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A CONFLICT BETWEEN DOUBT AND EQUALITY

ABSTRACT

Miro Suomela: A Conflict Between Doubt and Equality
Candidate Thesis
Tampere University
Philosophy
12-2021

In this thesis I analyze how contemporary findings in philosophy of science regarding the effect of propagandists on scientific consensus matter to Elizabeth Anderson's notion of democratic equality. As main sources I present three contemporary articles studying the effects of industry on the generation of scientific consensus. The basis for these studies is a novel mathematical modeling technique for the workings of epistemic networks called network epistemic modeling. The authors of these source articles name critical mechanisms for the purposes of the analysis in my thesis, such as industrial selection, selective sharing and biased production.

I articulate from Elizabeth Anderson's notion of democratic equality its three requirements for someone to be an equal in Andersonian terms: a) the capability to function as a human; b) the capability to access cooperative production; and c) the capability to function as a democratic citizen. With the use of these conceptual tools then, I analyze possible tensions that arise for an Andersonian equal given the findings from the philosophers of science ring true.

By the end, my analysis hints that at least a) and c) from Anderson's equality framework are notably compromised by the effects of propagandists on scientific consensus – if the literature from the philosophers of science is to be taken as valid evidence of these processes.

Keywords: philosophy of science, equality, social epistemology

The originality of this thesis has been checked using the Turnitin OriginalityCheck service.

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1. INTRODUCTION

There is much talk about equality in our Western society, questions of how our society should best enable everyone to live their individual lives as equally functioning and capable human beings. Our Western ideals have come a long way from the feudal ages past when individuality and equality were at best a discussion for the noble and other highborn, from there it has advanced to the point where the discussion in the present has spread to the whole of civil society, resulting in us almost universally advocating some form of equality in the West.

Though equality is as banal an aspect of life as breakfast for the sophisticated modern Western individual – it could even be described as a principle moral structure[1] – there is much discussion and disagreement about what it is in philosophy. Even if equality is mostly accepted as one of the key building blocks of modern society in contemporary philosophy, there is still disagreement on how exactly it should be implemented. In the contemporary discussion the key questions have to do with for example the relation of justice and equality, the question of what it is that is to be equalized, among whom it should be equalized, and what equality means within a comprehensive theory of justice, and in addition there is much contest on the precise notion of equality. (Gosepath 2011)

In this work my interest is though not in evaluating which notion of equality best fits which purposes. Instead, I intend to analyze the light some new findings in philosophy of science regarding the influence of industry on scientific and public bias might offer us with regards to functioning as an equal citizen in our modern information ecology, and as I will argue, an equal citizen as a whole.

The motivation for this work goes back to a personal curiosity towards communication and what it means to be a meaningful part of society, and an intuition that something is amiss at least with regards to communication in our society. These questions rather organically first guided my open research towards questions of justice and equality – first I would need to have some idea of what justice is to be able to formulate what could be amiss for an epistemic agent in society. After having done my pro-thesis on Elizabeth Anderson's *What*

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[1] All these propositions ought to be attributed towards a citizen in the Western world from here forward, even when not explicitly stated. The rest of the world may vary with their notions of justice.

is the point of Equality (1999) I found myself at a lack of interest in diving deeper in the questions of equality, for a sufficient notion of equality, *democratic equality*, was formulated by Anderson in her paper – a sufficient notion at least for my purposes for now. So, instead of a deeper dive into equality, I found a connection point I was looking for regarding the aforementioned question about communication: there was a connection between the question of what being equal in a democratic society is and the way our information ecology works, or rather a tension, to be more precise. If one needs to know of their opportunities in a real and concrete way to function as an equal (Anderson 1999), how then can one hold on to their democratic integrity in a seemingly shrouded and even disinformed information ecology?

I wanted to find out more about this tension, whether there was any philosophical merit to the thought and that led me to research social epistemology, which I found out to have a link to philosophy of science. My agenda was to somehow, through the work of accomplished academics and thinkers, try to formulate this tension into a simple enough philosophical research question for a candidate's thesis, for I had no idea about the amount of work already done on the subject. By the end of this paper here, as expected, I have only been following the tracks of a much bigger beast, the rest of which is yet shrouded in mystery.

Let us hope this surface level inquiry then offers us some substance, or at least some gasoline for the question machine on the trail forward, towards my master's thesis – one can also humbly hope there to maybe be some novel food for thought for the reader of this thesis.

1.1. Method and Structure

This paper is going to be an exploratory look into contemporary philosophy of science and social epistemology and the questions some of their findings seem to raise about navigating a just democratic route in modern society. The conclusion itself is loaded with moral presumptions, and as such will be investigated with Anderson's view of democratic equality.

The main evidential sources for the analysis of this paper are three papers in contemporary philosophy of science that use network epistemology models to simulate how industry can affect scientific consensus through (a) means of industrial advertising (Holman & Bruner 2015); (b) through industrial selection (Holman & Bruner 2017); and on the other hand, (c) how witting or unwitting propagandists can affect public belief through selective sharing or biased production (Weatherall, O'Connor & Bruner 2020).

The structure of this paper is as follows:

First in chapter 2, I will introduce the aspects of Anderson's democratic equality that I deem relevant for the scope of this inquiry, namely her three necessary capabilities for an individual to function as an equal in society.

Then, in chapter 3, I will briefly explain what network epistemology models in social epistemology and philosophy of science are to help build some grounds for understanding the upcoming main sources for the analysis.

In chapter 4, I will go over some of the methodology and main conclusions from the above-mentioned network epistemology simulation papers, especially relating to the democratic integrity of an epistemic agent in Anderson's terms.

Finally, in chapter 5, I will attempt to formulate a coherent argument concerning the implications of Weatherall and others' work regarding scientific and public epistemic bias, and how this bias might not only be worrisome for the ideals of unbiased knowledge in the scientific community, but also for an individual trying to navigate their social epistemic world and make decisions as an "Andersonian equal". Timothy Morton's (2013) concept 'hyperobject' will be used as a tool for some of the analysis here.

The main concepts of this paper in their order of appearance in the main text are as follows: *network epistemic modeling, democratic equality, Sen's functionings and capabilities, intransigently biased agents, industrial selection, the tobacco strategy, witting and unwitting propagandists, selective sharing, biased production, incentivized hyperobjects.*

2.   THE CAPABILITIES REQUIRED FOR AN ANDERSONIAN EQUAL

A necessary groundwork for answering questions about democratic properties is to choose a framework through which to do this. I have chosen to use Elizabeth Anderson's (1999) *democratic equality* for this, and precisely her necessary capabilities for an individual to function as a democratic equal in society. She defines three of these necessary capabilities for us.

For her definition, Anderson uses Amartya Sen's capabilities approach as the substantive dimension of equality to be equalized amongst a society's citizens. For Amartya Sen people have *functionings*, such as cycling or reading, eating, or playing chess, making love or being inspired, in other words, these functionings are the states a person *can and would want to have* in general. *Capabilities* then are from these functionings those that a person has the material and personal resources *to access*. For someone who doesn't have a bike, cycling is only a functioning and not yet a capability - until necessary resources are gained or available to purchase a bike, that is. Or, more closely regarding to citizenship or some other democratic group-membership: if a person has the functioning to take part into democratic decision-making but is bound to a wheelchair, then for that functioning to become a capability for said person, there must be a way for her to travel to the places of democratic influencing. An obvious example of such a capability not being satisfied and remaining but a functioning, would be an election locale with no ramps for wheelchairs and the like. (Sen 1980)

From Sen's work Anderson forms her capability-bases necessary for equal citizenship (Anderson 1999, 317-318): firstly, an individual needs access to functioning as a human being. This means that they must have access to the means of fulfilling their biological needs and they must have access to the basic conditions of human agency. Fulfilling one's biological needs is to have nutrition, to have shelter, to be able to sleep an adequate amount for one's everyday needs, and such. For one to have access to human agency on the other hand, they will need to know of options available to them on which to practice their psychological autonomy. Psychological autonomy being here exactly what the name suggests.

So, I will infer from this that an Andersonian equal must also have epistemic clarity of the choices that affect their physical and mental wellbeing in society. For how can you be considered an autonomous agent if you don't know the extent of the effects your decisions bring upon you? For this premise we will have to suppose that there is 'a necessary amount of knowledge' for a person to have for sufficient autonomy. I would also say that the amount of knowledge required for said autonomy would be somewhere in the consensus of the scientific community, and that is precisely what we will have to suppose as another premise for the epistemological claims in this paper. We will not have to make any claims for infallible scientific knowledge here for the argument to hold its rigidity, it is completely reasonable to suppose that consensus in the sciences is fallible – we will just suppose that scientific consensus is the best *available* and *sufficiently* authored knowledge for a person's capability to function as a human.

Later, I will argue that if the simulations regarding the effect of industry on scientific consensus are to be believed, they are violating especially this first capability-requirement in the Andersonian democratic framework through slowing scientific decision-making and even skewing the consensuses made.

The second place on Anderson's capability-list is occupied by the capability to *function as an equal participant in cooperative production*. This means that one must have effective access to the means of production in their system, which requires for them to have access to education, freedom of occupational choice, and the freedom to enter into agreements and make contracts with others in the system. Basically, for an Andersonian equal to satisfy this capability he needs to have satisfactory access to the means of making one's living. This capability is not so directly influenced in the analysis of this paper, but there is possible indirect influence on it.

Lastly, Anderson necessitates for the democratic equality of an individual the capability to function as a citizen. This means effective and equal access to political participation, such as voting and freedom of speech for example; the third capability also requires effective access to the goods and relationships of civil society, which include the possibility to have public relations as well as private relations. We will find that there is a very plausible conflict here regarding to the effect of industry on opinion-forming in the modern social media.

So, the three Andersonian capabilities to keep in mind here before we dive into the philosophy of science of things are:

(a) the capability to function as a human,
(b) the capability to access cooperative production,
(c) and the capability to function as a democratic citizen.

3. NETWORK EPISTEMIC MODELING

Kevin Zollman (2007, 2010) was the first to use the network epistemic framework in philosophy of science to formulate the epistemic interactions inside a scientific community – a framework that was initially formulated by economists Bala and Goyal (1998) for modelling how individuals learn from their neighbors.

In the model we have agents in a network of a chosen variety, where the agents can be for example all connected to each other, or it could be that only some of them are connected to each other, with the arrangements of connections between agents varying. In Zollman's model, the agents must decide between some two options,[2] from which one is the better option. In our case of scientific research, the question to answer could be for example "which medicine, *A* or *B* is the better medicine for a particular disease?" In the model both options have an intrinsic value between 0 and 1 of their efficacy and each agent, or scientist in our case, has a particular credence in either option being preferable to the other. For example, in *Figure 1* we see the black nodes representing a scientist who believes option *B* to be the preferrable one of the two and the white nodes representing scientists who believe in option *A* being preferrable. The simulation is set in rounds, and on every round, scientists will test their hypothesis (*A* or *B*) and afterwards update their credence according to Bayes' rule based on the results of their test and their neighbors' credence. When the overall credence

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[2] It could be that the modeling allows for more than two options from which to choose from, but I do not yet know the inner workings of network epistemic modeling closely enough to give a definitive answer to that. At least in all the examples explored in this paper there are only two options for the scientists to choose from.

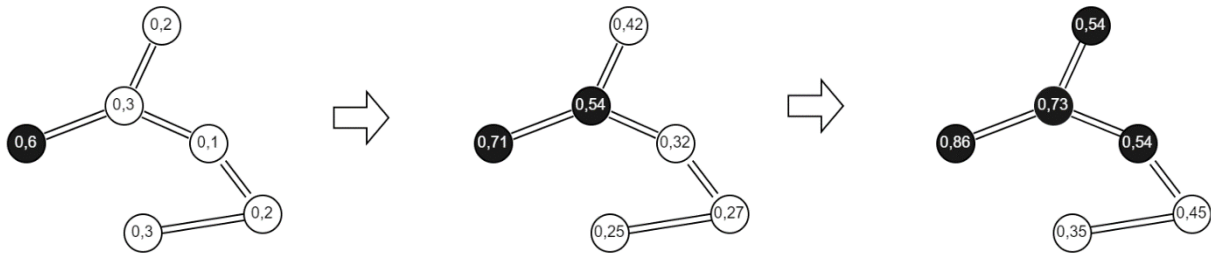in the community exceeds a certain given threshold towards either option *A* or *B*, the simulation ends.

Figure 1 A visual simplification of a network epistemic framework in three instances. Every time the credence of an epistemic agent rises above 0,5, or in other words when they start to believe in option B as the better option, the node will be shown in black. Furthermore, as can be seen, the nodes an agent is connected to as a neighbor affect the credence of the agent too.

I will in the next section showcase the main three sources of this paper (Holman & Bruner 2015; Holman & Bruner 2017; Weatherall, O'Connor & Bruner 2020) on the mechanism of scientific and public bias. As stated before, all of these papers use network epistemic modeling as their basis for research. In the conclusion of this paper, I will reflect the contents of the source papers on Anderson's three capability requirements for equality.

4. THE EFFECTS OF INDUSTRY ON SCIENTIFIC AND PUBLIC CONSENSUS

Bruner and Holman (2015, 2017) explore how industry affects the scientific community, while Weatherall, O'Connor and Bruner (2020) explore how influencers in general can affect the making of policy in the scientific domain. To do this, Bruner et al. build upon Zollman's (2007, 2010) initial model of network epistemic framework. First, I will explore Holman and Bruner's (2015) results on industry advertising, then their results on industrial selection (Holman & Bruner 2017), and lastly, I will explore the effects of intentional or unintentional information biasing on public consensus (Weatherall, O'Connor & Bruner 2020)

4.1. Intransigently Biased Agents

Holman and Bruner (2015) use network epistemic modeling to demonstrate a situation where there are intransigently biased agents in scientific communities.

4.1.1. A Case of Harmful Pregnancy Hormones

In their paper, Holman and Bruner attempt to answer questions raised by the frequent use of diethylstilbestrol (DES) in medicine from the 1940s to the 1970s, a synthetic estrogen used for problems in pregnancy for example. It was well documented throughout the decades that DES had carcinogenic effects. Still, it took all the way to 1971 for the drug to be withdrawn from treatment.

Holman and Bruner ask then, what might explain the continued use of an ineffective and dangerous drug, even when the dangerous side-effects were known?

They give a few possible answers for the situation: maybe the use of the drug could be explained by studies that were published in medical journals; or maybe the opinions of the medical elite were in favor of the drug; maybe the doctors just anecdotally witnessed the drug working; and lastly, maybe the information provided by the pharmaceutical companies had some bias in it.

The first guess is probably not an answer to Holman and Bruner's question, because as they explain, DES was not supported by the medical literature. In addition to that, regarding the second option, the view of the medical elite, there were internal memos documenting that the experts rejected the drug.

Bruner and Holman's proposition of the doctors being anecdotally convinced by the efficacy of the drug is also fast rejected by the duo, because it would have needed a random set of births which all went well to show a doctor the efficacy of the drug. Considering the cosmic fortune necessary for such an occurrence, when the meta-data shows the drug to have been inefficacious and even harmful, it seems unlikely. Another situation for the doctors to be optimistic about the drug, that Bruner and Holman ponder, is that the doctors could have been for some reason so sold on the intervention that failures were perceived as successes – something Holman and Bruner's fourth possible answer to the question could also support.

The fourth answer, mis- or disinformation from the pharmaceutical companies, is the one Holman and Bruner lean on, and the data suggest that there is reason for supposing its effects to be major. There was an industrially funded manual, *Physician's Desk Reference,* that over half of the doctors used daily. The manual had DES as an efficacious treatment for the problems with pregnancies. Holman and Bruner describe this manual and its detailer to be an *intransigently biased agent*, an agent whose workings they attempt to simulate within their epistemic network model. (Holman and Bruner 2015, 959)

4.1.2. How to Thwart Intransigently Biased Agents

What Holman and Bruner observe from their simulations is that when epistemic agents are in but small networks and always in contact with an intransigently biased agent, there is little to no hope of converging on the better conclusion[3] out of the two options on a scientific question. The duo claims this to have been the case with DES: the doctors had small circles, and most of them consulted an intransigently biased agent, in this case the manual from the pharmaceutical companies, for their medical treatment.

Fortunately, Holman and Bruner analyze two ways to thwart the effects of intransigently biased agents. They gather these results after changing the parameters of the initial static model offered by Zollman (2007, 2010) into a more dynamic one that accounts for an asymmetric belief between its epistemic agents – that is for example an older researcher having more of an impact on a younger researcher than vice versa. These asymmetric beliefs would also change based on the results of each round. For a research community to steer away from the epistemic bias of intransigently biased agents, Holman and Bruner find it to be most beneficial 1) to have as many connections as possible, that is to have as large and connected network as possible between the scientists; and 2) the scientists need to become more aware of the intransigently biased agents and not take them into account.

One more point to gather from Holman and Bruner's (2015) simulations is that if the intransigently biased agents fail to be subtle in their induced bias, the epistemic agents in the simulation will notice their effect almost every time, something Weatherall, O'Connor and Bruner (2020) also show.

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[3] Better for truth-seeking in i.e. science, not necessarily better for the biased agents.

The intransigently biased agents will be in tension with at least Anderson's capability requirement of being a human. We will delve deeper into this in chapter 5.

4.2. Industrial Selection

Holman and Bruner (2017) define a distinct mechanism for the scientific community to become biased without any of its epistemic agents being biased – or whatever bias the epistemic agent might have, is at least not for the benefit of an outside interest. They call this mechanism *industrial selection*. Rather than scientists being malleable to conflicts of interest and hastily changing their epistemological bias to resonate with the interests of industry, Holman and Bruner show in their simulations how you can have the researchers be "epistemic angels", as they say, and still as a community fall prey to industrial bias because of industrial selection. Basically, what Holman and Bruner mean with industrial selection then is that industry, through focused funding of research, *selects for* the research that then actually gets made and promoted – which becomes evident in the upcoming example.

4.2.1. A Case Study: The Cardiac Arrhythmia Suppression Trial

As a case study Holman and Bruner use a paradigm case for randomized trials in the field of philosophy of science: The Cardiac Arrythmia Suppression Trial (CAST). These trials showed that, not only was the drug ineffective, it also dramatically increased the death risk for a patient – and death from a heart attack in particular, precisely what the drug was supposed to treat. Because of its wide prescription and harm, it is estimated that the death toll of the drug is at least in the tens of thousands, if not in the hundreds of thousands, Bruner and Holman cite.

There were two meaningful schools of research methodology during CAST, Holman and Bruner iterate: one concerning themselves with the efficacy of the drug depending on the actual death rate of the patients, and another studying the antiarrhythmic effects of the drug as a correlate to its efficacy. From these two schools the second one had the method that was the one with the fastest results. Though the drug did lower arrythmia in patients that had it administered to them, it was a mistaken hypothesis to correlate this result with actual decrease in mortality rates. The faster antiarrhythmic method was also chosen for industry partnerships, unsurprisingly. In addition, both groups of researchers were shown to work with epistemic integrity throughout their research, not even the researchers with the incorrect

hypothesis had been shown to change their methodology since receiving funds. They didn't have to, Holman and Bruner argue, for the industry *selected* for their industry-favorable research.

4.2.2. Simulating Industrial Selection

Holman and Bruner manage to replicate the effect of industrial selection in their simulations. Basically, they simulate the situation with three alterations to Zollman's (2007) model. First, the scientists are given varying productivity during a time period. Second, and most importantly, the scientists have differing *methodological biases*, which means that no matter what the actual success rate of a drug is, they will still have an implicit limited success bias on attaining one of the two options – think of someone with a worse set of lab-equipment compared to the norm as an example of this bias. Thirdly, an exit-entry model is introduced, which will have one scientist after every period leave the group with probability e, and be replaced by a new one. This new scientist will inherit the methodological bias from another scientist k, and this inheritance is determined by the productivity of k.[4] An example of inheriting methodological bias from another scientist would be for example when a new scientist gets trained by an experienced scientist in some domain of research. Holman and Bruner believe these dimensions to accurately depict the function of an epistemic community. (Holman & Bruner 2017)

In their model, Holman and Bruner show that even with the slightest industry funding and only minor selection for an industry-favorable outcome, the probability of the scientific community converging on the epistemically better option is slight. This holds true even if you have private, distinct from the industry, non-profit organizations funding the research. With certain parameters non-profit funding can even worsen the situation when combined with industry funding.

Holman and Bruner's major takeaways from their research are that no individual level intervention to industry funding – being knowledgeable of one's bias, being diverse in choosing funders etc. – alone suffices for countering industrial selection. They argue that only policy on the community level is enough to thwart the effects of industrial selection. It

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[4] The exit-entry model described here is adopted from evolutionary biology – it is called the Moran process, and in evolutionary biology it is used to approximate the behavior of cultural and biological evolution. (Holman & Bruner 2017)

is to be noted, that Holman and Bruner also highlight an insidious aspect of this mechanism: especially since the scientists' integrity still holds, the effects of industry bias through industrial selection fly wholly under the radar of the whole community. With the findings of Holman and Bruner's analysis, they note, at least an open discussion can be had with industry scientists concerning the situation, as their epistemic integrity is now clarified. (Holman & Bruner 2017)

4.2.3. Initial Reflections of the Effect of Industry on Democratic Integrity

We have seen ways in Holman and Bruner's (2015, 2017) research in which the industry can and does affect the scientific community. I would argue that there is a violation to be drawn against being an Andersonian equal just from these two papers' findings. If the capability of an Andersonian equal to be a human requires transparent knowledge of their options (Anderson 1999), and industrial selection has the capability to influence the scientific consensus on medical fields, then what keeps it from having such influence on other fields of importance for individual wellbeing? Say, if the industry had its claws on research made on nutrition for example, then you would not be able to sincerely give an individual an adequate expert opinion on how to best feed their bodies, because there is a plausible skewness of the nutritional information due to industrial selection. Remember, even minor promotion of research directed towards industry favorable outcomes is enough to select for scientific consensus in favor of the incentives of industry. There is no need to tamper with the researchers' epistemic integrity. As a matter of fact, there is no need to do anything but promote alternative hypotheses to the truthful one to get the job done, as we will see in Weatherall et al.'s (2020) article regarding industry-manufactured doubt.

4.3. The Tobacco Strategy and its Unintended Variants

Two historians, Oreskes and Conway, in their book *Merchants of Doubt : How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (2010) explore how the tobacco industry strategically manipulated public belief regarding the connection between smoking and lung cancer. They name this act *the tobacco strategy*. Because a mechanism in the dispersed domains of sociology and psychology is not easily pinned down to one single causal factor, Weatherall, O'Connor and Bruner (2020) aspire to simulate this effect, and through network epistemology modeling claim to have strengthened the evidential basis for Oreskes and Conway's original claim.

4.3.1. Selective Sharing and Biased Production

Weatherall et al. (2020) generalize this 'tobacco strategy' into a mechanism of industry propaganda, which uses two ways to foul the data: *selective sharing* and *biased production*. They show these effects with two new epistemic agent types added to the previous models in addition to the scientists. The *policymaker* is an agent in the model that provides no evidence for the other agents but listens to evidence from some set of the scientists and propagandists. The *propagandist* is an agent of biased information sharing whose work differs slightly in the two information skewing methods, selective sharing and biased production. In the models for selective sharing, the propagandist chooses from the scientists' evidence which to forward to the policymakers, with a tendency to favor the unpreferable option to truth-seeking. It is important to notice that the propagandists do not tamper with evidence itself, they only tamper with the total sample of the evidence seen by the policymakers – in other words they grow the proportion of evidence supporting the unpreferred theory in the whole set of data. In the biased production models, the propagandists produce their own science, and only share the results that favor their cause. Importantly, the science produced is once again well-made science with no tampering of the evidence.

Weatherall et al. (2020) show that even a single propagandist sharing evidence to the policymaker with the aforementioned methods severely manipulates the ability of the scientific community to converge to the preferrable conclusion on a scientific question. Even more to the detriment of the scientific community, Weatherall et al. again show similar mechanisms to Holman and Bruner's (2017) industrial selection: the more subtle the data-manipulation is, the more likely it is for the policymakers to converge to the cause of the propagandist.[5] To make matters worse for the average person, if industry combines selective sharing with industrial selection, the effect is exacerbated. Notably, while biased production is a viable method for the propagandist to manipulate scientific consensus, it is

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[5] Zollman (2007, 2010) actually shows that the longer scientists get to test the evidence (more rounds in the simulation) the more likely they are to converge on the preferrable option. This 'transient diversity of opinion' is put into tension by Weatherall et al. (2020): It seems that while time with the problem at hand does tend to produce preferrable scientific consensus, it looks that at the same time the longer the scientific community is stuck on a question, more the likely is *the public* to be affected by the propagandist, who now has ample time to do their work on the evidence-pool.

nowhere as cost effective for the propagandist as simple selective sharing of the subset of data. (Weatherall et al. 2020)

4.3.2. Unintentional Bias-Generation

So far, we have only explored intentional influencers of scientific consensus, Weatherall, O'Connor and Bruner (2020) generate a third trial for their modeling, one with unwitting propagandists, *journalists*. In this model the propagandist is replaced by a new agent, journalist.

The journalist is given three methods of evidence-sharing. The first method of sharing in Weatherall et al.'s model is the *fair method.*[6] The fair method is a formalization of 'fairness doctrine', a doctrine mandated by policy in the US from 1949 to 1987 for journalists to always share the opposing argument for a contested topic at hand. In the fair method, after each round, a journalist shares one piece of evidence from both sides. In the second method of sharing, *the random method,* the journalists share the evidence of two random studies from the whole set. Thirdly, in *the complete method,* the journalists share all available evidence each round. The journalist does not produce evidence themselves and in addition this time the policymakers only listen to the journalists.

Weatherall, O'Connor and Bruner (2020) show that applying the fairness method severely negatively affects the convergence of the public on the preferred theory for truth-seeking, as the random method gives the public much more transparency and the complete method makes it nigh impossible for the public to converge on the worse scientific opinion. It is important to note here that, as Weatherall et al. (2020) mention, Oreskes and Conway (2010) argue that the fairness doctrine had a significant effect on how the tobacco industry was viewed by the public. On top of that, the journalists, in all likelihood, were completely well-intentioned. Still, the mechanism is identical to the one generated by the involvement of a witting propagandist.

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[6] Weatherall et al. (2020) never call these sharing methods for the journalists '*<insert name> method*', but for the sake of paraphrasing I decided to sum them into terms.

5. A CONFLICT BETWEEN DOUBT AND EQUALITY – AN ANALYSIS

I have given you an exploratory look at contemporary philosophical research on the effect of a witting or an unwitting proponent on both scientific and public epistemic consensus. As shown, the proponent can be the industry (Holman & Bruner 2015, 2017) or some other unnamed propagandist (Weatherall, O'Connor and Bruner 2020). If these papers' epistemic network modeling paints a picture reminiscent of our actual reality, these inquiries tell a frightening tale of epistemic vulnerability at best and are a vision of violation on our objective ideal of science, and to that extent, a violation on our democratic integrity at worst. Or so I am to argue.

Weatherall et al. (2020) reach upon the conclusion that their modeling effectively cements the hypothesis from Oreskes and Conway's (2010) primary analysis: the tobacco strategy works, and it most likely was used by the tobacco industry; and since it works so well, it is very likely to be used again.

What does this all mean for an Andersonian equal? Given that an Andersonian equal needs to have (a) the capability to function as a human, (b) the capability to access cooperative production, and (c) the capability to function as a democratic citizen, we now have a concrete framework to analyze the conflict between equality and the above findings.

5.1. (a): Tensions in the capability to function as a human

As I previously already touched on, (a) can be easily violated by industrial selection, as was the case with my abstract account of nutritional research. If one cannot access an adequate expert opinion of the best knowledge at hand, how can one be expected to make liable decisions concerning their health?

The effect of intransigently biased agents channels into this same violation: take the studies around diethylstilbestrol. There is no way an ordinary person would have necessary epistemic reach to come to any sensible, health-preserving conclusion about the options they are given if the doctor administering the drug themself is having their medical opinion skewed by an intransigently biased agent. This violation becomes extremely alarming when

you consider the fact that in the DES-case, the drug was administered on expecting women mostly. Be the treatment on whomever though, the one looking for medical care must be able to trust that the science their treatment is based on is a result of as unbiased medical research as possible. This is the only way a person can be psychologically autonomous in their health decisions, I would argue.

In a similar vein (a) is blatantly violated by the tobacco strategy. If there are powers at play that corrupt the epistemological playing field for policy makers by applying doubt into the information mixture, without the policy makers, or anyone else for that matter even knowing this, it will not take a complicated inference to see (a) being put in direct violation. Within a 'tobacco strategy', like before with the intransigently biased agents, the public has no access to the adequately best expert opinion, and thus cannot make decisions concerning their wellbeing that are based on their psychological autonomy – at least not to the extent of getting out of their choice what they actually gambled for.

What makes the harm of the tobacco strategy to epistemic clarity, and with that to (a), so devastating, is that the powers at play are so powerful in their wealth, yet their workings are extremely insidious and difficult to conceptualize in a convincing manner. This is because the industry is a hyperobject.

'Hyperobject' is a technical term coined by Timothy Morton (Morton 2013, 1) to describe those objects that escape the human scope of conceivable ordinary objects; hyperobjects are not simply in a place, their actual position and 'material' is impossible to pinpoint because it can be stretched thin across all the world for instance. Climate change is an example of a hyperobject, the world economy another, and social media yet another. With this definition the industry is also a hyperobject.

On top of being a hyperobject, the industry could be described to be an *incentivized hyperobject*. Its incentive is to grow and foster in the game of the market. The game of the market sets the boundaries inside which the industry chases its incentives. So here we seem to have an extremely goal-motivated hyperobject, which being a hyperobject is downright invisible to the eyes of an individual. Such non-clarity gives industry vast space and time to work towards their own agendas without the 'ordinary objects', us people, really noticing what results in what. The research shown in this paper gives ample evidence of this insidious effectiveness.

5.2. (b): Tensions in the capability to access cooperative production

For the moment, I cannot figure any straightforward enough tensions for (b) that are not already tensions in (a) and (c) to be noteworthy for listing here. All the limitations for the access of an individual to shared production seem to me to be indirect influences from the tensions that reside in (a) and (c). So, for example, one could have their lung health impaired because of the tobacco strategy and that could affect their ability to work in a given job. But then again, this effect is a chain-effect flowing from the lack of psychological autonomy, at least as defined in this paper.

So, for the purposes of space, I will not dive into such indirect tensions further, even if there would be value in investigating them in some other context.

5.3. (c): Tensions in the capability to function as a democratic citizen

For (c), the capability to function as a citizen, this sample of literature is not quite sufficient to straightforwardly prove any causal links, but questions can certainly be raised. Remember, for Anderson (1999) the capability to be a citizen implies equal access to political decision making. I would argue that equal access to political decision making requires at its base an institution that guarantees, or at least constantly builds for epistemic transparency and integrity. Basically, what I mean is that one cannot make fully informed decisions regarding their democratic position and possibilities in society when there are propagandists, whether unwitting or witting, in the mixture. I wouldn't say it to be too insincere to suspect there to be at the least industry incentivized information with how today's social media[7] has proven to work as a platform. I'd say that the work of people such as Tristan Harris from the Center for Humane Technology is showing us how Bruner and Holman's 'industrial selection' might be at play in the social media too, though that term is not used in the contemporary discussion (Center for Humane Technology 2021).

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[7] When talking about 'social media' here and from here on out, I mean social media as the structure of instant message platforms, picture platforms and comment platforms such as Facebook, Twitter, Instagram, TikTok and the like. This is important to note because "what a social media is?" is a valid philosophical question. In the 20th century the printed press was a social media. For our purposes here we will distinguish between such printing technology paced 'slow' social media and today's computing technology amplified 'fast' social media, even though printed social media still exists.

What Harris and other people on his agenda are showing is how the social media is actually an attention market aimed at selling information to industry[8] (Wu 2020). The information sold is likely used to make people see a social media tailored for their likes and dislikes individually; this happens with targeted marketing and even algorithmic reorienting of who gets to discuss with whom and about what.

I would go so far as to call the modern social media a civil society of sorts, and a forum for public opinion-making at the least. If there is any merit to such a distinction, then the idea that a part of civil society is customized and channeled for industry purposes to the point of skewing the epistemic landscape of the citizens' decision-making is a critical violation of an Andersonian's access to capability (c).

To add holes to the already well-leaking cruiser of healthy epistemology, if Weatherall et al.'s (2020) model for propagandists can be generalized to work for other non-industry propagandists, such as political speakers and the like, which again I would say is not too intellectually insincere to infer, then we have a true epistemic network of knots and shades on our hands. It is devastating to democratic opinion-forming on its own when a hyperobject such as the industry insidiously steers the discussion platforms to aid their market incentives through well-targeted marketing, but it gets to another level of devastation when such incentives are also heard through sponsored internet influencers and news-media, and even politicians.

Add to this the potential unwitting propagandists already brought to question in Weatherall et al.'s (ibid.) article, journalists, who are thoroughly conjoined with the workings of social media, to the point of actually being a meaningful part of the information-generation in social media. Remember the fairness doctrine, where both sides need to have equivalent exposure, and how Weatherall et al. showed such manner of conclusion sharing to have just the same effects as the intentional, funded biased sharing. There is something to watch out for in the way social media seems to bipartition opinions and how the fairness doctrine works in an epistemological network.

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[8] There are other information buyers in the market, but they fall blatantly out of the scope of the investigation in this paper.

So, the capability of an Andersonian equal to be a democratic citizen is at stake if the above propositions are to hold any weight.

6. CONCLUSION

I have in this paper explored contemporary findings from philosophy of science and social epistemology, how network epistemic modeling lights new perspective into the workings of epistemic communities. Through the lens of Andersonian democratic equality I have then proposed how these findings might put an Andersonian individual and citizen in an unjust place.

The main mechanisms in tension with the Andersonian, as illuminated by Weatherall et al.'s (2020) and Bruner and Holman's (2015, 2017) research, are intransigently biased agents, industrial selection, biased sharing and biased production. Especially industrial selection and biased sharing are notable in their effects on the Andersonian because their effect is so insidious and yet powerful, and potentially affects both individual wellbeing and choice-making.

My analysis has shown that Anderson's capability requirements (a), the capability to function as a human, and (c), the capability to function as a democratic citizen are most notably at odds with the workings of these epistemological manipulator-agents. There are effects to (b), the capability to access shared production, also, but I deemed them too indirect to include an analysis of the effects in this paper.

It is important to note, that though most of the analysis has been around hyperobjects such as the industry and social media, it doesn't take a witting agent to skew the epistemological field. As Weatherall et al. (2020) show, simple equal representation of the different viewpoints from unwitting agents does the job – so journalists mandated by principles such as the fairness doctrine can be influential merchants of doubt also.

Most of these effects in most cases do not require any malevolence from the epistemic community at large, usually strong enough incentives get the job done, or just a few

propagandists who skew the scientific knowledge generation and thus slow or skew the transfer of this knowledge to the public consensus.

Though this paper has been an analysis of the negative effects of these processes, there is hope to be had here also. The research done by these philosophers also points ways in which the scientific community can combat these epistemic influencers, such as being more knowledgeable of such biases in the case of intransigently biased agents; or getting a sample of the viewpoints that truly resembles the samples in the overall population of research, as was the case in remediating the effects of the fairness doctrine.

It is also important to add, that this analysis is done on the basis of simulations, and thus does not necessarily hold grounds with reality to the extent I have painted a menacing picture here. The evidential weight of these simulations though arguably increases, as Weatherall et al. (2020) show in their paper closely the same effects as Oreskes & Conway's (2010) historical analysis, as they themselves remark also in their paper. This gives me some confidence in using the simulations as an instrument for argument.

7.   REFERENCES

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