *A* has some direct cause or some direct effect in the actual world @ relative to any rational belief function β.

And we can prove that this Weak Principle is equivalent to the Stable Reason-Truth Connection given the assumption that each direct cause immediately temporally precedes its direct effect; cf. Spohn (2102, p. 553, assertion 17.25).

All this shows that our principles have considerable bite. However, the Weak Principle is still not the classic principle of causality stating that each atomic fact has a cause. I am not sure whether it can be established in an a priori manner; in any case, I have so far no idea how the epistemic principles might be appropriately strengthened. Still, I am satisfied that we are able to at least derive the Weak Principle of Causality from a priori principles about the connection between truth and reason.

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