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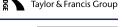aInstitute of Philosophy, Social Sciences and Mass Communication, Kazan Federal University, Innopolis, Russia; bCentro Universitario Internazionale, Arezzo, Italy; cFaculty of Humanities and Social Sciences, Human Machine Interaction Lab, Innopolis University, Innopolis, Russian Federation

ABSTRACT

We start by introducing the idea of echo chambers. Echo chambers are social and epistemic structures in which opinions, leanings, or beliefs about certain topics are amplified and reinforced due to repeated interactions within a closed system; that is, within a system that has a rather homogeneous sample of sources or people, which all share the same attitudes towards the topics in question. Echo chambers are a particularly dangerous phenomena because they prevent the critical assessment of sources and contents, thus leading the people living within them to deliberately ignore or exclude opposing views. In the second part of this paper, we argue that the reason for the appearance of echo chambers lies in the adoption of what we call 'epistemic vices'. We examine which vices might be responsible for their emergence, and in doing so, we focus on a specific one; 'epistemic violence'. In assessing and evaluating the role of this epistemic vice, we note that it can be triggered by epistemic contexts characterized by high stakes that may turn ordinary intellectual virtues (such as skepticism) into vices (such as denialism). In the third part of this contribution, we suggest a way to deal with echo chambers. The solution focuses on advocating a responsibilist pedagogy of virtues and vices that -we claim- might be capable of preventing their emergence.

1. Introduction

There is no universal consensus on the root causes of fake news, nor a widespread agreement with respect to why it persists, despite all efforts made by states, communities, institutions, and various authorities to undermine it (Van der Linden, Panagopoulos, and Roozenbeek 2020; Lorenz-Spreen et al. 2020; Lewandowsky, Jetter, and Ecker 2020; Pritchard 2021). Social media (such as Facebook, VK, Instagram, Tik Tok etc.) is usually held responsible for the spreading of fake news (Guess, Nagler, and Tucker 2019; Meel and Vishwakarma 2020; Naeem, Bhatti, and Khan 2021). However, attributing all the responsibility for the pervasiveness of this phenomenon to social media may be a mistake, or better a gross simplification. Social media is a means or medium of information. Like all information channels we use in our everyday life, it is not perfect and much of its efficacy ultimately depends on the way in which we use it. This means that we may use social media more or less accurately, or responsibly (Galeotti 2019; Bronstein et al. 2021). In this contribution we are not concerned with studying or analyzing the 'proper' way to use social media; rather, we want to address the question of why people (often influenced by it) choose to believe bizarre ideas (fake news[1]), despite considerable evidence available to counter it (Mukerji 2018).

It is useful in this context to preliminarily distinguish between filter bubbles and echo chambers (Nguyen 2020). Filter bubbles (Flaxman, Goel, and Rao 2016; Bruns 2019) are informational spaces where those relying on their news invariably get the information that favors their opinion. This happens because the news feed consists uniquely of messages created by either friends or groups of friends that share similar views. Although filter bubbles present an obstacle to forming true beliefs about anything, they can be burst through exposure to a different body of information. So, by considering available counter-evidence people living within filter bubbles might be able to change their views. In essence then, filter bubbles restrict access to alternative viewpoints but don't necessarily undermine the possibility of acquiring alternative evidence, which may be used to revise previous understandings.

Echo chambers work in a significantly different way (Fantl 2021). Echo chambers exploit our (pre)-dispositions or inclination to understand certain types of information or certain types of sources in a positive or negative way. Gunn defines echo chambers as 'groups of homophilous ('like-minded' or 'similar') individuals, where members have mostly interactions with other members, and make choices about what information to attend to that amounts to varieties of voluntary exposure' (Gunn 2021, 195). Echo chambers thus preemptively enforce trust with respect to certain sources and distrust to other ones (Cinelli et al. 2021). This means that once a body of information enters the echo chamber, such information is immediately labeled as either 'true' or 'false', often without critical scrutiny and independent reflection/assessment. In this way, the label 'true' is given the highest credit and the least amount of doubt, while the label 'false' receives the opposite treatment. While in filter bubbles people are ignorant about a certain topic and this can be explained by -for instance-lack of access or exposure to relevant information; in echo chambers people are not just ignorant (in the sense of lacking access to information), they are willfully and deliberately ignorant (in the sense that they a priori refuse looking for alternative viewpoints that may undermine their position). Therefore, no amount of counterevidence can ever persuade members of echo chambers because such people are ideologically committed to the view they endorse.

Consider the following example (involving the QAnon conspiracy theory) as a paradigmatic illustration of this claim. QAnon (Bleakley 2021) is a conspiracy theory that spread fast in social media and claimed that the whole world is run by a cabal of pedophile and Satan-worshippers. Followers of QAnon typically believe that there is an imminent event known as the 'Storm', which will cause thousands of members of the cabal to be arrested or to face public prosecution. This will trigger a military takeover of several countries that will determine a global revolution, which will ultimately contribute to Earth's salvation. The QAnon conspiracy theory led to the formation of a quasi-political movement that counted hundreds of thousands of online members. The movement was very popular among Trump's supporters. Despite several failed predictions (Guglielmi 2020) and various false claims made by QAnon theorists,[2] members of the conspiracy theory ideologically refused to accept these repeated failures and aggressively undermined any attempt to defuse the conspiracy.[3] This example paradigmatically shows the dangers of echo chambers and their difference with filter bubbles. If in filter bubbles presenting sufficient counterevidence against a certain point of view might result in refuting it (the disagreement would be resolved in favor of a more substantiated view or least resolved in a fallibilist way), in echo chambers presenting any amount of counterevidence does not affect the original view – quite the opposite- it may reinforce it. Understanding this point is important because it shows why the methods and strategies normally used to counter filter bubbles are ineffective when applied to echo chambers. Promoting fact-checking, blocking access to sources of active disinformation (e.g. social media), encouraging public dissemination of scientifically proven information (in the form of counterevidence, for example), or having experts in the field appearing in mass media has little or no effect on a person inside the echo chamber.

Furthermore, echo chambers may also affect first-hand experiences. For example, an unvacci-nated person belonging to an echo chamber promoting, say, ideas about the non-existence of COVID-19, may not come to regret her choice (of not being vaccinated) even after suffering serious

consequences of the disease (e.g. being hospitalized). If, for example, such a person considers the risks associated with vaccination to be greater than the risks of getting through the disease (COVID-19), then almost anything (except perhaps death) could be considered by her as a 'more positive' outcome than a possibility, which was considered -a priori- as unacceptable or undesirable. So, it seems that echo chambers also have a rather subjective dimension; one that is difficult to eradicate. Because of this, we need to introduce a degree of subjectiveness to explain their partially subjective nature. For this reason, in the next sections of this paper, we purport to show that an appropriate analysis of the origins of echo chambers cannot prescind from an analysis of the socio-epistemic conditions or practices that are common to the individuals inside them.

2. Fake News: Why Do We Accept Them?

Evolutionary psychology is a metatheoretical framework that attempts to examine human psychological structures from the standpoint of evolutionary biology (Dunbar and Barrett 2007). Many evolutionary psychologists assert that much of human cognitive behavior can be explained by appealing to a set of adaptive psychological mechanisms, which have evolved to solve recurrent problems or challenges in human ancestral environments and are therefore the functional products of natural selection (Barkow, Cosmides, and Tooby 1992; Buller 2005).[4] Evolutionary psychologists thus typically maintain that many human social behaviors and even individual traits/abilities occur universally across all cultures (Cosmides and Tooby 2013). Examples of such traits/abilities include abilities to infer others' emotions (Al-Shawaf et al. 2016), identify kinship (Jones 2003), and cooperate with others (Johnson and Bering 2006, for a helpful review). Examples of universal social behaviors include marriage patterns (Weisfeld and Weisfeld 2002), altruism (Piccinini and Schulz 2019), and perception of beauty (Symons 1995) among others.

There are two strands of research in evolutionary psychology that seem relevant to explain the formation and persistence of absurd beliefs. These are motivated reasoning and in-group/out-group attitudes. Next, we briefly review some of the research underlying these domains and try to explain why such research might be considered to support evidence for the epistemic mistrust towards outsiders found in society. We nevertheless claim that neither of these factors on their own can fully explain the existence of echo chambers. In other words, motivated reasoning and in-group/out-group attitudes are only contributing, but not sufficient, conditions for their emergence and persistence.

Motivated reasoning can be defined as an emotional bias that leads to decisions based on their desirability rather than on their logical soundness. In other words, it is the tendency to find arguments in favor of conclusions we want to believe to be stronger than arguments for conclusions we do not want to believe (Kunda 1990). For example, researchers (such as Liu and Ditto 2013) observed that people morally opposed to condom education were much less inclined to believe that condoms were a good instrument to prevent sexually transmitted diseases or that people who had moral issues with capital punishment (disagreed with its implementation) were less likely to believe it represented an effective tool to counter crime, by deterring it.

In this context, a widely accepted claim is that belief in fake news (especially in the political sphere) is driven, for the most part at least, by partisanship (Kahan et al. 2017). This idea is supported by various arguments, for example, by the pervasive effects of motivated reasoning on human judgment (Mercier and Sperber 2011) but also by the observation that voters tend to support a preferred political candidate when presented with negative information (Redlawsk, Civettini, and Emmerson 2010) or by the fact that people tend to strenuously debate arguments that are inconsistent with their political view, while passively and uncritically accepting those that are in line with their ideology (Strickland, Taber, and Lodge 2011). A recent empirical study, though, (Pennycook and Rand 2019) raised serious doubts about the idea that motivated reasoning may be the only mechanism responsible for these processes, indicating in fact that analytic/critical thinking plays a hugely important role in people's self-inoculation against political disinformation. In other words,

increasing amount of 'evidence indicates that people fall for fake news because they fail to think; not because they think in a motivated or identity-protective way' (Pennycook and Rand 2019, 10). While we believe that motivated reasoning may have some effect on the persistence of echo chambers, we agree with the conclusion of the empirical study above-mentioned and hence use it to argue that this mechanism cannot be exclusively responsible for their emergence.

Research in evolutionary psychology also names another phenomenon, (in-group/out-group attitudes: Tajfel 1970), that explains the emergence of epistemic mistrust towards outsiders and thus can also possibly explain the rise of echo chambers. The logic of the in-group as opposed to the out-group manifests itself in the reactions of aversion towards the 'foreigner' and the 'different' or, at any rate, in the differential treatment that we tend to give to those who are not part of our inner circle (Greene 2013). These are defensive mechanisms that have become internalized and unconsciously automated to preserve the group that allowed individuals to thrive from the threat of potential enemies.

Research in cognitive psychology surely demonstrated a tendency toward in-group favoritism and out-group derogation (Adorno et al. [1950] 2019). As Kinder and Kam (2010, 8) put it: 'members of in groups (until they prove otherwise) are assumed to be virtuous: friendly, cooperative, trustworthy, safe, and more. Members of outgroups (until they prove otherwise) are assumed to be the opposite: unfriendly, uncooperative, unworthy of trust, dangerous, and more'. This tendency may well contribute to explaining the fact that individuals tend to stick with the people or opinions they like (or perceive as being part of their group), but -per se- does not explain how echo chambers arise. For the in-group-out-group divide is not an epistemic distinction but -primarily- a moral one. As Greene (2013) argued the underlying mechanisms of in-group-out-group attitudes are (mostly) related to different ethical views and perspectives since the remedy proposed is often of a utilitarian nature. So, once again, while we think that this mechanism can be considered as a potentially important mechanism to explain why people consistently believe fake news (even in the face of available counter evidence), we don't believe that it can be uniquely deployed to fully justify and explain the process that leads to their emergence and persistence.

Cognitive science (not only evolutionary psychology) also offered a variety of proposals for explaining why people believe fake news. We all know that cognition is contaminated with cognitive biases – systemic flaws in our cognitive patterns that lead us to false judgements about reality (Kahneman 2011).[5] A recent study by Geschke, Lorenz, and Holtz (2019, 129) showed that 'echo chambers emerge as a consequence of cognitive mechanisms, such as confirmation bias'. The problem with this understanding is that cognitive biases (often) operate at the sub-personal level; that is, they are present in all of us as systematic deviations from rational judgements. That's why cognitive biases alone cannot offer, in our view, a sufficiently general explanation with respect to why certain people tend to end up in echo chambers more than others. In addition, we notice that cognitive biases (unlike people's attitudes in echo chambers) can be overcome with conscious effort and through rational argumentation (Doherty and Carroll 2020; Haselton, Nettle, and Murray 2015).

Other studies attempted to isolate some of the cognitive mechanisms that make people more prone to accept fake news. Kahan (2015), for example, performed an interesting study where he used an Ordinary Science Intelligence Scale to demonstrate that those who score higher in the scale (hence have a higher IQ) are less likely to accept fake news. In a similar vein, Lewandowsky, Jetter, and Ecker (2012) helpfully spelled out some interesting connections between higher education and substantially less susceptibility to fake news. Thus, on the one hand, it might be broadly accurate to say that those who possess higher intelligence or better education are less likely to believe in fake news; hence to enter echo chambers. On the other hand, though, this appears to be a very course-grained solution. It would be too easy to blame the spread of fake news and the emergence of echo chambers on a lower level of intelligence and/or literacy. Besides, this wouldn't necessarily explain why sometimes highly intelligent people end up believing in conspiracy theories (e.g. Nobel Prize winners such as Luc Montagnier). Thus, embracing such an approach (centered uniquely on cognitive mechanisms) may make us blind towards the real causes of the problem. For this reason, we

believe that we need a fine-grained solution. We think that a more promising route to explain the development of echo chambers would be to use certain resources found in virtue ethics and, more specifically, to refer to the concept of epistemic vice as recently discussed in contemporary epistemology (Cassam 2019).

In truth, the significance of epistemic vices with respect to susceptibility towards fake news has already been demonstrated in a recent empirical study conducted by Meyer, Alfano, and De Bruin (2021). In this study, the researchers carried out a survey to classify which epistemic vices may be taken as predictors of acceptance of COVID-19 misinformation. Results showed that predictors include *i. closed-mindedness, ii. sloppiness, iii. obstinacy, iv. apathy, and v. diffidence*. In this paper, building on these preliminary empirical findings we would like to offer to our readers a broader theoretical framework capable of generalizing them. The main component of this framework is what we may call a 'responsibilist approach' (such as Zagzebski 1996, 2018; Cassam 2019; Battaly 2021) to epistemic vices and epistemic environments (more on this below).

Before we go on to specify our view, let us briefly explain what we mean by responsibilism. Responsibilism is a position in philosophy, inspired by Aristotelian virtue ethics, that holds that epistemic virtues coincide with character traits, such as open-mindedness and intellectual humility (Wright 2017). How do we define an epistemic vice? An epistemic vice is, roughly speaking, the opposite of an epistemic virtue. If epistemic virtues are regarded as traits of character that, if manifested or pursued, will likely lead those who adopt them to true beliefs; then epistemic vices might be defined as traits of character which, if manifested or pursued, will likely lead those who adopt them towards falsehood. As we have seen above, various researchers attempted to classify epistemic vices.[6] A richer, and more encompassing taxonomy is provided by Cassam (2019), who also considers as epistemic vices traits of character such as: *vi. dogmatism, vii. prejudice, viii. wishful thinking, ix. overconfidence, and x. gullibility*. On a similar vein, Battaly (2021) investigated the significance of close-mindedness to people routinely engaging with fake news or misinformation. Close-mindedness can be defined as unwillingness to revise a person's own beliefs. As such it can be regarded as the opposite of open-mindedness. Unwillingness here might be understood as a character trait and not simply as a cognitive incapacity. Epistemic vices are typically but not uniquely found among laypersons. Sometimes, though, they are also observed among experts (e.g. leading scientists). In a recent work (Van Dongen and Paul 2017), the authors discussed the virtues and vices of leading scientists of the past, such as Einstein and Maxwell. In their study, the authors showed that even Einstein was a victim of certain epistemic vices, namely of his near-maniacal obstinacy to search for mathematical simplicity in any scientific theory. The points we want to make at the end of this brief discussion are the following: (1) current analysis of echo chambers based on research conducted on evolutionary psychology and/or cognitive science -while meritorious- are not (on their own) sufficient to explain the emerge and persistence of echo chambers; (2) epistemic vices represent serious obstacles to attain true knowledge; and (3) they can be consistently found even among very intelligent people.

3. Epistemic Vices and the COVID-19 Pandemic

Now, let us frame our discussion about vices in the current COVID-19 pandemic. We believe that the pandemic brought into play a new and important dimension, which involves the specific contexts in which certain human vices may manifest. The idea that virtues and vices are context-dependent is, of course, not something new in itself. It was already proposed by Zagzebski (1996). It seems evident that certain virtues could become vices in certain contexts and that, conversely, certain vices may become virtues in others. Consider intellectual perseverance as an illustration of this claim. In a specific context, say, when a scientist manifests a strong desire to research a certain hypothesis and continues to work hardly and honestly on it (despite numerous difficulties, obstacles, or failures); one may consider this trait as an intellectual virtue. The same desire to work on the same hypothesis but in a different context (one where, for instance, there is extreme competition and lack of respect

and integrity) and one will consider that intellectual disposition as a vice. As Zagzebski brilliantly put it: 'correct cognitive actions are, roughly speaking, those that people with intellectual virtues could or would do in certain circumstances' (Zagzebski 1996, 233).

So, the question naturally arises: what type of context determines which epistemic behavior is virtuous and which is vicious? We can use the concept of epistemic environment (Ryan 2018; Blake-Turner 2020) to try to answer this question. We can define an epistemic environment as the social and cultural structure that can facilitate or hinder a successful cognitive process. To make an example, a modern physicist is in a much more advantageous position than Newton or Descartes were, since she has much greater access to information and knowledge, as well as much more sophisticated technical capabilities and tools at her disposal. This means that the intellectually virtuous subject is now in a better position to form intellectually virtuous beliefs about the nature of subatomic particles, exoplanets, etc. due to the epistemic environment to which she is exposed.

But how did the COVID-19 pandemic change our epistemic environments? (Mazzocchi 2021). Levy and Savulescu (2020) referred to the current coronavirus situation as an 'ideal epistemic storm'. The idea is that the traditional criteria and protocols, which were prescribed to make responsible decisions have, in the context of the COVID-19 pandemic, been attacked and strongly criticized. Biomedical experts and politicians made harsh decisions to counter the spread of SARS-COV-2. Such decisions involved, among other things: closing national borders, enforcing lockdowns, introducing mandatory vaccinations, etc. However, the pandemic was a phenomenon previously unknown to decision-makers in modern societies (the last global pandemic [the Spanish Flu] occurred over 100 years ago). This meant that decision makers were utterly unprepared to face it. Ordinary people found themselves in analogous conditions, only exacerbated by the fact that they have been passive actors, on the receiving end of such epistemically controversial decisions. Under normal conditions most laypeople would probably have deferred to experts' opinions; they would have done so when they lacked specified competence (e.g. about epidemiological protocols). However, experts' credibility as well as authority was weakened and eroded by (among other things) the uncertainty of the situation as well as by the occasional lack of consensus observed among scientists and the unpreparedness that characterized decision makers. These factors contributed to raising significant skepticism towards experts.[7]

There has been a lot of research on the rise of anti-intellectualism and populism in Western societies (Harambam 2017; Ylä-Anttila 2018; Lavazza and Farina 2021a, 2021b). However, the situation with COVID-19 raised the stakes for everyone (even for intellectually virtuous individuals). It is not hard to assume that people who normally trust their doctors and other scientists may possibly have minor doubts about some of their recommendations (who doesn't make mistakes after all?). However, the very same people who (under normal circumstances) wouldn't believe conspiracy theories might, in a stressful situation (such as the COVID-19 pandemic), behave very differently and openly question or challenge such recommendations. What is rational to believe is now affected by the high stakes that are imposed by the pandemic. In a normal situation, being open-minded means that you do not reject (in principle) any alternatives to your views, that you carefully consider objections to your beliefs, and that you are willing to change your beliefs in light of new evidence (indeed a virtuous attitude). More importantly, open-mindedness means that you are literally open to different approaches and solutions to a certain problem (Riggs 2010; Hare 2011). Now, consider the consequences that an open-minded person may face during the pandemic. Being open-minded to a radically different viewpoint with respect to COVID-19 may involve -for instance- considering a possible alternative to the expert consensus about wearing masks in public places or reconsidering adherence to vaccination campaigns (Farina and Lavazza 2021a). The problem is precisely this: the person believes that in being open-minded, she is acting in a rational, critical, and intellectually virtuous manner.

The experts and the decision makers face -to some extent- the same dilemma. They may make decisions about allowing experimental medicine for emergency use, enforcing lockdowns, or closing national borders based on insufficient evidence and mathematical models that could turn out to be false; however, delaying such decisions and waiting for more evidence to accumulate may be dangerous, as it would probably lead to losing many lives (Ferguson et al. 2020; Dente et al. 2022; Lavazza and Farina 2020; Farina and Lavazza 2020; Horton 2020; Pietrini, Lavazza, and Farina 2022). Knowing this context, laypeople may become more skeptical than they would have been under normal circumstances, and they might do so (for the most part, at least) in good faith. This can probably partly explain why COVID-19 echo chambers not only include minorities (ideologically polarized people) but also large swathes of society.

Remember, echo chambers are different from filter bubbles, because a person in an echo chamber is not necessarily unaware of alternative explanations but rather actively distrusts them. This means that people in echo chambers think that they are making a rational choice, even when they deliberately and willingly decide to exclude alternative evidence (even if scientifically grounded). As we know there are several competing explanations for that. One, discussed above, says that there are certain mechanisms evolved over the course of our evolutionary history that still shape our actions and directly determine mistrust towards outsiders. This explanation, we argued, seems to be undermined by recent empirical evidence. Another explanation asserts that certain people are prone to cognitive biases and lack either sufficient cognitive capacities or literacy to make a rational choice when presented with accurate information. This explanation, we claimed, is too simplistic because it fails to explain why vices can be found in highly intelligent people. An alternative explanation, offered by responsibilists, emphasizes the importance of epistemic virtues and vices in the prediction of whether a person will be more susceptible to misinformation. This does not amount; however, to saying that character failing is a sufficient condition to fall into an echo chamber (or a necessary one for that matter). Vices and virtues are certainly crucially important (relevant) factors but, in our view, they are still not enough on their own. Above, we argued that to deal with echo chambers, we also need to consider the epistemic environments in which a particular person manifests their virtues and vices. We showed that the COVID-19 pandemic contributed to the formation of unfriendly epistemic environments because it drastically raised the stakes for everyone. We claimed that blaming certain people (or groups) as being characterized by cognitive incapacity or epistemic vice cannot not be enough. This, we argue, can only trigger further distrust to all sources found outside of echo chambers. The nature of this distrust, we believe, can be explained in terms of epistemic violence.

The concept of epistemic violence was introduced by Dotson (2011). Epistemic violence is the 'a refusal, intentional or unintentional, of an audience to communicatively reciprocate a linguistic exchange owing to pernicious ignorance' (238). Ignorance is not necessarily harmful. For example, if a three-year-old is ignorant about the electoral system of her own country, she does not make any harm to anyone. Ignorance becomes harmful when it is vicious. Dotson identifies two vicious practices underlying epistemic violence: quieting and smothering. The practice of quieting can be illustrated by a case in which a certain minority, say women, is systematically underestimated as cognitive agents, (i.e. their words are considered not credible) (Collins 2000). Suppression or smothering refers instead to cases where the subject suppresses their own testimony due to external factors (Crenshaw 1991, 1256).

In this paper we are more interested in the former practice as we think that it can be used to describe the emergence and development of echo chambers at least -partly during the COVID-19 pandemic- or -in general- in situations where stakes are high. What is the essence of the practice of quieting? In brief, this practice presupposes that a person is denied her status of knower or of reliable informant based on a biased view of the group to which the person belongs. Earlier on, we defined echo chambers as social and epistemic structures or environments, which inadequately assess the information by means of active and vicious quieting of opposing views rather than by accidental omission. It seems to us that epistemic violence in the form of epistemic silencing becomes

widespread, especially when the epistemic environment becomes unfriendly, due to the high stakes in decision-making and reduced consensus about the rational courses of action. This results in the free circulation of misinformation within the echo chamber, which is constantly reinforced by the exchange of like-minded (homophilous) people, and even by contrary evidence, which is painted as paid propaganda meant to harm.

4. Changing Epistemic Environments to Counter Echo-Chambers

In our research -as mentioned above- we adopt a contextualist approach to epistemic virtues and vices, according to which epistemic virtues are realized in an environment. According to this view, subjects and their epistemic virtues are affected passively by the environment (in a benevolent way or otherwise), but at the same time, we are always actively shaping our own epistemic environments. This is a two-way (highly interactive) process and below we will examine how changing epistemic environments may help to counter echo-chambers. We will also review and analyze the role that community and state responsibilities may play in that process.

To achieve this much, we further clarify the concept of epistemic environment, which we introduced above. One may distinguish between *epistemic environments* and *epistemic situations*. Epistemic environments consist of a set of fairly stabilized types of explicit knowledge and rules of thumb to which we usually resort and that are common to everyone in society. Epistemic situations are instead characterized by a set of unstable and temporally various forms of knowledge in which some new elements due to a non-epistemic event with epistemic repercussions (such as the spread of an unknown virus,) or to an epistemic event (such as a sudden paradigm shift in a scientific discipline) disrupt and distress the epistemic environment. Such a disruption can have either a positive or negative valence. If the epistemic situation causes an epistemic actor to express and accomplish their virtuous potential, we have a positive situation. If, on the contrary, the epistemic situation causes the epistemic actor to lose her ideal epistemic stance, then we have a negative situation.

One can use an analogy at the moral level to illustrate these scenarios. When we are on a ship and the ship starts to take on water, panic can break out and some moral actors, faced with the risk of drowning, can lose respect for the principles that they seem to have internalized in their daily life and behave in a selfish and violent manner to save themselves at the expense of other passengers, while others will simply refuse to do so. Based on this interpretive grid (involving both positive and negative scenarios), we could speculate about how to differentiate between interventions in favour of epistemic virtues and in contrast to epistemic vices. For instance, to restore a good epistemic environment (more on this below), we could find out and leverage on epistemic elements (e.g. novelty and unpredictability of the health situation; strong discordance of opinions among experts) and non-epistemic factors (e.g. increased availability of filter bubbles and echo chambers thanks to Internet platforms). In this sense, a pedagogy of epistemic responsibility (more on this below) may qualify as one of the most effective tools available in our hands.

In attempt to favor the emergence of epistemic virtues, we could nevertheless also distinguish between epistemic environments in a narrow and a wide sense. In a wide sense an epistemic environment can be defined as everything that surrounds an agent and affects his chances of acquiring true beliefs about anything. We may call it, the 'infosphere' (Floridi 2014). However, there is also a narrower sense of the term. In this sense, my epistemic environment coincides with the people with whom I choose to communicate, with the particular social groups I frequent, or decide to subscribe to on social media, with the channels that I choose to watch on my TV, etc. This is my immediate epistemic environment. In the wide sense the epistemic environment is the same for everyone and outside of the individual's control (e.g. I am involuntarily exposed to certain information simply because it circulates broadly in the media). In the narrower sense, though, my epistemic

environment is one of my choosing, is the result of my voluntary exposure. Even if I must use media to acquire information, I am by no means a passive recipient of such information. I can always choose to ignore certain media or to control what sources of information may affect the formation of my beliefs.

Changing epistemic environments in a wide sense may require changing legislation, possibly on a national or transnational level, to introduce additional regulations that may block or create an obstacle for the spread of fake news and misinformation. In other words, it will require us to identify epistemic polluters and deal with them accordingly. Other authors before us, already proposed different measures that have been or are being implemented to such an end, with extremely controversial effects (Porter, Wood, and Kirby 2018; Pennycook et al. 2020). These measures involve: putting warning labels, adding professional fact-checking to sources, issuing retractions, and the banning of certain types of content in the social media or in the mainstream press. However, as we argued above, this is unlikely to bear significant fruits, especially for those people who are already inside an echo chamber. This is because such people selectively process the information at the input, so it is the epistemic environment in the narrow sense that matters to them and that needs to be modified if any meaningful change is expected to take place within those people and their attitudes.

However, as we already mentioned, epistemic environments in the narrow sense are (for the most part) under individual responsibility; their change cannot be enforced. Because of this significant problem one could propose to limit the beliefs that we acquire by communication to those uniquely learned from experts. Experts are 'people with certified specialist knowledge, who can however translate it into practical suggestions, decisions, and/or public policies that are ethically more balanced and that ultimately lead to fairer, more inclusive, and more representative decisions' (Lavazza and Farina 2021b, 142; see also [Farina and Lavazza 2021a]). It might be argued that it is intellectually virtuous to show deference to experts. On paper, this proposal seems to be better; however, there might be some problems with it.

Firstly, a person inside an echo chamber may distrust the experts; in fact, they will not trust any person who does not share their opinion and will label them as 'biased', 'bought', 'incompetent' or the like. Secondly, deferring to experts in high stakes context may be (as the pandemic has shown) epistemically problematic because experts might be forced to issue judgments based on incomplete data. Furthermore, one may argue that we cannot delegate all decisions to experts. This would lead to an undesirable epistocracy, according to which only experts are entitled to decide. The idea of an epistocracy in political philosophy was pioneered by Plato in the *Republic* (Cooper and Hutchinson 1997) and subsequently articulated by Mill ([1861] 2013). In contemporary political philosophy this idea has been defended by Brennan (2016). Brennan argues that voters are -in general- incompetent and irrational and should be replaced by people with 'superior judgement". Brennan's idea has been strongly criticized, for instance, by Reiss (2019) and Gunn (2019). In this context, Lavazza and Farina (2020) also showed how certain experts – during the current pandemic- consistently lacked moral (and intellectual) virtues, casting doubts on the sufficiency of epistemic virtues for proper decision making.

The measures discussed above, which include changing legislation, putting warning labels on social media, or recommending deference to experts' opinion, do not fully consider the role of individuals' behaviors in the emergence of echo chambers. To specify such a role, we need to discuss what function individual responsibility may play in this whole process. Early thinkers in virtue epistemology, such as Code (1987), defined epistemically virtuous agent as responsible agents. Being responsible means being motivated to form beliefs in virtuous manners. In the case of knowledge that would mean being motivated to work on one's epistemic environment/situation to ensure that this environment/situation will not use epistemic violence, and the practice of epistemic silencing. We think that preventing epistemic silencing may be instrumental in defeating echo chambers.

When talking about epistemic responsibility, we also think that it is crucially important to distinguish between epistemic and moral blame. Epistemic blame is related to the failure to resort to good epistemic sources and proper reasoning. Moral blame is related to the failure to comply to ethical rules and to commit offences. Epistemic blame does not imply moral blame as one can be blamed for objectively failing to resort to good epistemic sources and proper reasoning, but one can also be deemed as morally innocent since she has not had the opportunities to be epistemically competent.

In this context it is worth noting that some epistemologists questioned the usage of the expression 'epistemic blame', reducing this concept to moral or practical blame. For example, Dougherty thinks that all instances of epistemic irresponsibility can be reduced to purely non-epistemic irresponsibility (moral or instrumental) (Dougherty 2012). Other researchers have criticized this reductionist approach (e.g. Nottelmann 2007; Meehan 2019). Siding with this criticism, we would like to emphasize that when placing epistemic responsibility on an individual subject, we must be aware that there are certain circumstances affecting their cognitive practices (including a person's background, the community in which they were raised, the school where they were taught, etc.), that are beyond the person's control and for which -therefore- they cannot be (morally) blamed [or said to bear (moral) responsibility[8]].

To this end, we should acknowledge that individual responsibility might also be influenced by, for example: state's responsibility (pursued by introducing appropriate legislation) and/or private companies' responsibility (achieved by producing appropriate algorithms capable of fighting the spread of fake news, while not undermining the possibility of dissent; or by government-imposed rules that would require partisan Web sites, and also neutral platforms, to provide links to contents with opposing views (Sunstein 2017). Nevertheless, we maintain that individual responsibility should be the optimal measure and benchmark to implement meaningful actions on this matter, as it largely falls on individual agents to responsibly form their epistemic environments. Again, one may argue that individual responsibility can be partially delegated to other people or institutions; however, individual responsibility cannot be completely taken away from individual agents and offloaded (*tout court*) on the shoulders of experts or of the community (however large) they may represent. This is because, in the end, it is a particular individual who practices epistemic silencing by willfully choosing not to trust the sources outside her echo chamber.[9] Thus, it seems to us that individual responsibility is not easily replaceable by any measure implemented by the state or by society.

In this context, a pedagogy of epistemic responsibility could be proposed, and probably pursued and implemented. Such a pedagogy should be based on a compulsory education that all citizens must attend, and especially be directed at children (Pritchard 2013). In specific epistemic (high-stakes) situations, such as those underlying the Covid-19 pandemic, one strategy against fake-news could be to remove any appeal to general epistemic authorities (the scientific method, science, the scientific community, etc . . .), and to bring everything back to the concrete realization of practical epistemic contents. For example, don't assert that 'science says that vaccines are effective', rather say that: 'so far 18 clinical trials have been carried out involving 92,000 people in 19 countries, with a control group of 46,000 people. The overall results, which were published after peer-review, showed that after three months in the first group 5% of participants fell ill while in the second group 78% fell ill'. Or avoid saying: 'evidence-based medicine is more reliable than homeopathic medicine', rather say 'each molecule must be tested objectively and repeatably to assess the extent to which it contributes to the improvement of the patient's condition, excluding all other possible causes'.

Similarly, do not say: 'Professor P claims that giving antibiotics is useless so non-experts cannot claim that they are useful to cure Covid-19'; rather assert: 'those who want to claim that the virus can be cured with antibiotics must provide clear and objective data from a trial in which only antibiotics were given to a group of patients for a certain period of time'. In other words, people should be made aware that epistemic claims carry an epistemic responsibility and that that involves understanding, appreciating, and ultimately valuing the outcomes of an epistemic position. Being epistemic agents should not only be a value – of course (Pritchard 2009); it must also be made explicit

that it comes with significant moral and ethical consequences. False or unjustified knowledge can cause dramatic effects in people's lives, including (in the case of Covid-19 discussed above) severe health damages up to and including death. The pedagogy we are proposing could then perhaps envisage, for those responsible for repeatedly spreading misleading messages, some negative consequences.

This could be done either for pedagogical or coercive purposes. In the latter case, one might set up a threshold for considering an individual as no longer merely exercising his or her freedom of thought. If that threshold is overcome, then the individual becomes a propagator of a false message and thus an irresponsible epistemic agent, who can and should be, excluded from public communication. Perhaps one could also envisage mechanisms to sanction this malicious epistemic irresponsibility. Indeed, it seems that a distinction can be made between culpable epistemic irresponsibility (when the individual is found to lack all the tools necessary to be a fully responsible epistemic agent) and malicious epistemic irresponsibility (in which the individual wilfully violates the principles that a responsible epistemic agent should follow) (e.g. US Supreme Court's case law, specifically Curtis Publishing Co. v. Butts (1967)).

In general, epistemic responsibility seems to be grounded in the basic concept of truth, understood as 'that speech which says things as they are is true' (Plato, *Cratylus*, 385c). This concept of epistemic responsibility plays a pivotal role in democratic and liberal societies, as it is a prerequisite of every legal system and ultimately guarantees cooperation between citizens.

We may therefore characterize a good epistemic environment as an environment in which epistemic virtues (such as truthfulness, honesty, sincerity. accuracy, and transparency), hooked and welded on a truth function, prevail. This is not a trivial assumption to make as it may seem, especially if we frame it in opposition to postmodern traditions that defended a different view. According to such traditions:

> when viewed from the level of a proposition on the inside of a discourse, the division between true and false is neither arbitrary nor modifiable nor institutional nor violent. But when we things on a different scale, when we ask the question of what this will to truth has been and constantly is (. . .) the type of division which governs our will to know, than what we see taking shape is perhaps something like a system of exclusion, a historical, modifiable, and institutionally constraining system (Foucault [1970] 1981, 54).

Such postmodernist traditions may be used to bring certain political instances (such as claims and rights for minorities) to the fore. In doing so, however, they may expose themselves to potentially devasting criticism; namely the impossibility of having a way of affirming non-relative values on which to ground an analysis of the present. For this reason, an epistemic environment capable of promoting and endorsing non-relative truths appears to be more desirable, especially if we consider the protection of minorities.

It has been proposed that alethic rights exist (D'Agostini and Ferrera 2019). Such rights are not only related to epistemic features but also to ethical and pragmatic values and interests. These rights include rights to be correctly informed and not to be deceived; to receive adequate education; to have reliable epistemic authorities; to live in a political and social environment where these rights are recognized and protected; to live in a society where the importance of truth is recognized (D'Agostini and Ferrera 2019). The affirmation of such rights does not guarantee their respect per se. However, they can be considered as one of the tools of education, thus contributing to the promotion, appreciation, and further spreading of epistemic responsibility.

However, the existence of rights also entails the presence of duties that guarantee the enjoyment of those (alethic) rights. In this sense, disseminating information that is as reliable and verified as possible becomes a duty towards fellow citizens. To enforce duties, actions of different kinds can be taken, including coercive ones. Coercive actions are those that require those who disseminate news on sensitive topics through public channels or platforms run by private companies to make explicit the source of their information (scientific article, personal observation, simple opinion). The media could be -for instance- strongly advised to have an epistemic code when dealing with sensitive

topics, such as in this case the SARS-Cov-2 pandemic. Scientific quality (e.g. h-index or number of biomedical citations) of all invited speakers should be highlighted, in addition to academic or other affiliations.

However, the coercive strategy -in our view- cannot be the preferred one both because of the maximum freedom and autonomy that must be granted to each citizen and for strictly epistemic reasons. No one is in possession of the complete truth on any subject. Good cognitive practices and truthful discourse emerge from a cacophony of voices, from trial and error, as the history of science also shows. The idea of a pedagogy we are advocating here should therefore target the two epistemic excesses that contributed to poison public discourse in recent years: i. the belief that one knows more than others, and ii. the belief that no one really knows anything. Countering dogmatism and nihilism is a democratic aim that is aimed at improving the epistemic, and therefore the existential condition of each and every one of us. Doing so may also help us dealing with echo chambers.

5.　Conclusion

Epistemic vice is a prominent factor in creating echo chambers. Epistemic vice prevents us from acquiring truth and knowledge. We identified several potential epistemic vices that may be found in echo chambers, however, we observed that epistemic violence, especially in the form of epistemic silencing, can be considered as the most pernicious epistemic vice. This is not just an individual vice but rather a combination of epistemic properties of an agent with its environment, which creates socio-epistemic conditions for the emergence of echo chambers. We showed how this situation was worsened by the COVID-19 pandemic, which created high-stakes contexts for everyone, experts and laypersons alike. We maintained that -for various reasons analyzed above- it is mostly (but not uniquely) the responsibility of the individual not to allow epistemic silencing and ensure a friendly epistemic environment for everyone.

Responsibility thus becomes a crucial virtue, not only at the epistemic level but also at the civic one. A well-ordered, open, and inclusive society must guarantee to its citizens a good epistemic environment and some alethic rights that can give everyone the possibility of flourishing, both epistemically and morally; that is, of achieving responsible autonomy.

However, having analyzed the role of epistemic vice in the formation of fake news and echo chambers we should acknowledge that the virtue and vice approach is to be used with caution, especially in politically sensitive issues, where people are likely to label their opponents as intellectually incapacitated or vicious simply because they share opposing political views. Therefore, an inclusive pedagogy that is primarily pursued and implemented with non-coercive means, aimed at promoting the worth and merits of a good epistemic environment (one that does not uniquely require individual responsibility), should be preferred. Only when great threats to good epistemic environments materialize, we may resurrect to coercive means. However, those should only be adopted to flank (and not to replace) our suggested pedagogy of virtues and vices. In brief, it is not a matter of getting into an ideological fight; rather we should promote the establishment of mutually beneficial epistemic, liberal, and democratic attitudes at all levels.

Endnotes

1. Regina, Rini. *How to Fix Fake News*. The New York Times, Oct 15, 2018. https://nyti.ms/2QPaqRl, https://cs50.harvard.edu/x/2021/labs/10/fakenews.pdf.
2. Mike, Rothschild. *Here is every QAnon prediction that's failed to come true*. Daily Dot. https://www.dailydot.com/debug/qanon-failed-predictions/.
3. Lois, Beckett. *QAnon: a timeline of violence linked to the conspiracy theory*. The Guardian, Oct 16, 2020. https://www.theguardian.com/us-news/2020/oct/15/qanon-violence-crimes-timeline.

4. A full-scale analysis of evolutionary psychology transcends the scope of this paper. For a comprehensive overview of this research paradigm as well as of its ramifications and implications in the cognitive sciences, please refer to Farina (2016).
5. See Johnson and Levin (2009) for a helpful review and Lauwereyns (2011) for an integrative and interdisciplinary account of the function of bias in cognition.
6. (see Meyer, Alfano, and De Bruin 2021 for a nice, albeit not exhaustive, taxonomy).
7. Of course, there have always been science denialists and those would not have exercised deference in any case; however, those -under normal conditions- would have been a small minority.
8. This is especially true for minority and underprivileged groups, who often are themselves the objects of epistemic injustice and epistemic violence (Fricker 2007).
9. Of course, the concept of epistemic silencing cannot be applied vis-à-vis to known bearers of fake news. We remind again that epistemic silencing is defined as pernicious ignorance (the will to not know). But we don't allow fake news to spread precisely because we know the origins of those fake news or have positive evidence against them.

Disclosure statement

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