21. NO-FAULT THEORIES OF REGULATIVE JUSTIFICATION

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ABSTRACT. Several epistemologists (Levi, Harman, Pollock) have recently urged the adoption of what I call a "no-fault" approach to the justification of beliefs. I argue that these views fall prey to objections raised by Alvin Goldman against internalism, specifically: they assume an initial set of regulative principles. It is also suggested that the way to avoid Goldman's objections is through a psychologistic account of initial warrant.

Most of us would admit that at least one of our epistemic commitments might just possibly be false. Of course, it is not our fault that we have adopted this mistaken belief and if we could just find a way of uncovering elusive errors we would happily expunge them from our belief sets. The same attitude is rational to adopt with respect to truth. Even if we are convinced that everything we believe is true, few of us would claim omniscience. There are some truths we have not encountered yet, but when we do we will be happy to add them to our rational corpus. But again, this lack of truth is not our fault as long as we have done the best we can in light of our initial epistemic endowment and our epistemic goals. For instance, that eminently reasonable man Plato believed that the sun moved in a circular path around the earth. This mistake was surely not his fault, he lacked the means to discover the error of his belief. One person cannot be faulted for failing to achieve what others require, an as yet undeveloped body of background knowledge and instruments to understand. If Plato were alive today we might have difficulty pointing out to him the error in his theory of forms, but we could certainly convince him to change his cosmology.

Perhaps I am being overly optimistic, but the example will serve us in making some epistemologically relevant distinctions. It is at least plausible to think that a false belief may be justified for a person S by the evidence in S's possession when he lacks disconfirming evidence for reasons which are effectively beyond his control and awareness. This is not to say that one may maintain any belief just by arbitrarily rejecting disconfirming evidence. All that is being claimed is that considerations relevant to the justification of S's belief that p at time t may go beyond the truth of p. And one may of course be legitimately interested in what these factors of evidential justification, in the sense of evidence and not certainty, might be. And our S, being a flexible and non-dogmatic epistemic agent, will also be interested in determining what paths to follow in purging his body of beliefs K of errors and adding to K new war-
ranted beliefs. Principles which serve these functions will be regulative of S’s changes or additions of doxastic attitudes.

Principles of regulative justification are not irrelevant to evidential warrant. One might argue, as Alvin Goldman does, that the outputs of a reliable belief producing mechanism are a warranted evidence base. Also, an evidence base of warranted doxastic attitudes may contain particular beliefs which are indicative of what regulative principles to adopt. A belief in fate and divine guidance may suggest the regulative principle of following the I Ching. Or the evidence base itself may contain beliefs in regulative principles. It is interesting to note that if we were to continue our example and present Plato with evidence about the cosmos, and he rejected this evidence out of hand, we would revoke our ascription of justified false belief to him. Being wrong is understandable, but not stubbornness and over-conservatism.

I am particularly concerned with the role of regulative belief acceptance and rejection within a coherence theory. It seems to me that contemporary advocates of negative coherence theories erroneously ignore the dependence of principles of regulative belief on considerations of evidential support. Negative coherence theories are those in which the occurrence of a belief in our K is taken to be a warrant, and reasons only need to be developed for these beliefs when they are somehow placed in doubt. Such theories amount to the reduction of considerations of justification to those of regulative belief. The justification of our body of beliefs K is taken as non-problematic, even infallible, thus eliminating any lingering worries about the status of K. But if K is the basis for a choice of regulative principles it seems to me we had better worry about its status. This radical optimism about our K also leads to a misplaced conservatism in the revision of beliefs, as I shall argue below. Negative coherence theories fall prey to criticisms of internalism advanced by Alvin Goldman against their grounds for choosing principles of regulative belief, in Goldman’s terms DDP’s. I will suggest that a more psychologistic coherence theory with a less optimistic account of the core rationality of K provides the necessary patch for a no-fault theory of regulative justification.

First, I will provide some preliminary remarks on epistemic concepts which will help to distinguish coherentist and foundationalist views. Then I shall introduce Goldman’s externalist view and his critique of internalism. Goldman’s own view will be subjected to evaluation in passing. We will then look at the relevance of the internalist critique to the negative coherence theories of Isaac Levi and Gilbert Harman.

1. EPISTEMIC PRELIMINARIES

Traditionally, foundationalists have made use of two strategies in arguing for their view of justified belief. One is to claim that all warrant is transitive, and then to conclude that there must be a source of self-warrant on pain of an infinite regress. Self-warranted beliefs are the source of whatever justification is transferred to higher order beliefs by principles of evidential basing which must be transitive. The other tactic is to claim that a particular type of belief or evidence possesses a characteristic such as incorrigibility which marks it as the actual foundations of belief. These two tactics tended to be intertwined in traditional epistemologies. But, as William Alston has persuasively argued,
the claim that mediate belief must have an immediately justified basis on
pain of infinite regress can be made and evaluated in the absence of a
commitment to a specific position on what the actual terminating justi-
fiers are. I will refer to the position Alston has delineated for us as a
minimal foundationalism.

A few words on the regress argument will help clarify minimal
foundationalism and its epistemological rivals. Take an intuitively accept-
able part of our common sense body of beliefs: it is raining outside to-
day. The foundationalist will allow that this claim may be supported by
other mediatly justified beliefs, but require that, however many sources
of support it has, each branch of support must terminate in a self-war-
ranted belief. Perhaps in this case I look out the window and also stick
my hand out. There will be two branches supporting my belief that it is
raining, one terminating in a sensation of touch, the other vision. This
analysis is a specific foundationalism which holds that the branches ter-
minate in sensations. The minimal foundationalist is only committed to the
structure of support, and to the view that there is some analysis of
epistemic agents which can provide basic beliefs.

So, minimal foundationalism is the view that there are two types of
justified beliefs, mediate and immediate. The latter is the source of war-
rant for the former. And we may highlight the implications of the posi-
tion by phrasing it as the view that there are some beliefs that are ac-
ceptable without reasons, without support from other beliefs. This is im-
portant since we ordinarily think of justification in terms of an agent’s
being able to give reasons for positions. The minimal foundationalist also
rejects the reiteration of justification. I may be warranted in a belief p
without being warranted in believing that I am warranted in believing p,
or being able to show that I am warranted in believing p. The latter
means that I can have justified beliefs which I am not aware of, there
are foundations of belief without my being aware what the specific
foundations are.

The alternative answers to the regress problem are to claim that
branches terminate in unjustified beliefs, or with the reappearance of
the initial belief that it is raining, or that the branches do not termi-
nate. The first option leads to skepticism since, if all justification is
transitive and the terminal belief is unjustified, there is no warrant to
be transferred to the top of the branch. The foundationalist claims that
on the second option, where the initial belief reappears, it is either
unjustified or self-warranted. The former suboption leads to skepticism,
the latter to foundationalism. This general structure of circular warrant
of beliefs is usually associated with coherentism, explaining the suspi-
cion that coherentism is either skepticism or a disguised foundational-
ism. And finally, the third option, where the branch is of infinite
length, leads to skepticism since there are no terminal justifiers to
serve as a source of warrant for the top of the branches. So the re-
gress argument, according to minimal foundationalism, suggests that the
options are really foundationalism or skepticism.

Now, a radical skeptic might not allow this analysis to get started
by denying that people have intuitively valid mediate beliefs at all. But
it seems to me that one of the strong points of the analysis is how it
allows for the possibility of skepticism as a conclusion without begging
the issue in its favor at the outset. If a problem can be found with
foundationalism comparable to those which have been urged to be fatal
Regardless of whether one accepts minimal foundationalism, it has emphasized distinctions which are worthwhile for any epistemology. We have already noted that neither showing the justification of a belief nor knowing one is justified in believing $p$ is required for being justified in believing $p$. Such distinctions are useful to coherentists who might desire to claim that if coherence justifies beliefs one need not be able to show how it does so. Also, one can develop reasons after the fact for believing that a class of beliefs is basic without committing oneself to the view that reasons always show mediate justification. One can discover, come to reflectively know, unreflectively self-justified beliefs. Or, perhaps one can discover relations of mutual support in unreflectively warranted beliefs. But most importantly, the position points out the inadequacy of a concept of justification in purely epistemic terms requiring the ability to defend one's beliefs with reasons. The non-epistemic and pre-epistemic, warranted beliefs which are not yet reflectively known or which are possessed by agents who do not yet possess the conceptual equipment necessary for the explicit adoption of reiterative epistemic attitudes, are allowed a justificatory role. Justification may now be construed as normative, and here we see the explicit connection with questions of regulative justification. Justification involves epistemic responsibility, living up to epistemic standards which are applicable to the type of agent one is. And epistemic agency will be determined as a function of goals and initial resources.

Having used Alston's position to characterize the epistemological field, I would be remiss in my epistemic responsibility if I did not criticize minimal foundationalism to some extent. Even if we accept the view that there must be basic beliefs to avoid skepticism, this will not satisfy our curiosity about their nature. We will return to our starting point, canvassing the usual specific foundationalisms. It will not do to claim that any belief could serve as a terminating one. For we want to know what beliefs halt the regress now, what accounts for the mediate justification of my beliefs, or even what warranted Plato's views on cosmology. And the candidates for the terminating role must be at least plausible to ascribe to the agents in question: consistent with their psychology, cognitive abilities, knowledge, conceptual development, and linguistic ability. One might want to claim that a pre-linguistic child believes it sees colors, so perhaps the claim should be that the belief to be attributed should be in the simplest concepts compatible with the agent's psychology. Otherwise, when the child learns a language and we ask her about neurophysiology we will find that learning has made her less knowledgeable.

The minimal foundationalist is correct is observing that one can be justified in believing $p$ without knowing that one is so justified or being able to demonstrate that justification. A foundational belief might even be pre-epistemic, as in the case of the pre-linguistic child. But not much epistemological capital may be bought with these distinctions. Foundational beliefs cannot be regarded as beliefs-in-themselves if they are to provide justification for an epistemic agent (at a particular stage of cognitive development). Neither the child nor I can converse in the language of neurobiology. But a view which would make beliefs framed in such concepts candidates for a foundational role cannot be applied to
us as epistemic agents. The notion of perspectival justification, that beliefs are justified by evidence in one's possession (however loosely defined), is abandoned when basic beliefs are ones which cannot be attributed to the agent in question. The agent does not possess a conceptual facility as developed as the concepts used in representing the beliefs.

A second, and I believe fatal, difficulty for all brands of foundationalism is the commitment to intrinsic warrant. Foundationalists need not claim that the basic beliefs are true, all they maintain is that some assertions or evidence have epistemic immunity. For instance, the ultimate sources of warrant could be reports which are infallible, incorrigible, indubitable, or just self-warranted. From the view that a type of report is indubitable, it does not follow that all reports of that type are true. So members of an intrinsically warranted class of beliefs may occasionally turn out to have been false.

But the claim that a class of beliefs is intrinsically, and not provisionally, warranted does commit one to holding that the beliefs have some degree of non-defeasible warrant. We can easily imagine cases where the usual candidates for intrinsic warrant are replaced as a class. Perceptual observations could be replaced by those of scientific instruments. Or someday we may even be able to abandon the farmer's almanac.

Androids with sophisticated radar guidance systems are popular science fiction characters. I am suggesting that it is conceivable that such "perceptual" techniques could eventually be implanted in humans to replace biological perceptual mechanisms. If there are two reliable mechanisms available, and one is more reliable than the other, I would hold that the more reliable is the more warranted. Since these replacements are more reliable than the so-called basic beliefs, the degree of warrant possessed by the former should be higher than that of the latter. If anything, what we have is a new class of basic beliefs and the old class is warranted only to the degree it is encompassed by the new. But saying that the old foundations now have mediate warrant amounts to admitting that their intrinsic warrant has been defeated and they were really provisional all along. Nor can the foundationalist admit the new basic beliefs and ascribe them retrospectively to epistemic agents without violating the condition of psychological plausibility. Instead of terminating beliefs, there are termites at the basis of the foundationalist tree.

Foundationalism is an extremely complex and formidable position. And there are so many varieties of specific foundationalisms that it would be next to impossible to do justice to them all. I have argued that minimal foundationalism has provided epistemologists with some rather valuable distinctions, and I will exploit those distinctions in what follows. I have also suggested that minimal foundationalism is insufficient as it stands to serve as an epistemological theory applicable to epistemic agents. It must commit itself to a specific account of basic beliefs.

Finally, I do not believe it to be possible to refute foundationalism. There is nothing logically impossible about belief having a foundation. And so any sustained critique of the view must deal with nonenumerable versions of specific foundationalisms. I have raised two objections to foundationalism which make me doubt its viability as a research plan and perhaps explain my own preference for coherentism.
Foundationalism removes the class of basic beliefs from revisions. Individual bricks in the foundation may prove faulty, but the class of bricks must remain the same. Either the foundationalist adopts beliefs as basic which cannot be psychologically attributed to epistemic agents, and so abandon perspectivism in epistemology. Or, if the foundationalist adopts psychologically plausible candidates, the class of basic beliefs is removed from radical revision. An approach which sees all beliefs as revisable seems to me to avoid these difficulties, although coherentism has difficulties of its own.

2. EXTERNALISM AND INTERNALISM

I suggested above that minimal foundationalism cannot explain perspectival warranted belief without becoming a specific foundationalism. Nor can it allow for improvement in warrant sources. Goldman's critique of internalism is more sweeping with its inclusion of the epistemic alternatives of coherentism and fallibilism. But the basic point is similar, internalist theories have no valid account of perspectival warrant because they lack an acceptable account of regulative justification.

Goldman's objections to internalism are fatal when applied to negative coherence theories, what I have called no-fault theories. But it seems to me that positive coherence theories, especially those which naturalize epistemology, can provide an adequate account of the justification of regulative principles. Here I will give an exposition of Goldman's views as a means of characterizing the difference between coherence theories. Then, I will give a sketch of a positive coherence theory which avoids Goldman's critique. And, in the final section, the accounts of regulative justification given by two negative coherence theories are evaluated.

Regulative justification is a matter of adopting doxastic attitudes. From the perspective of K, there must be methods of adding new beliefs to the corpus to acquire new information, as well as methods of deleting information in K that turns out to be unjustified. Regulative justification is then a question of when addition or subtractions to K are warranted. Even suspension of judgment or doubting a content of K may be seen in terms of a temporary refusal to add or a temporary deletion from K. Some might quarrel with the idea that all replacements of members of K, especially radical ones which involve changes in belief about scientific theories or methods, can be fairly construed as sequences of additions and subtractions from K. If so, then this can be thought of as an additional regulative issue.

Goldman introduces the notion of doxastic decision principles (hereafter DDP's) to describe an agent's voluntary and non-voluntary regulative mechanism.

We may represent a DDP as a function whose inputs are certain conditions of a cognizer—e.g., his beliefs, perceptual field, and ostensible memories—and whose outputs are prescriptions to adopt (or retain) this or that doxastic attitude—e.g., believing p, suspending judgment with respect to p, or having a particular subjective probability vis-a-vis p... a single complete set of principles prescribing all doxastic attitudes a cognizer should have at a single time.
Regulative justification can then be thought of as the application of the right DDP. S will be justified in believing p at t if and only if the right DDP, when applied to relevant input conditions characterizing S at t, enjoins S to believe p at t. A similar analysis would hold for the other doxastic attitudes. Two restrictions are placed upon the input conditions: they must be available to the epistemic agent at t, and the justificatory status of doxastic attitudes is inadmissible in analyzing the initial choice of a DDP to avoid begging the question.⁴

The purpose of the first restriction is to allow the use of a DDP in conscious deliberation. Goldman does allow that a DDP need not be accessible during deliberation. However, if one can be justified in applying a DDP without being able to show it is the right one or even have access to the particular DDP being used, then certainly one can allow the DDP to access non-occurrent input conditions in S's possession in a broader sense. There is no reason to eliminate S's memory bank, non-epistemic, or pre-epistemic justified beliefs. Perhaps it is Goldman's view that the internalist is committed to the view that all deliberation is conscious and voluntary. Here I believe that he has run afoul of the distinction of being justified in believing p from being able to show to oneself or others that justification. Also, by requiring that the input conditions be accessible, the function of belief regulation is needlessly restricted to voluntary adoptions of beliefs. And it seems obvious that many beliefs are the non-voluntary results of a DDP. Part of the function of the total DDP is the automatic non-conscious generation of belief. It will not do to say that what is meant by requiring that input conditions be those about which the person can tell at t is that a verbal or non-verbal act would warrant others in ascribing to S the input as a belief at t. For, then, the DDP may also be ascribed as a belief of S on the basis of non-verbal behavior. This latter position seems to me the correct one to take on both input conditions and DDPs.

People sometimes forget the reasons which justified making an expansion of K and so it might be difficult to decide what evidence is in their possession. Perhaps a previously justified member of K remains in the evidence base to serve as input, even when the cognizer no longer can show its justification, if its contradiction has not also been added to K.

Goldman's characterization of a DDP makes it a regulative mechanism, but it is not broad enough to capture the entire regulative function. The criticisms he develops of DDP selection, however, apply to the justification of regulative principles in a broad sense. And the reforms of his concept I just suggested correspond to the broader regulative function we will see addressed below by Levi and Harman. I will use Goldman's terms to refer to his concept of a DDP in what follows, and regulative justification in the broader sense when discussing Levi and Harman. But, although the terminological distinction is appropriate, the normative justification of regulative principles is still the issue.

Goldman adopts a familiar position on the goals of cognition that a DDP serves. Epistemologists generally agree on the twin goals of believing the truth and avoiding error. Neither is satisfactory on its own. If the first is pursued to the exclusion of the second, then one should believe as much as possible, regardless of the evidence, to maximize the acquisition of truth. And if the second goal is isolated, then one quickly
becomes a skeptic. Now, it might be the case that epistemic agents have these twin goals in some ideal sense. However, reasoning carried on with a limited evidence base and imperfect inferential strategies for the purpose of solving a problem now might conceivably benefit more from the adoption of a different DDP than that of the final scientific community. And it is only by ignoring the need for a DDP which maximizes short term, as opposed to long term goals, that Goldman may lend credence to his view that there is one right DDP which constitutes regulative justification of belief.\textsuperscript{9} It seems quite possible that ultimate long term gains will result from the serial short term application of different DDPs, rather than the constant application of the right one. Perhaps this is especially true of conscious deliberation. In any case, a DDP which is applicable in decision making must leave room for short term goals.

Goldman correctly notes that the internalist has an extra requirement for the DDP beyond the optimality of results. An epistemic agent must have reasons or grounds which support that DDP.

The objective optimality of a DDP, on this view, does not make it right. A DDP counts as right only if it is certifiable from within.\textsuperscript{10}

This is the basic contrast between externalism and internalism on regulative belief.

This emphasis on the reasons or grounds for a DDP is important because it is difficult to imagine how such a restriction on the part of internalism would be possible if the function of a DDP is to prescribe beliefs. Internalism needs a DDP to get a DDP. Notice that the externalist might reply to the objection I made above to there being one right DDP by admitting that different DDPs are appropriate at different stages of cognitive development, while still maintaining that the right DDP is defined by optimality at that stage. Perhaps evolutionary programming wires in causal DDP switchover. The contrast with internalism would still remain. One additional point in favor of the externalist account is that it is the justification of the DDP and not its output which is at question. For instance, if I have a less than perfect DDP which tells me to believe \( p \) at \( t \), and the ideal DDP would have issued the identical prescription, the externalist views \( p \) as justified even though the wrong DDP produced it. So externalism is not open to the charge that it construes most of what people believe as unjustified.

It will be useful to list the six options which Goldman considers as available for the internal grounding of a DDP: (1) DDP \( X \) is right iff: \( X \) is actually optimal; (2) DDP \( X \) is right iff: we are justified in believing \( X \) is optimal; (3) DDP \( X \) is right iff: we believe \( X \) is optimal; (4) DDP \( X \) is right iff: (a) we believe that \( X \) is optimal, and (b) this belief was caused by reliable cognitive processes; (5) DDP \( X \) is right for \( S \) at \( t \) iff: \( X \) is self prescribing for \( S \) at \( t \); and (6) DDP \( X \) is right iff: \( X \) is the proper DDP to choose if one chooses from the internal standpoint.\textsuperscript{11}

Option one is obviously unavailable to the internalist, it corresponds to externalism. Option two does not answer the question of how one acquires evidence for a DDP without assuming a function which assigns doxastic attitudes to beliefs. The justification condition assumes what needs to be explained. Three leads to "anything goes", any DDP believed to be optimal no matter how unreasonable is acceptable. What is
most puzzling about three is why one would be interested in this type of a position on regulative justification since it corresponds to the absence of regulation. Of course one is free to adopt a standard and hold to it, but then any rule one managed to believe or accepted from habit would be justifiably regulative. Fiat or habit are not sufficient to justify a particular DDP. Nor can they account for why one should not change one’s DDP by fiat except by an appeal to conservatism. The reformulation of three found in four is unavailable to the internalist because of its appeal to an external reliable mechanism which is not grounded on evidence. Four, like one, is an externalist view. Goldman’s objection to five is that it is conceivable that two or more DDPs would be self-prescribable for S at t, and if so they may give conflicting prescriptions about what beliefs to adopt. It looks as if six is internalism’s last hope.

Goldman claims that the trouble with six is that it will not allow the selection of a preferred DDP, and so the conception of a DDP will be unfulfillable. The argument is that although one does not need a DDP to choose a DDP, since a regulative function but not an attitude toward that function is being adopted, selecting a DDP requires justified evidence on which the selection is based. And until a DDP is functioning, no beliefs have a sanction. The internalist must disallow any justified beliefs in the position in which the initial DDP is selected and acquire a justified DDP behind a veil of ignorance. Such a restriction would be fatal for epistemologists such as Levi and Harman who assume a body of beliefs as justified and pose the questions of expansion, deletion, and replacement on the basis of probabilities, knowledge, or warrant accepted within the corpus. All that is allowed in the initial corpus are logical truths and first person Chisholmesque appear sentences. This accounts for Goldman’s remark that although option six may be an appropriate description of internalism, it cannot provide the view with a preferred DDP. And without a DDP, it will be hard to distinguish internalism from relativism. I must disagree with Goldman’s description of OOPs in a way that withholds from them the attribute of being beliefs. If a DDP is a belief regulating function for S at t, it will be possible to attribute X to S in an extended sense of belief on the basis of behavior. If S’s behavior is apparently rational and is in conformity with a DDP, then unreflective belief in the DDP can be attributed to S as long as the attribution makes use of concepts which are psychologically plausible for S. But the major point of Goldman’s critique is well taken against epistemologies which seek to import evidential baggage for regulative principles. We will see just how damaging the critique is when we turn to an examination of Harman and Levi’s views. But it should be pointed out that internalisms which do not ignore evidential justification have a means of escaping the attack posed against six.

An extremely useful tactic would be to claim that regulative principles possess some form of epistemic immunity. Or perhaps it is only classes of particular beliefs which are self-warranted. But even the latter case would provide doxastic states sufficient to select a DDP according to option six. By advocating the self-warrant of general principles, the foundationalist can adopt Goldman’s option two. And by advocating the evidential justification of individual beliefs, the foundationalist adds to the initial corpus the evidence necessary for DDP selection. The evidence base may underdetermine DDP selection, but certainly too many DDPs is an improvement over none. But although a foundationalist
might be able to pursue the tactics just outlined, they are of no use to coherentists.

We have already noted that the requirement that the inputs to a DDP be accessible to a cognizer ran afoul of the distinction of being justified and showing justification. The internalist position is that a DDP must be one that the cognizer has evidence for using, not that the evidence must be shown or reflectively used. Rational behavior whose simplest explanation is in intentional terms is sufficient to ascribe beliefs in the extended sense. And nothing prevents the cognizer, who cannot show evidence at one stage of conceptual or linguistic development, from later discovering and formulating the evidence or the DDP in deliberation or conceptual analysis.

Goldman's own position is close to that I have suggested for foundationalism. He argues that the only way to avoid an infinite regress of DDP selections is to base the choice on doxastic habits. But then he too would need some account of evidential justification to make the selection non-arbitrary. And it is also problematic how he could hold that belief is justified by the application of the right DDP, and also claim that the justification of a DDP could be based on people's doxastic habits, unless he is holding that our doxastic habits somehow correspond to what the right DDP would prescribe. This seems overly optimistic, suggesting a back to nature movement for epistemology.

3. CORE RATIONALITY

If behavior can be given the best explanation on the basis of hypothesized beliefs and a functioning DDP, then there is no need to require a conscious deliberate DDP selection ex nihilo. From the internalist perspective, S is already non-reflectively applying a DDP on the basis of evidence in S's possession. The distinction of being justified from showing justification chains, when tempered with the notion of psychological plausibility, provides an answer to the critique of internalism.

Here it will be appropriate to make some remarks on the core rationality thesis of belief ascription of which Goldman's is just one variety. The idea is that adopting the intentional stance, treating an entity as a rational agent, involves hypothesizing the occurrence of an interconnected set of beliefs, desires, and inferential strategies. Sometimes the claim is made that even error can occur only within the background of largely true shared beliefs.

The basic claim is that much community belief is needed to provide a basis for communication or understanding; the extended claim should then be that objective error can occur only in the setting of largely true belief. Agreement does not make for truth, but much of what is agreed must be true if some of what is agreed is false.

Apparent occasional slips in the performance of pre-epistemic agents might be attributed to a degree of irrationality or to corrosion in a rational mechanism. When the core rationality approach takes a strong form, requiring that ordinary reasoning set the canons of rationality, then higher level data must always be explained or explained away to
preserve the validity of intuitive practice.\textsuperscript{17} Intuitive inference is made non-defeasible as in foundationalist epistemology.

I would prefer to use the term 'warranted', as opposed to 'rational' to describe the status of the reasoning attributed to pre-epistemic agents judged to be intuitively rational. This allows one to reject the claim that the agent's strategies are perfect and at the same time allows the provision of a source of warranted beliefs for DDP selection. Core rationality can then be used to attribute an initially, but not intrinsically, warranted set of beliefs $K$ from which $S$ reasons, revises, contracts, expands, or just makes explicit upon epistemic development.

Elliott Sober has taken the core rationality approach to assert the a priori truth of the view that beings capable of having beliefs have warranted beliefs in this weak sense of rationality.\textsuperscript{18} But the claim is an empirical one about the nature of evidence. Whatever is evidence that an entity has beliefs is also evidence for a degree of warranted reasoning. Perhaps there are entities that have beliefs and lack core rationality, but no empirical evidence could support the claim since wherever one suspects beliefs occur without core rationality one withdraws the intentional perspective.

In order to make my own view more explicit it will be necessary first to distinguish intrinsic and initial warrant. Intrinsically warranted beliefs are justified to some degree independently of inference from other beliefs. The intrinsically warranted may be infallible, or incorrigible, or the output of a reliable belief producing mechanism. The particular form of warrant is not crucial for my purposes here. The important notion is that the intrinsically warranted possess an epistemic immunity, they need not have inferential support in order to be justified. It is important also to note that an individual intrinsically warranted belief need not be true. The general reliability of the class of such reports would be sufficient for a weak form of intrinsic warrant, self-warrant, to apply to each class member.

Within foundationalist epistemologies, intrinsically warranted beliefs serve as a source of inferential warrant for non-basic beliefs. And so a final characteristic of the intrinsically warranted is that as the ultimate justifiers they must always retain some degree of warrant, at least as a class, even though individual members of the class are defeasible.

In contrast, initially warranted beliefs may be ultimately dispensable as a class. The initially warranted need not possess or retain a degree of intrinsic justification, although they too may turn out to be true or justified in the process of inquiry. The initially warranted provide a provisional inferential support for non-basic beliefs and are in turn justified by inferential beliefs.

Now I agree with the core rationality view that the adoption of an intentional stance toward an agent involves the hypostatization of a network of interconnected beliefs and desires. The untutored and unreflected inferential practices of prelinguistic agents is given its simplest explanation by such hypostatization as long as the concepts used in the description of that practice are simple ones. So I would equate the initially warranted with such untutored inferential practice. Where I disagree is with the strong claim made by people such as Cohen that this core reasoning sets the canons of rationality. It should be seen a provi-
sionally warranted, and so as providing a preliminary DDP, the one already operative in unreflective practice.

The conditions of belief ascription to an epistemic agent in light of that agent's needs and goals are what narrow the field of the initially warranted, not a covert assumption of intrinsic warrant. Suspending the conditions of belief ascription would be tantamount to abandoning the discussion of perspectival justification, but such a thought experiment illustrates a point. Suppose there is a person whose beliefs are equivalent to the content of a novel and this novel is coherent. Suspending the conditions of belief ascription, and the person has warranted beliefs. Apply the conditions and the intentional perspective is revoked, the beliefs in question are not perspectively warranted, and no epistemic immunity has been invoked. Practical reasoning then proceeds from an initially warranted network that is at least partially satisfactory of the epistemic agent's needs and is open to replacement by superior procedures or revision as the agent's goals are clarified. Perhaps all coherent systems would be equally warranted for an unmoved mover.

Now it might be objected that the initially warranted is not limited to just one set of beliefs. This seems to me to be unproblematic: some alternatives may be found more useful than others. Perhaps all will converge on one or two alternative systems. In any case, skepticism has been avoided without appeal to a foundationalist epistemology. Relativism is an issue for another time, but a relativism allowing several live alternatives for an epistemic agent might be desirable and is certainly not equivalent to the relativism of "anything goes".

I would like to draw an analogy or two to the functioning of our legal system in order to clarify the preceding discussion. In civil cases where juries make decisions on the basis of the balance of the evidence, a standard of reasonable action is supported to be applied. In negligence cases, for instance, the test of reasonableness is the conduct which would be adopted by a standard person in the same situation as that of the agent whose conduct is being evaluated. A standard person is not perfect, but a peer. The jury consists of such standard persons who should be able to judge from their own unreflective practice how one should act in a given situation.

It is possible that a jury would find several courses of action reasonable in a given situation. Some options might be equally acceptable, others being given higher or lower grades. In negligence suits, all that the law requires is reasonable conduct, not the most reasonable. Now, I have suggested that the initially warranted be defined in terms of the beliefs which may be ascribed as acceptable for a similar agent by epistemic peers. There is also the additional condition that S's verbal or non-verbal behavior warrants ascribing the beliefs in question. The epistemic peers do not decide upon guilt, but on whether to invoke the intentional perspective. The beliefs which are perspectively warranted for person S will be directly related to the additional beliefs possessed by S and used in practical reasoning. For instance, S may possess more information than standard members of the community; eliminating some acceptable alternatives and introducing options beyond the capacity of standard members. Alternatively, S may possess less information or be from a different epistemic community. The initially warranted is a point of departure for practical reasoning, while what a person is warranted in believing is relative to a time-slice of his beliefs.
And so I would offer the following as a definition of initial warrant:

If p is a member of a person S's body of beliefs K, p is initially warranted for S if and only if K does not contain any belief inconsistent with p.21

But I wish to emphasize the pragmatic aspect of believing p, as well as its provisional status. It would not be correct, however, to object to my psychologistic account of warrant that it makes epistemology into a socially relative enterprise. It does allow a variety of socially relative standards but it is not clear to me that there could be societies in which "anything goes" was their concept of justified belief. Evolution takes care of such societies.22 If one objects that I have made epistemology relative to an epistemic agent's inheritance, needs, and capacities, I would consider that a virtue of the account.

4. NO-FAULT THEORIES OF REGULATIVE JUSTIFICATION

Coherence theories of regulative justification tend to be characterized by epistemic conservatism. If we reject the strong version of the core rationality thesis, then conservatism will not be given an all-important role in matters epistemic. If all is not well with our body of beliefs then revision should not be postponed until inconsistent data force themselves into our consciousness, but should be a more constant goal of inquiry. If one accepts a naturalistic or psychologistic approach to epistemology, and also sees the philosophy of scientific method as a continuous branch of epistemology, then the dispute between negative and positive coherentism has crucial implications for scientific method. As we will see, Levi and Harman both emphasize conservatism and gradualism.

Harman advances the view that beliefs are justified just by being believed provided that one is not currently in possession of evidence capable of raising doubts. The goals of regulative belief are maximizing coherence and minimizing change.23 For instance, Harman offers an example in which an agent comes to infer several beliefs on the basis of initially credible evidence which is later defeated. The agent is told that test scores which had implications for her aptitudes were those of another person, and her own scores have been lost. The agent in the example rejects the initial evidence, but retains the inferential beliefs adopted on that basis because they cohere with her other beliefs.24

Now Harman believes that this procedure is correct since people normally engage in belief perseverance. But this will not do unless we can establish that what the plain man does constitutes the canons of rationality. Nor will it help to remark that people rarely keep track of their justifications in order to avoid clutter.25

Even if the student in the example has forgotten what inferences she made on the basis of aptitude scores, it would certainly be a good thing to be able to remember the proximate relations among beliefs or to be able to redo the inferences later that were performed with the earlier scores. The least that the agent should be able to do is suspend judgment about the inferences until she can retake the test. Granted, other beliefs in her belief set K cohere with the relatively new infer-
ences, but degrees of support need to be considered. If she had taken
other aptitude tests which gave similar results, then perhaps coherence
would give sufficient support to retain the belief that she will not do
well in history class. But if she only took one history class and stopped
going after two weeks, this will cohere not only with the belief that she
is not proficient in history but also with other plausible beliefs. Perhaps
it is motivation, not aptitude, which is lacking. Just because one belief
is in the set should not mean that it has to stay there, especially if the
set contains beliefs about proper support and regulative procedure.

From the facts that occasionally our evidence base is defeated and
our memory is limited, it does not follow that one must choose between
the regulative principles: (1) Stop believing p whenever one positively
believes that one's reasons for believing p are not good, and (2) stop
believing p whenever one does not possess adequate justification of p.26
One could require that no belief be added to the corpus without either
proper justification or being the output of a reliable routine mechanism
of expansion, and that agents periodically review the evidence within
relevance classes for beliefs, especially in important contexts. If the
bulb burns out on the warning panel at a nuclear reactor, one should
not forget to replace the bulb and continue to believe that everything
is all right because one also believes that the probability of a meltdown
is low. On Harman's account, why should the student not believe that
her actual scores were close to the ones she was mistakenly given? Co-
herence with her belief set supports perseverance in that view also.

Levi has argued that we must treat our body of knowledge as if
it were infallible if it is going to be able to serve as a resource in ra-
tional inquiry. For Levi, our corpus serves as the standard of serious
possibility. An hypothesis is seriously possible if it is consistent with
S's K at t. So serious possibilities are a subclass of logical possibilities.
This is important to note since Levi is concerned to reject what he calls
categorical fallibilism, the view that all beliefs are seriously open to re-
vision. Such a view holds that every logically possible hypothesis is a
serious one, since K might be wrong it cannot serve to demarcate seri-
ous alternatives.27 And so K will not fulfill the role of guide in inquiry
unless it is taken to be infallible.

This is a bit unfair to the fallibilist position for two reasons.
First, no fallibilist holds that every belief is open to revision. Most
would place what Levi places in an ur corpus: logic, mathematics, set
theory; beyond consideration. Second, from the fact that one holds that
every member of a set might be mistaken, it does not follow that one
believes that the entire set may be mistaken. All the fallibilist holds is
that no belief is beyond scrutiny, one does not know which beliefs are
faulty and, in the interests of improving K, one is open to the revision
of members and periodically reconsider their grounds.

However, Levi does not take the position that K is incorrigible. His
position is that fallibility must be rejected if K will be able to make
progress in knowledge possible for epistemic agents who cannot possibly
treat all logical possibilities as serious given limited cognitive resources.
And when K undergoes expansion, contraction or replacement into K', S
will have the same infallible attitude toward K.

This is a curious notion of infallibility. Normally infallibility means
that S cannot be in error about anything S believes. So infallibility
would be weaker than omniscience, where S believes everything which is true. S would be able, if infallible, to make additions, but not replacements or contractions of K. Incorrigibility is usually taken to mean that there is no evidence which could correct the views to which it is attached. Reports of mental states might be false, and still it might be the case that there is no evidence which could ever be used to correct the mistakes. On this account, infallibility would imply the weaker claim of incorrigibility. Since this is clearly not Levi's intent, I take him to be talking about the attitude that S must take toward K for pragmatic reasons. This opens the position to the objection that a source of justification is being assumed.

Certainly, treating K as infallible is close to the position I have labeled epistemic conservatism. It might be more useful to think of K as a warranted starting point which is corrigible, core rationality could be used to avoid assuming the evidential warrant of K. And K could still be used as a standard of serious possibility in light of the epistemic agent's capacities.

So the objection that Levi is open to is that no account has been given of the justificatory status of the beliefs which serve as a basis of DDP selection except optimism about K. If the reply is made that one has to start somewhere, why not with one's own belief set, this implies that any DDP which follows from a belief set is valid. Not much support is achieved for a standard of serious possibility in inquiry. Levi is in effect importing justified belief into the initial position to allow for the selection of a DDP. Claiming that the adoption of an attitude of infallibility toward K will maximize error avoidance and acquisition of new information will not explain the selection of a DDP on an arbitrary basis. Nor will it quiet the suspicion that the initial DDP has made some crucial theory seriously impossible by being assumed. Just because an alternative looks crazy from K does not mean that it is when we realize that K itself is conventional.

It might be the case that Levi is only concerned with local, and not global, justification. This would suggest something akin to Goldman's option three. Each sub-area of inquiry would have its own contextually defined standards. What this position would require is an account of how global issues are irrelevant to local justification and an explanation of how contextually relevant possibilities are defined. Without global regulative standards my suspicion is that contexts and contextually relevant regulative principles might proliferate under the influence of conservatism and infallibilism.

A deeper reason why Levi cannot adopt fallibilism is that the DDP to which S is committed is an ideal one, not one justified in part by the agent's capacities.

I suggest that we distinguish between the standard for serious possibility to which S is committed at time t and X's awareness at t of the standard to which he is committed. A normative account of the improvement of knowledge should prescribe no more than persons and institutions are capable of implementing. The standard of possibility to which S is committed at t is, on this view, the standard to which he would be conforming were he ideally situated. I do not suppose that they (epistemic agents) are ideally
situated and rational. I urge them to be rational in the sense that they live up to their commitments insofar as they are able.²⁹

Some might hold that being justified does not follow from being excused. Perhaps it is correct to excuse the members of a pre-scientific community for adopting the wrong DDP, but one might still hold that the propositional attitudes they adopt would be justified only if they would have been enjoined by the right DDP.³⁰ Levi's position is close to this, the agent is committed to that portion of a DDP comprising serious possibility which is consistent with K whether S has the cognitive ability to consider these possibilities or not. Whether excuse is sufficient for justification of the attitudes which are adopted is unclear, but I will assume Levi holds that it is.

There are several problems with the position. We may remember that the importance of regarding K as infallible was to enable it to serve as a guide in inquiry. Presumably humans cannot regard all logically possible hypotheses as seriously possible and still make progress in inquiry. But if the capacities of an epistemic agent are good grounds for justifiably imposing restrictions on responsibility, why not extend this approach and accept S's warranted regulative principles in K as defining serious possibility at t. Or perhaps allow S's commitment to be specified in terms of epistemic capacities and warranted position.

I agree that S's regulative commitment cannot be restricted to those he may consciously report or those he can consciously show. But to make regulative commitments considerations which are beyond his abilities for no fault of his own is to abandon perspectival justification. Most of the beliefs S adopts will follow from a less than optimal DDP according to K. Only excess optimism will suggest that the output will correspond to that of the ideal. And so most of what S believes will be unjustified, not the result one wants from a theory of justification. And S will have no way of knowing when he has fulfilled this epistemic responsibility and no way to sort justified and unjustified epistemic attitudes. This looks especially bad when K is supposed to be regarded as infallible. Some specification of relevant possibilities in K defined in terms consistency, context, currently warranted procedures, relevance classes, and epistemic capacities would be more appropriate.

As to the question of whether excusing S for using the wrong DDP is sufficient to justify its use and its prescriptions, two types of excuses need to be distinguished. Sometimes applying a rule is valid but useless in a particular case. A criminal caught twenty years after the fact may be validly punished, but we might excuse him because the punishment would now be useless. The rule is not rejected in his case as inapplicable as it is when we decide not to put animals on trial for crimes. Here one excuses animals because they lack an important presupposition for application of the rule. It seems to me that the excuse involved in epistemology for following less than ideal procedures is of this latter type.

So far I have considered that part of Levi's position on regulative justification dealing only with the specification of possible hypotheses. There are other elements in the position which lead to a complete DDP. I would like to turn to that element of the position most related to con-
servatism, credal probability. To do that, I must explicate some related notions.

The ur corpus (UK) is a subset of sentences in a deductively closed set of sentences expressing the corpus K in language L. UK contains logical truths, set theoretical truths, mathematical truths, and any incorrigible members as defined in K by its standard of serious possibility. Any allowable body of knowledge will be an expansion of UK, or an adjustment of K by some sequence of expansions, contractions, and replacements. Expansions may occur either deliberately, through K’s principles of inference, or routinely, through the principles of input accepted in K such as observation or the testimony of experts and instruments. S will be motivated to revise K by the realization that K is incorrigible, inconsistencies produced by routine inputs and for the purpose of obtaining more information or explanation. Suspension of judgment also has an important role. A theory not in K might look implausible especially when it has a competitor in K. One might then want to contract K to K’ and suspend judgment between the two rivals, before deciding which to readmit into K’. Or one may remain in K’ and admit neither rival. Each time one expands or contracts there is an alteration in the standard of serious possibility. It might seem puzzling that an S who regards his K as infallible would allow expansion which disrupts K or contraction which removes information (although one need not forget temporarily bracketed information). But infallibility is not omniscience, S desires more information and can revise a corrigible K.

Given the need for new information S may perform abductions from K which will perhaps lead to a suspension of judgment and a contraction or expansion. Levi calls the hypotheses which are potential answers to the questions considered in abductions the ultimate partition U such that K at t entails the truth of at least and at most one member of U. Each member is consistent with K. S may reject all members of U but one and add it to the corpus, reject some members and suspend judgment among the survivors, or reject no members and remain in full suspense. The informational value of hypothesis h in U is positively correlated to the number of alternatives rejected as a result of h’s acceptance. In whatever adjustments are made K serves as a premise in an argument which leads to K’ as the conclusion, each change is global in that it affects the standard of serious possibility. Even replacements which might seem incommensurable show this structure.

The final notion we need is that of credal probability. It might seem that credal probability would sufficiently narrow the field of serious possibilities for S at t, answering some of the problems I raised as to the applicability of the standard and the justification of many of S’s beliefs. But there is at least a tradeoff here. To the extent that credal probabilities restrict serious possibility, they foster conservativism and prevent revision. And if we can assume that S’s credal state is influenced positively by K at t, then entrenched members of K will be given high probability.

It might seem that S’s set of credal probabilities 0’ at t’ would be the conditionalization of the Q function of S at t that led by expansion or contraction to K’. Levi realizes that this would result in a rather restrictive method of inquiry, so he places weak restrictions on Q functions. For my purposes, it is sufficient to note two restrictions he does not adopt: strict conditionalization of Q functions and uniqueness.
Instead, he holds that any set of Q functions is seriously permissible for S which S has no warrant for ruling impermissible relative to K. Levi allows S to change his confirmational commitment. On adopting K' S need not adopt Q' but may adopt another seriously permissible Q function according to K'. It is easily imaginable that a variety of Q functions will be consistent with K' and so seriously permissible. S will then face a scaled down version of the Goldman problem, inability to justify the selection of a particular DDP because of an undetermined basis.

What is recommended is that S adopt the confirmational commitment that Levi says ideally rational agents would accept, the weakest one, on the ground that Q functions should not be ruled out without warrant. The difficulties with this suggestion is that we are not ideally rational agents and the DDP which is maximal for them may not be maximal in the short run for us. Considerations of the importance of the context and our limitations may make this suggestion too conservative. Presumably, the motive here is to avoid possible loss of information in future. This, however, would be seriously difficult to suggest as a restriction to someone following a research program. Levi goes on to claim that one is justified in ruling out seriously permissible Q functions on the basis of one's previous confirmational commitment or contextual considerations such as the agent's goals, values, and the previous methods used in this context.34

Committing oneself to a research program in a given context raises its own set of issues dealing with conservatism. It has been argued that there is an incommensurability of problem solving in science which is compatible with an overlap in language, data, and standards. Built into rival theories are standards dictating the relative priorities of the problems to be solved and what counts as a solution. This interpretation of incommensurability does not posit an absolute epistemological break but does suggest that there is no way of adjudicating the ranking of problems except historically and contextually.35 Anomalous data may be shared by rival theories but have different importance because of the variant standards. The implication of this view for the position we are considering is that conceptual incommensurability is not the only type. Problem solving incommensurability may be created by deciding to follow a research program on the basis of contextual considerations. This is especially problematic when K is treated as infallible and is a well entrenched theory. I am not claiming that this type of contextual orientation in DDP selection can be eliminated, but that the conservatism it supports needs to be tempered by abandoning the infallibility approach.

The cash value of Levi's recommendations is that S may choose a variety of Q functions, but he is also justified in deciding to invoke confirmational commitment and pursue a particular Q function if context warrants. This leaves S a lot of voluntarism in regulative commitment, as well as no evidential grounds for DDP selection. If one is concerned, as Levi is, to avoid the "anything goes" position on scientific method, one cannot allow so much flexibility. Indeed, one could see Feyerabend as making a point similar to Goldman's, internalist philosophers of science allow so much flexibility that anything goes. They cannot justify commitment to one DDP. Perhaps it would be better to take our context seriously, but temper the infallibility approach with corrigibilism. One DDP would then be initially, not permanently, warranted by context, but we would be open to rival problem solving approaches.
Returning to the suggestion that the weakest Q function should be adopted, this would provide S with the minimal amount of information available now as defined by U. Perhaps Q function selection could be made sensitive to the relative value of new information and error avoidance in a context. As it stands, this suggestion sacrifices short term information for long term. And if credal states are correlated with those of the initially warranted position and the Q function which gives maximal information is adopted for science, epistemic conservatism could be avoided.

A final word is appropriate on replacements and incommensurability. Levi holds that any change from K to K' which is legitimate can be reconstructed as a series of legitimate expansions and contractions from K regardless of the historical occurrence of these steps. This may even be correct, but such an approach does not preserve subjective justification in the replacement move. Reconstructing the method which, if followed, would have been rational, does not preserve S's rationality. At worst it suggests that science should not accept a revolutionary replacement until it works out a rational reconstruction. But if one starts with a warranted K, not an infallible one, such replacements will always seem possible. Their entertainment in light of the corrigibility and lack of optimality of one's current corpus will be eminently rational.

5. CONCLUSIONS

My conclusion is that negative coherence theories must be rejected on at least two counts: lack of concern with issues of evidence on the basis of which to justify regulative procedure and a correlated inability to produce an account of regulative justification beyond conservatism or traditionalism. These regulative suggestions sacrifice error avoidance and information acquisition for relative stability of belief. Where ethical theorists are tempted to derive ought from is, negative coherentists have the opposite tendency. They equate is, truth, with what one ought to believe at a specific time. A workable coherence theory must provide initially warranted beliefs to justify an internally warranted DDP. It must also be sensitive to the epistemic capacities and goals of the agent if it is to be applicable. I realize that I have only given the barest outlines of a positive coherence theory in section three. Such a theory requires a sustained exposition and justification and must be taken up elsewhere.

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ENDNOTES


3 William P. Alston, "Has Foundationalism Been Refuted?", Philosophical Studies, 29 (1976), 290.

4 I am using belief here in an extended sense to mean only some state of evidence in S's possession which is given a sentential representation in K.

5 It seems to me that this is an incorrect representation of coherentism since that position also involves a denial of the claim that all warrant is transitive, but this topic cannot be pursued sufficiently here. See John Post, "Infinite Regresses of Justification and of Explanation", Philosophical Studies, 38 (1980), 39-40.

6 A foundationalism which claims self-warrant for sense data will find it difficult to reconcile this warrant with their non-existence. One can find a tyranny of the foundations in this view which rivals the imperialism of reason its advocates attribute to rationalist coherentism. See William P. Alston, "The Role of Reason in the Regulation of Belief", in Rationality in the Calvinian Tradition, ed. Hendrik Hart, et al., (Lanham, Maryland: University Press of America, 1983), 138.


8 Ibid, 30-31.

9 Ibid, 32. For discussion with different emphases upon the epistemic goals of avoiding error and acquiring truth see: W.K. Clifford, "The Ethics of Belief", Lectures and Essays, 1879; and William James, "The Will to Believe" which was written in response to Clifford's essay. Clifford seems to me to get the better of this discussion, perhaps because of his perception of the darker side of our passional nature in decisions which are living, forced, and momentous.

10 Ibid, 32.

11 Ibid, 33-38.

12 Ibid, 38.


14 Ibid, 47.


18 Sober, 116-17.


20 Ibid.

21 Pollock, "A Plethora of Epistemological Theories", 108-10. Pollock uses similar conditions to explicate the initially warranted, although he seems to claim that just believing \( p \) is a warranting property. Pollock labels his view a negative coherence theory, since the primary role of evidence is to defeat, not support, members of \( K \). This seems to me to undervalue the pragmatic element involved in being able to believe \( p \).

22 See, Ronald Giere, "Philosophy of Science Naturalized", Philosophy of Science, 52 (1985), 340-41, for an attempt to use evolution to avoid the circle argument in epistemology. I am sure there is a close relationship between the biological account Giere gives and the social account of initial warrant I offered above. Certainly the arguments support each other. I prefer the social argument since it makes warrant a clearly epistemological concept.


24 Ibid, 43.

25 Ibid, 45-47.

26 Ibid, 46.


28 I owe this interpretation of Levi to Henry Kyburg.


32 Ibid, 27-35.

33 Ibid, 45-46.

34 Ibid, 89-92.


This is why Kuhn, although he has no account of scientific progress, is not guilty of making science irrational. Radical replacements are irrational only from a gradualist perspective.