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Epistemic Goals of Scientific Inquiry: An Explanation Through Virtue Epistemology

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Abstract: The paper examines the integration of virtue epistemology into the philosophy of science, emphasizing its potential to deepen our understanding of scientific inquiry. The article begins by considering the limitations of traditional epistemological frameworks that focus on beliefs. The discussion is set in the context of the "value turn" in contemporary epistemology. Arguments are made to move towards recognizing the significance of intellectual virtues and the nature of epistemic agents. The current gaps in definitions of intellectual virtues about reliabilist and responsibilist approaches are examined and conceptual steps are proposed to bridge these gaps. It is suggested that the local and general epistemic goals of science should be clearly distinguished and then different ways of knowing should be attributed to these goals. These ways of knowing are proposed to be seen as exemplifying the realization of reliable skills and intellectual character traits. In sum, the article argues that adopting a virtue epistemology not only enriches the discourse on scientific knowledge but also promotes a culture of responsibility and integrity in the scientific community.

Keywords: virtue epistemology; scientific inquiry; epistemic goals; intellectual virtues; skopos; telos

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1. Introduction

The purpose of this paper is to give an account of how the integration of virtue epistemology into the philosophy of science is possible. I first consider the reasons why virtue epistemology might be productive for discussing the meaning of scientific inquiry; then, I discuss the available approaches to integrating virtue epistemology into the discourse of philosophy of science. Finally, I examine the existing gap in the definition of intellectual virtue by reliabilist and responsibilist approaches and suggest some conceptual steps to bridge it.

There is a growing number of studies of intellectual virtues and/or vices. This is happening as the influence of the so-called "value turn" is increasing in the theory of knowledge. The emergence of virtue epistemology and the revival of various forms of Aristotelianism are symptoms of this process. As it is noted, "the peculiarity of the value turn in virtue epistemology is its orientation on the subject, which manifests itself in the use of concepts related not to abstract propositions but to the value qualities of the cognizer as explanations" [1] (p. 9). The focus on epistemic agents in essential aspects distinguishes epistemology after the "value turn" from many other projects, which tend to investigate beliefs primarily, and hence can be called "doxastic epistemologies".

As defined by H. Battaly, "In belief-based epistemology, beliefs are the primary objects of epistemic evaluation, and knowledge and justification, which are evaluations of beliefs, are the fundamental concepts and properties in epistemology. In contrast, in virtue

epistemology, agents rather than beliefs are the primary objects of epistemic evaluation, and intellectual virtues and vices, which are evaluations of agents, are the fundamental concepts and properties" [2] (p. 640). An example of such a project is K. Popper's *Epistemology without a Knowing Subject*, which explicitly elides the epistemic agent from his theory. In turn, virtue epistemology considers the epistemic agent, rather than belief, as the main subject of analysis. Although virtue epistemology also seeks to develop as consistent definitions of knowledge or justification as possible, its primary focus is on personal states and dispositions of intellectual behavior.

At the same time, most studies of this kind consider only the general level. They discuss the relationship between intellectual virtues and moral virtues, identifying their potential for solving traditional epistemological problems, such as defining knowledge, and justification, and solving the problems of relativism and skepticism. The level of individual knowing practices remains a less studied area. This state of affairs is due to a complex set of reasons, the most significant among them being the divergence of the epistemology of science and the general theory of knowledge in contemporary philosophy, and the difficulty of applying the subject-centered, normative theoretical language of virtue epistemology to the discussion of science. A further difficulty stems from the fact that such a project of integration is only possible if one agrees with the thesis of the sensitivity of virtues in the context of individual epistemic practices. This means being realistic is not only about intellectual virtues per se, but also agreeing with the possibility of their specific embodiment as virtues of the natural sciences or humanities, and probably even more specific manifestations—the virtues of mathematicians, biologists, linguists, and so on.

However, if we agree with the starting point of virtue epistemology, then there is an opportunity to realize important innovations in the philosophy of science. The point is that since the times of "old positivism", the question of the interaction of two conditions of production of scientific theory has been relevant. These are the so-called "context of discovery" and "context of justification". The first includes various external, primarily socio-economic influences on how a scientist arrives at the formulation of a particular hypothesis, and why something becomes the subject of his research and something does not. The second includes those universal methodological prescriptions that guide the scientist during the direct verification and falsification of his hypothesis.

In general, there are three main possible answers to the question of how these contexts interact. Firstly, it is possible to consider that they are impermeable to each other. This is K. Popper's position, and it suggests that the philosopher of science should be interested in the generalized methodology and criterion of demarcation rather than in the subjective characteristics of the scientist derived from his social status. Secondly, some argue that the context of discovery greatly influences the context of justification. This is the position of T. Kuhn and I. Lakatos. It tends to be derived from a historicist view of the development of scientific theories, which leads to the thesis of the incommensurability of paradigms or research programs. Thirdly, it can be argued that the context of discovery determines the context of justification. This is a radical or even revisionist point of view, which can be expressed in different ways, for example, in the format of P. Feyerabend's anarchist epistemology or B. Latoure's actor-network theory and various STS-style sociologising projects.

Virtue epistemology allows us to look at the interaction between the context of discovery and the context of justification from a new perspective, namely through their identification. The starting point of virtue epistemology overcomes the narrowness of the doxastic approach to knowledge, which is limited to analyzing beliefs and how they are justified (or supported) by other beliefs. This "narrowness" has implications for a philosophy of science for which scientific knowledge turns out to be primarily complex propositional knowledge. Although it is expressed in the beliefs of particular scientists or

scientific groups, it can only be considered and evaluated in isolation from their personal characteristics. It is argued that it is possible to evaluate the social context of a theory's emergence and its logical and empirical validity. However, a philosophy of science based on doxastic epistemology is not concerned with personalities. The study of the latter is the province of historians, biographers, and popular science literature. On the contrary, the philosophy of science based on virtue epistemology is sensitive to subjective, that is, personal characteristics—at least in terms of finding a correlation between universal normative descriptions of intellectual excellence and their embodiment in the activities of particular scientists in a wide range of fields.

As C. Hookway notes, virtue epistemology brings back to philosophy the view according to which knowledge is a merit, a value obtained as a result of a certain kind of practice [3]. At the same time, the content of this practice remains suggestive. Hookway himself proposes that the notion of "inquiry" is a common bracket for epistemic practices of different levels, from the every day to the scientific or religious [4]. In the practice of inquiry, intellectual virtues play a regulative role in guiding how epistemic goods are achieved. Thus, a theory of knowledge, in his view, should be understood as "describing and explaining our <. . .> epistemic evaluations" as well as "investigating whether our epistemic goals are appropriate" [3] (p. 192). Clarifying this thesis, we might say that the philosophy of science should consider scientific inquiry as a praxis of a special kind, with its own moral and intellectual virtues, and then illustrate these virtues with specific episodes from the history of various disciplines. In this article, we will follow this imperative. But before proceeding with this task, it is necessary to consider studies already available in the philosophical literature with a similar intent.

2. Ways to Integration

Because of its basic principles, virtue epistemology has been successfully applied to various areas of social and applied theory of knowledge. For example, the integration of virtue epistemology into research in the philosophy of history [5], and medicine [6], as well as decision and management theory, critical thinking [7], and political philosophy [8] has been fruitful. There is a growing number of publications, where virtue epistemology is applied to address problems in educational theory [9–11]. Based on all this, it seems that there should be no problem with its integration into the discourse of philosophy of science. Nevertheless, works specifically integrating virtue epistemology into the philosophy of science have only begun to appear in recent decades. However, we note that certain non-systematic reflections on the role of intellectual virtues in science can be found in several historical works, as well as in the works of scientists themselves.

The concept of intellectual virtue, through which one can describe dispositions, traits, characteristics, skills, and/or attitudes, the cultivation and realization of which are considered epistemically necessary for the production of scientific knowledge, is currently being particularly discussed by Dutch philosophers and historians of science. In particular, J. van Dongen and H. Paul believe that the notion of the scientific self refers to individual performances in which the concrete experience of the individual is linked to abstract normative constellations [12] (pp. 1–11). As H. Paul argues about historical scholarship, "Scholarly personae are no private dreams or individual ideals of how to be a historian, but collectively recognized models that individuals have to appropriate, in one way or another, in order to be recognizable as 'real' historians. Scholarly personae change, but it takes more than a single individual to put that change in motion" [13] (p. 354).

Such an approach presupposes agreement with the institutional nature of intellectual virtues. Therefore, H. Paul and J. Van Dongen devote their research to the study of scientific communication and what can be called reactive attitudes about the value of cognitive

practices. The latter, for example, is the focus of H. Paul's article. Paul's article *The Icarus flight of speculation: Philosophers' vices as perceived by nineteenth-century historians and physicists* [14] shows, by analyzing reviews of scientific papers, that dissociation from philosophical speculation was seen as an important element in the formation of the identity of the virtuous scientist in the 19th century.

The conceptual pair "scientific ethos" and "scientific self", as well as their genesis from a set of epistemic and non-epistemic virtues and characteristics to which individuals relate in order to be recognized as something (e.g., as a physicist) is also discussed by C. Engberts [15]. In particular, in some of his works, he proposes to consider the above problem from the reverse, believing that intellectual vices are easier to identify.

The historian of science L. Saarloos describes a more general level at which the production of the "scientific self" is proposed to be seen as a process of subjectivization, in which individuals are driven by normative incentives to shape their subjectivity according to specific values deemed necessary or important by them and/or their peers [16]. It also regards it as important to consider the political implications arising from such a perspective (politics is here understood including at the local level of the administration of science and the academy).

Several researchers devote their works to the problems of method, and differentiation of materials necessary for the study of intellectual virtues. They are also concerned with the operationalization of the concept of intellectual virtue. They seek to describe ways of identifying epistemically virtuous behavior. The collection *Virtue Epistemology Naturalized: Bridges between Virtue Epistemology and Philosophy of Science* is largely devoted to the above questions [17]. It contains a large number of important papers of a methodological nature, as well as descriptions of empirical studies that confirm (sometimes refute) some of the theoretical assumptions of virtue epistemology. In particular, this anthology discusses in detail the so-called "situationist challenge, i.e., the assumption of social psychologists that there is no such thing as virtue at all.

We should also mention the collection *Epistemic Virtues in the Sciences and Humanities*, which provides a comprehensive overview of the perceptions of research virtues in different disciplines and in different historical periods. Finally, of interest is the voluminous work by C. Engberts, "Scholarly Virtues in Nineteenth-Century Sciences and Humanities: Loyalty and Independence Entangled" [15]. This monograph is important because it discusses rather specific intellectual virtues that are often beyond the scope of research interest. In particular, it describes the role that the virtue of trust in authority plays in scientific discovery.

While recognizing the significance of all of the above works, it is necessary to note one philosophical or general theoretical difficulty they face. It has already been argued in the introduction that one must be realistic about the contextualized epistemic virtues themselves if they are to be integrated into a philosophy of science. However, on what is this contextualization based? This question is related to another: on what grounds it is possible to carry out a classification of virtues? These are non-trivial questions to which different answers can be given. The problem is that the mentioned researchers in most cases use the notion of "intellectual virtue" as if there is one universally accepted model of operationalization of this theoretical concept. However, this is not the case. Moreover, such operationalization is difficult because of the significant difference in research paradigms within virtue epistemology.

In our view, one of the most general, and therefore productive, approaches to addressing this problem is offered by F. Tanswell and I. Kidd. They make the following tripartite distinction, without committing to the adoption of any particular version of virtue epistemology: "(a) Generic epistemic virtues pertinent to all types of inquiry in a domain-neutral

way; (b) Specific epistemic virtues generic ones that take specific forms, inflected by some specific features of specific domains; (c) Local virtues confined or 'local' to a certain subject, e.g., mathematics" [18] (p. 408).

This distinction can serve as a tool for further categorization. Much of research in virtue epistemology, however, is limited to level (a), which provides a basic classification of intellectual virtues into reliabilist virtues (defined as reliable cognitive processes leading to the production of true beliefs) and responsibilist virtues (defined as stable dispositions of intellectual behavior). The demarcation of levels (b) and (c), as well as their co-occurrence (a), as the authors themselves note, can be problematic. For example, the question arises whether the realism of local disciplinary virtues is determined by the specificity of the objects (ontological assumption) with which a particular science deals, by the format in which its research practice is organized (methodological assumption), or by the institutional organization of the discipline (social assumption). In the following, I will illustrate that all three aspects are important: local virtues are determined both by the specificity of the research subject, the format of the organization of the research, and the institutional conditions of the existence of science. An adequate account of localized virtues should therefore follow after a description of the characteristics of the discipline in question in the three mentioned respects.

At the same time, the main problem faced by proponents of the integration of virtue epistemology into the philosophy of science is more fundamental. It is related to the fact that the concept of intellectual virtue itself does not have one stable definition. As mentioned above, at the level of general intellectual virtues (i.e., (a)-level), there are at least two basic competing approaches that offer different definitions: on the one hand, one can speak of intellectual virtue as a reliable cognitive skill (reliabilism) and, on the other hand, as a stable trait of intellectual character (responsibilism). These approaches are not merely complementary to each other but are often seen as rivals, and therefore it is problematic to talk about reliabilist and responsibilist virtues within the same theory.

However, if we do not have a satisfactory integral approach to virtues at level (a), what are we talking about at levels (b) and (c)? In exploring virtues in sciences are we looking for reliable skills valuable for their ability to produce truth or dispositions of behavior valuable for their motivational potential? Just as it is problematic to reconcile consequentialism and deontology within a single moral theory, it is also extremely difficult to reconcile epistemic externalism and internalism.

Of course, there have been recent attempts to create two-level or hybrid theories, which, despite all their advantages, are difficult to apply to private areas of epistemology [19]. The reason for this is that reliabilism is for the most part an epistemology applicable rather to single cognitive acts (cognitions). Also, it exists in a veritist paradigm where truth is the ultimate epistemic value. Responsibilism, in turn, enters the realm of social epistemology, since responsibilistically understood virtues are character traits whose acquisition, cultivation, and realization are impossible outside of social interaction. Here, the veritist intuition recedes into the background, since virtue justification can have independent epistemic value (this is demonstrated by internalists, in particular through "The New Evil Demon Problem" [20]). Thus, we see that these theories do not simply introduce different basic definitions, but arguably speak of different levels of cognition. Any project of integrating virtue epistemology into philosophy of science must therefore take this difference into account and attempt to explain it.

3. Local and General Goals of Science

One of the proponents of the hybrid approach in virtue epistemology is the already mentioned C. Hookway. He argues that it requires adopting "A two-tier picture: we would

not be reliable seekers after the truth or effective solvers of theoretical problems if we did not possess specific skills and capacities: good eyesight and hearing, a reliable memory, good knowledge of specific subject matters and so on; but our success also requires us to possess traits of character which enable us to use our skills and capacities effectively when inquiring and deliberating" [3] (pp. 187–188). Applied to science, this must mean that its practice involves the actualization of both robust cognitive skills and the development of specific intellectual character traits. Adopting a hybrid approach implies a rethinking of science and more specifically its goals.

The traditional definition of this type of epistemic practice assumes the truth about nature as its primary goal. However, modern science, partly as a result of philosophical reflection carried out within the framework of post- and neo-positivism, and partly as a result of internal rethinking of methodological guidelines, stands on the positions of fallibilism. As A. Karimov notes, "The infallibilist interpretation of justification was the reason for the defeat of fundamentalism in the philosophy of science. Many objections were raised against the fact that something can be justified definitively, once and for all. One of the arguments against infallibilism is usually cited as backward induction. We know from the history of science that scientific theories have been disproved in the past. It follows that all of today's best scientific theories will probably be disproved as well" [21] (pp. 22–23). All this characterizes scientific inquiry as constantly renewed and unfinished. Truths are relative, and thus the veritist maxim is a local rather than an overall goal.

Hence, the assumption is that scientific inquiry must have additional goals that would, among other things, justify a commitment to veritism. Several philosophers and sociologists of science believe that scientists, especially theorists, are orientated towards achieving a state of certainty about some state of affairs based on understanding. If this is the case, then science is a practice with both truth and understanding as its goal. To illustrate the latter claim, let us look at how physicist J. Maxwell explains (rather floridly) the fallibilism of science: "Is it not wonderful that man's reason should be made a judge over God's works, and should measure, and weigh, and calculate, and say at last 'I understand I have discovered—It is right and true' . . . we see before us distinct physical truths to be discovered, and we are confident that these mysteries are an inheritance of knowledge, not revealed at once, lest we should become proud in knowledge, and despise patient inquiry, but so arranged that, as each new truth is unraveled it becomes a clear, well-established addition to science, quite free from the mystery which must still remain, to show that every atom of creation is unfathomable in its perfection" [22] (p. 77). From this quote, we see that for the scientist, understanding and truth are the common goals of science. Moreover, the auxiliary role of truth is asserted here. It has no independent value, but acquires it only in the context of revealing the overall "perfection". Given all this, the application of a hybrid virtue epistemology is warranted because we can attribute reliabilist and responsibilist virtues to different epistemic goals of science.

In *The Structure of Virtue*, J. Annas mentions the Greek concepts of "skopos" (σκοπός) and "telos" (τέλος), which allow her to make a distinction between local goals and general goals: "But what is the virtuous person's aim in acting? She has two. One is her telos or overall aim, of living virtuously and acting from motives of virtue. Virtue, after all, is a settled state of the person, with the overall aim of making the person's life as a whole be one way rather than another, virtuous rather than evil or complacent. (Living virtuously, further, either constitutes, or contributes to, happiness; but that is a distinct issue.) The virtuous person's other aim is what the Stoics call her skopos or immediate target, which is what is aimed at in any particular case of acting virtuously" [23] (p. 24). Thus, there are two notions of goal, or rather two aspects of all goals, which can be conceptually distinguished. Skopos is a foreseeable goal (the word "σκοπός" is etymologically related to the notions of

elevation and observation point). Skopos is that goal that has a concrete way of realizing it; it is accessible. Telos, in turn, is the final goal that has no concrete way of realization. Telos means the culmination, the highest achievement, and the limit in development. Skopos is that which is necessary for the achievement of telos, whereas telos is the limit, and therefore it is valuable in itself.

Applied to epistemology, the distinction between skopos and telos of knowing allows us to explain the cases of veritical luck on the one hand, and the value of epistemic virtues on the other, within the fallibilist paradigm. An epistemic subject may be successful in attaining skopos, as which a particular true belief is to be regarded, but fail to attain telos, that is, fail to be epistemically virtuous in the responsibilist sense. However, the opposite is also possible: a virtuous subject may be unsuccessful in forming true beliefs. As J. Annas writes: "It is crucial, therefore, in examining a virtuous act, to ask what kind of success is in question—success in achieving the overall goal or success in achieving the immediate target. Achieving the overall goal is a matter of having the right motivation (something, of course, which in virtue ethics is the result of a lengthy and demanding process), and this is up to the agent, since it is she who makes her life be one kind of life rather than another. But success in achieving the immediate target may not be in this way up to the agent, and may depend on various kinds of moral [or epistemic] luck" [23] (p. 25).

Truth is seen as something that belongs exclusively to the realm of local epistemic goals. The general goal, that is, telos, is the acquisition, development, and realization of responsibilist epistemic virtues, not the acquisition of true beliefs. This is not to say that truth is not valuable. It is valuable, but instrumentally. As an instrument, it signals the presence of a general virtue in the subject. A virtuous subject therefore has a stable disposition to acquire true beliefs: not because they are valuable in themselves, but because they signal to him that he is on the right track in attaining the telos of knowing. In other words, truth as a skopos is the content of the epistemically virtuous life, but not its condition. This view of epistemic values arises as a result of the "value turn" and the rejection of the doxastic paradigm. This view is sometimes referred to as "conventional relativism". This name reflects the fluidity of the content of the value discourse in epistemology. Conventional relativism is characteristic of L. Zagzebski. Her responsibilist theory proposes to consider truth as a special case of a general goal: "The simplest way to describe the motivational basis of the intellectual virtues is to say that they are all based on the motivation for knowledge. They are all forms of the motivation to have cognitive contact with reality, where this includes more than what is usually expressed by saying that people desire truth" [24] (p. 167). This can also include the theories of S. Grimm and K. Ahlstrom [25], M. Nussbaum [26], C. Price [27], and others.

The distinction between the skopos and telos of cognition allows us to better understand the two goals of science as an epistemic practice. In addition, the attainment of truth and understanding are not just different goals of science but are also associated with different ways of knowing, to which different intellectual virtues correspond.

Truth is the skopos of science. This goal is predetermined by the veritist maxim and is realized through interaction with facts. The latter involves the use of natural cognitive abilities. One of the important elements of scientific inquiry is the enhancement of these cognitive faculties, primarily through various technical improvements: instruments, installations, and means of measurement. In doing so, they are, by their function, reliabilist intellectual virtues. Recall that the key element of intellectual virtue for reliabilists is the so-called "success component". It refers to the extent to which the application of a particular cognitive skill contributes to the reliable attainment of truth. If a skill fails to achieve truth under any conditions, it will be categorized as an intellectual vice rather than a virtue. Therefore, as J. Greco argues, "The key idea here is not that knowledge requires

responsibility in one's conduct, although that might also be the case, but that knowledge requires responsibility for true belief. Again, to say that someone knows is to say that his belief in the truth can be credited to him. It is to say that the person got things right owing to his own abilities, efforts, and actions, rather than owing to dumb luck, or blind chance, or something else" [28] (p. 111).

Thus, we can attribute the achievement of provable truth as a goal to the stage of scientific inquiry when methodological reflection and theorizing do not constitute the main content of the scientific debate. Such a state is characteristic of everyday scientific activity in the state of "normal science" when disciplines develop extensively through the accumulation of provable truths. Such a format of science is characterized by a consensus on how the work of the scientist should be structured, that is, how the discipline produces provable truths. I. Kidd calls such a state "confidence", stating that "Perhaps confidence would require the agent to have certain sorts of specialist knowledge (cognitive) or an ability to perform certain actions (practical) or access to certain objects or places (material)" [18] (p. 13).

Intellectual virtue at this stage would be considered to be that which maximizes the probability of obtaining truth. Such characteristics of the cognitive agent will include particularized reliabilist virtues like accuracy in the observation of patterns or the ability to perform mathematical calculations. An intellectually virtuous researcher is one who, having learned a certain repertoire of cognitive skills, uses them adequately, i.e., methodologically correctly, to produce provable truths within their discipline.

A direct analogy can be argued between the situation of everyday cognition and intra-disciplinary scientific inquiry: in everyday contexts, it is enough for a cognitive agent to refer to the presence of the cognitive ability to justify beliefs about visual, auditory, or any other perceptions, whereas in the context of science, it is enough to show that the agent has used a specific and community-accepted form of inquiry. Responsibilist virtues are not so important at this stage, since the prescribed mode of epistemic behavior is constrained by scientific consensus.

The situation is different in at least two cases: when the scientist is interested in the methodology itself and when they go beyond the boundaries of their discipline, i.e., realizes interdisciplinary research. Thus, for example, physicist J. Tyndall in *Essays on the Use and Limits of Imagination in Science* discusses the "ultra-scientific" sources of his research. To such a source he attributes "intellectual vision", which (as in the case of Maxwell quoted above) gives a sense of "the mystery of man's relation to the universe" [29]. As we see, at a certain stage of knowing, the scientist seeks not merely to produce reliably true propositions about reality, but a personal state of warrant or understanding. As the I. Kidd summarizes this point, "Confidence in a naturalistic picture of the world ultimately requires a process of conversion, rather than the provision of evidence or reasons" [18] (p. 21). In these cases, there is no one reliable way of obtaining truth, and thus no guiding principle for the scientist to follow. In such a situation, the responsibilist virtues are primary, since they favor the attainment of understanding rather than provable truth. This is the telos of science since the goal here is general rather than disciplinary knowledge. Of course, at this stage truth is also an important "gain", but it does not act as a final goal [30].

Interestingly, such a view is inherent not only in virtue epistemology but also in some other epistemological projects. In particular, W. Quine's project of naturalized epistemology speaks of scientific inquiry as a networked, coherently organized set of beliefs that give meaning to our experience [31]. In addition to this, he also attributes the production of provable truths to the disciplinary level of inquiry, reproducing a reliabilist argumentation in its meaning: "Just as mathematics is to be reduced to logic, or logic and set theory, so natural knowledge is to be based somehow on sense experience. This means explaining the

notion of the body in sensory terms; here is the conceptual side. And it means justifying our knowledge of truths of nature in sensory terms" [32] (p. 71).

Postulating understanding as the central epistemic goal of scientific inquiry significantly changes our view of the regulative principles of science. Indeed, if provable truth is a secondary value in interdisciplinary and theoretical research, there is a danger of relativizing science. The latter can be parried by arguing that general responsibilist virtues are a kind of safeguard against scientists using constructions in the spirit of anarchist epistemology. While reponsibilist virtues do not prescribe how to achieve true belief, they do define the boundaries of what is permissible for the social role in question, in this case, the role of the scientist, which is defined through intellectual character traits like criticality, open-mindedness, and a commitment to an objectivist attitude, of which L. Daston and P. Galison have written extensively [33].

4. Conclusions

The integration of virtue epistemology into the philosophy of science represents a significant advancement in our understanding of scientific inquiry. By emphasizing the moral and intellectual virtues that underpin scientific practice, we can better appreciate the complexities and nuances of knowledge acquisition. This approach not only enriches our comprehension of scientific processes but also highlights the importance of the epistemic agent's character in the pursuit of knowledge.

The article has outlined several compelling reasons for this integration, including the need to address the limitations of traditional epistemological frameworks that often prioritize beliefs over the qualities of the individuals who hold them. The "value turn" in contemporary epistemology underscores the necessity of focusing on virtues and vices, thereby shifting the discourse towards a more holistic understanding of knowledge that encompasses ethical considerations.

Moreover, we have identified existing gaps in the definitions of intellectual virtues, particularly within the contexts of reliabilist and responsibilist approaches. This recognition calls for further exploration and refinement of these concepts to ensure that they adequately reflect the diverse and dynamic nature of scientific inquiry. By doing so, we can foster a more robust framework that not only guides scientific practice but also cultivates a culture of responsibility and integrity among scientists.

Ultimately, the pursuit of knowledge in science is not merely a technical endeavor; it is a moral one that requires a commitment to understanding, collaboration, and the responsible application of knowledge. As we continue to navigate the complexities of scientific inquiry, embracing virtue epistemology will be essential in guiding us toward a more ethical and effective practice of science. This shift not only enhances our understanding of what it means to know but also reinforces the idea that the quest for truth is inherently tied to the virtues we embody as seekers of knowledge.

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References

1. Karimov, A. Towards knowledge through the virtues: On the foundations of the aretic approach in epistemology. *Epistemol. I Filos. Nauk. Epistemol. Philos. Sci.* **2021**, *58*, 6–21. (In Russian) [CrossRef]
2. Battaly, H. Virtue epistemology. *Philos. Compass* **2008**, *3*, 639–663. [CrossRef]
3. Hookway, C. How to be a virtue epistemologist. In *Intellectual Virtue: Perspectives from Ethics and Epistemology*; Zagzebski, L., DePaul, M., Eds.; Oxford University Press: New York, NY, USA, 2003; pp. 183–202.
4. Hookway, C. Epistemology and inquiry: The primacy of practice. In *Epistemology Futures*; Hetherington, S., Ed.; Oxford University Press: Oxford, UK, 2006; pp. 95–110.
5. Paul, H. How historical scholarship is shaped by epistemic virtues. *Hist. Theory* **2011**, *50*, 1–19. [CrossRef]
6. Emran, S. The nature of epistemic virtues in the practice of medicine. *Med. Health Care Philos.* **2015**, *18*, 129–137. [CrossRef] [PubMed]
7. Paul, R. Critical thinking, moral integrity, and citizenship: Teaching for the intellectual virtues. In *Knowledge, Belief, and Character: Readings in Virtue Epistemology*; Axtell, G., Ed.; Rowman & Littlefield Publ.: Lanham, MD, USA, 2000; pp. 165–175.
8. Boult, C. The (virtue) epistemology of political ignorance. *Am. Philos. Q.* **2021**, *58*, 217–232. [CrossRef]
9. Battaly, H. Teaching intellectual virtues. *Teach. Philos.* **2006**, *29*, 191–222. [CrossRef]
10. Baehr, J. *Intellectual Virtues and Education: Essays in Applied Virtue Epistemology*; Routledge: New York, NY, USA, 2008; 284p.
11. Croce, M.; Pritchard, D. Education as the social cultivation of intellectual virtue. In *Social Virtue Epistemology*; Alfano, M., Klein, C., de Ridder, J., Eds.; Routledge: London, UK; pp. 583–601.
12. Paul, H.; van Dongen, J. Epistemic Virtues in the Sciences and the Humanities. van Dongen, J., Ed.; Springer: New York, NY, USA, 2017; 198p.
13. Paul, H. What is a scholarly persona? Ten theses on virtues, skills, and desires. *Hist. Theory* **2014**, *53*, 348–371. [CrossRef]
14. Paul, H.; ten Hagen, S. The Icarus flight of speculation: Philosophers' vices as perceived by nineteenth-century historians and physicists. *Metaphilosophy* **2023**, *54*, 280–294.
15. Engberts, C. *Scholarly Virtues in Nineteenth-Century Sciences and Humanities: Loyalty and Independence Entangled*; Engberts, C., Ed.; Springer: New York, NY, USA, 2022; 226p.
16. Saarloos, L. Virtue and vice in academic memory: Lord Acton and Charles Oman. *Hist. Humanit.* **2016**, *1*, 339–354. [CrossRef]
17. Fairweather, A. *Virtue Epistemology Naturalized: Bridges between Virtue Epistemology and Philosophy of Science*; Springer: New York, NY, USA, 2014.
18. Tanswell, F.S.; Kidd, I.J. Mathematical practice and epistemic virtue and vice. *Synthese* **2020**, *199*, 407–426. [CrossRef]
19. Ichikawa, J.; Jarvis, B. Hybrid virtue epistemology and the a priori. In *The A Priori: Its Significance, Sources, and Extent*; Dodd, D., Zardini, E., Eds.; Oxford University Press: Oxford, UK, 2016.
20. Littlejohn, C. The New Evil Demon Problem. Internet Encyclopedia of Philosophy. Available online: https://iep.utm.edu/evil-new/ (accessed on 3 December 2024).
21. Karimov, A. *Ocherki Sovremennoj Epistemologii Essays on Modern Epistemology*; Kazan University: Kazan, Russia, 2017; 145p.
22. Maxwell, J. Inaugural Lecture at Aberdeen. In *Reginald Victor Jones, James Clerk Maxwell at Aberdeen, 1856–1860*; Notes and Records of the Royal Society of London; The Royal Society Publishing: London, UK, 1973; Volume 28, p. 71.
23. Annas, J. The structure of virtue. In *Intellectual Virtue: Perspectives from Ethics and Epistemology*; Paul, M., Zagzebski, L., Eds.; Oxford University Press: New York, NY, USA, 2003; pp. 15–33.
24. Zagzebski, L. *Virtues of the Mind: An Inquiry into the Nature of Virtue and the Ethical Foundations of Knowledge*; Zagzebski, L., Ed.; Cambridge University Press: Cambridge, UK, 1996; 365p.
25. Grimm, S.R.; Ahlstrom, K. Getting it right. *Philos. Stud.* **2013**, *166*, 329–347.
26. Nussbaum, M. *Upheavals of Thought: The Intelligence of the Emotions*; Cambridge University Press: Cambridge, UK, 2001.
27. Price, C. Fearing Fluffy: The content of an emotional appraisal. In *Teleosemantics*; Macdonald, G., Papineau, D., Eds.; Oxford University Press: Oxford, UK, 2006; pp. 208–280.
28. Greco, J. Knowledge as credit for true belief. In *Intellectual Virtue: Perspectives From Ethics and Epistemology*; Zagzebski, L., DePaul, M., Eds.; Oxford University Press: New York, NY, USA, 2003; pp. 111–134.
29. Tyndall, J. *Essays on the Use and Limit of the Imagination in Science*; Longmans, Green, and Co.: London, UK, 1870.
30. Kvanvig, J.L. *The Value of Knowledge and the Pursuit of Understanding*; Cambridge University Press: New York, NY, USA, 2003; 216p.
31. Quine, W. *The Web of Belief*; Random House: New York, NY, USA, 1970; 95p.
32. Quine, W. *Ontological Relativity, and Other Essays*; Columbia University Press: New York, NY, USA, 1969; 165p.
33. Daston, L.; Galison, P. *Objectivity*; Zone Books: New York, NY, USA, 2007; 501p.