Epistemic justification: its subjective and its objective ways

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Abstract Objective standards for justification or for being a reason would be desirable, but inductive skepticism tells us that they cannot be presupposed. Rather, we have to start from subjective-relative notions of justification and of being a reason. The paper lays out the strategic options we have given this dilemma. The paper explains the requirements for this subject-relative notion and how they may be satisfied. Then it discusses four quite heterogeneous ways of providing more objective standards, which combine without guaranteeing complete success.

Keywords Epistemic reasons · Justification · Apriority · Objectivity · Pragmatic theory of truth · Rationality · Ranking theory

1 Introduction [1]

Truth is objective. This is a deeply entrenched tenet, without which our epistemological enterprise seems futile. Truth for you and truth for me—this would not be worth a penny. However, there is no god to tell us what is true; we must tell by ourselves. And our only internal guide towards the truth are our reasons. We receive reasons, we weigh them, and our conclusions point to the truth. Hence, if the latter is objective, our reasons and indeed the reason relation, the relation that relates reasons to their conclusions, must be objective as well. Otherwise, the aim reasons point to is as subjective as the reasons themselves. This is the ultimate motive for our hope that reasoning and

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justification can be established to follow objective rules. The hope is nourished by the fact that deduction or logical consequence is indeed perfectly objective and seems to offer a good and possibly complete model of reasoning and justification.

However, the attempts to establish the objectivity of reasons are not so promising. Although governed by objective standards, deductive reasoning offers in effect a very incomplete model of reasoning. Inductive reasoning cannot be reduced to deductive reasoning[2] and seems to follow personal tastes, which may differ without one being wrong or refutable or illegitimate.

There is indeed a powerful adversary to objectivity: inductive skepticism. It comes in many guises. For me, the modern paradigm is Goodman's new riddle of induction. We make the familiar "green" induction, the strangers make their weird "grue" induction. However, every argument why our induction is reasonable and theirs unreasonable can be replicated by the strangers to the effect that precisely the reverse holds. The dialectic situation seems completely symmetric. Despite many attempts and partial success[3] I don't know of any telling general solution of the new riddle.

Surely, one may have a more positive view of the chances of overcoming inductive skepticism than I have. Alternatively, we may grant the fundamental subject-relativity of the reason relation. That's the alternative I prefer. However, this is not to say that all objectivity is lost. By contrast, instead of presupposing objectivity right away, it now turns into a constructive research program how and how much objectivity can be gained building on a subjective base. Pursuing such a program is, in my view, the best we can do to erode inductive skepticism from inside, and it is more instructive than reversely insisting on objectivity and frustratingly learning that its claims must be more and more restricted.

This paper does not make attempts at such a constructive program; even a book could only fail. In fact, there are rich and diverging partial attempts. They follow different strategies, they do not combine into an overall picture; every detail is heavily contested, and nothing is finished in any way.[4] How far they reach out into objectivity is very unclear.

In this paper I just want to expound the strategic options we have for objectivizing our ways of reasoning and justification and thus for overcoming inductive skepticism. My hope is that on the whole they present a satisfactory offer to those erroneously presupposing objective standards of justification.

The idea thus is to offer a systematic frame within which all those partial and variegated attempts can be located. So, unavoidably, the paper has a survey character and mentions many things without going into details. To my knowledge, though, such a strategic overview has not been given in such a succinct way. It should be valuable for all those in danger of getting lost in details.

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[2] Here I use "inductive" in the widest possible sense of "non-deductive". There is a widespread prejudice that inductive reasoning is nothing but deductive reasoning with implicit premises. This prejudice is deeply amiss.

[3] Freitag (2015) gives an entertaining and convincing analysis of a crucial aspect that goes wrong in Goodman's riddle.

[4] My own attempts are contained in Spohn (2012), at least in chapters 5, 6, 12, 15, and 17.

This suggests the following structure of this paper: in Sects. 2 and 3 I will introduce the basic subject-relative explication of the relation of something being a reason for something else and of the property of something being justified. These two sections do not yet strive for objectivity. I will give the explication in an informal and neutral way, and I shall indicate that it may be made formally precise in terms of ranking theory.

Sections 4–7 will then briefly discuss four different dimensions in which this subject-relative explication might gain (more) objectivity. The topic of Sect. 4 is *incipient objectivity*, which tries to find objective standards for the a priori attitudes with which we approach reality. The topic of Sect. 5 is *terminal objectivity*, which consists in the idea that by accumulating more and more reasons we approximate objective truth. In Sect. 6, I address the idea that reasons are objective because they must be true. This idea is very popular, and therefore I should at least mention it, even though I will discard it as unhelpful. The topic of Sect. 7, finally, is what I call *modal objectivity*, which tries to establish objective modal counterparts to our subjective epistemic modalities. We will see, though, that it remains an open question how far these ways of objectivization reach. But this is only as it should be. Section 8 will draw a short conclusion.

2 The basic subject-relative notion of a reason

There are many types of reasons: epistemic reasons, practical reasons, moral reasons, *pro tanto* and overall, etc. etc. A look into the philosophical literature displays a highly confusing variety of qualifying adjectives. It is clear that we are talking here only about epistemic or, rather, doxastic reasons to believe (something more or less firmly). I assume that for our purposes it is clear enough what distinguishes epistemic reasons from other kinds of reasons.[5]

First a word about the relata of the epistemic reason relation: It seems to relate only beliefs; one belief is a reason for another. However, it also relates mere contents of beliefs, or assumptions or propositions; a proposition, which need only be entertained and not believed, may as well be a reason for another. I won't try to clarify the nature of propositions; I shall only assume them to have the usual algebraic or Boolean structure.

Some philosophers think that not all, but only true propositions or facts can be reasons. I will discuss this issue in Sect. 6, but for the time being I prefer to avoid this restriction. Other philosophers think that only the second relatum, what is justified, but not the first relatum, the reason, must be propositional. Perhaps, perceptions or non-propositional perceptual contents may constitute reasons as well. I reject this for reasons that will become immediately clear. However, this is a big issue, which I shall neglect in the sequel.

Having thus taken a stance towards the relata of the reason relation, what about the nature of that relation itself? When we simply attend to our ordinary linguistic usage, it seems perfectly clear what epistemic reasons are or do: *A* is a reason for *B* iff *A* speaks in favor of *B*, if *A* supports or confirms *B*, if *A* makes *B* more credible or less

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[5] For instance, one may also have moral reasons for having a certain belief (if one manages thereby to acquire or maintain that belief). The distinction between epistemic and other reasons to believe is an interesting side issue. Cf., e.g., BonJour (1985, sect. 1.2).

incredible; there are many similarly apt phrases. Already the multitude of expressions indicates that we are up to something important here. Let's turn to the last one: What does it mean that A makes B more credible? A does not really *do* something here. The best thing to say here is that it means that B is more credible given A than given $\sim A$ (=non-A).[6]

So, A is a reason for B iff B is more credible given A than given $\sim A$. This explication clearly refers to conditional degrees of belief. If *cred* is a function specifying such degrees, the explication is more formally:

Definition 1 A is a *reason* for B iff $cred(B|A) > cred(B|\sim A)$.

Obviously, everything depends on what kind of function *cred* actually is. I will discuss this in a moment. However, as a schema Definition 1 is without good alternative. In Spohn (2001, sect. 5) I have discussed various strategies for explicating the reason relation that are on the market, the deductive, the computational, and the causal approach, and I have argued that the present approach comprises all of them and avoids their inadequacies. I shall not repeat this discussion here, but simply proceed from Definition 1.

Note that the schematic Definition 1 already decides about the relata of the reason relation. They must be possible objects of that credibility function, i.e., propositions or contents of belief. Anyone who has a wider understanding of those relata cannot use that schema and owes us a different account of the reason relation. (Or he might use the schema by extending the set of conditions for which *cred* is defined to non-propositional contents. Again, though, he would owe as an account of how this is to work.)

Note, moreover, that Definition 1 makes room for the distinction between *being* a reason and *having* a reason. If you *have* the reason A for B, you believe or accept A. If A *is* a reason for you for B, it is left open which doxastic attitude you have towards the reason A (and also towards B). Perhaps it would be better to say in this case that A *would be* a reason for you for B; speaking of A being a reason for B actually sounds ambiguous. Clearly, there is a real distinction here. By all means, *being* a reason will here always be understood in the weak sense.

The most important observation, though, is that the present approach presupposes a representation of epistemic states that allows for belief to come in degrees *and* for degrees of belief to take conditional form. We will see examples satisfying this presupposition. However, no weaker representation will do for realizing the schema of Definition 1. Surely, the degrees need not be numerical degrees; any (partially or linearly) ordered set of degrees will do. Still, the presupposition is quite powerful. For instance, it excludes standard accounts of default reasoning, prima facie at least, since they do not provide degrees of belief.[7] Prima facie, it also excludes AGM (Alchourrón,

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[6] Note that we can give a similar account of what it means that A is a reason against B or may speak against B. This has equally many ways of linguistic expression.

[7] Horty (2012) is the most elaborate attempt to provide a theory of reasons in terms of default logic. It does not point out, though, any way how to conform to Definition 1. Of course, one might start with defaults and construct from them a suitable credibility function, as first proposed by Pearl (1990). However, this is not Horty's way, since he wants to provide an alternative to what he calls the weighing and the force conception of reasons, both of which he finds too metaphorical (pp. 2ff.).

Gärdenfors, Makinson) belief revision theory, which may be said to provide degrees of belief (or of entrenchment), which also accounts for conditional belief, but which has no obvious ways of representing conditional degrees of belief; this is related to the difficulties belief revision has with accounting for iterated belief change.[8]

Before proceeding to positive examples I should emphasize the essential subject-relativity of Definition 1. However we specify *cred*, we thereby specify the degrees of belief or the credibility function of a given subject, who may distribute her degrees any way she likes within the bounds of rationality. Thus the reason relation essentially depends on her epistemic state.

Objectivists about reasons and justification may well agree with Definition 1, though not as a definition. Their intention is presumably a different one. They hope to be able to characterize reasons more objectively; and after having established this, each subject is rationally bound to distribute her degrees of belief in conformity with Definition 1. Thereby we obtain a rational constraint on those degrees. However, whether and the extent to which we are able to establish such constraints is just at issue. We must bracket the objectivists' hope. But then we are left with the subject-relative starting point of Definition 1, from which we have to explore how much of that hope is realizable.

As emphasized, Definition 1 intentionally provides only a schema. How may it be realized? Staying informal is no option. But there are many formal ways to fill the schema. There are plausibility and possibility measures, there is prospect theory and the Dempster–Shafer theory of belief functions, etc.[9] Each way would be most interesting to study. However, this is not the task of the present paper. Let me mention only two instances, which I take to be primary.

The one is, of course, delivered by probability theory; this is by far the best-established account of degrees of belief and indeed delivers conditional degrees of belief, as required. Thus, *cred* may be some probability measure P over a space W of possibilities or (small) possible worlds, the subsets of which form an algebra $\mathscr{A}$ of propositions for which P is defined. Thereby Definition 1 turns into

Definition 1p A is a *reason* for B iff $P(B|A) > P(B|\sim A)$.

This is why I denote Definition 1 also as the *positive relevance* notion of reasons; in this specification a reason is simply probabilistically positively relevant for what it is a reason for. Note that the probabilistic reason relation is nothing but Carnap's second notion of probabilistic confirmation in the sense of increase of firmness (cf. Carnap 1950, §§ 8–10). However, in the beginning of his project of inductive logic, Carnap certainly had the more objectivistic intentions just discarded.

In the present context, though, the probabilistic interpretation is suboptimal. We do not only deal with reasons raising the credibility of propositions. In the end, we also want to discuss reasons and the justification for actually believing something—where

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[8] The AGM way of specifying conditional degrees of belief would consist in specifying a posterior entrenchment order after a first belief change, which would govern then a second (iterated) change. See, however, the many possibilities of specifying such a posterior order in Rott (2009), none of which seems generally adequate.

[9] A thoroughgoing study of many possible measures is given by Halpern (2003). Still other options are studied in Walley (1991).

believing a proposition is the specific positive attitude of taking that proposition to be true. Then, however, the probabilistic interpretation is simply not applicable.[10]

Why? The point is: there are no beliefs in this sense in probability theory. The so-called Lockean thesis says: A is believed iff $cred(A) > x$ for some suitable threshold x. This thesis is very popular; I adhere to it, too. However, the probabilistic Lockean thesis, which interprets $cred$ as probability, is untenable. This is shown by the infamous lottery paradox.[11]

Therefore it is good news that there is another interpretation of $cred$, which does better in this respect, namely that provided by ranking theory, which accounts for belief *and* for degrees of belief at the same time. Let me introduce at least its basic definitions.[12]

Definition 2n κ is a *negative ranking function* for the algebra $\mathscr{A}$ iff κ is a function from $\mathscr{A}$ into the set of natural numbers plus infinity such that for all $A, B \in \mathscr{A}$:

(a) $\kappa(W) = 0$ and $\kappa(\varnothing) = \infty$,
(b) $\kappa(A \cup B) = \min\{\kappa(A), \kappa(B)\}$ [*the law of disjunction*].

This immediately entails:

(c) either $\kappa(A) = 0$ or $\kappa(\sim A) = 0$ or both   [*the law of negation*].

Negative ranks express degrees of disbelief. That's why they are called negative. $\kappa(A) > 0$ says that A is (more or less strongly) taken to be false. Hence $\kappa(\sim A) > 0$ (= disbelief in $\sim A$) expresses *belief* in A, i.e., the fact that $\sim A$ is taken to be false or that A is taken to be true. $\kappa(A) = 0$ says that A is not taken to be false. This is compatible with $\kappa(\sim A) = 0$ saying that A is not taken to be true. Both together amount to indifference or suspense of judgment. This makes clear that the law (c) of negation postulates the consistency of beliefs; one cannot take $\sim A$ as well as A to be true.

One may as well introduce positive ranks representing belief instead of disbelief:

Definition 2p β is a *positive ranking function* for $\mathscr{A}$ iff there is a negative ranking function κ such that $\beta(A) = \kappa(\sim A)$.

Thus, A is believed according to β iff $\beta(A) > 0$. We might finally introduce two-sided ranks representing belief and disbelief at once:

Definition 2t τ is a *two-sided ranking function* for $\mathscr{A}$ iff there is a negative ranking function κ (and the related positive function β) such that $\tau(A) = \kappa(\sim A) - \kappa(A) = \beta(A) - \kappa(A)$.

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[10] This is the main reason why traditional epistemologists are reserved or even hostile towards Bayesian epistemology.

[11] There is a rich discussion trying to get around this devastating conclusion. Understandably so. On the one hand, there is little sympathy with Jeffrey's radical probabilism (1992, ch. 1) simply dispensing with the notion of belief; on the other hand, one very much wants to preserve the unity of our epistemological accounts. In my view, however, this discussion is a complete failure (as explained in some detail in Spohn 2012, sect. 10.1). Let's not enter it. The most sophisticated recent attempt of Leitgeb (2014) leads to an extremely partition-relative notion of belief. He defends this consequence; I find it unacceptable.

[12] More extensive presentations may be found in Huber (2013), Spohn (2009) and Spohn (2012, ch. 5)

So, we have $\tau(A) > 0$, < 0, or $= 0$ according to whether τ believes in A, or disbelieves in A or suspends judgment regarding A. Surely, the three notions are interdefinable, and we could have characterized the latter two notions directly in an axiomatic way. Their behavior, though, is completely fixed by Definition 2n.

An important observation is that in explaining these formal definitions I have referred to the weakest understanding of belief. However, there are many ways of representing belief by ranking functions. For any threshold $z \in \mathbf{N}$ we may say that A is believed in κ (or β) iff $\kappa(\sim A) = \beta(A) > z$. This captures a real vagueness in our notion of belief. The larger z, the fewer beliefs or the stricter the requirements for belief and the larger the range of suspense of judgment (from $-z$ to z in terms of two-sided ranks). Still, however we choose z, belief is consistent due to (c) and deductively closed due to (b)[13] and thus satisfies the two basic rationality postulates for belief.[14] This makes clear, moreover, that the Lockean thesis is satisfied for any threshold z, if we interpret *cred*, the degrees of belief it refers to, as ranks. This vagueness in the interpretation of belief will play a crucial role below.

The final essential step is to introduce conditional ranks:

Definition 3n Given $\kappa(A) < \infty$, *the conditional negative rank* $\kappa(B|A)$ *of B given A* is defined as $\kappa(B|A) = \kappa(A \cap B) - \kappa(A)$.[15]

This translates immediately into *the law of conjunction*: $\kappa(A \cap B) = \kappa(A) + \kappa(B|A)$, which is highly intuitive. It asks: what is your degree of disbelief in $A \cap B$? One way for $A \cap B$ to be false is that A is false; this contributes $\kappa(A)$ to that degree. However, given A is true, B must be false; so, this adds $\kappa(B|A)$ to $\kappa(A)$.

Definitions 2n and 2 make clear why negative ranks are the theoretically most useful version (even though their negative terms are intuitively less smooth). They display a strong formal analogy to probability theory,[16] which extends to the full development of the theory, but is not visible in terms of positive or two-sided ranks. Still, it is useful to add the definition of two-sided conditional ranks:

Definition 3t Given $\kappa(A) < \infty$, *the conditional two-sided rank* $\tau(B|A)$ *of B given A* is defined as $\tau(B|A) = \kappa(\sim B|A) - \kappa(B|A)$.

By finally specifying *cred* in Definition 1 to be a two-sided ranking function τ we arrive at the ranking-theoretic explication of reasons:

Definition 1r A is a *reason* for B iff $\tau(B|A) > \tau(B|\sim A)$.

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[13] Note that $\kappa(A \cup B) = \min \{\kappa(A), \kappa(B)\}$ translates into $\beta(A \cap B) = \min \{\beta(A), \kappa(B)\}$.

[14] In the lottery paradox we may have $\tau(W) > z$, i.e., a belief in the proposition W that exactly one ticket wins, and the same attitude $\tau(L_i) = 0$, i.e., suspense of judgment, for all propositions L_i that ticket i loses. This is not an exciting solution, but it clearly is a consistent belief state, and this is all that matters.

[15] This definition is the crucial progress of ranking theory over its predecessors such as the functions of potential surprise of Shackle (1961) or Baconian probability as conceived by Cohen (1977) and even over parallel developments such as possibility theory presented in Dubois, Prade (1988), which is formally equivalent to ranking theory, but gives no clear intuitive guidance for defining conditional degrees of possibility; this may be done in a way equivalent to Definition 3 or in some other way as well.

[16] Just replace min in (b) by + and addition and subtraction of ranks, respectively, by multiplication and division, and you get the basic laws of probability.

We may even distinguish different cases of being a reason, depending on whether $\tau(B|A)$ and $\tau(B|\sim A)$ are larger or smaller than 0. Below I will refer to only one of those cases, namely: A is a *sufficient reason* for B iff $\tau(B|A) > 0 \geq \tau(B|\sim A)$. So, in this case, B is believed given A, but not believed or even disbelieved given $\sim A$. If we want to set a higher threshold $z > 0$ for belief and sufficiency, as envisaged above, we may instead require $\tau(B|A) > z \geq 0 \geq \tau(B|\sim A)$. In any case, this phrase can only be explicated within a theory that represents not only conditional degrees of belief, but also belief, as ranking theory does, but probability theory fails to do.

So, there are some good ways of implementing Definition 1, and at least one good way, if the notion of belief is to be accommodated as well. This is what I wanted to exemplify. This is not to say that there might be other good ways; but it is to say what they must achieve.

3 The basic subject-relative notion of justifiedness

So far, I have been a bit sloppy by talking of reasons and justification in one breath. What I actually did, though, was explicating only the relation of one proposition being a reason for, or justifying, another proposition. However, the crucial premise of the famous Agrippan trilemma is: *a belief is justified only if it is justified by reasons that are justified in turn*. This premise refers not only to the reason relation, but also to the property of being justified. There is a lot of literature on the binary relation and on the unary property, but how they relate is surprisingly little addressed. The Agrippan premise seems to be the only guideline.

The notion of justified belief is attended in particular in dealing with the Agrippan trilemma and with the JTB analysis of knowledge (saying that knowledge is justified true belief). However, we hardly find there any formal analysis of the concepts involved. What we do find are mainly nice metaphors for justificatory networks, which build up like pyramids, ramify like trees, or form networks like electric circuits and which should illustrate how epistemic warrant spreads among propositions. This helps imagination, but not theory.

We also find vigorous discussions of where warrant or justification ultimately comes from, however it precisely spreads through the network. There are justification internalists who accept the Agrippan trilemma and seize one of its horns: either by being foundationalists and claiming that justification originates in something like sense-data or perceptual beliefs or by being coherentists who see justification created by the coherence of the network itself.[17] We find a number of mixed positions. These internalistic debates are opposed by the justification externalists who avoid the trilemma by their reliabilism. And then there are those who find a lot of context dependence in our talk of justification and knowledge. We need not take a stance here. The point is only that these are the debates one finds when it comes to justification, but they don't help much to clarify the relation between reasons and justifiedness.

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[17] There is formal literature that tries to explicate the degree of coherence one proposition has with others; cf., e.g., Shogenji (1999) and Olsson (2012). However, it remains unclear there what this has to do with reasons and justifiedness. Moreover, I am obviously neglecting the third option of accepting an infinite regress of justification.

A familiar notion of coherence is to say, in terms of the schematic credibility function *cred*, that *cred*(*A*) *coheres* with the rest of *cred* iff *cred*(*A*) is determined by the rest of *cred* given the form of *cred*, whatever it is. "The rest of *cred*" is a bit vague. Taken literally, the rest of *cred* is *cred* restricted to the set of propositions different from *A*. Coherence is quite trivial then; I am not aware of any exception. For instance, you cannot change a probability measure locally for just one proposition without violating the laws of probability. This is precisely what Bayesians mean by probabilistic coherence (since de Finetti 1937, p. 7). The Bayesian might continue to say then that *cred*(*A*) is justified through this coherence with the rest of *cred*. I very much doubt, though, that coherentists about justification are satisfied by this weak sense of coherence.

There are a number of attempts to explicate the metaphor of justificatory networks. In probability theory we have the well-elaborated Bayes nets (cf. Pearl 1988, chs. 3–4); it is unclear, however, how this translates into the language of justification. The same doubt applies to the inhibition nets studied by Leitgeb (2004). John Pollock has made very detailed proposals to render the network metaphor precise, in particular in Pollock (1995). We also find formal explications in so-called argumentation theory; see, e.g., Besnard and Hunter (2008) and Betz (2010). I am not sure, though, whether those ideas conform to the requirements of the credibility function imposed by Definition 1.

Hence I would like to mention that ranking theory is very well able to explicate the relation between reasons and justifiedness. First, we may elaborate on the network metaphor in terms of ranking nets, which behave in the very same way as probabilistic Bayes nets (cf. Spohn 2012, ch. 7) and which provide a nice model for the flow of warrant through the justificatory network. Secondly, we may identify the warrant, or the degree of justifiedness, that is bestowed upon a proposition A with its positive rank $\beta(A)$, since ranking theory talks only about rational or justified belief, anyway. If $\beta(A) = 0$, A is not believed or justified at all. And if $\beta(A) = n > 0$, A is believed or justified to degree n. Of course, we may also say that A is only justified if it is sufficiently justified to degree $> z$.

This explication also accounts for the Agrippan premise, as it should. Let me explain. Let's assume a principle of sufficient reason: for each proposition (whether believed or not) there is a sufficient reason (whether believed or not) in the sense specified after Definition 2. In the next section I say a bit more about where such an assumption might come from. From that assumption we may infer the Agrippan premise: if B is justified, i.e., $\beta(B) > z$, then B has a sufficient reason A, i.e., $\tau(B|A) > z \geq 0 \geq \tau(B|\sim A)$, which is justified in turn, i.e., $\beta(A) > z$.[18] Hence, ranking theory gets the basic relation between reasons and justifiedness right.[19] As

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[18] Proof: $\beta(B) > z$ entails that both $\kappa(A \cap \sim B) > z$ and $\kappa(\sim A \cap \sim B) > z$. $\tau(B|\sim A) = 0$ entails $\kappa(\sim B|\sim A) = 0$ and hence $\kappa(\sim A \cap \sim B) = \kappa(\sim A)$. Therefore $\kappa(\sim A) = \beta(A) > z$.

[19] This theorem has no probabilistic counterpart, at least if one identifies justifiedness of a proposition A with its probability $P(A)$ being above some threshold x. Even if A is a sufficient reason for B in the sense of $P(B|A) = 1 > P(B|\sim A)$, $P(B) > x$ does not entail $P(A) > x$.

such, though, this does not, and does not intend to, tell where justification ultimately comes from.[20]

Note that according to this explication justifiedness is just as subject-relative as the degrees of belief. The entire network, the strength and the direction of the reason relations, the way justification is transferred: all this belongs to the subject's epistemic make-up. So far no objectivity is in sight. Let's see now whether and how far we can satisfy our objectivistic inclinations on this subjective base.

4 Incipient objectivity: the a priori

The first and very obvious observation is: There may be a lot of subjective freedom in epistemic matters. Definitely, though, not anything goes. The subjective epistemic states must have a certain form, and they must master the propositional algebra $\mathscr{A}$ and the concepts generating it in order to be about those propositions. Traditionally, such issues are treated under the general category of the a priori, which is supposed to be binding for all epistemic states.

No doubt this is a very contested category, and I cannot do full justice to it here. For me, the a priori does not only classify propositions; it more generally refers to any feature of epistemic states, not only to the propositions believed in them. And then, such a feature is *unrevisably a priori* iff all rational doxastic states have it. Hence, I take the a priori to be a normative category; it is about rational doxastic states. This is the origin of its claims to objectivity. Similarly, we may define such a feature to be *defeasibly a priori* if all initial rational doxastic states have it. This obviously raises the difficulty to say what "initial" is to mean here. However, there is a growing opinion that we have to distinguish two senses of apriority.[21] In my view, this simply reflects a deep ambiguity in the common characterization of the a priori as independent of all experience. This may mean that an a priori feature is unrevisably present given *any* experience whatsoever. Or it may mean that an a priori feature is defeasibly present given *no* experience (and may thus change given some experience).[22]

There is a further division that is important for our present purposes: between the conceptual a priori and what I would like to call the structural a priori. Since Kant, the *conceptual a priori* was subsumed under the category of analyticity. This is what an epistemic state has to obey in order to master the concepts involved. E.g., any epistemic state having acquired the concept of a bachelor must know that bachelors are unmarried men. Kripke has widened our perspective by showing that there are unrevisably, though

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[20] I have addressed this issue more extensively in Spohn (2012, ch. 16), where I find only little fault with traditional foundationalism with respect to perception, i.e., just as much fault as to satisfy its opponents.

[21] The distinction is not always drawn in the same way. For instance, Friedman (1999) identifies a constitutive, relativized a priori diverging from the traditional Kantian a priori, whereas Field (1996) distinguishes a weak and a strong form of apriority. I have explained my two notions more carefully in Spohn (2012, sect. 6.5 and 17.1).

[22] This explains the difficulty of characterizing "initial" in the explication of defeasible apriority. Given literally no experience whatsoever, we cannot form any concepts or any doxastic state at all. Hence, initiality must be understood in a relative sense: after sufficient experience to develop the relevant concepts, but before any experience applying these concepts to a new case to be judged.

contingently a priori truths like "I exist now". However, they still are conceptual truths. A further kind hitherto overlooked in my view consists of propositions that are defeasibly a priori on conceptual grounds. My paradigm example[23] is given by reduction sentences for dispositions. Everyone mastering the concept of solubility must start assuming that, if a is put in water, then a dissolves iff it is soluble. However, this holds only under normal conditions, as first observed by Carnap (1956, pp. 66ff.). One may well learn that exceptional conditions obtain in which the reduction sentence fails.

Be this as it may, in the present context the conceptual a priori is less important, because it refers to the a priori demands for mastering propositions and the concepts involved in them. I rather would like to draw attention to the fact that there is also the large field of the *structural a priori*. This is, I think, very close to the intentions of Kant's synthetic a priori, i.e., the conditions of the possibility of experience. It is about the structure of our epistemic constitution that enables us to learn anything at all.[24]

I have already alluded to that field in the previous section when I referred to the weak sense of coherence and the form of the credibility function. Of course, the subject cannot distribute degrees of credibility in any way she likes. This would not make any normative sense. The degrees of credibility have to conform to the requirements of rationality. These are intended to be objective, not open to the subject's likings.

What these requirements are is not so clear and is explored in rigorous normative argument. One must not presuppose that there is a unique answer. The paradigm, of course, is delivered by probability theory; rational degrees of belief must conform to the laws of probability. There is ample justification for this claim. The Dutch book argument is the standard pragmatic justification. The community is presently thrilled by the options of a non-pragmatic justification, since it promises to derive the laws of probability from the approximation to truth; cf. Rosenkrantz (1992), Joyce (1998), and Pettigrew (2016). There are more arguments in favor of probability theory. And nothing of all this is uncontested.

That debate is relativized by the fact that other forms of the credibility functions are justifiable as well. Again, this could be turned into a long story. However, since ranking theory has been the other main example for filling the schema of Definition 1, let me only mention that given Definition 3 of conditional ranks, the basic axiom (b) of ranking theory, the law of disjunction, is equivalent to the conditional law of negation: either $\kappa(B|A) = 0$ or $\kappa(\sim B|A) = 0$ or both, provided $\kappa(A) < \infty$. This says that you must avoid contradictory (dis-)beliefs not only unconditionally, as stated in the law of negation (c), but also given any entertainable supposition A. This seems indispensable—and thus provides extremely strong normative foundations of ranking theory. There are other justifications of ranking theory as well. Everything, though, is open to argument.

Further formats of the credibility function may be supported by further convincing normative argument. Unification of the field would certainly be desirable. However, it

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[23] Cf. Spohn (2012, sect. 13.3–4).

[24] Literally, Kripke's contingent a priori also counts as synthetic a priori. But since it is still purely conceptual it thoroughly misses Kant's intentions.

is unclear how to achieve it in view of the multiplicity of normative argument. I guess only through ingenuity and more careful argument. Still, if there should be several rational epistemic forms, as I indeed think, there are only few. This is already a big step towards objectivity.

Is the *structural a priori* exhausted by the form of the credibility function? Not at all. I find this point deeply underrated in the literature. There are further general conditions on the credibility function, which are usually not counted as belonging to its form, its basic axioms, but which must be satisfied in order for us to be able to learn anything from experience.

A familiar such condition is *regularity*: that only epistemically necessary or impossible propositions should get, respectively, the maximal or the minimal credibility value. This maximizes the range of the reason relation in the sense of Definition 1, since it minimizes the set of propositions having minimal credibility, given which no conditional credibility can be explained. In terms of standard probability theory this means that only the impossible proposition gets probability 0, and all other propositions are admissible conditions for conditional probabilities. In terms of ranking theory this means that only the impossible proposition gets negative rank ∞.

There are a host of further a priori principles. *Symmetry principles*, for instance; however, this is a delicate topic full of pitfalls and paradoxes. There are *limit principles* like the so-called Reichenbach axiom, which says that subjective probabilities must converge to observed relative frequencies. There are *learnability principles*, for instance the principle of positive instantial relevance, which says, e.g., that one white swan confirms or makes it a bit more likely that the next swan will be white again. This is a modern version of *enumerative induction*.[25] A most basic learnability principle would be that there at all exist reasons for each proposition a posteriori; otherwise it would be outside the reach of possible experience. Perhaps this may be strengthened to the principle of sufficient reason used in the previous section for the derivation of the Agrippan premise. Such learnability principles are, in effect, principles about the reason relation in the sense of Definition 1. Williamson (2005) strongly argues for objective Bayesianism, which claims a much richer a priori structure. Pollock (1990) is another rich source of potential structural a priori principles. And so on.

Obviously this opens a large and philosophically highly relevant field of inquiry. For instance, I prove in Spohn (2012, sect. 17.4) that certain learnability principles imply versions of the principle of causality. A certain symmetry principle plus an assumption roughly saying that no statistical hypothesis is excluded a priori entail both, enumerative induction as well as the Reichenbach axiom (cf. Carnap and Jeffrey 1971, ch. 4). And so on. The range of such principles of structural apriority as well as the relations among them are severely underexplored.

In my view, the fate of the topic is an unhappy one. One should grant that Kant started the topic with his explorations into the synthetic a priori. However, his claims were so contested and his alleged proofs so unclear that the only sober response seemed to be that of the logical empiricists, who outright rejected the synthetic a priori. So, ironically, it was not realized that Carnap embarked on the same kind of enterprise,

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[25] For all this see, e.g., Carnap and Jeffrey (1971). For a ranking theoretic account of enumerative induction see Spohn (2016b).

when he started his project of inductive logic. Moreover, this project seemed to be a failure. Carnap (1950) noticed that the so-called Wittgenstein function embodies much too strong symmetry principles preventing all learning. Thus he went for weaker and more tenable principles; the final statement of his inductive logic may be found in Carnap and Jeffrey (1971). However, this had the effect that his program was perceived as one of deconstruction rather than construction, possibly collapsing into de Finetti's Bayesianism, which acknowledges just the form of probability. Moreover, we do not find any exploration of the structural a priori within any other epistemic format than probability.[26] So, it is widely overlooked that we are dealing here with a field of highest philosophical significance, which is capable of constructive development and by far not exhausted.

And, to repeat, it is about normative conditions on our subjective credibility functions and reason relations, the objectivity of which is to be established by normative argument. How restrictive these conditions are can only be judged when this field is more fully explored. There is no risk in vaguely predicting that structural apriority will do a lot that counts as success. However, it will also leave a lot of leeway for our subjective credibility functions. Hence, we are well advised to look for further ways of objectivizing reasons and justifications.

5 Terminal objectivity: rich reasons

The more reasons a judgment is based on, the better it is. This is an utter platitude we follow everyday. This is why we search for further reasons when we are unsure, either by exploring by ourselves or by listening to others; this is why we exchange reasons all the time. What does it mean that the judgment gets better? There are many paraphrases: it thus gets firmer or more certain, more reliable, more likely to be true, less easily overturned, etc. Clearly, this is a further pull towards objectivity. The picture is that the augmenting and sharing of reasons is a continuously increasing process that ever better approximates the truth. Somehow, the entire net of beliefs seems to simultaneously approach the truth. Is this picture in any way tenable?

In any case, it raises an array of issues, which are extensively addressed in the literature, though in quite a disorderly way, without much connection and comparison. One should think that this array is amenable to more unification. This would be a huge task, though; I am not clear about how to even start tackling it. Let me only mention four relevant issues.

First, it should be noted that our incessant search for reasons is a theoretical fiction. We do stop that search and, being finite beings, must do so. When do we stop? Roughly, if it doesn't pay, if the expected gain in certainty is not worth the trouble. When that is very much depends on the importance of the issue at hand. There is a decision theoretic explication of this point in terms of the expected value of information, which is always positive, if the information is relevant and cost-free;[27] otherwise there is no guarantee. This expected value of information is derived from practical desires or

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[26] The only exception I know of is my own in terms of ranking theory; cf. Spohn (2012, ch. 17).

[27] This was first proved by Savage (1954, p. 114).

utilities. It would be interesting to have a similar assertion exclusively in terms of epistemic utilities, if such there are.

Let's ignore hence the practical limitations of our search for reasons. Then I would like to mention, *secondly*, that there have indeed been some attempts to give the weight of reasons or evidence some theoretical role to play. For instance, Carnap (1952), in his so-called λ-continuum of inductive methods, assigned a weight to the evidence received, which was simply the number of observed instances; this was then mixed with the weight λ of the a priori distribution. A more general attempt is presented by the Dempster–Shafer theory of belief functions, which is paradigmatically presented in Shafer (1976) and which comes with a sophisticated account of weights of evidence (cf. Shafer 1976, chs. 4–5). This is an interesting approach, which is still insufficiently critically reflected in philosophy in my view.

Now, if the picture of approaching the truth by accumulating reasons is apt, one should think that one converges to the truth by converging to the maximal weight of evidence. Can anything like this be proved within the accounts of weights of evidence? I am not aware that this question has been explored within the Dempster–Shafer theory.[28] However, there is a probabilistic story. I mentioned above that the Reichenbach axiom can be derived from more basic assumptions about probability measures and thus from Carnap's λ-continuum, which satisfies those assumption as well. Now, the Reichenbach axiom may be interpreted as convergence to the true statistical hypothesis (which amounts to the limit of the relative frequencies). So, in this special setting we have a precise explication of that picture.

Perhaps, *thirdly*, convergence to the truth can be established in some other way. This is indeed the distinctive goal of formal learning theory as initiated by Kelly (1996). The learning algorithms discussed there can be shown to converge to the truth given certain conditions. More precisely, the true hypothesis will provably be reached after finitely many learning steps (which just consist in a prediction and a check whether the prediction was correct). However, we cannot effectively specify the number of steps required, nor do we know when we have arrived at the true hypothesis; we need to go on checking, even if we actually never need to change our hypothesis. This is something that holds, *mutatis mutandis*, for all pertinent convergence results. The problem with this theory in our present context is that it does not speak of reasons at all and does not provide any obvious explication for them. So, again, it's hard to say whether this theory fits the picture. At least, Kelly (1999) explores in detail how various learning algorithms, which are inspired by AGM belief revision theory and ranking theory and which are more affine to the terminology of reasons, behave according to his criteria.

Fourthly, the notion of approximating the truth should go hand in hand with measures of distance from truth. Although formal learning theory has its own distance measure, the main study of such measures is found elsewhere. On the one hand, there is the theory of verisimilitude (see Oddie 2014); on the other hand, there is the project of the non-pragmatic vindication of probability theory (see Joyce 1998), the aim of which is to show that only probability measures maximize accuracy, which is a more or less well justified measure of distance from the truth (or the inverse so that maximal

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[28] Shafer (1976, p. 78) mentions that "evidence of infinite weight produces … certainty".

accuracy is minimal distance). Again I am not aware that these theories make any attempt to explicate the slogan of the truth-conduciveness of reasons. What comes closest to it is the justification of probabilistic learning of conditionalization in terms of maximizing accuracy, which is given by Greaves and Wallace (2006) (who speak of epistemic utility instead of accuracy) and Leitgeb and Pettigrew (2010); cf. also Pettigrew (2016, part IV).[29]

I have mentioned quite a mixed bag of ideas in order to suggest that they all contribute, in some way or other, to the same project, namely that of showing how richer and richer reasons move us towards the truth. However, it remains a mixed bag. Big efforts seem required in joining forces and really realizing this project.

In my view, this project is closely related to the pragmatic theory of truth as propounded by Charles S. Peirce, William James, Hilary Putnam (under the label internal truth), and many others. It says that in the (highly idealized and counterfactual) limit of inquiry there is no longer any skeptical gap between belief and truth. Truth is what we believe after (ideally and counterfactually) complete evidence gathering and judgment formation, i.e., when no reason can possibly turn up that could change our beliefs. I do not think that this notion of truth competes with the correspondence notion. Rather, the pragmatic theory delivers an epistemic notion of truth, the correspondence theory delivers an ontological notion, and both coexist and complement each other.[30]

However, the picture of approximating the truth is completely reversed with the pragmatic theory. As I have introduced this picture here, it seemed to be that there is a fixed complete truth about the world which we attempt to approach, and the task was to find a way to do so and to show that our practice of accumulating reasons is such a way. In the pragmatic perspective there is no such fixed truth. Rather, truth is whatever we approximate through our reason finding activity. The pragmatic theory states that this approximation is by definition successful in the limit. However, it does not make any assertion about where we stand in the middle of the process. Even though a judgment is better, if based on more reasons, it may turn out completely wrong by still further reasons. The infinite path to the truth could only be abbreviated, if there were decisive reasons that cannot be overturned by further reasons. It is, however, a very open question whether decisive reasons in this sense exist at all.

Is the objectivity of truth preserved in the pragmatic conception of truth? Isn't it possible that there are many limits of inquiry, even based on the same reasons, so that there is no objective truth, after all? This is a familiar objection. It is not to be rejected right away, neither is it easily established. This issue could be more reliably resolved only if we had a much more detailed and precise description of the process of accumulating reasons and its limit. Still, this does not invalidate my reference to the pragmatic theory in the present context. Even if the limit is not unique, it cannot lie everywhere. The pull towards objectivity exerted by the demand of collecting richer and richer reasons cannot be denied, even though its strength is debatable.

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[29] For a criticism see Lukits (2014).

[30] As more fully explained in Spohn (2016a).

6 True reasons

I have emphasized that the reason relation is basically subject-relative; whether A is, or would be, a reason for B depends on one's conditional degrees of credibility. However, there is an obvious further cause for interpersonal difference, namely the having of reasons. I may have, i.e., believe in many reasons for assuming that Russia will keep the Crimea; and you may do as well for other reasons. We then establish more intersubjective agreement by discussing and possibly sharing our reasons. As mentioned, this is a process we are continuously engaged in.

In the previous section I discussed the idea of introducing more objectivity into this process by accumulating ever more reasons. Another idea might be to cut short this process by right away requiring that only true reasons count as reasons. No doubt, when we discuss our reasons, we do so precisely with the aim of finding out which of them are true. So, should we amend Definition 1 by defining A to be a reason for B iff $cred(B|A) > cred(B|{\sim}A)$ *and* A is a true, i.e., a fact? That is, should we assume that the reason relation is factive with respect to the first relatum?

The factivity of epistemic reasons has been reintroduced by Williamson (2000, ch. 9) with his heavily discussed thesis that all and only knowledge is evidence. For instance, I have no reason to believe that Einstein's special relativity theory is false, if I believe it on the ground that certain signals were allegedly running faster than light (which simply turned out to be a measurement error). The factivity of practical reasons seems even more widely accepted nowadays within practical philosophy, after it has been forcefully argued by Bittner (2001) and Dancy (2000). For instance, we may grant (even though it's highly questionable) that Saddam Hussein's possession of weapons of mass destruction would have been a reason for invading Iraq. Now, in my terminology, George W. Bush had a reason for invading Iraq if he believed that Saddam possessed such weapons. Not so, if reasons are factive. Then Bush had no reason for invading Iraq, since there were no such weapons in Saddam's possession.

I can feel the urge for factivity. However, I think there are simply both ways of talking, and one must not discard one of them as illegitimate. A long time ago, there was a similar debate about scientific explanation. Hempel and Oppenheim (1948, sect. 3) insisted that explanations are factive, i.e., must refer to true laws and antecedent data. So, at any time, we can only claim to have explained some phenomenon, although we may be mistaken. In Hempel (1965, p. 338), he is more liberal in calling such explanations true and also allowing "more or less strongly supported or confirmed" explanations, if the explanans is so as well. At that time this issue has simply been taken to be secondary. The important and vigorously discussed issue rather was how to explicate the explanatory relation, and then the Hempel–Oppenheim model of deductive-nomological explanation was soon found to be insufficient. I recommend the same conclusion here.

Surely, we aim at true beliefs, and hence we aim at true reasons. This is certainly a pull towards objectivity, different from incipient objectivity. It is not different, though, from terminal objectivity discussed in the previous section. We aim at objectively true beliefs, yes; but my opening statement of this paper was that our only guide towards the truth consists in our reasons. So, we cannot *start* with requiring that our

reasons must be true. Rather, within the picture of the pragmatic theory of truth, the satisfaction of this requirement can only be the result of our ever richer reason gathering activities.

7 Modal objectivity: objectivizing epistemic attitudes themselves

In the last two sections I have discussed two ways of objectivization pertaining to the having of reasons, a proper and a spurious one. However, as emphasized several times, it is not only the having of reasons that is subject-relative, it is also the reason relation itself. It depends on our conditional degrees of belief or credibility, which are only partially, but not completely determined by the considerations in Sect. 4. This is also related to the indeterminacy of the limit of inquiry; a variance in the reason relation may well lead to a variance in the limit. Can we say anything about the objectivization of the reason relation itself and the underlying conditional degrees of credibility that goes beyond incipient objectivity discussed in Sect. 4?

Here we enter a final large field, too large for going into any details. The general question here is: Are there any objective counterparts of our subjective epistemic modalities? Which objective modalities may these be? And how can we establish such objective counterparts? There is an easy answer, if the subjective modality is just belief or taking to be true. Then the objective counterpart is just truth, the basic alethic modality, which we establish precisely by our reason finding activity. But what about our more complex attitudes, which allow of conditional degrees of credibility?

For many of the epistemic formats mentioned in Sect. 2 the questions have not even been asked; there is no idea of any objective counterpart. I know only of two exceptions.

The first example is probability theory, of course. There are not only well understood subjective probabilities; there also are objective probabilities, still not so well understood. They come in two forms. The first is studied in inductive logic, which started from the hope that there are objective inductive or confirmatory relations between propositions. However, I have already mentioned above that this hope turned out to be more than questionable.[31]

The most promising second form is in form of propensities, probabilistic tendencies lying in the objects themselves. They are just postulated. However, Lewis (1980) has introduced a bridge principle, his well-known Principal Principle, that offers a prominent way (and according to him the only way) of understanding objective probabilities via their relation to subjective probabilities. It has met a lot of discussion and also criticism, summarized in Spohn (2010), where I rather propose a projectivistic understanding of that relation.

The second example is ranking theory, which also comes along with a sophisticated account of objectivization. In fact, there are two such accounts. The one is given by

[31] J. Williamson's (2005) objective Bayesianism is a strong effort to reestablish objective inductive probabilities. T. Williamson (2000, ch. 10) intends to relaunch them as well as what he calls evidential probabilities. He has interesting things to say about the form in which they process evidence. However, unlike Carnap and J. Williamson, he makes no efforts to say anything about their a priori shape. Thus, he just postulates them. I cannot find that this procedure makes his posits credible.

Huber (2014), who postulates objective negative ranks, which are to be interpreted as degrees of counterfactuality (refining the ordering of similarity usually assumed for interpreting counterfactuals since Lewis 1973). And he proposes to access these objective ranks via a ranking theoretic analogue to the probabilistic Principal Principle, which he calls the Royal Rule.

The other account is given by Spohn (2012, ch. 15), and it is more germane to our present concerns. Very roughly, it studies the extent to which the reason relation can be objectivized and finds conditions under which it can indeed be objectivized as the *causal* relation between facts. It thus attempts to explicate Hume's projectivistic understanding of causation, as nicely laid out in Blackburn (1990).[32] A comparison of Huber's and my account is still owing.

Whether or not such attempts succeed and whether they proceed in a postulational or in a projectivistic way, these very brief remarks should only show what we can expect of this objectivizing move: namely an account of some (or all) of our so-called natural modalities like causation, counterfactuality, and objective probability, which are intended to be part of objective reality.

8 Conclusion

The paper started with the common assumption that our reasons are our only internal guide to objective truth and that therefore the reason relation must itself be objective. However, the consequence of inductive skepticism is that there is no such objective reason relation. I initially accepted this consequence. The point of the paper then was to display three proper ways, and a spurious one, of at least partially evading this consequence and retrieving more and more objectivity in our epistemic business. This is what I meant in the introduction by eroding inductive skepticism from inside.

We thereby entered three discussions referring to three dimensions of objectivity labeled here as incipient, terminal, and modal objectivity. These dimensions are indeed quite different and make quite different contributions. Incipient objectivity is about the rational preconditions, the satisfaction of which is required for our epistemic business to work at all. Terminal objectivity is about the possibility of reaching objective results in our epistemic inquiry of the one given world, whichever it is. And while the epistemic business in the first two dimensions concerns only non-modal facts, modal objectivity is about the extent to which we may find also objective modal facts. Still, they contribute to the one overarching aim of reaching more objectivity.

Surely, I could only indicate those discussions. It was clear that each discussion becomes very technical and ramified. Still, the broader survey may have served its aim. The question how much objectivity we reach thereby remains open. The challenge is to strengthen each dimension as far as possible. That is our only way to fight inductive skepticism.

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[32] I have explained my version of the projectivistic picture in Spohn (2017). The details of my account of objectivizing ranks, however, are quite involved; they can only be found in Spohn (2012, ch. 15).

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