Open-mindedness as a Corrective Virtue

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Abstract

This paper argues that open-mindedness is a corrective virtue. It serves as a corrective to the epistemic vice of confirmation bias. Specifically, open-mindedness is the epistemically virtuous disposition to resist the negative effects of confirmation bias on our ability to reason well and to evaluate evidence and arguments. As part of the defense and presentation of our account, we explore four discussions of open-mindedness in the recent literature. All four approaches have strengths and shed light on aspects of the virtue of open-mindedness. Each mentions various symptoms of confirmation bias and some explore aspects of the corrective role of open-mindedness. However, ours is the first to explicitly identify open-mindedness as a corrective virtue to the specific epistemic vice of confirmation bias. We show how the corrective account also permits a response to the concern that open-mindedness might not actually count as a virtue.

1. Introduction

This paper defends the view that open-mindedness is a corrective virtue. We argue that it serves as a corrective to the epistemic vice of confirmation bias. Specifically, open-mindedness is the epistemically virtuous disposition to resist the negative effects of confirmation bias on our ability to reason well, to engage in successful inquiry, and to evaluate evidence and arguments fairly. Those who exhibit the virtue of open-mindedness are engaging in cognitive processes that are less impaired by confirmation bias than those who do not exhibit that virtue. The principal goal of this paper is to defend this novel account of open-mindedness.

While we believe that there is evidence supporting the project of ameliorative epistemology the present paper does not take sides on the question of whether one can successfully cultivate open-mindedness in oneself or in others (see for example Ahlstrom-Vij, 2013). This has been an area of considerable attention in epistemology but it is not the focus of our paper. Instead, we hope to persuade readers that understanding open-mindedness as a corrective virtue is a theoretically satisfying, practical, and potentially fruitful alternative to standard accounts.

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As part of the defense of our account, we explore four previous discussions of open-mindedness in the recent literature. These approaches have significant strengths and shed light on aspects of the virtue of open-mindedness. Each mentions various negative consequences of confirmation bias and some explore aspects of the corrective role of open-mindedness. Our approach goes beyond existing discussions by explicitly identifying open-mindedness as a corrective virtue to confirmation bias. We will argue that understanding open-mindedness as a corrective provides an account that comes closest to capturing all and only all instances of open-mindedness. While we recognize that confirmation bias is a pervasive feature of human cognition, its negative effects are mitigated by the corrective virtue of open-mindedness.

Treating open-mindedness as a corrective virtue means orienting our analysis by reference to the features of the relevant vice – confirmation bias. This approach has the additional benefit of providing a novel response to the concern that open-mindedness is not actually a virtue. Philosophers like Jeremy Fantl (2018) have explored the concern that open-mindedness is not an epistemic virtue insofar as an open-minded person can risk losing true beliefs, knowledge, and understanding in virtue of the willingness to consider counterarguments to what is known.[1] If one has knowledge of p, engaging open-mindedly with arguments that purport to show that p is false would involve an epistemically vicious willingness to entertain reasoning known to lead to a false conclusion. Why praise open-mindedness about the possibility that not-p if one knows that p? We explore this widely shared concern and offer a strengthened version of it. We then show that by recognizing the corrective role of open-mindedness one can respond to this objection.

Previous accounts of open-mindedness tend to focus on its role in gaining and losing true beliefs, knowledge, and understanding. They also tend to be excessively inclusive and general in ways that capture phenomena that we will argue do not belong under the category of open-mindedness. As we shall argue below, we should avoid accounts that would, for example, count intellectual diligence, willingness to engage, or intellectual curiosity as instances of open-mindedness.

[1] There have been a number of responses to this concern in the recent literature. We see the corrective account as adding to the range of possible responses, not necessarily contradicting them. For responses to this objection see Carter and Gorden (2014), Taylor (2016), and Kwong (2017). On the logic of considering objections to what is known see Rendsvig and Symons (2019).

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Theories of open-mindedness can also fail by dint of excessive narrowness; neglecting intuitively recognizable instances of open-mindedness. We contend that understanding open-mindedness as a corrective to confirmation bias avoids both kinds of failure and results in a more adequate account than those currently defended in the literature. Our approach contributes to understanding this important epistemic virtue by providing a more accurate and unifying definition that is consonant with our commonsense understanding of open-mindedness while also allowing for connections with the empirical psychology of reasoning in potentially fruitful ways.

2. Open-Mindedness as a Corrective to Confirmation Bias

Our approach follows Philippa Foot's approach to the moral virtues. She argues that the virtues are correctives in the sense that they compensate for the familiar deficiencies of ordinary human nature (Foot, 2002). For instance, courage is a virtue only insofar as people are ordinarily inclined to flee or submit in the face of dangers when they ought to stand firm. If human beings were not subject to such inclinations, courage would not be a virtue for us. As Roberts and West (2015) note, virtue epistemologists have generally overlooked the corrective character of the virtues: 'Neither those who conceive of intellectual virtues as reliable cognitive faculties (e.g., memory, reasoning powers, vision) nor those who think of them as character traits (e.g., open-mindedness, intellectual courage, intellectual humility) have given much attention to virtues as correctives' (Roberts and West, 2015). On our view, Foot's corrective account provides a fruitful model for understanding the epistemic virtues more generally. However, for the purposes of this paper our attention will be restricted solely to open-mindedness. On our view, open-mindedness corrects a familiar and pervasive epistemic vice in ordinary human reasoning – confirmation bias.

In order to show why open-mindedness is a corrective to confirmation bias the first step is to identify the main features of the relevant vice. Confirmation bias is the most widely recognized of the so-called cognitive biases. It is the disposition to illegitimately favor evidence or actions that confirm one's preexisting beliefs or cherished hypotheses (Villarroel and Garcia-Mila, 2016; Symons, 2017). In this context 'legitimate' is to be understood in terms of epistemic norms.[2] Confirmation bias not only inclines us to misjudge the

[2] What we have in mind by epistemic norms are (following Pollock 1987, p. 61) norms describing when it is epistemically permissible to hold

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relative weight or significance of evidence, it also distorts the course of inquiry. It does so by disposing us to search for the kind of evidence that we would expect to find, given the truth of our favored hypotheses or what we would expect to find given our understanding of what is entailed by those hypotheses (Nickerson, 1998, p. 177). Furthermore, we tend to avoid inquiry that we regard as likely to lead to evidence that is counterindicative of our favored hypotheses (Koriat, Lichtenstein, and Fischhoff, 1980).

In this paper we will not examine the competing psychological accounts of the phenomenon of confirmation bias, but will assume that confirmation bias exists and that it is an epistemic vice insofar as it generally leads to the violation of epistemic norms and impedes the pursuit of truth and understanding.[3] While there is some disagreement in the psychological literature concerning the interpretation and explanation of the experimental evidence for confirmation bias we believe that no matter which of the prominent accounts of confirmation bias holds true, the philosophical point that we are making still stands. Whatever its sources or mechanisms there is ample experimental evidence, dating back to the classic experiments of Peter Wason in the early 1960s, of the negative epistemic effects of confirmation bias in human reasoning (Wason, 1960; Mynatt et al., 1977; Oswald and Grosjean, 2004).

Our discussion is restricted to the epistemic aspects of open-mindedness for individual agents; we are interested in understanding how it should be characterized *qua* epistemic virtue rather than in its broader moral, social, and political context. One must concede that confirmation bias may be beneficial in some non-epistemic ways. Confirmation bias may have been an adaptive cognitive trait in our early evolutionary history; what we now regard as a bias and an epistemic vice may have resulted from a heuristic that helped our ancestors achieve ends that increased their fitness.

We certainly do not endorse the view that all cognitive heuristics as characterized by empirical psychologists are epistemically vicious. In fact, as Hintikka (2004) argued, some of the heuristics underlying what are sometimes called the cognitive fallacies might not lead to fallacious reasoning after all. Furthermore, see Gigerenzer et al. (1999)

various beliefs. There may be non-epistemic norms governing whether it is permissible to hold various beliefs, but consideration of those norms is beyond the scope of our paper.

[3] For an overview of some of the competing accounts see Klayman (1995), Nickerson (1998).

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for an account of how many heuristics are indispensable for boundedly rational agents. It is beyond the scope of this paper to explore this issue, but we would point, for example, to Hintikka's (2004) discussion of the conjunctive fallacy in this regard for a concrete example. Ahlstrom-Vij (2013, pp. 11–14) also provides a valuable defense of the distinction between heuristics and biases. He makes the case that not all heuristics are biases in the sense of being epistemically vicious. While it is clearly a mistake to regard all cognitive heuristics as biases, to the best of our knowledge, there is no account of confirmation bias that does not regard it as epistemically vicious.

Speculation concerning the evolutionary history of confirmation bias is beyond the scope of this paper (See for example, Haselton et al., 2015). However, it is reasonable to suppose that confirmation bias could serve biological systems in a range of non-epistemic ways. We also recognize that the epistemic virtue of open-mindedness may not always be conducive to achieving worthy moral, political, or social ends.[4]

As noted above, under some circumstances, the epistemic vice of confirmation bias may facilitate an agent's pursuit of some epistemic goods.[5] Just as a cowardly soldier might, under certain circumstances, accidentally help to win a battle in virtue of his caution, confirmation bias can sometimes contribute to the pursuit of epistemic goods. For example, one can imagine circumstances in which an agent subject to confirmation bias might be more likely to find new evidence

[4] Fantl (2018, p. 177), for example discusses moral and political reasons for not being open-minded in certain cases. Should one be open-minded in one's choice of campus speakers or should one exclude speakers whose presence might offend some individual or group? Such invitations might be distressing for some or might exhibit a lack of solidarity with the groups or individuals that might be harmed. Notice that this position rests on placing moral and political considerations above epistemic considerations. There are occasions where such a ranking is justifiable. Epistemic goods are not the only kinds of good and sometimes other kinds of goods certainly should trump epistemic considerations. While invitations to campus are a matter where reasonable people might differ, it is clear that one should not experiment on human subjects against their will for the sake of knowledge.

[5] Thanks to an anonymous referee for urging us to clarify this point. Just as we should not expect a virtue like courage to contribute solely to good outcomes without exceptions, we should recognize that a vicious disposition like greed, cowardice, or in this case confirmation bias, can occasionally help an agent achieve some good ends.

supporting a cherished belief that happens to be true. Imagine a dedicated, but dogmatic scientist who pursues some hypothesis that he or she holds for irrational reasons. Imagine that this scientist doggedly devotes time and resources to that hypothesis in a manner that is unsupported by evidence. Perhaps the scientist ignores countervailing experimental evidence during her initial inquiries solely in virtue of her bias in favor of her initial hypothesis. Now imagine a scenario in which, by chance, these efforts pay off and the scientist's preferred hypothesis turned out to have been true all along. One can grant that inquiry motivated by confirmation bias occasionally has some good effects, even some good epistemic effects. However, it is usually an obstacle to achieving epistemic goods under ordinary circumstances at the level of individual knowers.

Confirmation bias can affect epistemic agency via at least three broad pathways:

a) ATTENTION: Selectively granting consideration to evidence or sources (for example, deliberately or unconsciously ignoring countervailing evidence).

b) INTERPRETATION Interpreting challenging evidence or sources without maintaining appropriate levels of charity (assigning evidential weight to new information in biased ways).

c) AFFILIATION Preferring exposure to or affiliation with persons, groups, or sources that tend to share the agent's views.

On our account, open-mindedness is the disposition to resist negative effects on epistemic agency in at least these three broad domains of action. In this way, open-mindedness results in additional epistemic goods beyond simply the acquisition of true beliefs, understanding, and knowledge. The corrective model permits us to explain what it means to hold an open-minded attitude towards persons, groups, and sources and why resisting one's dispositions with respect to social affiliation can be epistemically virtuous. The most distinctively epistemic good that the corrective view of open-mindedness highlights is the disposition of open-minded agents to devote themselves to the pursuit of becoming good thinkers. We will explain this in detail below.

Given our social nature, an important source of confirmation bias for human beings is our desire to affiliate with a favored group by signalling conformity with the approved beliefs of that group. This tendency to avoid people and sources of information from, for example, groups with lower social status or adversaries may serve some non-epistemic goods. Such dispositions might manifest virtues such as

loyalty and contribute to the solidarity of social groups. Whatever its non-epistemic benefits may be, among the many epistemically vicious states and dispositions that results from this disposition is an unwillingness to engage. Open-minded agents resist the epistemically negative effects of socially-motivated confirmation bias in a variety of ways, for example, by being willing to associate with or engage with people and sources beyond their immediate affiliation groups.[6] Thus open-mindedness can be an epistemic virtue that can influence our attitudes towards people, groups, and sources. From a non-epistemic perspective this corrective function of open-mindedness can be judged as a harm insofar as it reduces group solidarity. Nevertheless it is undeniably *epistemically* virtuous to exhibit an open-minded attitude towards those who fall outside one's affiliation group.

Notice that the corrective account departs from traditional accounts of open-mindedness in a fruitful way here. Traditionally, virtue epistemologists have tended to focus on open-mindedness as an attitude towards beliefs and information. By seeing open-mindedness as a corrective to the epistemically negative effects of confirmation bias, we can straightforwardly account for ordinary uses of the term 'open-minded' wherein we apply the term to attitudes towards people, groups, and experiences and not just beliefs and evidence.

If one regards open-mindedness as a disposition towards beliefs and evidence rather than as a corrective to confirmation bias one misses its role in other important contexts too. For example, in the context of arguments, confirmation bias not only causes agents to favor false premises over true, but strikingly it can cause an agent to engage in faulty *patterns of reasoning*. Confirmation bias can actually interfere with the quality of our logical inferences; with the form of our reasoning and not just its content. For example, consider an agent who strongly associates Muslims with act of terrorism. We can predict that this person's commitments will be supported by confirmation bias in their evaluation of evidence. However, notice how this strong association will also dispose the agent to commit the following instance of bad reasoning that are not directly a matter of evaluating evidence. For example:

[6] Willingness to engage with ideas that run counter to one's own preferred views is sometimes seen as the essential characteristic of open-mindedness (See, for example Kwong, 2016). On our view willingness to engage is one of the many ways that the open-minded agent corrects the effects of confirmation bias.

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1- If someone is a terrorist then he is likely to be a Muslim.
2- Ali is a Muslim.
3- Therefore, Ali is likely to be a terrorist.

This is, of course, an instance of the fallacy of affirming the consequent, a formally incorrect pattern of reasoning. Even if premises 1 and 2 are true, the conclusion does not follow. Notice that the failure here is a failure at the level of reasoning or inference rather than in the evaluation of evidence *per se*. To see why confirmation bias is at play here compare the following instance of the fallacy of affirming the consequent:

If someone is a dentist, then he is a human
Jack is a human
Therefore, Jack is a dentist.

It is unlikely that the association between human and dentist would lead someone to commit this instance of the fallacy. The form of this inference is identical to the previous case, however, given the lack any biasing association, it is easier to avoid impaired reasoning in the second case than in the first. Both the truth of the particular beliefs involved and the question of whether specific beliefs were generated by a reliable method of inquiry are distinguishable from the tendency of confirmation bias to encourage us to engage in formally incorrect patterns of reasoning. A basic requirement for being a good thinker is that one avoid logical fallacies like the fallacy of affirming the consequent. An open-minded person would be inclined to resist this effect of confirmation bias. Notice that we are not offering a general explanation for all cases of formal errors in reasoning. This is simply an example of ways that confirmation bias can have negative influences on our reasoning beyond its influence on the manner in which we evaluate evidence.

Summarizing what we have argued so far: Arguably all embodied cognitive agents must engage in selective attention and must rank their priorities and resources in the accomplishment of any task, including cognitive tasks. We can assume that confirmation bias is an ineliminable feature of epistemic agency in beings like us who inevitably face constraints on our time and energy (Gigerenzer and Goldstein 1996). While human rationality is bounded in many unavoidable ways, open-mindedness is a disposition to resist the negative epistemic effects of confirmation bias. As such we regard it as a constitutive part of endeavoring to reason well in the face of the inevitable constraints on finite epistemic agency.

Thus, open-mindedness resists the negative aspects of confirmation bias rather than eliminating it. Some philosophers have argued that we cannot rely on ourselves for epistemic improvement (See for example Ahlstrom-Vij, 2013, p. 36). However, notice that we are not arguing that open-mindedness either completely overcomes the epistemically negative effects of confirmation bias, nor for the purposes of our argument here does one need to be committed to the idea that one can personally increase one's level of open-mindedness. Rather, our point here is that where the virtue of open-mindedness is manifest in individuals it serves as an epistemically beneficial counterbalance to confirmation bias. Thus, even if pessimists about the possibility of epistemic self-improvement like Ahlstrom-Vij are correct, our account can still characterize the role of open-mindedness as a disposition in those of us who happen to be less susceptible to the negative effects of confirmation bias.

Nevertheless, there is a long history of research into reducing the effects of bias and improving decision making (see Milkman et al., 2009). Specifically, there is experimental evidence that some debiasing strategies can be effective (see for example Sellier et al., 2019; Morewedge et al., 2015). Insofar as they are effective, debiasing strategies can be understood to help us cultivate the epistemic virtues. Clearly, human beings vary with respect to our ability to resist the epistemically negative effects of confirmation bias, but if the psychological literature is to be believed, there are debiasing strategies that seem to provide some benefits.[7] Again, the question of the

[7] For techniques to reduce confirmation bias see Sellier et al. (2019). See also Lilienfeld et al. (2009) for a discussion of the benefits of debiasing. Their work collects 'basic education about specific cognitive biases (e.g., brief and nontechnical tutorials on confirmation bias) also decreases participants' tendency to fall prey to certain errors, including confirmation bias' (Sellier et al., 2019, 393) (Evans, Newstead, Allen and Pollard, 1994; Kurtz and Garfield, 1978; Mynatt, Doherty and Tweney, 1977; Newstead, Pollard, Evans and Allen, 1992; Tweney et al., 1980). These results do not directly address the philosophical concerns of Kornblith and Ahlstrom-Vij concerning the power of reflection and the likelihood of epistemic self-improvement (they may, in fact, support the argument for epistemic paternalism) but they should increase our confidence in the possibility of creating social and cultural environments that cultivate or diminish the virtue of open-mindedness. There is still a need for more psychological research on effective debiasing methods, and on the extent to which their efficacy generalizes to real-world behaviors and persists through time.

effectiveness of these debiasing strategies is orthogonal to our purposes in this paper. However, if one aims to increase one's open-mindedness and if one accepts our account, then empirically supported debiasing strategies that mitigate the effects of confirmation bias would be recommended. Of course, we must leave it to our colleagues in psychology to determine the efficacy of such strategies.

To date, philosophers have not characterized open-mindedness in terms of this corrective role. By focusing on beliefs and evidence, the usual treatment of the virtue misses other important features of the psychology of reasoning that are influenced by confirmation bias. The examples we have discussed so far involve an unwillingness to engage with out-group sources and persons and the tendency to reason fallaciously. The corrective account of the virtue can address these kinds of cases more successfully than traditional accounts. In the following section we will examine some of the most highly developed accounts of open-mindedness in the literature in order to demonstrate some additional advantages of the corrective account.

3. Competing Accounts of Open-mindedness

3.1 Riggs' account of open-mindedness

Wayne Riggs defines an open-minded person as someone who takes challenges to her views seriously because she is aware of her fallibility in forming beliefs (Riggs, 2010, p. 177). Consequently, she is aware that she may be prevented from considering opposing views fairly. Thus, Riggs believes there are two traits required for open-mindedness: self-knowledge and self-monitoring. For Riggs, an open-minded person takes opposing views seriously by being aware of her own fallible nature and by guarding herself against it in the process (Riggs, 2010, pp. 182–83; Kwong, 2017, p. 1619). The open-minded agent treats the fact that she is biased as an additional piece of evidence. She takes opposing beliefs seriously on Riggs' view because of facts derived from self-monitoring and from knowledge of the her own fallibility

Unlike Riggs' view, the corrective account is not focussed solely on beliefs. Beliefs about bias are not straightforwardly constituitive of the virtue of open-mindedness. It is implausible to believe that learning about biases and the effects of heuristics is not enough to cause someone to become open-minded. The corrective function of

open-mindedness does not reduce to simply recognizing facts about one's limitations and weighing those facts appropriately.

Consider other ways that open-mindedness can manifest. For example, simply being willing to listen to persons or sources outside one's affiliation group is a manifestation of open-mindedness even if they do not present countervailing evidence. As discussed above, this manifestation of the virtue follows naturally given the corrective account. On our view, the willingness to risk being receptive to individuals who are not members of one's affiliation group is an example of actively resisting confirmation bias. We would intuitively associate this kind of openness as a paradigmatic trait of an open-minded person. It exemplifies the virtue of open-mindedness, even independently of whether those channels actually offer opposing ideas.[8]

3.2 Baehr's account of open-mindedness

Jason Baehr's project is motivated by the demand that a satisfactory account of open-mindedness should capture all cases that we would intuitively regard as instances of open-mindedness (Baehr, 2012).[9] Baehr has categorized cases of open-mindedness into three classes. First, there are the cases where we consider seriously ideas that are in conflict with our beliefs (Baehr, 2011, p. 192; Kwong, 2016, p. 341). Second, are cases where we have two or more competing positions, none of which we presently accept or reject, but we are still required to have an open mind to make a rational assessment of them. This would be the case, for example, for a judge who is required to remain neutral in order to make a fair evaluation of a case. Third, are cases where we are required to have open mind in order to departure from our usual ways of thinking. For example, students who are exposed to Einstein's General Theory of Relativity, for the first time, are still required to be open-minded in order to suspend their usual ways of thinking, and then to understand unfamiliar concepts of space and time (Baehr, 2011, p. 197; Kwong, 2016, p. 341). These are three classes of open-mindedness, what is shared between

[8] While it is important to distinguish the psychological disposition of openness from open-mindedness, the aspects of openness in social contexts that we ordinarily associate with open-minded people can be understood as resulting naturally from the virtue of open-mindedness.

[9] For our view of the proper role of intuition in philosophical methodology, see Symons (2008).

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these classes is that the agents are 'characteristically […] willing and (within limits) able […] to transcend a default cognitive standpoint […] in order to take up or take seriously the merits of […] a distinct cognitive standpoint' (Baehr 2012, p. 202; Kwong, 2016, p. 341). The conceptual core of open-mindedness on his view is the capacity to engage with a novel standpoint. This capacity is sometimes described in the psychological literature as cognitive empathy or perspective taking (see Gerace et al., 2013).

Baehr's account is designed to capture all three cases described above.[10] However, it ends up being an excessively inclusive account capturing cases that we would not intuitively recognize as instances of open-mindedness. In the first set of cases, his approach is consonant with our view. Although Baehr did not explicitly mention confirmation bias, it can be inferred from his statement: 'In the context of intellectual conflict or opposition, open-mindedness is an antidote to vices like narrow-mindedness, closed-mindedness, dogmatism, prejudice, and bias' (Baehr, 2011, p. 195). Baehr's account is tantalizingly close to identifying confirmation bias as the central vice that open-mindedness corrects, but unfortunately he does not do so.

For the second category of cases, the case exemplified by the judge's duty to impartiality, the agent is assumed to have no prior commitment, and is therefore neutral regarding the issues he is considering. But here we need to ask what prevents a judge from giving serious consideration to different positions. In this context, Baehr believes that intellectual laziness or intellectual hastiness might prevent the judge from being open-minded. However, notice that one could be open-minded and lazy or open-minded and hasty. The virtue that might serve as a corrective for intellectual hastiness or laziness is intellectual diligence. Ultimately, the degree to which the unity of the epistemic virtues holds, will determine the degree to which they act together in correcting epistemic vices (Goldman 2001). Given a commitment to their unity one might be committed to believing that any vice is at least partially corrected by any epistemic virtue. We disagree, but it is beyond the scope of the present paper to defend our position here. However, independently of the degree to which one believes that each of the virtues contributes to the correction of the vices, it would be implausible to claim that open-mindedness is the principal corrective virtue for hastiness. We can acknowledge for example that open-mindedness might indirectly

[10] See also Kwong's discussion and analysis of Baehr in Kwong (2016, p. 342).

act to correct laziness or hastiness insofar as those vices are supported by prior commitments for example a commitment to the belief that some particular enterprise of inquiry is not worth pursuing. So, for example, one might not be inclined to take some area of inquiry seriously because of some bias. A college student might be lazy and rush through their work in an ancient philosophy course because they have negative beliefs about the value of ancient philosophy. In this case, the virtue of open-mindedness might indirectly correct hastiness or laziness. But imagine that a student is lazy and hasty in their Bible Study course in spite of being a committed Christian. Open-mindedness would not help correct the vice in this case.

In the judicial scenario that Baehr mentioned he assumes that the judge has no prior commitments with respect to the specifics of the case. Thus, the judge's ability to resist laziness and hastiness is not an instance of the corrective function of open-mindedness. It is true that judges ought to be open-minded in the sense of being open to novelty, as described above, but again this is orthogonal (in this case) to the correction of laziness and hastiness.

As in the case of the students discussed above, we need to find out why the judge is unable to continue to consider the arguments of both parties fairly and impartially. If the reason is that the judge is unwilling to make the effort required to consider the arguments, this epistemological vice is not necessarily a result of a lack of open-mindedness, but could result from either intellectual laziness, or lack of conscientiousness. Thus, in case the judge gives serious and careful consideration of the arguments of both parties and is not combatting some prior prejudice or commitment, she is exhibiting intellectual diligence rather than open-mindedness. By contrast, if the judge's failure to continue seriously considering the arguments of one of the parties is due to the judge's commitments to existing beliefs, then her failure would be due to confirmation bias. In such circumstances, if the judge had resisted the negative effects of confirmation bias and continued to consider the arguments of both parties conscientiously, then her actions would represent an instance of open-mindedness.

With respect to the third set of cases mentioned by Baehr, in which students are attempting to go beyond the special to the general theory of relativity, on our account they might, indeed, need to be open-minded while considering the general theory. Again we need to untangle the reasons for the students' inability to understand the general theory of relativity. Baehr suggests that the students are habituated to a certain way of thinking about spacetime and that they need new ways of thinking. Baehr claims that commitment to

habitual ways of thinking in these situations is due to a lack of open-mindedness. But what does Baehr mean by holding on to traditional ways of thinking? If he means that the students are strongly committed to their previous assumptions, and this commitment is causing them unwittingly to ignore the new information that does not fit with the existing idea, or to misinterpret it in a way that make it fit with the existing idea, then this case is captured by our account of open-mindedness, insofar as the students' learning is impeded by confirmation bias.

If 'holding on to traditional ways of thinking in these situations' does not mean that the students are subject to confirmation bias, other candidates might include deficiencies in intellectual skills such as weakness in imagination, or weak analytical or formal abilities. If these other deficiencies are to blame, there is no reason to believe that the students' failure will be corrected by increased open-mindedness.

3.3 Kwong's account of open-mindedness

Jack Kwong argues that the conceptual core of open-mindedness is engagmeent. On this construal, 'a person is open-minded when she is willing to engage with a novel idea, that is, to make room for it in her cognitive space, and to give it serious consideration' (Kwong, 2016, p. 85). He argues that understanding open-mindedness as an engagement is more satisfactory than Baehr's and Kwong's accounts in capturing all instances of open-mindedness (Kwong, 2016, p. 85).

Kwong defines engagement broadly 'to encompass a wide range of cognitive activities. It can take the form of assessment, which enables an agent to evaluate the novel viewpoint in the light of relevant criterion […] It can also refer to activities generally subsumed under the heading of "understanding" such as trying to make sense of the viewpoint, and to figure out how it might be true, false, or senseless' (Kwong, 2016, p. 75). However, Kwong does not regard all instances of engagement as instances of open-mindedness. In order for an instance to count as such, it must be (1) motivated in the right way: that is, to be motivated by a desire for new truths and for a deeper understanding, and (2) be executed seriously and fairly (Kwong, 2016, p. 76).

Kwong defines a novel idea as any idea that the agent is not familiar with. Contrary to Riggs, and following Baehr in this regard, Kwong thinks that those novel ideas are not limited to ideas that challenge our default ideas, as in Baehr's conflict-based cases; they could be neutral

relative to our default position, as in the adjudication model discussed above.

Kwong's account of open-mindedness is undermined by the excessively broad character of the term 'engagement'. This leads to his approach capturing phenomena that are not instances of open-mindedness. For example, imagine that a professor challenges her students to solve a mathematical problem. Let's say one of the students A, attempted to solve the problem while student B also attempted to solve the problem but reached a different answer. B informed A that she reached a different conclusion, and she asked A whether he would like to see how she solved the problem. Student A knows that B is a talented student and rarely makes mistakes solving these kinds of problems, whereas A considers himself unskilled in solving such problems. Thus A assumes that his solution is wrong and decides to learn from B how she solved the problem. Based on Kwong's account of open-mindedness, A's actions would count an instance of open-mindedness. B's way of solving the problem is novel for A. Student A agreeing to hear B's idea, would count as willingness to make cognitive room for the idea. Finally, the attempt to understand B's idea in solving the problem, exemplifies the requisite thinking skills. This fulfills all of Kwong's requirements for realizing the concept of 'engagement'. Furthermore, student A's reaction to B's offer was based on the motivation to know the truth. Of course, he was motivated to know the truth because he was also strongly motivated to get a good grade, but the latter motivation does not exclude the former. His approach was objective, fair, and impartial.

While student A has fulfilled all the conditions set by Kwong for open-mindedness, it does not match our intuition that A's case is not a genuine instance of open-mindedness; it is true that what A has done manifests an epistemological virtue but it's closer to being an instance of intellectual diligence. When A accepts help from a superior student in class and compares it to his own, we would not say: 'look at A, he is open-minded', but rather, we would regard him as diligently pursuing a good grade. If A were not willing to learn from B we would not consider A's unwillingness to accept B's idea, which is likely to be correct, as an instance of closed-mindedness but rather as some other vice, perhaps laziness.

It is evident that the concept of engagement cannot capture the conceptual core of open-mindedness. A's willingness to consider novel ideas with the motivation of knowing the truth in an objective and impartial manner, fails to constitute an instance of open-mindedness and serves as a counterexample to the proposed

definition. Kwong's account conflates open-mindedness with intellectual diligence.

Let's modify the conditions of the example of students A and B in a way that brings out the important characteristics of open-mindedness that Kwong's definition misses. Let's assume that in this case student A is actually very skilled in solving these types of problems, perhaps with exactly with the same degree of excellence as B. Let's also assume that A, having solved the problem, has a justified belief that his answer is correct in virtue of his skill. If A were willing to be 'engaged' with B's alternative approach to the problem, we could now consider student A to be exhibiting open-mindedness and not just intellectual diligence. The difference is that in the second case, A is confident that his original answer is correct. In the first version of the example, A did not have a strong belief in the correctness of his own work, in fact he thinks that his solution is most likely wrong. Therefore, it is reasonable to suppose that his engagement with B's solution to the problem was motivated by something other than open-mindedness. In the first case, student A has the sense that his solution is inaccurate, and he wants to know the truth. Because of this, he decided to look at B's solution and give it serious consideration. By contrast, in the second case, A had a strong belief that his solution to the problem is correct, so we identify his engagement with B's alternative approach as an instance of open-mindedness. The difference is not the strength of A's belief in the two cases, but rather in the second version of the example, A would not be able to engage with the challenging idea and to give it serious consideration without resisting his bias in favor of in his own solution. This would be what makes his engagement with the competing solution an instance of the virtue of open-mindedness. In the first version of the example, he did not 'resist' confirmation bias because he was not committed to his own solution to the problem. He already believed that there was a high chance that his solution was wrong. All he has done, perhaps, was to resist intellectual laziness and/or intellectual recklessness. The engagement account lacks the resources to distinguish between these two types of case. By contrast, viewing open-mindedness as a corrective to confirmation bias allows the distinction to be made in a very natural way.

In each of the three accounts that considered here, it has been assumed that open-mindedness is an epistemic virtue and that it is primarily directed towards beliefs, ideas, or evidence. The corrective view allows for a more expansive account of open-mindedness and, as we shall see in the next section, offers a line of response to objections concerning the limits of open-mindedness.

4. Is open-mindedness a virtue?

How does an open-minded person characteristically act in order to combat the negative effects of confirmation bias? In part this is an empirical matter, but we suggest that the virtue can manifest in a range of practical ways. Note that given our account of open-mindedness the open-minded person resists the negative effects of confirmation bias by acting in ways that are directly contrary to those encouraged by confirmation bias. By defining open-mindedness as a corrective to epistemically vicious dispositions, those dispositions provide a precise guide to what it means to act in an open-minded way. Thus, the corrective approach has the additional virtue of clearly characterizing the kind of behaviors that open-mindedness encourages.

While the corrective approach captures our intuitions about open-mindedness, we must still defend the claim that it should be regarded as a virtue. As discussed above, critics of open-mindedness worry that it risks the danger that one might lose one's true beliefs and knowledge. Surely being open-minded in relation to, for example, some basic or very well-supported scientific, logical, or moral facts is not epistemically praiseworthy?

There are a variety of lines of argument available for the proponent of the corrective view of open-mindedness as we shall see. One obvious tack is to argue that open-mindedness in such cases is virtuous insofar as conscientiously considering the possibility that some core epistemic commitment is false can be useful for gaining a deeper understanding of that commitment. Call this the *enrichment defense* of open-mindedness. On this line of thinking, by engaging with someone who believes that the Earth is flat, we are forced to rethink the reasons for our own commitment in ways that may offer new insight. That certainly may be a beneficial side-effect of open-mindedness in these contexts. However, it fails to explain why we would consider an open-minded attitude epistemically virtuous even in cases where we have excellent reasons to believe that engaging with alternatives will *not* bring us deeper understanding, new knowledge, or new insights. Surely in cases of this sort, open-mindedness is, at best, a waste of valuable time and at worst an epistemically vicious willingness to consider false beliefs true. If so, should we say that open-mindedness is not an epistemic virtue?

In his recent work on these topics Jeremy Fantl explores what he sees as some of the limits of open-mindedness and has defended the legitimacy of what he calls 'forward-looking dogmatism' with respect to such cases (2018, p. 34). Even if a Flat Earther presented

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arguments that one is personally unable to refute, Fantl recommends that one should maintain forward-looking dogmatism with respect to such well-entrenched beliefs. On his view, even if I personally do not possess any effective counter-arguments, I have good reason to assume that a more competent respondent could defeat the Flat Earther's arguments.

The 'forward-looking dogmatism' that Fantl recommends risks falling into closed-minded conservatism. It would certainly block the kinds of deepened understanding that the enrichment defense offers. However, Fantl's account can be understood more charitably as indicating the agent's recognition of their own fallibility and limitations. Specifically, in many of the examples he considers, the agent is aware that despite being unable to refute the clever opponent personally, there are good reasons to believe that other more well-equipped persons will have a compelling response that will protect the knowledge that is under threat. Given this reading, Fantl is not arguing against open-mindedness per se. Rather we can interpret his line of criticism as encouraging us to recognize that epistemic agents can call on broader resources than their own immediate cognitive capacities and should take the existence of these resources into account in their deliberations. An agent who is confronted by a compelling sales pitch from an unscrupulous investment advisor for example, can recognize that others are more qualified than they to respond to the denial of some piece of knowledge appropriately. Thus, to be open-minded does not mean that one must accept any argument that one cannot refute given one's unsupplemented cognitive resources at a specific moment. It would be a mistake to assume that open-mindedness requires agents to screen off relevant knowledge by artificially precluding reference to people who might know better. As we shall see, the corrective account of open-mindedness helps us to understand the kinds of cases where Fantl's recommendation of 'forward-looking dogmatism' might make sense.

Let's consider what it means to defend open-mindedness in the Flat Earther case. Flat Earthers promote a false belief. Traditionally, debates concerning open-mindedness in these cases involve concerns about gain or loss of true belief. The challenge of the loss objection is that open-mindedness can involve an epistemically vicious willingness to risk accepting false beliefs as true. As we discussed above, there are ways to respond to the loss objection along the lines we and others provide.[11] However, there is a way to

[11] See also Carter and Gorden (2014), Kwong (2017), and Taylor (2016).

sharpen the traditional objection along the following lines: Clearly, for an educated scientist, a conversation with a Flat Earther would be a waste of their time if that scientist is thinking purely in terms of additional true scientifically relevant beliefs or improved understanding. A competent scientist can be highly confident ahead of time that he or she knows that the Earth is not flat and will gain no new insights or understanding by revisiting well-established findings in response to their interlocutor's ignorance or easily corrected misunderstanding. Thus, the enrichment defense of open-mindedness will not succeed here. Even if the scientist found some initial contacts with Flat Earthers useful as a way of developing persuasive arguments or in some other way, repeatedly rehearsing the arguments is unlikely to prove edifying.

One might argue, perhaps that the scientist is serving some useful social or political function by correcting the Flat Earther. Perhaps, but such goods are generally not directly epistemic. So, how should we understand the educated scientist's open-minded attitude towards the Flat Earther in scenarios where no ordinary epistemic payoff (no new beliefs/understanding) can be expected? Is open-mindedness in such cases simply a perverse or bizarre disposition? As in the traditional loss objection, we will defend the value of being open-minded in relation to beliefs or persons where we have confidence that being open-minded will provide no better understanding. It might be worrying to advocate open-mindedness in cases where we risk the loss of knowledge, but in this strengthened case it is simply bizarre (seemingly) to recommend open-mindedness where we know that entertaining alternative positions serves absolutely no epistemic payoff. In this case, how can exercising open-mindedness be a virtue? We answer this question by showing how understanding open-mindedness as a corrective helps to explain the pursuit of an additional epistemic good beyond the acquisition of knowledge, true beliefs, and understanding. This additional good is the project of becoming a better thinker.

On our account, being open-minded, even towards the possibility that very well-confirmed or core beliefs could turn out to be false, should be understood as a constitutive part of being an excellent thinker. One should not maintain an open-minded attitude towards core beliefs solely because of the expectation of some epistemic pay-off, either in terms of additional beliefs or deeper insight. Instead, as we argue in the following section, one simply cannot be a good thinker and a closed-minded thinker even with respect to privileged core beliefs. As we shall argue below, the reason for this is because on the corrective view, open-mindedness is not actually a

matter of entertaining the falsity of some favored belief p. Instead, it is the disposition to correct the illegitimate influence of confirmation bias on our reasoning. Whenever confirmation bias is playing a role, even in cases where it is working in support of a true belief, open-mindedness acts against it. Compare an analagous case for courage and cowardice. It is sometimes strategically efficacious to behave in a cowardly manner. Courage is the virtue that corrects cowardice and it acts even when cowardly action is the right course of action. The fact that cowardice sometimes has a better payoff than courage does not make courage any less of a virtue.

5. Excellent Thinkers are Open-Minded

Our account assumes that being a good thinker as an intrinsically valuable condition and that being open-minded is constitutive of being a good thinker. We will argue that being a good thinker need not be valued solely for its contribution to the acquisition of other goods. Being a good thinker means being disposed to reason well and on our view it is good to reason well independently of whether one happens to gain other goods as a result of doing so.

As with any intrinsic goods, it is difficult to persuade others that being a good thinker or exercising the capacity to reason well is intrinsically good. Nevertheless, one can straightforwardly distinguish the goodness of a skill or a dispositional state from its usefulness. Consider the following analogy: The acquisition of fish is the primary purpose of fishing. But even in the case of a practical activity like fishing there are a variety of reasons that motivate people to fish. Some fish competitively for sport and some in order to spend time with friends or family. Many of those who fish do not keep the fish they catch, but release them. Clearly it is not the case that the only purpose of fishing is the acquisition of fish. The development of fishing skills and the practice of fishing can also be a goal in its own right.

Imagine a scenario in which someone has two options. The first option being a magic hook that one can use to catch a fish as soon as it is thrown into the water. This would be a way to acquire fish without using any fishing skills. The second option is to acquire high level fishing skills. Given that catching fish is not the only good that we associate with fishing and given that fishing skills themselves can be valued in their own right, one could imagine many people for whom the second option would be preferable. Clearly, there will be some of us who are not interested in becoming highly

skilled in fishing. It is conceivable that a magic fishing hook that produces food conveniently and cheaply would be preferable to many. However, the point here is that it is possible to distinguish the goodness of the skill from the goodness of the pragmatic payoff.

The person with the magic fishing hook has fish, but no skill. The master angler is in the position to catch fish and has the skill. The same thing can be said about the skills and dispositions that we associate with being a good thinker. They can be valued in their own right, independently of their instrumental value. The average graduate student in physics has more true beliefs about their subject matter than a 19th century physicist like James Clerk Maxwell, but it is a fair bet that Maxwell was a superior thinker than the average contemporary graduate student.

Let's consider the following case in the epistemic domain. Imagine one has the choice between two options. The first option involves implanting an electronic chip in one's body. This chip somehow provides one with reliable access to a sufficient number of true beliefs as well as all the knowledge and understanding one will need throughout one's life to acquire all non-epistemic goods to a satisfactory level. However, imagine that once this chip is implanted, one sacrifices one's thinking skills beyond the basic ability to recognize and act on one's existing beliefs. Let's suppose also that this chip will work well for one's whole life and that one will face no pragmatic costs due to the loss of one's prior thinking skills. The second option is to have the required cognitive skills and dispositions that would give one the opportunity to achieve (but would not guarantee) a comparable number of true beliefs and similar level of understanding.

While we are inclined to believe that there can be something intrinsically valuable in the cognitive skills and dispositions that is independent of the pragmatic fruits of those skills, it might be objected that the real difference here lies in the character of the beliefs that result from the alternative options. On this view, our intuitive preference for the second option is motivated by the differences in the properties of the true beliefs in each of the two cases. For example, we might be concerned with the distinction between accidentally true beliefs and beliefs acquired through reliable methods. It is common to distinguish the truth of a belief from the virtues of the sources of that belief since we can sometimes acquire true beliefs from unreliable methods. However, we value reliable means for acquiring beliefs because truth is not the only epistemic good. Most obviously, the fact that a belief is justified is also important. However, notice that in the case of the belief-chip thought experiment, the chip itself is stipulated as being a reliable device for the generation of beliefs and

understanding. The subject of the thought experiment could be justified in holding beliefs generated by the chip insofar as one regards the justification of a belief as related to reliable processes for belief acquisition. However, notice that, as in the case of the magic fishing hook, the fact that one would lack thinking skills still strikes us as a deficiency. If there is some additional good associated with the possession of thinking skills, it is not a good solely in virtue of the truth or even the justification of the beliefs that one acquires. This extra value suggests that being a good thinker has value over and above whatever value the beliefs themselves might possess.

The development of good epistemic dispositions and skills is a kind of cognitive success that can be appreciated independently of pragmatic payoff. Clearly there is often a connection between the development of such skills and payoffs. For example, developing the ability to make a correct logical inference will automatically offer successful access to an infinite number of new true beliefs. However, the cognitive success associated with becoming a good thinker can be accidentally disassociated from the possession of true or justified beliefs. Its goodness is not dependent on the instrumental benefits associated with the possession of true beliefs. Consider, for example, a scenario in which a deceptive and all-powerful being modified the world so as to systematically alter the referents of a good thinker's beliefs in order to make them all false. In such a scenario, a good thinker would remain a good thinker while possessing no true beliefs. The falsity of his beliefs, in this case would be the result of his unluckily falling afoul of the evil deceiver. Nevertheless, we would continue to regard his achievement as a cognitive success. Just as the good fisherman might fail to catch fish for accidental reasons, the good thinker might also fail to acquire true beliefs for reasons that have nothing to do with the valuable capacities that he or she has developed.

A good thinker is an agent who (among other things) tends to form and revise beliefs for good reasons or in comformity with epistemic norms. Given our psychological, social, and biological conditions, human beings manifest epistemic vices that hinder our ability to form or revise beliefs well. The most important of these vices is confirmation bias. Arguably, as mentioned above confirmation bias is an intrinsic feature of our epistemic condition as embodied agents in social contexts with finite resources. Some degree of selectivity is inevitable for finite agents and given the kinds of embodied beings we are, our reasoning is likely to be influenced by our preferences and commitments. Given these constraints, we understand the corrective function of open-mindedness as a constitutive part of being a good human thinker.

6. Conclusion

We introduced our account of the virtue of open-mindedness and demonstrated its strengths of this account before comparing it with the most well-developed alternative accounts of open-mindedness. Their weaknesses are due to a failure to recognize open-mindedness as a corrective virtue to confirmation bias. We concluded by suggesting that open-mindedness may be a constitutive part of what it is for human beings to be good thinkers. This approach allows us to defend open-mindedness from the principal argument against its status as a virtue, namely the risk of loss objection. We offer a strengthened version of the objection and show how open-mindedness contributes to the achievement of a central epistemic good, namely the ideal of being a good thinker.

References

Kristoffer Ahlstrom-Vij, *Epistemic paternalism: a defence* (London: Palgrave, 2013).

Jason Baehr, 'The structure of open-mindedness', *Canadian Journal of Philosophy*, 41 (2011), 191–213.

Jason Baehr, *The inquiring mind: On intellectual virtues and virtue epistemology* (New York and Oxford: Oxford University Press, 2012).

Adam Carter and Emma Gordon, 'Openmindedness and truth', *Canadian Journal of Philosophy*, 44 (2014), 207–224.

Jonathon Evans and Paul Pollard, 'Debiasing by instruction: The case of belief bias', *European Journal of Cognitive Psychology*, 6 (1994), 263–85.

Jeremy Fantl, *The Limitations of the Open Mind* (New York and Oxford: Oxford University Press, 2018).

Philippa Foot, *Virtues and vices and other essays in moral philosophy* (New York and Oxford: Oxford University Press, 2002).

Adam Gerace, Andrew Day, Sharon Casey and Philip Mohr, 'An exploratory investigation of the process of perspective taking in interpersonal situations' *Journal of Relationships Research*, 4 (2013). doi:10.1017/jrr.2013.6

Gerd Gigerenzer and Daniel G. Goldstein, 'Reasoning the Fast and Frugal Way: Models of Bounded Rationality', *Psychological Review*, 10 (1996) 650–69.

Gerd Gigerenzer, Peter Todd, and the ABC Research Group, (eds.) *Simple Heuristics that Make Us Smart* (New York and Oxford: Oxford University Press, 1999).

Alvin Goldman, 'The unity of the epistemic virtues' In: A. Fairweather, L. Zagzebski (eds.) *Virtue epistemology: Essays on epistemic virtue and responsibility* (New York and Oxford: Oxford University Press, 2001) 30–48.

Martie G. Haselton, Daniel Nettle and Damian R. Murray, 'The evolution of cognitive bias' in. David M. Buss (ed.) *The handbook of evolutionary psychology, Vol. 2* (New Jersey: John Wiley & Sons, 2015) 968–87.

Jaakko Hintikka, 'A fallacious fallacy?' *Synthese*, 140 (2004) 25–35.
Asher Koriat, Sarah Lichtenstein, and Baruch Fischhoff, 'Reasons for confidence' *Journal of Experimental Psychology: Human learning and memory* 6.2 (1980) 107.
Joshua Klayman 'Varieties of confirmation bias', *Psychology of learning and motivation*. 32 (1995) 385–418.
Richard M. Kurtz and Sol L. Garfield, 'Illusory correlation: A further exploration of Chapman's paradigm', *Journal of Consulting and Clinical Psychology* 46 (1978) 1009–1015.
Jack Kwong, 'Open-Mindedness as Engagement.' *The Southern Journal of Philosophy* 54 (2016) 70–86.
Jack Kwong, 'Is Open-Mindedness Conducive to Truth?' *Synthese*, 194 (2017) 1613–26.
Scott O. Lilienfeld, Rachel Ammirati, and Kristin Landfield, 'Giving debiasing away: Can psychological research on correcting cognitive errors promote human welfare?' Perspectives on psychological science 4 (2009) 390–398.
Katherine L. Milkman, Dolly Chugh, and Max H. Bazerman, 'How can decision making be improved?' *Perspectives on psychological science* 4 (2009), 379–383.
Carey K. Morewedge, Haewon Yoon, Irene Scopelliti, Carl W. Symborski, James H. Korris, and Karim S. Kassam, 'Debiasing decisions: Improved decision making with a single training intervention' *Policy Insights from the Behavioral and Brain Sciences* 2 (2015), 129–140.
Clifford Mynatt, Michael Doherty, and Ryan Tweney, 'Confirmation bias in a simulated research environment: An experimental study of scientific inference' *Quarterly Journal of Experimental Psychology* 29 (1977) 85–95.
Stephen Newstead, Paul Pollard, Jonathan Evans and Julie Allen. 'The source of belief bias effects in syllogistic reasoning' *Cognition* 45 (1992) 257–284.
Raymond Nickerson, 'Confirmation bias: A ubiquitous phenomenon in many guises' *Review of general psychology*, 2 (1998) 175–220.
Margit E. Oswald and Stefan Grosjean, 'Confirmation bias', In Rudigher Pohl (ed) *Cognitive illusions: A handbook on fallacies and biases in thinking, judgement and memory*, New York: Psychology Press (2004) 79–96
John L. Pollock 'Epistemic norms', *Synthese* (1987) 61–95.
Rasmus Rendsvig and John Symons, 'Epistemic Logic', *The Stanford Encyclopedia of Philosophy* (Summer 2019 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/sum2019/entries/logic-epistemic/>.
Wayne Riggs, 'Open-Mindedness' *Metaphilosophy*, 41 (2010) 172–188.
Robert Roberts and Ryan West, 'Natural epistemic defects and corrective virtues', *Synthese* 192 (2015), 2557–2576.
Anne-Laure Sellier, Irene Scopelliti, and Carey K. Morewedge 'Debiasing training improves decision making in the field', *Psychological science* 30 (2019) 1371–1379.

John Symons, 'Intuition and philosophical methodology', *Axiomathes* 18 (2008) 67–89.
John Symons, *Formal Reasoning: A Guide to Critical Thinking* (Dubuque, IA: Kendall Hunt 2017).
Rebecca Taylor, 'Open-Mindedness: An Intellectual Virtue in the Pursuit of Knowledge and Understanding', *Educational Theory*, 66 (2016), 599–618.
Ryan D. Tweney, Michael E. Doherty, Winifred J. Worner, Daniel B. Pliske, Clifford R. Mynatt, Kimberly A. Gross and Daniel L. Arkkelin, 'Strategies of rule discovery in an inference task', *Quarterly Journal of Experimental Psychology* 32 (1980), 109–123.
Constanza Villarroel, Mark Felton, and Merce Garcia-Mila, 'Arguing against confirmation bias: The effect of argumentative discourse goals on the use of disconfirming evidence in written argument', *International Journal of Educational Research* 79 (2016) 167–179.
Peter C. Wason, 'On the failure to eliminate hypotheses in a conceptual task' *Quarterly journal of experimental psychology* 12 (1960), 129–140.
Linda Zagzebski, *Virtues of the mind: An inquiry into the nature of virtue and the ethical foundations of knowledge*, (Cambridge: Cambridge University Press 1996).

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