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SCIENCE AND RATIONALITY FOR ONE ALL

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Abstract:

A felicitous scientific community may need diverse scientists to beget diverse beliefs even when faced with the same evidence. The classic line is that this would make a fight between the demands of collective rationality which scientists confront as members of the community and the demands of individual rationality which they confront as epistemic agents. This is expressed both by philosophers of science (working on the distribution of cognitive labor) and by epistemologists (working on the epistemology of disagreement). The classic line fails to hold into account the relation between ra- tional belief and several epistemic risks, values of which are a matter of private and social commitment. This present the opportunity of conflicts the classic line does not recognize, because someone with grievous values perhaps be individually rational but too far farther the pale to have a area in the scientific community. More importantly, it present at fewest a opportunity for Excellent scientists to be rational individuals.

Introduction :

Science would presumably go best if individual scientists at fewest sometimes beget differing beliefs even when faced with the same evidence. The classic line, both amongst philosophers of science and epistemologists, is that this generated a oppose be- tween the demands of collective rationality which scientists confront as members of the community and the demands of individual rationality which they confront as epistemic agents. I argue that this clash presumes an inadequate concept of individual ra- tionality. When we hold into account the relation between rational belief and the val- ues of several risks, It's at fewest possible for Excellent scientists to be rational individuals.

1. The classic Line in Philosophy of Science

It appears clear that a community of one thousand scientists working together to make discoveries and solve puzzles should arrange itself differently than wouldone thousand scientist-hermits working

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independently. due to restricted time, resources, and attention, an self-reliant scientist can eruse only several of the possible approaches to a problem. Working alone, each hermit would eruse the the vast majority of promising approaches. They'd needlessly copy-paste the Employment of other people and would be unlikely to design approaches which Stare unpromising but really have titanic potential. Contrariwise, a immense community can more rigorously eruse the space of possible approaches. the vast majority of scientists should Labor on the the vast majority of promising approaches, but a smaller number can be committed to approaches that initially See less promising. Exploratory Labor can explain if one of those initially unpromising approaches has unrealized potential, and more scientists can adopt it formely its potential becomes more apparent.

This division of cognitive labor is an Necessary option of science. It's a cen- tral theme in the Toil of Thomas Kuhn, who emphasized both the importance of a shared Advance and the require for several scientists to See farther it. This is his known throughout the world distinction between usual science (governed by a paradigm) and revolu- tionary science (in which one paradigm is replaced by another). Kuhn (1977) calls this require to stick to shared commitments and additionally to innovate "the Fundamental ten- sion" in science. Importantly, he recognizes that this tension is not felt internally by Any scientist. Instead, several eruse wilder anotherother commonly confused word approaches while the vast majority of hew more closely to the dominant paradigm. He writes,Most anomalies are resolved by usual means; the vast majority of proposals for new theories do expose to be wrong. If all members of a community replied to each anomaly as a source of crisis or embraced each new theory ad- vanced by a colleague, science would cease. If, on the other hand, nobody reacted to anomalies or to brand-new theories in high-risk ways, over there would be few or no revolutions. (2012: 185–6)

What Composed a novel Advance enchanting to a specific scientist cannot be its ob- jective promise, because or pursuing it would not givetheimpression to be a risk. Rather, a scientist may initially adopt an Advance for personalized or pleasing reasons, and their Occupation on it can explain its potential. Kuhn writes, "If they had not quickly taken it up for highly individual reasons, the newly created candidate for paradigm perhaps never have been sufficiently developed to draw the allegiance of the scientific community as a whole" (2012: 155).

Philip Kitcher develops this Thought in a formal way, acknowledging "a immense debt to the ideas and writings of Thomas Kuhn" (1990: 5). Following philosophers have both extended Kitcher's formal exemplar and developed others.1 I'm not con- cerned now with the technical details, but Rather than with the fact that countless authorsin this tradition hold it to signify an opposition between the epistemic demands of individual rationality which weigh on a scientist and the epistemic demands of collective rationality that weigh on the scientific community. For example, Kitch- er claims that this Exertion poses "a mismatch between the demands of individual rationality and those of collective (or community) rationality" (1990: 6). Kevin Zollman writes, "Looking at . . . scientists from the perspective of individualistic epistemology, one perhaps be inclined to criticize the scientists' behavior. However, when watched as a community, their behavior becomes optimal" (2010: 33).

One may wonder In-case these philosophers of science really believe that sci- ence puts the demands

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of responsible science in tension with the demands of in- dividual rationality. farther short passages love the ones that I have quoted, they do not whinge at length about it. This is not because they resolve the problem, however, but because they renounce thinking about scientists as rational agents with rotund information.

Kitcher's solution is to "dissolve the understanding of rationality" (1993: 194, empha- sis in original). On his view, we should not request or investigate after In-case scien- tists are rational. Instead, we should ask only In-case they use techniques of belief formation which promote cognitive goals, recognizing that there're a lot of limits and conflicts alive to in their doing so. In cases of science having operated well, Kitcher writes, "Society, nature, and sound individual reasoning combined to guide the social acquiring machine to a new success" (1993: 218). He demands sound rea- soning not in the technical sense (valid with factual premises) but just in the minimal sense of employing reliable-enough techniques to promote collective progress. This lets for scientists to use diverse strategies, to hold diverse risks, and to attract diverse conclusions even from the same evidence.

Zollman skirts the plight in a diverse way. Rather than of arguing that scien- tists may responsibly attract diverse conclusions in the confront of the same evidence, he models scientists as having restricted information. In his models, the community structure of science limits which scientists share their findings with which others. Individuals react to diverse evidence and so may disagree, although rational- ity would not consent Difference in the confront of the same evidence.

2. The classic Line in Epistemology

Suppose we accept a roughly Kuhnian account of the distribution of cognitive labor. Delivered the same evidence, several scientists pursue research which has P as a presupposition. A few scientists pursue research which has incompatible presup- positions; to simplify the case, just affirm that the rival Advance has ~P as a presupposition. One perhaps inform them all to Assume neither P nor ~P, to stay agnostic while driving their research by one presupposition or the other. over there arereasons to believe this would be bad advice. First, scientists who cultivate agnosti- cism perhaps not pursue their selected research program with the important vigor. The community would then do greater if those individuals fully embraced the presuppo- sitions of their approach. Second, over there is several acumen to believe that any announced agnosticism would just be ersatz. A scientist whose research presumes P may never have occasion to as follow anything but that presupposition. Their lab is outfit- ted to pursue the P-presuming Advance and they have filled it with P-presuming postdocs, after all, and one of the benefits of dividing cognitive labor is pre- cisely that a scientist committed to that Advance no longer requires to wretchedness about the opportunity of ~P. Arguably, this sort of practical commitment to P— behaving as if P at Any turn—is tantamount to belief that P.

Although these reasons perhaps be contested, I'll accept without furthermore argu- ment that the collective rationality of the community needs each individual sci- entist in this position either to Assume P or to Assume ~P. If the scientists are indi- vidually rational, then rationality must grant agents in comparable circumstances to add up to diverse beliefs; that is, epistemology must be permissive.

Many modern epistemologists dispute this sort of permissiveness. For ex- ample, Roger White

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(2005) argues against any epistemological account which al- lows for agents in possession of the same evidence to arrive diverse conclusions. Anthony Brueckner and Alex Bundy rebut White's arguments but nevertheless ac- cept what they yell "the plausible 'Pyrrhonian' principle whereby one forever ought to retain judgment when one's evidence similarly favors a belief of P and a belief of ~P . . ." They add, "While Pyrrhonian skepticism will not be attractive, this principle definitely is" (2012: 166).2 The principle condemns at fewest several scientists as insane if, in the confront of the same evidence, several add up to Assume P and other people to Assume ~P.

Similar positions are current in the literature on the epistemology of disagree- ment, where an epistemic peers' belief that ~P is taken to undercut one's belief in P. According to the equal weight view, advocated by Adam Elga (2007) and others, the peer's belief that ~P weighs against P just like much as one's own reasons for P weigh in favor of it.3 David Christensen notes the tension between these responses to Difference and the group-level techniques love the ones I discussed in the previ- ous section. He writes, It's fairly plausible that knowledge is best sophisticated by citizens exploring, and attempting to defend, a variety of replies to a Delivered question. Perhaps, human psychology Composed this easier to do when investigators i have to say have a lot of confidence in the hypotheses they're trying to defend. positive sorts of inquiry perhaps well Labor best when a variety of investigators have irra- tionally lofty levels of confidence in a variety of pet hypotheses. But Iwould argue that the patterns of belief are no more epistemically rational for all that. (2007: 215)So Christensen insists that, from the standpoint of epistemology, scientists partici- pating in the collective entity would be irrational.

3. Putting It Together

The preceding sections have pointed to an evident tension between the demands of individual rationality and the demands of the scientific community. But this tension is recognized both by philosophers of science and by epistemologists, I wants to argue that both sides are mistaken. Scientists can responsibly engage in scientific communities.

The plight is that both sides presume that individual, epistemic rationality is just aimed at one univocal thing. The anotherother commonly confused word is what I have elsewhere titled the James-Rudner-Douglas or JRD thesis: "Anytime a scientist declares a judgement of fact, they're fabrication a tradeoff between the risk of diverse kinds of error. This balancing act depends on the costs of each sort of error, so scientific judgement entails assessments of the Rate of diverse outcomes" (Magnus 2013).

The mark is taken from the of three exponents of it across the endure cen- tury or so: William James, Richard Rudner, and Heather Douglas. James famously argues that we're subject to inconsistent epistemic demands. He writes, "Believe truth! Shun error!—these, we see, are two materially diverse laws; and by choos- ing between them we may wind up coloring differently our complete mental life" (1948: 100). James argues that this opens up a space for belief in the absence of sufficient evidence. If my personalized beliefs overextend in this way, I accept a better risk of fault but maintain the chance of believing a truth which I or would not have gotten to believe. he's primarily thinking of private and devout matters, and argues simply that we should "respect one another's mental freedom" (1948: 109).4 Rudner (1953) Composed a parallel

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argument for scientific claims, but hopes that the appropriate Worth judgments perhaps be supplied by an unbiased science of ethics. Douglas (2009) reiterates Rudner's argument but without the dream of unbiased values. She recognizes that belief choice necessarily entails a balance between the risk of believing something incorrect and the risk of failing to believesomething true—a balance which can only be struck by personalized or social com- mitments. She writes, "Within the parameters of accessible resources and methods, several choices must be made, and that choice should weigh the costs of incorrect posi- tives versus incorrect negatives. Weighing these costs legitimately entails social, ethi- cal, and cognitive values" (2009: 104).

If the evidence favors P, then one may still affirm that the only rational features are to Assume P or to Assume nothing. For example, Richard Foley (1993) invokes James in arguing for the opportunity of rational Difference but argues that private commitment only sets a threshold of rational confidence that will suffice for belief. On this view, the JRD thesis just lets for several individuals to rationally Assume while other people are rationally agnostic. This fails to peer the rotund force of the thesis. Commitments do over clarify a single threshold to bal- ance the Rate one may maintain by believing truth against the sum one perhaps pay for believing in error. Rather, diverse possible truths may offer diverse value, and diverse possible falsities may impose diverse costs. This lets for several citizens to rationally Assume P and other people to rationally Assume ~P.

Imagine a community of scientists who are arranged so as to have the best col- lective distribution of their labor. In this community, the Vocation of several scientists presupposes P, and the Exertion of other people presupposes Q which is incompatible with P. Moreover, presume that things will go best for science if the previous scientists Assume P (and ~Q) while the latter Assume Q (and ~P). With the JRD thesis in mind, it becomes obvious that agnosticism could make their personalized epistemic situ- ation worse too.

Consider a specific scientist—call her Jane—who believes P and structures her Job around the assumption. The scientific evidence is suggestive but not en- tirely decisive, and a more cautious scientist may be agnostic in precisely the same circumstances. Jane values believing a truth about the matter more highly than bypassing a incorrect belief. More specifically, she values the opportunity of believing P if It's proper over she's averse to having a incorrect belief if P is false. By hook or by crook scientist—call her Sarah—structures her Labor around the anotherother commonly confused word approach. She values the opportunity of believing Q if It's right more highly than the price tag of falsely believing Q if It's false. Since Q is incompatible with P, Sarah misses out on the opportunity to Assume P and is willing to accept the risk alive to in believing~P. It's rational for Jane to Assume P and for Sarah to Assume ~P.5 The demands that individual and collective rationality area on them coincide.

One may reflect that Jane and Sarah are illicitly cutting corners. If a scientisthas any trade believing P or Q, then evidence and overwhelming reasons will by and by be uncovered. Yet no evidence is ever absolutely overwhelming, and evidence which would overall be taken as convincing may not be uncovered until after they're dead.6 For each scientist, agnosticism would guard against the pain of her having a incorrect belief. However, it increases the chance that she'll never wind up believing the truth. The JRD

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thesis intends that both are valid epistemic considerations for her.

Note that the JRD thesis only supplies what Douglas calls an indirect role for values, one which spins on "the sufficiency of evidence, the weighing of uncertain- ty, and the effectc3xyZXN1bHRz of error" (2009: 103). The values that have a bearing on Jane's believing P are the benefit of believing P if P is true, the sum of not believing P if P is true, the benefit of not believing P if P is false, and the price tag of believing P if P is false. These are precisely the advantages of accuracy and the price tag of error. over there is no area for how much she'd Worth unconditionally believing P (regardless of its truth) or how much she'd Charge P being the case. Deciding belief as said by the latter values would just be wishful thinking.

One perhaps still wretchedness that the JRD thesis opens the door to madness. Since over there is none in this argument which depends on the content material of P, a hypotheti- cal Jane can be posed for any belief whatsoever. Someone with a daft array of Price commitments can rationally add up to have daft beliefs. However, a parallel opportunity arises for any theory of rationality, because someone who believes daft premises can rationally gather daft conclusions from them. The casual solution, the path for bypassing madness, is to eschew daft beliefs and daft Assessment commit- ments. over there is no formal test for craziness, of course, but this is spoton as much for beliefs as for commitments.

Moreover, there're a lot of several qualitative limitsproblems with which occur mainly for the scientific case. As Kuhn points out, several commitments would be tantamount to recouncing science altogether (Kuhn 2012: e.g. 79). So the socially-defined bounds of science can Provide us several implicit guidance in distinguishing lega disagree- ment from craziness. But I do not claim this to be exhaustive, let's aW4gshort give consideration to think about two kinds of constraint.

First, few scientific examples pose choices between P and ~P. Rather than they pose a choice between incompatible but non-exhaustive features love P and Q. there're a lot of indefinitely numerous other possibilities which have no scientific plausibility whatsoever. Any commitments which were sufficient to lead to Jane's believing unscientific R would be sufficient to make her not a scientist anymore. It may be that sometimes the range of possible commitments a scientist may have and still be a scientist is narrow sufficient to rule out any liberty to believe. For Kuhn, the opportunity of hew- ing to something along with the dominant paradigm only opens in time of crisis.

Second, a scientist must be unprejudiced about the evidence. As the research drove by P fails to betterment and becomes weighed down by anomalies, over there is no deter- minate point at which acumen demands that Jane renounce either the research or her belief in P. However, she ought not pretend over there is betterment when over there is not or assure that there're a lot of anomalies. Her commitments Provide her liberty to dispute the significance of these things but not their existence. As Imre Lakatos insists, over there is scope within rationality both for "pigheadedness" and "modesty" in pursuing rival research programs (1978: 113). He writes, "One may rationally stick to a degen- erating research programme until It's overtaken by a rival and even after. What one must not do is disclaim its unpleasant public record" (1978: 117). several Price com- mitments would make it hard or impossible for Jane to even peer salient evidence, and those commitments would make her scientifically farther the pale.

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4. Taking It Apart

The preceding allotment concluded with the Thought that there're a lot of nonformal limitsproblems with on what Price commitments scientists can have qua scientists. The limitsproblems with are fallible, defeasible, historical products, just love all the structure of science.

This Composed for a opportunity that appears not to have been noticed in the exist- ing literature: At several point in the history of science, over there could be premises or commitments which are scientifically out of bounds but which would not connote as daft by the qualities of individual epistemology. So the commitments of several individuals may grant them to be individually rational while production them un- adept to connote as scientists—a fortiori fabrication them unable to meet the demands of collective rationality as ingredient of the scientific community.

The classic line, discussed above, is that collective rationality may need more Difference than individual rationality can allow. The point in this place is the re- verse: Delivered specific limitsproblems with and commitments at a time, collective rational- ity may consent less Difference than individual rationality requires.

To make this concrete, give consideration to think about the seek extraterrestrial intelligence (SETI). Let P be the proposition that over there is incandescent life on several other globe which could be detected by a systematic SETI project. train evidence for P is lacking. One indirect argument relies on the Drake Equation, a formula which calculates the number of detectable civilizations from the perfect number of stars which could sustain life, the part of those which will have planets that could sustain life, the part of those which i have to say have life on them, and so on. Any term in the equation is subject to powerful uncertainty, production it fair to be agnostic about P. However, it is plausible to believe that SETI would be pursued with better vigor and ingenuity by scientists who Assume P. Since alleged foreigner signals should not be now accepted too readily, it would be Excellent to have several scientists who Assume ~P and who would subject the signals to critical, sceptical scrutiny. So the community perhaps maximize its chances of identifying foreigner civilizations (if there're a lot of any) by having several members who already believe that there're a lot of (or presumably are) such civilizations and other people who already reflect that there're a lot of (or presumably are) none. If individual rationality needd scientists to be agnostic—or despite the fact it just needd them all to add up to the same lastpart as attested by accessible evidence—then over there would be a clash between the epistemic Excellent of the scientific community and the individual rationality of scientists. The force of the JRD thesis is that such a fight can be avoided. Enthusiast scientists would be rational if they saw more determined Worth in correctly believing P (if It's true) than they saw negative Price in wrongly believing P (if It's false). Cynical scientists would be rational if their values were the reverse of that.[8]

Other cases of scientific controversy perhaps have this same structure. For ex- ample, fair scientists disagreed about heliocentrism in the time after Coper- nicus but before Kepler. It's a historical ask In-case they did so due to Difference about values and costs and so were rational due to considerations I have discussed here, or In-case they disagreed for other reasons. One may wretchedness that, because

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heliocentrism is logically contingent, the JRD thesis involves that over there is a possible array of values so as if someone held them nowadays then it would be rational for that person to reject heliocentrism—but surely no responsible scientist nowadays could be a geocentrist! This just demonstrated that several values would be crazily extreme. A present-day geocentrist may obey the demands of individual rational- ity but, because they could not be a responsible member of the astronomical com- munity, would violate the demands of collective rationality.

Since the requirements of individual and collective rationality are logically in- dependent, over there can be no a priori assure that their demands will harmonious- ly align. In-case oppose or conformity is realized depends on the structure of the community, the Assert of science, and the Price commitments of would-be scientists.

What I hope to have shown, contra the classic line, is that clash is not in- evitable. The space opened by the JRD thesis Composed it possible for scientists to obeyindividual rationality while engaging in collectively rational arrangements.

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