

Critical Rationalism and Post-Truth

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ABSTRACT

'Post-truth' has become a buzzword for numerous current crises: the fragmentation of the media landscape, the ongoing debate about 'fake news', the loss of trust in science, etc. Although these crises take place in society, it is claimed that the roots of post-truth can be traced back to the history of philosophy. Occasionally, it is asserted that Karl Popper's critical rationalism gave rise to post-truth: His rejection of verificationism has limited truth claims in the realm of science. Given the absence of infallible evidence and certainty, critical rationalism calls for challenging scientific authority. I argue that post-truth is compatible with critical rationalism from an epistemological point of view, considering that both positions are critical of certainty. However, in critical rationalism, fallibilism, responsibility, and the idea of criticism are combined, and in this respect, it offers a possible way to overcome the problems that are associated with post-truth. This treatment of the problems of post-truth results from the recognition of moral responsibility to take action on the basis of a hypothesis that remains open to revision.

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1. Introduction

The literature on post-truth is vast; numerous authors attempt to explain current affairs in politics and society by showing that twentieth-century philosophy led to a state of post-truth. The idea of an end of truth seems to be compatible with philosophy, society, and politics. It appears to capture the core of complex phenomena and thus provide explanations for them.

Whereas this impression is reasonable and appealing – using the term ‘post-truth’ implies intuitive explanations – it is also misleading. I am not convinced that the implicit presuppositions that post-truth brings with it are correct. Speaking of a ‘post-truth condition’ presupposes that truth once had been what gave scientific communities their stability and bewails the loss of this stability. In a theoretical-conceptual debate, ‘post-truth’ represents a combat term between positions that advocate a strong notion of truth and others that are critical towards truth.

Critical rationalism occupies a peculiar position in this debate since it is committed to an approximation to the truth but considers certain knowledge impossible. Sleigh (2021) and Baron (2019) point out that the fallibilist epistemology of critical rationalism can be seen as the origin of an intellectual development that led to today’s post-truth condition. If scientific progress is achieved by replacing erroneous hypotheses, then one can legitimately ask whether critical rationalism calls for defending a hypothesis or trying to disprove it. It is characteristic of post-truth movements to attack confirmed findings – and critical rationalism negates verificationism. This consideration raises the question, which will be examined in the following: Are critical-rational scientists called upon to defend a dominant theory, such as the theories of climate studies that affirm the existence of climate change, against attacks or called upon to falsify it? By addressing this question, it will be explored to what extent post-truth is a crisis at all and how its relationship with critical rationalism can be assessed.

The paper is structured as follows: The second section briefly introduces post-truth, highlights challenging aspects of the concept, and states the problems addressed by this expression. The third section explores the connections between post-truth and philosophy. Subsequently, the central part of the paper examines the connection between post-truth and critical rationalism from an epistemological point of view in the fourth section and from a moral point of view in the fifth section. The epistemological connection between critical rationalism and a particular interpretation of post-truth is confirmed, but post-truth is shown to be at odds with critical rationalism when the moral character is considered.

2. A crisis follows the end of truth

The public image of Europe over the last decade, and to some extent an image of the whole world, has been one of disaster: in 2022, after years of internationally sanctioned occupation of Ukrainian territory, Russia launched a military attack on Ukraine and began a war; global temperatures are rising; extreme weather disasters caused by human environmental destruction ruin stretches of land and cause lethal casualties; the COVID-19 pandemic and the attempts to

establish public health measures led to a political radicalisation of anti-vaccinationists and science deniers; religious fundamentalists commit terrorist attacks because of failed migration and integration policies; authoritarian regimes undermine democracies; the Brexit campaign, conducted with the help of lies and half-truths, has contributed to the UK leaving the EU.

I am aware that this list may be considered ideologically biased by nationalists of any kind, Brexiteers, anti-vaccinationists, climate change deniers, and so on. This rather performative circumstance may be added as an additional item to the list, illustrating what these disasters are accompanied by and what shapes their image: public disagreement. For each example given, there may be disagreement from a range of different groups about the causes, the question of whom to blame, and arguably about my judgement. Within different groups of the population, opinions have hardened to such an extent that supporters of other points of view can merely be understood as deluded followers of an ideology who apparently prefer to turn their backs on the truth. Their worldview appears to be a mixture of random opinions justified, at best, by conspiracy theories, ‘alternative facts’, or ‘the elite’s doctrine’. Such accusations are made by any group against any other (cf. Tavernise, 2019, 122). Hence, a popular attempt to better understand the given crises is by interpreting the recent years as a time of ‘post-factual’ or ‘post-truth politics’, or more generally, as a ‘post-truth era’.

There is no specific post-truth manifesto that introduces the concept and provides criteria for what counts as a post-truth phenomenon and what does not. In 2016, the term was elected as ‘word of the year’ by the Oxford Languages department at Oxford University Press (cf. Oxford Languages, n. d. a.). The reason for voting a term as ‘word of the year’ is its popularity, i.e., that a term “has attracted a great deal of interest over the last 12 months” (Oxford Languages, n. d. b.). Academic accounts that engage with post-truth confirm that the term “has become intensely popular in media and academic circles” (Bufacchi, 2021, 347). However, when analysed as a concept, there is also reason for dissatisfaction. The brief explanation in Oxford Languages (n. d. a.)¹ neither provides a clear conceptual exposition nor is it intended to do so. Post-truth “is not a proper analytical term with a developed history and an accepted set of theses” (Carlson, 2018: 1881), it is “murky” (Bufacchi, 2021, 347), and “appeals to the masses through style, not substance” (Mika and Matapo, 2018, 187). Jandrić (2018) concludes that post-truth “is a complex mashup of signals, data, information, knowledge and wisdom; truth and deceit; fact and emotion; reason and instinct” (110). There is no conceptual basis for a systematic theory of post-truth. Attempts to provide a definition for post-truth are given by Brahm (2020) and Bufacchi (2021).

In the following, I refer to texts that use different concepts of post-truth. Instead of choosing a specific definition or providing one of my own, I limit myself to examining some cases that are brought up in the context of post-truth politics and focus on common properties. A central aspect of post-truth phenomena is disagreement about what counts as true and how something can be justified. In many examples, emotions rather than facts are shown to be the truth-makers. Lee

¹ “*Post-truth* is an adjective defined as ‘relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief’” (Oxford Languages, n.d.a.).

McIntyre (2018, 2–4), for example, introduces the concept by quoting a 2017 CNN interview with a US-American politician, who suggests that national crime rates are high. The reporter disagrees and points out that statistics indicate low crime rates. The politician counters by claiming that people in large cities feel threatened, suggesting that the emotional attitude towards security gives a better representation of national crime rates than crime statistics. Similar examples are given by d’Ancona (2017, 23–34) and Baron (2019, 174–175).

It is not surprising that this example is used as an introduction to the subject matter, as it represents a typical case that hints at various aspects of post-truth. It expresses a loss of trust in recognised authorities: something close and familiar, e.g., feelings, is considered more trustworthy than authorities, be they experts or institutions. This goes hand in hand with other aspects of post-truth, such as accusing something of being ‘fake news’, justifications by ‘alternative facts’, and a fragmentation of the media landscape in which the influential power of established news outlets shifts to personal social media channels of public, private, or anonymous individuals. The problems that arise from this are complex: On the one hand, public discourse appears to be equally open to any assertion, and evidence-based assertions are losing out to emotional intuitions. On the other hand, social cohesion is threatened. The danger of a society falling apart is that populist tyrants have an easy time seizing power – even more so when truth and reason, which are considered corrective aids against wrong decisions, lose their power. What unites all post-truth problems is the fear of power falling into the wrong hands.

3. The origins of post-truth in philosophy

The problems I have pointed out belong to the areas of politics, media, and communication. It is noteworthy, therefore, that philosophy is often attributed to being the cause of post-truth. In (non-academic) non-fiction books, usually, some philosophical references or names from the history of philosophy are presented as origins of post-truth. For example, d’Ancona (2014) writes that when the US-American government introduced the notion ‘alternative facts’, it made use of a demotic form of “Nietzsches’s famous dictum that ‘there are no facts, only interpretations’” (14). Starting from examples that philosophically question truth, a development is then sketched that leads to what is often metaphorically referred to as a ‘war’ between truth and falsehood in the post-truth era: “There was no stable, verifiable reality – only an endless battle to define it, your ‘fact’ versus my ‘alternative fact’” (d’Ancona, 2014, 14).

Academic works provide similar accounts of the philosophical origins of post-truth. Raphael Sassower (2020, ch. 1) provides a comprehensive overview of possible connections between post-truth and the history of western philosophy. For McIntyre (2018), post-truth “roots in academic debates over the impossibility of objective truth that have been used to attack the authority of science” (14). This is to be considered in more detail, since McIntyre’s claim is not just aimed at showing similarities but also serves a purpose: As the post-truth phenomena mentioned are assessed negatively throughout, certain philosophical schools are thereby portrayed as being a bad influence and subsequently judged to be wrong. This does not concern

one particular philosophical school but several that otherwise have little to do with each other, from postmodernism to critical rationalism. The idea that post-truth emerged from postmodernism is a key premise of New Realism (cf. Ferraris, 2014), and can also be found, e.g., in McIntyre (2018), who claims that “postmodernism [is] the godfather of post-truth” (150). Schor-Tschudnowskaja and Bentka (2021, 55–69) claim that the broad acceptance of constructivism in society is related to post-truth. Arguments that critical rationalism is the origin of post-truth are less common but can be found citing Karl Popper’s falsifiability; for example in Baron (2019), who claims that “underlying the ‘fake news’ position is the respectable logic of falsifiability” (172), or in Sleigh (2021), who laments that the “notion that science is all about falsification has done incalculable damage” (13). Fuller (2018) interprets post-truth in terms of Popper’s philosophy. The next section will focus on this connection.

The proposed solution to overcome the ‘post-truth crisis’ is a return to truth (cf. Gili and Maddalena, 2022). The implicit call that is made by such a judgment is usually to give up the philosophical position that diminishes the value of truth: Since weakening truth has led to political and social crises, the value of truth should be strengthened again. Interestingly, some calls for a return to the truth *also* refer to Popper, but not as the perpetrator of the misery, but as its analyst: Parravicini (2022) calls the alleged politicisation of science during the COVID-19 pandemic – among other phenomena that are associated with post-truth – “Popper’s Nightmare” and concludes with a plea for “Bringing Truth Back” (24).¹

This shows that not one particular school of thought lies at the heart of the accusations against philosophy for being in some way responsible for post-truth, but rather the idea of abandoning truth. There are similarities between recent criticisms of philosophy for being responsible for post-truth and past criticisms of postmodern and feminist thinkers who were attacked for their criticism of authority and accused of leading society into chaos.²

4. Linking Post-Truth with Critical Rationalism: Epistemology

The main reason why critical rationalism and post-truth are supposed to fit together lies in a common approach towards truth. Thoughts on this issue are provided, for example, by Charlotte Sleigh in an opinion piece (Sleigh, 2021), which I use as a guideline to explore the links between post-truth and critical rationalism. For Sleigh, the Popperian understanding of science presumes that it does not “provide the final answer to any question, but contents itself with trying to disprove things. Science, so the Popperians claim, is an implacable machine for destroying

¹ Proponents of critical rationalism also accuse philosophers of supporting ‘post-truth’ by their theories that diminish the value of truth: Jagdish Hattiangadi (2019) blames Paul Feyerabend and Thomas Kuhn of having attacked the foundations of common knowledge that used to unite people and of having influenced the fragmentation of communities along ideological divides. This is due to the incommensurability thesis, according to Hattiangadi.

² Consider as examples the contributions of Sullivan (2005), who attacks feminist scholarship for fostering irrationalism and “thus undermining the vital role of universities as sources of knowledge essential to the functioning of modern democracies” (172), or Nanda (2005), who shows how “postmodernist critiques of science [...] threaten the advancement of civil society in India” (220).

falsehoods” (Sleigh, 2021, 7–8). The only way to achieve scientific progress, i.e., the growth of knowledge, is by rejecting a scientific hypothesis as wrong.

Among several other criticisms of Sleigh, I pick out two allegations that both regard Popper’s philosophy of science and illustrate why critical rationalism is associated with post-truth. The first criticism concerns the epistemology of science and is discussed in this section. The second regards the moral attitude of critical-rational scientists and is discussed in the next section. The first criticism is: The Popperian understanding of science gave rise to what can be called ‘naïve falsificationism’, i.e., the belief that a scientific theory can be refuted by any piece of counter-evidence (cf. Lakatos, 1970 for a discussion of this idea). The idea of naïve falsificationism is hardly found among natural scientists or philosophers of science. However, it is present in the recent ‘post-truth attacks’ against scientists coming from anti-vaccinationists who refer to, e.g., single cases of inefficient immunisation or reports of side effects, or from climate change sceptics who “seize upon a single anomalous piece of data to claim to have disproved the entire edifice of combined research” (Sleigh, 2021, 14).

A response to Sleigh was written by Jeremy Shearmur in another opinion piece, rejecting her criticisms. Shearmur (2021) points out Popper’s discussion of refutability in *The Logic of Scientific Discovery* (LScD): A theory of empirical science ought to be testable. That is, Popper demands that any empirical scientific system allows deducing empirical statements (i.e., statements that describe a logically possible and, in principle, observable event; in the systematic context of a theory, such statements are called ‘basic statements’) that can be tested and refuted by experience (cf. LScD §6). For Popper, and in critical rationalism, the concept of falsifiability amounts to more than just providing counter-examples for a given hypothesis. Falsifiability is introduced as a “criterion for the empirical character of a system of statements” (LScD §22, 66), which is, in turn, used as a criterion of demarcation between science and non-science (LScD §6); in both these senses, falsifiability only applies to the form of a system of logical statements. It should not be difficult for a given theory to check whether testable empirical statements can be derived from it or not. The methodological application of this idea, the call for falsification, is another aspect: It consists in the normative demand that scientific work attempts to disprove a theory by empirical observation. This methodological application is not a simple task, as it is not immediately clear what exactly must be met for a basic statement to be falsified or for a theory to be refuted. Falsification can be regarded as *naïve* when it is believed that a single piece of counter-evidence or the single observation of an anomaly refutes a theory. Popper’s examples of how an experiment refuted a theory may suggest that a single observation is sufficient for falsifying a theory, but this is not the case in scientific practice. He often put forward these examples just to clarify the *logical* aspect of the problem situation. Scientific experiments are conducted in a setting in which arbitrary factors are excluded as best as possible and their aim – following Popper – is to find disconfirming *effects*, i.e., basic statements to be systematically brought into a relation with a theory, and not the observation of single anomalies. Popper remarks that “a few stray basic statements contradicting a theory will hardly induce us to reject it as

falsified. We shall take it as falsified only if we discover a *reproducible effect* which refutes the theory” (LScD §22, 66). In *The Logic and Evolution of Scientific Theory* (ALPS_[1]), Popper uses the example of the missing protective effect of a vaccination in an individual to claim that neither a general biological theory of immunity nor the efficiency of a particular immunisation, such as vaccination, is refuted by this single case (cf. ALPS_[1], 17). If an observation that refutes a theory was made, it is still not clear which of the theory’s theoretical statements are refuted (cf. LScD §22, 58f.). Falsification should not only be negative and destroy hypotheses, but also provide a positive replacement. Also, it is always possible to counter objections with the help of ‘conventionalist stratagems’ (cf. LScD §19–20) or ‘immunisation strategies’, as Hans Albert calls it. Conventionalist stratagems are not what Popper proposes to choose when confronted with possible falsifications; he instead admits that “[i]t is not always simple, then, to apply the falsifiability criterion” (ALPS_[1], 17). This is not a conceptual problem of falsifiability, but a problem of its practical application (cf. LdF, *Neuer Anhang* *XIV and CR_[8], 261–271 for more on this issue). This all has to be considered as far as falsification is concerned; for an overview of the different aspects concerning the idea of falsifiability, see Gadenne (2019).

This refutes the first criticism that is brought up by Sleight (2021). However, there are two problems: Firstly, although Popper’s idea of falsifiability is far more complex than suggested by the naïve understanding of falsification, this does not stop people from referring to Popper when they bring up unsystematic observations or anomalies in order to refute a theory. But this is neither a theoretical issue nor a problem of Popper’s philosophy and thus does not need to be discussed here. A second problem does concern Popper’s philosophy: Given his radical refrain from any dogmatism (e.g., by his fallibilist attitude, his criticisms of what he calls ‘essentialism’ and of verificationism in science and epistemology, by the counter-totalitarian concept of the ‘Open Society’, etc.) and given his call for openness in science, the refutations appear to reconstruct exactly what had given rise to the objection in the first place: Falsification invites attack on (supposedly) certain knowledge. This diminishes the reliable status of, for example, the idea of climate change or the efficiency and necessity of vaccinations, as critical rationalism claims that there is no certain knowledge in empirical sciences. In other words, it leads “to the popular view that facts are only as good until the next one comes along that replaces or debunks the previous one” (Baron, 2019, 172). It seems plausible to claim that the trust in facts is undermined by the critical-rational demand to falsify scientific hypotheses.

Critical rationalism claims to be a realist position. But while realist scientists can accept theories of climate change to be true and see it as their scientific duty to find counter-measures against global warming, we might ask if critical-rational scientists regard the attempt to falsify climate change theories as the scientific approach to addressing climate issues. Realist scientists have a reason for not wasting their time with climate change denialism. Critical-rational scientists find themselves apparently in a different situation. Neil McIntyre and Popper claim that all knowledge is conjectural, that “we should be tolerant of ideas that differ from the dominant theories of the day and not wait until those theories are in trouble” (AOS_[39], 344), and that “there

can be no authorities” (AOS_[39], 343). Is defending the existence of climate change with scientific facts and referring to the scientific consensus even compatible with critical rationalism when Popper claims that those who defend a theoretical system “against criticism as long as it is not *conclusively disproved* [...] are adopting the very reverse of that critical attitude which in my view is the proper one for the scientist” (LScD §9, 28)? The link between critical rationalism and post-truth appears just to be confirmed.

A further investigation into this link is provided by Steve Fuller, who adopts a different stance and pursues a different goal: He, firstly, adopts a viewpoint of social epistemology and, secondly, considers post-truth as a condition that has always been there in the history of science. Science is, for Fuller (2000), “the systematic pursuit of knowledge” (7), and following an approach from social epistemology, the pursuit of knowledge is also a pursuit of power. Here, Fuller’s interest is directed towards the distribution of power. His approach draws attention to questions about (scientific) consensus, (science) funding and the interests of (scientific) authorities and institutions. Investigating science means examining the social-epistemic practices of peers active in science. This is not a normative analysis of science but a descriptive (namely, a sociological) one.

Given this premise, Fuller advocates an understanding of knowledge as a ‘power game’. An analysis of science in terms of social epistemology that frames knowledge as a game appears to be far away from Popper’s approach; Fuller, however, claims that it is not. He draws a direct line of intellectual descent from Popper’s philosophy to the sociology of scientific knowledge (cf. Fuller, 2018, 42) and claims that Popper’s “strategy for challenging dominant scientific theories – including his critical attitude towards the histories that legitimate those theories – aims to render science as *game-like* as possible” (Fuller, 2003, 48).

Fuller elaborated his account of Popper’s understanding of science as a game in *Kuhn vs Popper* (Fuller, 2003) in order to clarify differences between the views of Thomas Kuhn and Popper (which mainly concerns democratic participation). The notion of science as a game is picked up again in *Post-Truth* (Fuller, 2018). Popper himself is not shown to be an advocate of post-truth; instead, Fuller shows parallels between his understanding of post-truth and Popper’s philosophy.

Referring to the game character of science does not imply that irrational measures are taken. For Popper, the process of scientific research is ‘open’ and decided only by the choice of rational rules, i.e., the measures that Popper advocates for science *only* relate to the theoretical system. According to Fuller, this prevents tests from being biased towards a prevailing theory. Moreover, experiments ought to be detached from practical aspects of their implementation, such as financing: A rational decision in Popper’s science is based solely on a theory’s hypotheses and not on the associated political and economic prospects. (cf. Fuller, 2003, 48–52)

Claiming that science is like a game does not explain very much. Anything may be regarded as a game, also Kuhn’s ‘normal science’. What particularly distinguishes Popper’s ‘game-like science’ is its strong emphasis on democratisation: When Popper renders science as game-like as

possible, he also regards it as democratic as possible (cf. Fuller, 2003, 48–52). Here, ‘democratic’ does not refer to a form of governing but to the possibility of participation, unhampered by any barriers. Actions contribute to science if they are compatible with the rules of the game ‘science’. There are *no* other restrictions for Popper: neither belonging to an elite, nor wealth, not adopting a particular theory. Most importantly, a statement is not ‘scientific’ because it is ‘true’; verification is impossible and not to be aimed at. Thus, progress in science equals “improved gamesmanship” (Fuller, 2003, 49), and not the confirmation of theories, facts, or scientific rules.

Popper uses the game metaphor for science two times in LScD. It is used for the first time in §11 in the context of methodological rules and a second time in §85. In §11, Popper draws a distinction between the rules of pure logic and the methodological rules of empirical sciences. He claims that “[m]ethodological rules are here regarded as *conventions*. They might be described as the rules of the game of empirical science” (LScD §11, 32). He claims that empirical science is constituted by those conventions and that the rules can be altered. Just as the game of chess is defined by its rules, “empirical science may be defined by means of its methodological rules” (LScD §11, 32). The game of science is played “in principle, without end” (LScD §11, 32). It is played as long as the players are willing to call for further tests of their statements, and it ends when a player regards statements as verified (cf. LScD §11). This idea is also expressed in the second passage in which the metaphor is used: “Those among us who are unwilling to expose their ideas to the hazard of refutation do not take part in the scientific game” (LScD §85, 280).

The opportunity for philosophers dealing with post-truth is to examine how the ‘rules of the game’ are applied. Fuller distinguishes two ways of playing the game of science: An attitude in which participating in the game means accepting the given rules. He compares this attitude to the profiling of scientists in normal science, according to Kuhn. The second, post-truth attitude is characterised by the attempt to participate in the game by changing its rules. This attitude is compared to Popper’s philosophy of science. Fuller’s Popper calls “for a ‘permanent revolution’ in science” (Fuller, 2018, 6).

A power game can be considered ‘post-truth’ when certain players disrespect given rules and introduce their own. Questioning the authority of established institutions is one such step. An example is the discrediting of traditional media by introducing the term ‘mainstream media’ and the accusation that such media only follows the interests of an ‘elite’ (cf. Fuller, 2018, 3–4). Measures like fact-checkers cannot counter such a shift, as those who refer to facts play by different rules. This certainly does not lead to scientific consensus and “potentially tilts the balance towards ‘chaos’ over ‘order’” (Fuller, 2018, 181). It can, however, be understood as the “triumph of democracy over elitism” (Fuller, 2018, 181) – as it gives responsibility to those who make their own statements.

Speaking about *responsibility* shifts the focus from the epistemology of science towards its moral character. This will be discussed in the next section. Within epistemology, however, it can be plausibly asserted that central theses of critical rationalism are consistent with what Fuller presents as the post-truth condition. Fallibilism weakens the impact of knowledge claims. Put in

the words of Albert: “*all certainties in knowledge are self-made, and thus worthless for comprehending reality*” (Albert, 1985, 40). It is hard to deny the parallels between critical rationalism and post-truth with the help of epistemological objections.

One way to argue against that link, especially when referring to Popper, is to point out that rejecting erroneous ideas is regarded as an approximation to the truth. Conventional rules are not changed arbitrarily or only in respect of adjusting power relations (cf. LScD §11). Fuller does not once refer to verisimilitude or a theory’s degree of corroboration in Fuller (2003 and 2018). However, the choice to deal with verisimilitude also means addressing other problems (cf. Miller, 1994, 195–217) than what is discussed here.

I do not intend to bring forward epistemological objections against the similarities between post-truth and critical rationalism because I do not think that questions about the proximity to or distance from truth are helpful in solving problems of post-truth. Regarding the examples of climate change and the effectiveness of COVID-19 vaccination, proponents and opponents of *any* respective position invoke the truth. Both even bring forward explanations and justifications that they regard to be true. Suggesting that scientific progress can be achieved through empirical falsification is not helpful in solving the given problem of disagreement. A proposed solution to the question, if a critical-rational scientist shall defend the existence of climate change or attempt to find empirical counter-evidence, is related to the concept of responsibility, which has already been addressed by Sleight (2021), Shearmur (2021), and Fuller (2018). This approach is not exclusively related to epistemology, but also considers the moral attitude of scientists.

5. Linking Post-Truth with Critical Rationalism: Responsibility

In the previous section, I argued, largely following Fuller, that critical rationalism and post-truth coincide in renouncing the quest for certain knowledge. Fuller’s analysis concludes that the essential feature of post-truth is a renunciation of an elitist understanding of science. This renunciation is tantamount to democratisation, it can be found in critical rationalism, and it is rooted in the concept of responsibility. Critical rationalism does, of course, not call for lying or ruthless intolerance. If someone understands the rigid insistence on one’s own opinion – which may come along with accusing dissenting viewpoints as ‘fake news’ and justifications by ‘alternative facts’ – as post-truth, then critical rationalism does not resemble post-truth. However, such a rhetoric is not *post* truth, but the very core of truth: A true statement is to be defended against all other divergent statements.

The question posed at the beginning, whether a critical-rational scientist shall defend a dominant theory or attempt to falsify it, has not yet been answered. The hope now is that the critical-rational scientists’ responsibility may lead them to choose what is right.

Sleight (2021) expresses doubts about this. I now come to a second allegation of hers that concerns the moral attitude of critical-rational scientists. Sleight claims that the Popperian scientists’ work is only focused on theoretical contributions and that they do not take responsibility for the practical application of their findings. The attraction of falsification in

science thus offers “moral non-accountability to its adherents” (Sleigh, 2021, 10). Shearmur (2021) refers in his response to Popper’s 1968 text *The Moral Responsibility of the Scientist* (MF_[6]). Therein Popper writes that as science became potentially applicable, the idea that “the pure scientist or the pure scholar had only one responsibility beyond those which everyone else has – that is, to search for truth” (MF_[6], 121) became obsolete. Popper then suggests a modified and generalised version of the Hippocratic Oath that can be seen as a ‘code of conduct’ for all students of science. This oath obligates a scientist to acknowledge that “every kind of study may produce results which may affect the lives of many people,” and binds the scientist to “constantly try to foresee, and guard against, any possible danger, or possible misuse of his results, even if he does not wish to have his results applied” (MF_[6], 123).

It is clear that Sleigh’s objection falls flat. Popper demands that critical-rational scientists assume accountability for the practical uses of their findings and take full moral responsibility for their research. However, the hope hinted at earlier cannot be considered fulfilled. What happens when there is a disagreement about what it means to act responsibly? Both climate change deniers and defenders may claim that they take responsibility because they disagree about the initial problem. For a follower of climate studies, reducing emissions by, for example, imposing carbon taxes is a responsible action; for the climate change denier, preventing carbon taxes that damage the economy is a responsible action. No one would admit to acting irresponsibly; both may even invoke Popper’s altered oath. This leads again to Fuller, whose view seems to be confirmed. He claims, following Popper, that a democratic understanding of science implies tolerating and respecting others who hold divergent opinions. Disagreement is an element of the “triumph of democracy over elitism” (Fuller, 2018, 181), and it is to be preferred to a dogma that does not allow any other opinions than the one that is marked as true. This is both an element of Popper’s understanding of science and of post-truth.

Fuller’s suggestion offers an alternative model for participation in science that is open to everybody. The hope for a conflict resolution can be understood in the sense that, through their own responsibility, everyone chooses what is best for themselves. The opportunity to choose one’s own path to scientific engagement reinforces responsibility. This makes people more willing to accept scientific decisions as they consider themselves accountable for consequences. Thus, someone who holds a position that differs from a prevailing theory must not be denied access to science. (cf. Fuller, 2018, 174–180)

Not everything may meet scientific requirements – Fuller is aware that also charlatans participate in science, and liars disrupt the public political discourse (cf. Fuller, 2018, ch. 1 on Brexit) – but nevertheless, this is a model to be preferred. It overcomes an elitist understanding of science, in which knowledge is exclusively accessible to an elite with prior knowledge or the appropriate academic habitus. Free thought is only possible without a predetermined direction of thinking. The consequence of such a model is the formation of para- and pseudo-sciences like creationism or homoeopathy, which Fuller (2018) labels as “‘New Age’ science hybrids” (108)

and that subsequently lead to what Jagdish Hattiangadi (2019) calls the ‘fragmentation of knowledge’.

In this way, an answer is found to the question of scientific practice in the case of disagreement: The preferred position is the one in which more personal responsibility is taken. This answer is in line with Fuller and also compatible with Popper. However, I think that this approach misses a problem. The explanation requires a broader perspective: Fuller shows the connection between personal responsibility and the abandonment of a dominant theory using the historical example of secularisation during the Reformation. This example also occurs in Popper (CR_[19]) and, for example, in Hattiangadi (2019), who equates ‘secular thought’ with ‘free thought’. Freedom of thought existed before the advent of Christianity and Islam; it was then suppressed by religion and rediscovered by secularisation. Unlike Fuller, Hattiangadi considers free thought threatened by post-truth, but both agree on the role of the Reformation and secularisation. This is in line with Popper, who makes similar claims about how the Reformation gave responsibility to the individual (cf. CR_[19], 503).

In order to show that the moral attitude alone does not solve the problem, I refer to Albert’s idea of the ‘revelation model in epistemology’: For Albert, secularisation is not sufficient to make a significant change from an authority-bound science to a fallible understanding of a democratic, ‘open’ science. Secular science adopted elements of the supposedly overcome science from earlier epochs. In particular, secular science embraced the epistemological doctrine of revelation, which is found in religion. By ‘revelation’, Albert (1985) means the “doctrine that *truth is manifest*, that it lies open to view, and that one need merely open one’s eyes to see it” (21).¹ Truth reveals itself to truth seekers when they proceed correctly. There have been different views on how to access truth in the revelation model: The oldest probably is through a divine revelation, later through the methodology of natural philosophy (i.e., the correct application of sense perception or reason), or correct interpretation, etc. All these different approaches have in common that they facilitate groups of truth seekers who “are qualified to provide valid interpretations” (Albert, 1985, 24). Such groups endorse a particular way of accessing truth, and they may establish what Albert calls a ‘monopoly of interpretation’, i.e., a power structure that regulates who has access to knowledge, who is right, and who is wrong.

While Fuller, Hattiangadi, and Popper claim that secularisation overcomes the religious monopoly of interpretation, Albert disagrees and emphasises the continuity of the epistemological models of theology and secular science: “Modern philosophy has certainly not emancipated itself from this theological model, [...] [as] the process of knowing upon the interpretation of given statements endowed with authority” (Albert, 1985, 26). New methodologies of science that suggested, e.g., the use of reason, became substitutions for the divine revelation: “The naturalizing and democratizing of the idea of revelation in classical

¹ See CR_[0] for Popper’s discussion of the doctrine that truth is manifest.

epistemology detached knowledge from its traditional connections and made it into a revelation of *nature* by means of *reason* or the *senses*” (Albert, 1985, 28).

An illustrative example is the metaphor of the ‘book of nature’. Often Galileo’s use of the metaphor in *The Assayer* (1623) is regarded as the programmatic shift away from scholasticism and towards a mathematical approach in natural philosophy. There is a difference in tokens between learning about nature in a similar manner as one learns from the Bible and as one learns from mathematics. There is no difference in types, however. In both cases, truth is revealed to the educated reader by consulting a book of nature. Even if the book of nature were accessible to the illiterate, it would continue the tradition of the revelation model and constitute a monopoly of interpretation by those who use the book and exclude others who do not.

Albert identifies a similar continuity of epistemological models between ‘Christian science’ and the science of the Protestant Reformation. For him, Protestantism established itself in an authoritarian manner and rejected ideas of the Enlightenment: “[o]ne authority had been replaced by others of similar dogmatic function, while the authoritarian scheme of justification was still, in the end, retained: knowledge is justified through recourse to some absolutely certain authority” (Albert, 1985, 28). Whether one refers to an authority out of obedience or out of responsibility makes no difference. Only the idea of criticism can, for Albert, overcome dogmatism.

This is a valid objection against the view that secularisation led to personal responsibility and out of dogmatism. According to Fuller, abandoning a monopoly of interpretation leads to a democratic ‘science customisation’ that embraces personal responsibility. In doing so, however, he asserts precisely what Albert criticises: A large collective’s regime of truth becomes the regime of a smaller group, or even of an individual. Just because someone does not believe in a ‘truth of the elites’, it does not mean that the anti-authoritarian renunciation of elites is less dogmatic.

When Fuller (2018) claims that today’s followers of science customisation are “generally well educated and quite respectful of the need to provide reasons and evidence for their beliefs” (107), he points out that his understanding of taking personal responsibility for science-based decisions by ‘science customers’ means to provide evidence and justifications. This approach departs from the ideas of criticism and responsibility demanded by critical rationalism. For Popper, responsibility *does* play a role in science-based decisions. But, at least in applied science, this means that considerations about the moral consequences of a theory’s application should be made before theory-related decisions are taken. The question raised by Popper’s call for responsibility is whether the application of the theory will reduce the prevailing suffering of mankind.

Criticism does not demand evidence or justification. If it were a scientific authority’s purpose to decide what is true and false, then it would be rejected by critical-rational scientists. Criticism does not deny the existence of truth or knowledge but points to the conjectural character of knowledge. Critical rationalism demands a willingness to methodologically embrace criticism. In this sense, exercising epistemological modesty, accepting responsibility and a willingness to

engage with criticism, is to be a scientific authority. Doing so makes it possible to participate in the ‘game of science’ without having to make truth claims.

Are climate change deniers or anti-vaccinationists willing to engage with criticisms? It requires conviction to turn away from a dominant theory, and often, this does not prove responsibility but reveals stubbornness. In this respect, science customisation does represent democratisation, but in a negative sense: a liberation that leads into isolation. The fate of a movement that rejects all elites and experts might be a world of loners who refuse to listen to others. In the same manner, stubbornness can occur in defence of climate change: An uncritical attitude is revealed when a theory is immunised against all objections and defended as certain truth. The idea of criticism implies that one’s own thoughts should be the first object of critical examination. Such an examination requires searching for errors in the preferred theoretical position on your own, but also listening to others who offer criticism.

Critical rationalism unites fallibilism, responsibility, and the idea of criticism.¹ Both the defence of a theory and the attempt to falsify it are compatible with critical rationalism. Popper’s demand for deciding whether a theory should be defended or attempted to be falsified, cannot be detached from the original problem the theory is aimed at. If one accepts that the current environmental destruction causes harm to mankind, then it is clear that any attempts to falsify the theories of climate studies contribute nothing towards solving the environmental problems. Although this approach may be regarded as scientific, it is useless at the same time.

6. Conclusion

Critical rationalism and post-truth intersect in their common renunciation of the pursuit of certain knowledge. Critical rationalism does not share the realist belief that science is the accumulation of true statements. It states that science progresses through criticism, a method that “destroys, changes, and alters the whole thing” (CR_[4], 173–174). The alleged stability of the past is, therefore, an illusion. The history of science (and philosophy) is a battleground of competing theories and disagreements. If truth was supposed to provide stability, it ever failed to do so.

Critical rationalism and post-truth differ in the moral attitude taken towards making assumptions. Post-truth either means (a) that its proponents consider their own opinion to be true and defend it against criticisms by establishing a monopoly of interpretation or (b) an atomisation of diverging convictions. In both cases, beliefs stem from responsibility, but an uncritical attitude towards these beliefs is adopted. While (a) is Albert’s depiction of the history of science, (b) describes today’s post-truth world. The danger, in this case, is that populist tyrants have an easy time seizing power. ‘Taking responsibility’ can come in any form and may not be enough on its own to counter that danger. But there are more counter-strategies, and critical rationalism does call for them: assuming that knowledge is conjectural, being critical towards one’s own views

¹ The contributions of Noretta Koertge and Jeremy Shearmur in Parusniková and Cohen (2009) are helpful in explaining the relationships between fallibilism, responsibility, and the idea of criticism.

and those of others, not turning a blind eye to problems – also those put forward by scientific authorities –, and to reflect on the moral consequences of proposed solutions to problems.

Abbreviations

ALPS_[1]: *The Logic and Evolution of Scientific Theory*, chapter 1 of Popper (2001), based on a 1972 radio broadcast.

AOS_[39]: *The critical attitude in medicine: the need for a new ethics*, by Neil McIntyre and Karl Popper, chapter 39 of Popper (2001), first published in 1983.

CR_[0]: *On the Sources of Knowledge and of Ignorance*, introduction to Popper (2002a), based on a 1960 lecture.

CR_[4]: *Towards a Rational Theory of Tradition*, chapter 4 of Popper (2002a), based on a 1948 lecture.

CR_[8]: *On the Status of Science and of Metaphysics*, chapter 8 of Popper (2002a), based on two 1958 radio broadcasts.

CR_[19]: *The History of Our Time: An Optimist's View*, chapter 19 of Popper (2002a).

LdF: Popper (2005).

LScD: Popper (2002b).

MF_[6]: *The Moral Responsibility of the Scientist*, chapter 6 of Popper (1994), based on a 1968 address.

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