VICE EPISTEMOLOGY OF BELIEVERS IN PSEUDOSCIENCE[1]

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The demarcation of pseudoscience has been one of the most important philosophical tasks since the 1960s. During the 1980s, an atmosphere of defeatism started to spread among philosophers of science, some of them claimed the failure of the demarcation project. I defend that the more auspicious approach to the problem might be through the intellectual character of epistemic agents, i.e., from the point of view of vice epistemology. Unfortunately, common lists of undesirable character features are usually based on *a priori* reasoning, and therefore might be considered artificial or too vague. When we base our position on contemporary behavioural sciences, we can see that the epistemic character of believers in pseudoscience is for the most part determined by two related factors. Firstly, these epistemic agents show a higher level of cognitive laziness. By this I mean an inability or unwillingness to engage in reflective thinking and a reluctance to account for counterevidence. Secondly, they yield more easily to metacognitive overconfidence. This can be broadly understood as so-called "knowledge illusion", the inability to recognize one's own intellectual limits. The deficiency usually stems from a misunderstanding of the division of cognitive labour and of the agent's role in epistemic society. I find the proposed epistemological approach to pseudoscience crucial. Only if we understand the descriptive aspects of the problem, can we think of normative solutions to it.

1. Introduction

The demarcation of pseudoscience has been one of the most important problems for the philosophy of science since Karl Popper delivered the famous lecture "Science: Conjectures and Refutations" (Popper 1963). Regrettably, Popper's attempt to define pseudoscience through the lack of falsifiability and immunization against it was not

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successful according to many. It was criticized because the criterion of falsifiability is ahistorical, the demarcation line between science and pseudoscience might move through time (Kuhn 1970). Others claimed that many pseudoscientific theories are testable, and they were actually refuted, but the less informed people hold them anyway (Kuhn 1970, 7 – 8; Laudan 1983, 121 – 122). Moreover, the falsifiability contradicts the prevalent scientific practice in which one counterexample is not enough to abandon a well-established scientific theory. Scientists are cautious and conservative, they – as Imre Lakatos observed – "have thick skins":

> They do not abandon a theory merely because facts contradict it. They normally either invent some rescue hypothesis to explain what they then call a mere anomaly or, if they cannot explain the anomaly, they ignore it, and direct their attention to other problems (Lakatos 1978, 4).

In the end, some philosophers concluded that we must admit the futility of the demarcation project and accept its failure. Larry Laudan wrote that "the problem of demarcation between science and nonscience is a pseudo-problem (at least as far as philosophy is concerned)" and that "we ought to drop terms like 'pseudo-science' and 'unscientific' from our vocabulary; they are just hollow phrases which do only emotive work for us" (Laudan 1983, 124 – 125). I can see Laudan's point, but I do not agree. I think that in the world where Flat Earth Society has resumed its business,[2] it is our duty to deal with pseudoscience in a more accurate way. I am more supportive to the approach of David Resnick, who advocates the indispensability of identifying pseudoscience in a very persuasive way:

> The demarcation problem is not merely a philosophical issue, however, since it has a significant bearing on practical policy questions… For better or worse, policy makers, politicians, attorneys, judges, physicians, engineers, educators, and lay people must distinguish between genuine science and non-science when making practical decisions. The world cannot wait for philosophers of science to solve the demarcation problem (Resnik 2000, 249 – 250).

Fortunately, we have some strategies we can use to demarcate science from pseudoscience. We can discuss the family resemblance and find noteworthy similarities among various pseudoscientific theories, e.g., neglect of empirical testing, lack of

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[2] International Flat Earth Research Society was established in 1956, but during 1990s the interest in its theories declined. The society officially relaunched as the Flat Earth Society in October 2009 and now has members all over the world (see the webpage at https://www.tfes.org).

progress, stagnation of doctrine and methodology, immunization against counter-evidence, use of *ad hoc* hypotheses, etc. (cf. Bunge 1983, 223 – 228; Grove, 1985, 237 – 239; Thagard 1988, 170; Derksen 1993; Mahner 2013, 38 – 39; Hansson 2013, 72 – 73). Another strategy is to explore the epistemic character of believers in pseudoscience (cf. Lugg 1987, 222; Kitcher 1993, 195 – 196; Boudry and Braeckman 2011; 2012). This second approach I find the most promising. In this article, I am going to investigate the crippled epistemology of pseudoscience.

Supporters of pseudoscience show signs of a broader epistemic incompetence. Their intellectual characters lack intellectual virtues that are necessary for achieving justified true beliefs. Virtue epistemology has been a popular research program for the last forty years (since Sosa 1980). For the philosophy of pseudoscience, study of epistemic vices might be more useful. There is a vast literature that classifies numerous vices of various kinds, but my approach aims at the utmost simplicity possible. I believe that there are just two key epistemic vices, which I shall call *cognitive laziness* and *metacognitive overconfidence*. In my paper I will try to demonstrate that all other epistemic shortcomings stem from these principal deficiencies. Firstly, I summarize what epistemic vices are (Section 2). I also show how they were described and dealt with in the early modern philosophy. Secondly, I focus on the cognitive laziness as a fundamental deficiency in analytic thinking (Section 3). There are at least three ways of belief formation, some of them do not make gaining knowledge possible. Thirdly, I investigate the division of epistemic labour and the way it leads to the metacognitive overconfidence (Section 4). The knowledge illusion is based on the misunderstanding of one's place in the epistemic society and causes distrust in experts. Finally, I discuss the advantages and disadvantages of my approach (Section 5). It must be acknowledged that the presented model is not complete because it does not incorporate moral motives of believers in pseudoscience. However, it deserves attention for its simplicity and didactic value.

2. Epistemic incompetence

It is a trivial truth that not all agents are at the same level of epistemic competency. Their ability to achieve justified and true beliefs might be diminished by at least three sets of factors:

1. *Perceptual impairment* that affects sensorial organs or corresponding neural centres, e.g., near-sightedness, far-sightedness, blindness, colour blindness, hearing loss, deafness, loss of smell or taste, etc.
2. *Cognitive impairment* that affects the central nervous system and higher cognitive functions, e.g., intellectual disability, general learning disability, loss

3. *Epistemic impairment* that affects the most general ability to discriminate between warranted and unwarranted beliefs, i.e., cognitive laziness and meta-cognitive overconfidence in my account.

in general intelligence, specific learning disabilities, memory and attention disorders, etc.

The last kind of deficiency is currently in the centre of interest of applied epistemologists who focus on so-called crippled epistemology (Hardin 2002). The crucial question is why some epistemic agents tend to formulate unjustified conclusions based on insufficient information while using flawed inferential procedures. A popular answer to this philosophical puzzle rests in the virtue epistemology that follows the Aristotelian approach to ethics. According to this viewpoint, epistemic virtues are character traits that raise the probability of accepting justified and true beliefs. Epistemic vices are opposites to them, they decrease the chance of achieving knowledge. Definitions in the literature vary, but the underlying idea stays the same. Linda Zagzebski writes that a vice is an acquired defect of the soul, an enduring character trait that a person may be unaware of (Zagzebski 1996, 116 & 152). The definition of epistemic vice has been updated recently by Quassim Cassam. In his more elaborate attempt, he emphasizes the aspect of blameworthiness: "An epistemic vice is a blameworthy or otherwise reprehensible character trait, attitude, or way of thinking that systematically obstructs the gaining, keeping, or sharing of knowledge" (Cassam 2019, 23). A conventional list of epistemic virtues would include, e.g., fair-mindedness, open-mindedness, thoroughness, sensitivity to detail, caution, intellectual courage, intellectual humility, and perseverance (cf. Zagzebski 1996, 114). Every epistemic virtue is mirrored by a corresponding epistemic vice: prejudice, closed-mindedness, negligence, insensitivity to detail, gullibility, intellectual cowardice, intellectual pride, and idleness or laziness (cf. Zagzebski 1996, 152; Baehr 2010; Battaly 2014; Cassam 2016). Cassam distinguishes among more general types of vices, as he recognizes the ones related to character, thinking, and attitude. He also draws attention to so-called "stealth vices" that obstruct their own detection and he speculates about cognitive biases as a special kind of vices on the sub-personal level of reasoning.

For a sympathizer of philosophical naturalism, the vice epistemology that is carried out in this manner seems to be problematic for two reasons. First, it is based on *a priori* analysis. Second, it uses folk psychology concepts for determining virtues and vices. This approach leads to extensive catalogues of almost synonymous vices, illustrated by numerous anecdotic examples from history, politics, and fiction. I advocate a simplified theory of epistemic vices that is grounded in the findings of cognitive, social, and developmental psychology. Vices are character traits that produce

unwarranted beliefs, mainly because of an agent's inclination to intuitions, heuristics, and cognitive biases. There are two main epistemic vices that occur at the cognitive and metacognitive level:

1. *Cognitive laziness* is the inability or unwillingness to achieve warranted beliefs (i.e., knowledge).
2. *Metacognitive overconfidence* is the inability or unwillingness to recognize one's own errors (i.e., self-knowledge).

These epistemic flaws underlie all or most other vices in traditional lists. There are two main advantages of my approach. The first one is qualitative: the model covers a lot of areas. It can deal not only with pseudoscience, but also with conspiracy theories, paranormal beliefs, and political extremism. The second advantage is quantitative: the two vices can be empirically tested. We already have at our disposal some crude but promising measurements of epistemic agents' abilities. The tendency for cognitive laziness is measured by Cognitive Reflection Test (Frederick 2005), epistemic overconfidence by assessment of the difference between the actual and perceived ability (Kruger and Dunning 1999).

Laziness has been a topic of various philosophical and scientific approaches. Christian philosophers in the Middle Ages considered a vice of sloth or *acedia* one of seven capital sins that engender other vices and sins (Aquinas, *Summa Theologica*, II-II, Q. 35; see also *Catechism of the Catholic Church*, §1866). On the contrary, modern biology thinks of physical laziness as an adaptation that might be advantageous from an evolutionary point of view. Energy is a scarce resource, wasting appears irrational and counterproductive, thus laziness can be a rational strategy for survival. Some authors even presume that a trade-off between physical and intellectual activity might lead to physical or intellectual laziness – a higher need for cognition can correlate with physical inactivity and vice versa (McElroy et al. 2016). In the rest of my paper, I consider laziness vice as recognized in the writings of early modern philosophers. When René Descartes introduced his epistemological project to readers of *Meditations on First Philosophy*, he made the following observation on intellectual indolence:

> But to carry out this plan requires great effort, and there is a kind of indolence that drags me back to my customary way of life… I of my own accord slip back into my former opinions, and am scared to awake, for fear that tranquil sleep will give way to laborious hours of waking, which from now on I shall have to spend not in any kind of light, but in the unrelenting darkness of the difficulties just stirred up (Descartes 2008, 17, §23).

The same cognitive laziness that hindered Descartes from gaining clear and distinct ideas is also an obstacle to achieving justified and true beliefs.

Early modern philosophers warned against the false impression that someone is capable of producing a justified belief in cases when they do not have enough expertise to do so. Descartes in *Meditations* described the process of gaining the illusion of knowledge in a way both empathetic and self-critical: "since the range of the will is greater than that of the intellect, I do not confine it within the same limits, but extend it even to matters I do not understand" (Descartes 2008, 42, §58). He also recommended caution when coming to conclusions, even if it means to keep silent: "whenever I do not sufficiently clearly and distinctly perceive where the truth lies, I refrain from passing judgement" (Descartes 2008, 43, §59). Analogous ideas came from the intellectual tradition of British empiricism. There are many passages in the writings of David Hume in which he worried about the same epistemic predicament and advocated a similar solution. He was an avid supporter of the Academic Skepticism in its idealized form:

> The academics always talk of doubt and suspense of judgment, of danger in hasty determinations, of confining to very narrow bounds the enquiries of the understanding, and of renouncing all speculations which lie not within the limits of common life and practice. Nothing, therefore, can be more contrary than such a philosophy to the supine indolence of the mind, its rash arrogance, its lofty pretensions, and its superstitious credulity (Hume 2007, 30, E 5.1).

In the same vein as Descartes, Hume also recommended restraint in any intellectual activity: "In general, there is a degree of doubt, and caution, and modesty, which, in all kinds of scrutiny and decision, ought for ever to accompany a just reasoner" (Hume 2007, 118, E 12.24). These early modern accounts precede the notion of the cognitive laziness and metacognitive overconfidence. In the next two sections, I am going to present experimental evidence for my view.

3. Cognitive laziness

Dual process theories claim that the human brain includes two distinct but linked cognitive systems: one for evolutionarily older intuitions, the other for evolutionarily younger rationality. Type 1 processes are automatic, unconscious, heuristic, intuitive, and fast, while type 2 are controlled, conscious, analytic, reflective, and relatively slow (Tversky and Kahneman 1974; Wason and Evans 1975; Evans and Over 1996; Sloman 1996; Stanovich and West 2000). Type 2 processes require increased cognitive load, which means that more intellectual activity is needed to fully engage them.

The two systems might work in sync or be in conflict. This can be illustrated by the case of driving a car. If experienced motorists drive in a familiar environment without a lot of traffic, they can rely on undemanding type 1 processes, which secure automatic reactions. But when they cross the border into a foreign country where locals drive on the other side of the road, conditions change dramatically. Drivers must pay a lot of attention, think harder, and reflect on traffic rules and regulations. Type 2 processes are to be employed, resulting decisions get more arduous and cautious.[3]

Intuitive type 1 processes carry out reasoning efficiently in mundane challenges, but they are not apt to deal with unusual or abstract problems. When dealing with more complex matters, subjects must be able and willing to put analytic thinking into effect. Frederick (2005) proposed "Cognitive Reflection Test" (CRT) that evaluates this capacity. Each of its three items presents a mathematical task that seems to have a simple solution, but if put under a more thorough examination, the intuitive answer is recognized as incorrect. The point is that "reaching the correct answer often requires the suppression of an erroneous answer that springs 'impulsively' to mind" (Frederick 2005, 27). The original set of questions included the cost of a bat and a ball, the time needed for a machine to produce a widget, and the pace at which a patch of lily pads covers a lake. Because these tasks are quite infamous now, researchers had to devise updated sets. As an example, these questions come from Primi et al. (2016):

1. If three elves can wrap three toys in an hour, how many elves are needed to wrap six toys in 2 hours?
2. Jerry received both the 15th highest and the 15th lowest mark in the class. How many students are there in the class?
3. In an athletics team, tall members are three times more likely to win a medal than short members. This year the team has won 60 medals so far. How many of these have been won by short athletes?[4]

The original Frederic's research showed that a large majority of subjects did not do well in CRT, because just 17 % respondents got all answers right, whereas 33 % got all wrong. The results show that about one-third of people are not able or willing to activate type 2 processes and overcome their cognitive laziness. Other experiments

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[3] Recently, dual process theories have become subject of criticism (Keren and Schul 2009; Bellini-Leite 2018; Melnikoff and Bargh 2018). The most prevalent objection consists in insufficient empirical evidence for the dual approach. The distinction itself might be biased, untested and even untestable. Some consider it a harmful myth that psychologists must abandon. I take side with the advocates of the dual process typology (Osman 2018; Chater 2018; Pennycook et al. 2018). Dual process theories are still the best model for describing and explicating the nature of human reasoning.
[4] Intuitive but incorrect answers are 6, 30 and 20; reflective and correct responses are 3, 29 and 15.

found correlations between lack of success in CRT and adoption of unjustified beliefs. Cognitive laziness is tied to the failure to understand science (Shtulman and McCallum 2014), the refusal of vaccination (Browne et al. 2015), the acceptance of pseudoscience (Fasce and Picó 2019), conspiracy theories (Swami et al. 2014), and religious and paranormal beliefs (Gervais and Norenzayan 2012; Pennycook et al. 2012; Shenhav, Rand, and Greene 2012).

Presented data support the hypothesis that there are three distinct ways of belief formation which are based on specific epistemic virtues or vices. I dubbed the vices *cognitive idleness* and *cognitive laziness*; they differ in the level of cognitive disengagement in analytic thinking. The opposite virtue is *cognitive perseverance,* which presumes a higher degree of cognitive reflection. Let me describe these three procedures in more detail using a diagram that I co-created with Petra Chudárková (see Figure 1).
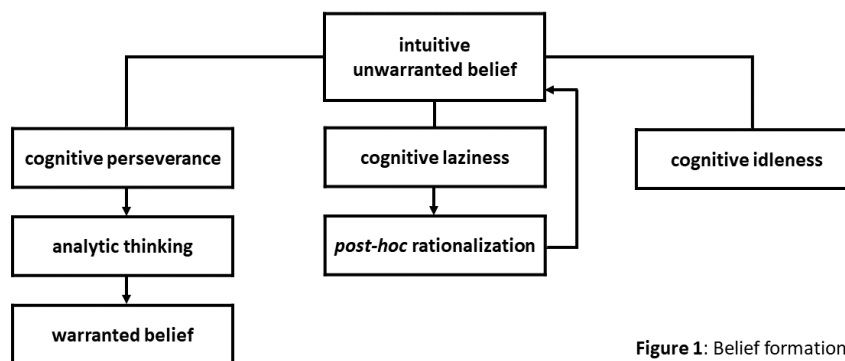

Figure 1: Belief formation

Almost every reasoning starts with an intuitive unwarranted belief. Since a warrant consists of a rational justification of a statement, intuitions cannot be justified in this way. Intuitions rise from unconscious processes we do not have cognitive access to, they are not pronounced verbally. We must at first articulate them consciously and then assess their justification through means of reflective cognition. Some epistemic agents have a hard time doing that, some may even find it impossible. In case of *cognitive idleness,* subjects do not do anything with the intuitive unwarranted belief, they just dwell upon it. The initial gut feeling is identical to the held belief, hence there is no comprehensive justification, potential refinement, or reconsideration. Epistemic agents of this kind are idle and feel no need for cognition at all. Alternatively, agents might be characterized by their *cognitive laziness*. They understand an obligation to re-evaluate their intuitions and bear the burden of proof but are too lazy to really do

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so. The cognitive reflection in these instances is limited to post-hoc rationalization, i.e., the invention of colourful narratives to vindicate one's gut feelings. Epistemic agents are not keen on forsaking their intuitive beliefs and do their best to harmonize them with counterevidence (more on this in Section 4). The last alternative is the only fruitful one. Thinkers who are endowed with *cognitive perseverance* can use analytic thinking in an effective manner. They contemplate on the validity of their logical inferences and consider the available evidence even in cases when it leads them to give up their initial intuition. Persevering is the only way of achieving a warranted belief. Of course, the final warranted belief might be the same as the original unwarranted intuition. However, to determine whether it is the case, one must make use of cognitive reflection.

In previous passages I have used "analytic" and "reflective" interchangeably, but I think there is a solid ground to prefer the latter term. The main reason is that in CRT and other laboratory experiments of analytic thinking, there is usually no need to take empirical evidence into consideration. The tasks contain a minimum amount of context to maximize the concentrate on the inferential reasoning itself. Real-world scenarios are more exhaustive and include a lot of collateral data that epistemic agents must choose from. Persevering agents meticulously weigh all accessible evidence and pay attention to pieces of information that oppose their instinctive beliefs. To stress out the difference between logical inference in mathematical puzzles and empirical reasoning in everyday situations, I endorse "reflective thinking" which was coined by John Dewey. In his educational book *How We Think* Dewey writes:

> Reflective thinking, in distinction from other operations to which we apply the name of thought, involves (1) a state of doubt, hesitation, perplexity, mental difficulty, in which thinking originates, and (2) an act of searching, hunting, inquiring, to find material that will resolve the doubt, settle and dispose of the perplexity (Dewey 1933, 12).

Later on, Dewey doubled down on the importance of an empirical basis for reasoning: "[d]ata (facts) and ideas (suggestions, possible solutions) thus form the two indispensable and correlative factors of all reflective activity" (1933, 104). Dewey's emphasis on evidence-based reasoning prompts me to prefer "reflective thinking" to not so clearly defined "analytic" or "critical". From now one, I will use Dewey's term.

4. Metacognitive overconfidence

It is hard to say when exactly the information explosion started, but it seems to be clear that in the mid-20th century the amount of human knowledge reached an unprecedented magnitude. Not only does it reveal an urgent need of systematic removal

of redundant information from one's cognition, but it also shows that thinking is a collective action. The scientific and intellectual progress is not led by solitaire geniuses any longer if it ever was the case. Division of epistemic labour is required because epistemic agents must specialize in one or a few fields of knowledge, if they want to get acquainted with all the findings of their predecessors and add a tiny bit of knowledge to the sum of it. This kind of hyperspecialization is sometimes interpreted as damaging, but there is no easy way of going back to a romantic ideal of the Renaissance man, the universal philosopher, the all-knowing sage. It is appropriate to say that all polymaths are long dead and that it is not possible to resurrect them – the set of human knowledge is too vast to be held in one secluded mind. It is not only true about the various branches of sciences where researchers deal with quite narrow areas of interest, but in every other profession – theoretical, practical, or technical. E.g., botanists in their study of plants usually focus on just a small group of organisms from the phylogenetic tree. In the same act of specialization, bakers bake and sell goods made of flour, barbers cut hair and shave beards, baristas prepare and serve coffee drinks. People can be experts in a limited number of fields, and they should know that. The problem starts when they do not accept this epistemic constraint and feel entitled to pronounce judgements outside the area of their proficiency.

The described epistemic overconfidence about expertise and skills might be called the *knowledge illusion* (Sloman and Fernbach 2017). When asked about a question out of their competence, agents feel free to produce answers. Too often they do it in fields they do not have any knowledge about because they cannot perceive their own ignorance. This psychological phenomenon is observed mostly in causal explanations, where the ignorance of underlying mechanisms or processes is easy to expose. People intuitively think they know how things work, but under a thorough investigation it comes clear that their actual knowledge is rough and incomplete. Unsystematic interactions with the objects in question do not help to understand their function. Naïve science of living beings, devices, and other inanimate objects is far from perfect, it cannot match the real scientific investigation of them. In a famous series of experiments, experimental psychologists proved that epistemic agents are subject to the *illusion of explanatory depth* and proposed a way to measure one's inclination to it (Rozenblit and Keil 2002). Subjects were presented with a device or phenomenon and had to use a 7-point scale to assess if their understanding of it is deep, partial, or shallow. The list of 48 items contained, e.g., a sewing machine, a can opener, a zipper, a flush toilet, a hydroelectric turbine, a speedometer, a heart, a helicopter, etc. The participants were then asked to write a detailed, step-by-step causal explanation of the object or phenomenon, in as many words as they could. After this part of the test, the participants had to re-evaluate and re-rate their understanding. The

comparison of the initial and final appraisal showed quite dramatic differences. When pressured to give their intuitions a more cautious thought, people admitted that they had been too confident about their ability to explain things. This kind of incompetence and accompanying ignorance of incompetence was shown in many other studies. In one of them, the participants were asked about the basics of bicycle design. Even those who initially felt that they had a remarkable knowledge of bicycles were not able to properly draw the position of the pedals, chain, and frame into a sketch of a bicycle (Lawson 2006).

A persistent question remains: What are the roots of metacognitive incompetence? There is a well-known explanation called Dunning-Kruger effect. According to this hypothesis, people with limited competence do not understand their own limits: "Not only do they reach erroneous conclusions and make unfortunate choices, but their incompetence robs them of the ability to realize it" (Kruger and Dunning 1999, 1121). Epistemic agents who are not able to do well in a specific task or domain cannot evaluate their ability for the same reason. This causes the overestimation of one's skills and knowledge, and the general overconfidence in comparing oneself with others. Subjects who demonstrate inferior knowledge of grammar or mathematics often believe that they perform on better-than-average or even outstanding levels. Their crippled epistemologies cause equally crippled metaepistemologies. The authors of the original study emphasize that the effect is not based on moral character flaws, e.g., arrogance or narcissism. The reasons are purely cognitive, which establishes a vicious circle with no way out: those who should doubt their skills and knowledge do not know about their deficits at all. The Dunning-Kruger effect correlates with serious epistemic shortcomings because subjects who fall victim to it have a higher tendency to accept unfounded worldviews. The real danger lies in the practical consequences of people inaccurately self-estimating their epistemic powers. The knowledge illusion is tied to the refusal of science (Shtulman 2015), the acceptance of pseudoscience (Fernbach et al. 2019) and conspiracy theories (Vitriol and Marsh 2018), and the commitment to political extremism (Fernbach, Rogers, et al. 2013).[5] At least some of these unjustified theories might have detrimental consequences.

The ignorance of ignorance casts a long shadow over people's life choices. The potential harm differs on the scale from mild embarrassment to severe damage to property, health, and life. Some examples of the knowledge illusion are quite amusing. If you believe in the chemtrail conspiracy theory, in which governments expose their citizens to mysterious chemical substances for nefarious reasons, you might suffer

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[5] There is also an expected relation between the Dunning-Kruger effect and the cognitive laziness in agents with lower levels of analytic thinking (Fernbach, Sloman et al. 2013; Pennycook et al. 2017).

only minor financial expenses when spraying vinegar to get rid of them. However, there is a more serious cautionary tale of an unfortunate pseudoscientist who had died in a courageous, if a bit foolish, attempt to prove Earth flat, flying the self-built steam rocket. Many historic instances of the knowledge illusion of those in power ended tragically, in horrendous deaths of millions of innocent people. The acceptance of Lysenkoism by politicians and *intelligentsia* resulted in the Soviet famine of 1932 – 1933. Proponents of "scientific" racism manipulated evidence, claimed inferiority of various ethnicities, caused suffering of generations of people of colour, and triggered the genocide of the European Jews. It seems clear that not knowing the facts and not knowing about one's own ignorance is a guaranteed recipe for a catastrophe. HIV / AIDS denialism by South African president Thabo Mbeki and government scientists had a fatal impact on public health policy. It is estimated that 343,000 deaths could have been prevented if antiretroviral drugs were used instead of the alternative treatment with common vegetables (Nattrass 2008). Mbeki's epistemic overconfidence in topics he did not know about and the misunderstanding of his role in the epistemic society produced highly immoral consequences. Fraud in the scientific research of British former physician Andrew Wakefield led many to believe that there is a link between vaccination against measles, mumps, and rubella and autism in children. Frightened parents refused to inoculate their babies, which meant a drop in immunization rates and gave rise to outbreaks of infectious diseases that were believed eradicated (Flaherty, 2011). Anyone avoiding inoculation participates in morally deplorable behaviour that has been initiated by their ignorance of ignorance.

5. Discussion and conclusion

Let me give you a practical illustration of my model. Take, for example, the case of cryptozoology. People who believe in Loch Ness Monster show both vices mentioned. A) Cognitive laziness as the inability or unwillingness to achieve warranted beliefs: cryptozoologists do not use analytic thinking to understand that a creature would not survive in this ecological niche (lack of food, low temperatures, inability to breathe underwater), they also do not use reflective thinking to consider publicly accessible counter-evidence. B) Metacognitive overconfidence as the inability or unwillingness to recognize one's own errors: cryptozoologists do not understand the division of cognitive labour and their role in the epistemic society, they also do not trust experts in the field of palaeontology and aquatic zoology. The same would apply to believers in alien abduction, astrology, chemtrails, dowsing, guardian angels, homeopathy, intelligent design, numerology, phrenology, ufology, unjustified conspiracy theories, etc.

The notions of cognitive laziness and metacognitive overconfidence are not without problems. Therefore, I honestly draw readers' attention to the possible weaknesses

of my model. Firstly, I claim allegiance to vice epistemology, which might not be entirely accurate. By definition, vices are reprehensible or even blameworthy (Cassam 2016; 2019). I am not sure if it is really admissible to claim that cognitively lazy and metacognitively overconfident subjects are to blame. In a big picture perspective, epistemic agents are driven by factors far beyond their control, and laziness or overconfidence could be of those hard-wired flaws, which are impossible to resist. It would be more appropriate to call these qualities "defects" to stress out their involuntary nature. It would still be permissible to criticize laziness and overconfidence in human reasoning even though there is little hope of their improvement.

Secondly, there has been a more general discussion about the stability of personality traits through time. Scepticism about character is based on the assumption that there is not enough evidence for the mere existence of character traits, e.g., virtues and vices. According to this view, philosophers often overlook situational factors and commit to the fundamental attribution error (Harman 1999; Doris 2002). The potential solution may consist in the same manoeuvre as in the first objection. Maybe we should not think of laziness and overconfidence as vices of a certain type of agents, but as defects that are present in the reasoning of all humans. Some of them are more capable of suppressing it, while others are less so. This treatment does not need to presume the existence of any fixed character traits, psychological inclinations to particular kinds of reasoning are sufficient.

Thirdly and most importantly, every model must be examined for potential oversimplification and incompleteness. I do not think that my model is oversimplified, even though it accounts for only two epistemic defects. Epistemic vices usually come in clusters. Therefore, cognitive laziness serves as a basis for prejudice, closed-mindedness, dogmatism, insensitivity to detail, gullibility, etc. In the same way, metacognitive overconfidence might be considered a source of arrogance, intellectual pride, contempt, etc. In the field of folk psychology, it is not possible to clearly distinguish among all those folk concepts. I hope my account streamlines the terminology without going too far. On the other hand, I must admit that the theory is incomplete. The model does not take into consideration the influence of moral factors: lying, intentional deception, malevolence, fraud, etc. Hence, the inescapable question persists: "Are epistemic agents who accept and spread pseudoscience incompetent, or immoral?" In many cases, I am afraid both possibilities can be true.

I present a simple explanatory model that covers a lot of areas and might be improved by future empirical findings of experimental psychology. Its main advantage is that it includes simple educational instructions for epistemic improvement and avoids a lot of random rules. Traditional vice epistemologists who are concerned with the enhancement of people's epistemic characters devise complicated propositions:

"Don't be prejudiced, closed-minded, negligent, arrogant, insensitive to details, careless, gullible, cowardly, proud, etc." My model embraces just two straightforward guidelines that are easy to understand, yet difficult to follow: "Don't be lazy. Don't be overconfident." Or, if you are into positive thinking: "Be diligent. Be humble." The aim of these rules is not to provide a universal key for the identification of crippled epistemic agents who cannot help themselves. They have mainly didactic use. They remind us that we all are crippled to some extent and that we must fight from day to day against our worst epistemic inclinations: cognitive laziness and metacognitive overconfidence.

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