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Scientism and Sentiments about Progress in Science and Academic Philosophy

Moti Mizrahi, Florida Institute of Technology, mmizrahi@fit.edu

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Abstract

Mizrahi (2017a) advances an argument in support of Weak Scientism, which is the view that scientific knowledge is the *best* (but not the *only*) knowledge we have, according to which Weak Scientism follows from the premises that scientific knowledge is quantitatively and qualitatively better than non-scientific knowledge. In this paper, I develop a different argument for Weak Scientism. This latter argument for Weak Scientism proceeds from the premise that academic disciplines that make progress are superior to academic disciplines that do not make progress. In other words, other things being equal, it is generally better for an academic discipline to make progress than to make little or no progress, given that an academic discipline that is making little or no progress is an academic discipline that is failing to achieve its epistemic goals. Now, if there is no question among academic philosophers that science makes progress, and significantly so, but there is an open question among academic philosophers as to whether academic philosophy makes progress (and if so, how much), then academic philosophers would have to agree that science is superior to academic philosophy in terms of making progress. I develop this argument in this paper and provide empirical evidence suggesting that the premises would be acceptable to academic philosophers.

1. Introduction

The mere mention of scientism tends to evoke negative sentiments among academic philosophers in general. For many academic philosophers tend to associate scientism with an excessive admiration for science at the expense of non-scientific areas of inquiry. For example, according to Boudry and Pigliucci (2017, 2), the term 'scientism' is used in the following ways:

> 1) An *excessive* deference toward the deliverances of science and anything to which the honorific label scientific is attached;
>
> 2) *Brazen* confidence in the future successes of scientific investigation, for example in arriving at a Theory of Everything, or in solving every interesting question about reality;
>
> 3) The conviction that the methods of science are the only worthwhile modes of inquiry, and will eventually supplant all others;
>
> 4) The thesis that other disciplines should be either subsumed under science or rejected as worthless;

> 5) The thesis that all ways of acquiring knowledge and understanding are (or should be) scientific in nature, and hence there is no interesting difference between science and other forms of inquiry (emphasis added).

Notice the negative sentiments expressed in definitions (1) and (2) in particular. As Mizrahi (2017a, 352) points out, no one who is inclined to think that scientific fields are superior to non-scientific academic fields would accept (1) or (2), for both (1) and (2) make scientism a mistake *by definition*. Van Woudenberg et al. (2018, 2) agree. As they put it, "no one will accept this notion of 'scientism' as an adequate characterization of their own views, as no one will think that their deference to science is *exaggerated*, or their readiness to accept claims made by the sciences is *excessive*" (emphasis in original), or their confidence in the success of science is *brazen*. In argumentation studies, definitions like (1) and (2) are known as "persuasive definitions." As Zarefsky (2014, 133) explains:

> [A] persuasive definition is a non-neutral characterization that conveys a *positive or negative attitude* about something in the course of naming it. The name is, in effect, an implicit argument that one should view the thing in a particular way. But the argument is never actually advanced. Rather, the definition is put forward as if it was uncontroversial and could be easily stipulated. The argument in behalf of the proposed definition is simply "smuggled in" through the use of the definition itself (emphasis added).

Accordingly, when Haack (2007, 17-18) defines scientism as "an *exaggerated* kind of deference towards science, an *excessive* readiness to accept as authoritative any claim made by the sciences, and to *dismiss* every kind of criticism of science or its practitioners as anti-scientific prejudice" (emphasis added), she puts forward a non-neutral definition of scientism as if it were uncontroversial and smuggles in an implicit argument that conveys a negative attitude about scientism, namely, that scientism is misguided because it is an exaggerated and excessive attitude toward science. But, of course, this non-neutral characterization of scientism is controversial. Haack cannot simply assume that deference to science is exaggerated and excessive. Rather, she needs to make an explicit argument for this claim, without smuggling it in through persuasive definitions designed to elicit negative sentiments about scientism.

Similarly, when Boudry and Pigliucci (2017, 2) define scientism as "*brazen* confidence in the future successes of scientific investigation, for example in arriving at a Theory of Everything, or in solving every interesting question about reality" (emphasis added), they make an implicit argument that conveys a negative attitude about scientism, namely, that scientism is misguided because any confidence in the continued success of science is bold, shameless, and unwarranted. But, again, Boudry and Pigliucci (2017) cannot simply help themselves to the assumption that confidence in the continued success of science is bold, shameless, and unwarranted. Rather, they need to make an explicit argument for this claim, without smuggling it in through persuasive definitions designed to elicit negative sentiments toward scientism.

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Thankfully, it appears that the philosophical debate over scientism has moved past persuasive definitions of scientism recently and is now focused on evaluating scientism on its merits. For the term 'scientism' actually encompasses a set of theses that can be argued for or against. Construed as an epistemological thesis, scientism can be broadly understood as either the view that scientific knowledge (or some other epistemic good, such as justified belief) is the *only* form of knowledge (or some other epistemic good, such as justified belief) or the view that scientific knowledge (or some other epistemic good, such as justified belief) is the *best* form of knowledge (or some other epistemic good, such as justified belief).[1] Construed as a methodological thesis, scientism can be broadly understood as either the view that scientific methods are the *only* ways of knowing about reality or the view that scientific methods are the *best* ways of knowing about reality.[2] Construed as a metaphysical thesis, scientism can be broadly understood as either the view that science is the *only* guide to what exists or the view that science is the *best* guide to what exists.[3]

Mizrahi (2017a) defends a version of epistemological scientism he calls "Weak Scientism." Weak Scientism is the view that scientific knowledge is the *best* knowledge we have. Weak Scientism is a weaker version of epistemological scientism than Strong Scientism, which is the view that scientific knowledge is the *only* knowledge we have.[4] According to Weak Scientism, while non-scientific disciplines do produce knowledge, scientific disciplines produce knowledge that is superior—both quantitatively and qualitatively—to non-scientific knowledge.

Mizrahi's (2017a) argument for Weak Scientism runs as follows. One thing can be said to be better than another thing either *quantitatively* or *qualitatively*. Accordingly, if scientific knowledge can be said to be better than non-scientific knowledge both quantitatively and qualitatively, then scientific knowledge is better than non-scientific knowledge, which is what Weak Scientism states. Now, scientific knowledge can be said to be *quantitatively* better than non-scientific knowledge because scientific disciplines produce *more* knowledge and the knowledge they produce has *more* impact than the knowledge produced by non-scientific disciplines.

This claim is supported by data on the research output (that is, number of publications) and research impact (that is, number of citations) of scientific and non-scientific academic disciplines. These data show that scientific disciplines produce more publications and those publications get cited more than the publications of non-scientific disciplines. Scientific knowledge can be said to be *qualitatively* better than non-scientific knowledge because scientific knowledge is explanatorily, predictively, and instrumentally more successful than non-scientific knowledge (Mizrahi 2017a, 2017b, 2018a, 2018b, 2018c).

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[1] For a classification of types of epistemological scientism, see Hietanen et al. (2020) and Mizrahi (2022, 1-24).
[2] For a classification of types of methodological scientism, see Mizrahi (2022b, 1-24). According to Bunge (2012, 24), scientism "is the methodological thesis that the best way of exploring reality is to adopt the scientific methods."
[3] For a classification of types of metaphysical scientism, see Mizrahi (2022b, 1-24).
[4] According to Rosenberg (2020, 48), "the methods of science [are] the *only* way to secure knowledge" (emphasis added).

In this paper, I develop a different argument for Weak Scientism. This argument for Weak Scientism proceeds from the premise that academic disciplines that make progress are superior to academic disciplines that do not make progress. In other words, other things being equal, it is generally better for an academic discipline to make progress than to make little or no progress, given that an academic discipline that is making little or no progress is an academic discipline that is failing to achieve its epistemic goals. Now, if there is no question among academic philosophers that science makes progress, and significantly so, but there is an open question among academic philosophers as to whether academic philosophy makes progress (and if so, how much), then academic philosophers would have to agree that science is superior to academic philosophy in terms of making progress. In what follows, I develop this argument in detail and provide empirical evidence suggesting that the premises would be acceptable to academic philosophers.

At the outset, then, it is important to note that, in this paper, I use academic philosophy as an example of a non-scientific academic discipline, which is why the conclusion of the overall argument of this paper is that science is superior to academic philosophy in terms of making progress. I do so for two reasons.

First, I focus on academic philosophy in order to make my empirical task in this paper more manageable.

Second, I focus on academic philosophy because I am concerned with the philosophical debate over scientism.

Some academic philosophers level the charge of scientism against scientists who are critical of academic philosophy. Philosophers who level the charge of scientism against those who are critical of philosophy typically identify famous scientists, such as Stephen Hawking and Neil deGrasse Tyson, as exhibiting this kind of allegedly misguided attitude toward science. For example, Kidd (2016, 11) refers to scientists like Hawking and deGrasse Tyson, who are guilty of scientism in his view, with apparent contempt as "cheerleaders for science."[5] Arguments for and against scientism (in one or more of its varieties), then, could help us assess the scientism charge and determine if it is warranted.

2. Progress in Science and in Academic Philosophy

For the most part, philosophers of science agree that science makes progress but they construe scientific progress in different terms. According to some philosophers of science, science is in the business of accumulating truths or approximating *truth*. According to the semantic view of scientific progress, science makes progress when more true scientific beliefs are accumulated or when there is greater approximation to scientific truth (see, for example, Niiniluoto 2014; cf. Bird 2007). For other philosophers of science, science is in the business of producing *knowledge*. According to the epistemic view of scientific progress,

[5] For more on the scientism charge, see Mizrahi (2022b, 1-24).

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science makes progress when there is accumulation of scientific knowledge (see, for example, Bird 2007; cf. Rowbottom 2008).[6]

Still other philosophers of science argue that science is in the business of increasing *understanding*. According to the noetic view of scientific progress, science makes progress when there is an increase in scientific understanding (see, for example, Dellsén 2016; cf. Park 2017). Finally, some philosophers of science argue that science is in the business of *solving* scientific problems, and so science makes progress when there are more solutions to scientific problems (see, for example, Shan 2019; cf. Bird 2007).[7]

For present purposes, the important point is that philosophers of science generally agree that science makes progress. They disagree about what science is in the business of producing, accumulating, or increasing, and so they define scientific progress in different terms, such as truth, knowledge, understanding, or solutions to problems. However, they tend to agree that, whatever the goal of science is, scientists are often successful in attaining it. As Niiniluoto (2019, https://plato.stanford.edu/entries/scientific-progress/) puts it:

> Science is often distinguished from other domains of human culture by its progressive nature: in contrast to art, religion, philosophy, morality, and politics, *there exist clear standards or normative criteria for identifying improvements and advances in science*. [...] The task of philosophical analysis is to consider alternative answers to the question: What is meant by progress in science? (emphasis added).

In other words, for most philosophers of science, there is no question that science makes progress. Instead, the question for philosophers of science is "How should we understand scientific progress?" (Douglas 2014, 55).

Indeed, the fact that science is often successful in attaining its goals is also taken for granted among philosophers of science. For example, according to Okasha (2016, 36), "Quite often, modern science is successful in its aim of supplying explanations." Philosophers of science who are scientific realists tend to take the success of science as evidence for scientific realism. For example, Putnam (1975, 73) famously argued that scientific realism "is the only philosophy that doesn't make the success of science a miracle."[8] Even anti-realists do not deny the success of science. Instead, they try to offer alternative explanations for the success of science. For example, constructive empiricists argue that the success of science can be explained by positing a selection process akin to natural selection. Like the claim that science

[6] For an empirical investigation of the semantic and epistemic accounts of scientific progress, see Mizrahi and Buckwalter (2014). For corpus-based studies of philosophical accounts of scientific progress, see Mizrahi (2021) and (2022a).
[7] For an overview of these accounts of scientific progress, see Dellsén (2018). Shan (2019) develops a functional account that defines scientific progress in terms of usefulness of problem-defining and problem-solving.
[8] For a recent defense of this argument (the so-called "no-miracles" argument), see Park (2022, 1-21). Cf. Mizrahi (2020, 52-62).

makes progress, then, the claim that science is successful is generally accepted among philosophers of science.[9]

According to Peels (2017), that "Science is highly successful" (14) is a reason but "*not* a good reason to embrace scientism" (15). It is important to note that Peels (2017, 12) defines scientism along strong (rather than weak) and narrow (rather than broad) lines.[10] In particular, Peels (2017, 12) takes scientism to be "the claim that only natural science provides *rational belief* or *knowledge*" (emphasis in original). Construed as the claim that *only* natural science provides knowledge, then, the success of natural science is not a good reason to embrace scientism because the fact that natural science is successful does not necessarily mean that non-scientific areas of inquiry cannot be successful as well (Peels 2017, 14). This seems to be correct, but it is not a good argument against embracing Weak Scientism. This is because Weak Scientism is the thesis that scientific knowledge is the *best*, but not the *only*, knowledge we have. On this view, non-scientific disciplines can be successful; it's just that scientific disciplines are more successful than non-scientific disciplines.

As Hietanen et al. (2022, 527) point out, as a particular conception of epistemological scientism, Weak Scientism, too, comes in narrow and broad varieties. In Turunen et al. (2022, 90), they put it this way:

> The narrow type [of Weak Scientism] states that the *natural* sciences are the best sources of knowledge, justification, and the like. On the other hand, the broad variety [of Weak Scientism] claims that not only the natural sciences but sciences *in general* are the best sources for the mentioned epistemic goods or something akin to them (emphasis in original).

In that respect, the variety of Weak Scientism I seek to argue for in this paper is board insofar as it is an epistemological scientism (of the weak variety) about *sciences in general*, which I take to include the natural and the social sciences, but exclude the arts and the humanities. For the purposes of this paper, I take it that academic philosophy, at least as it is currently practiced in academia, is among the academic disciplines that fall under the humanities.[11]

For present purposes, then, the important point is that even critics of scientism like Peels do not deny that science is highly successful. As Peels (2017, 14) puts it:

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[9] See also Kitcher (2002, 285), "Almost everybody seems to agree that the sciences constitute the richest and most extensive body of human knowledge."

[10] According to Hietanen et al. (2020, 525), "epistemological scientism can be sorted into *narrow* and *broad* varieties. The narrow versions state that only the natural sciences function as proper sources of knowledge, justification, rational beliefs, and the like. [...] The broad version, on the other hand, endorses a wider conception of science that encompasses both the natural and the human sciences. The term 'human sciences' includes the humanities, the arts, and the social sciences. One does not have to accept all of the human sciences as proper sources of knowledge in order to be a proponent of broad scientism, only a subsection will do" (emphasis in original).

[11] This is not to say that academic philosophy cannot become more like the sciences, especially, the social sciences. See, e.g., Buckwalter and Turri (2018).

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> Unnecessary to say, *science has been highly successful* in that it has unearthed countless truths about the world—at least, that is what (most) scientists and non-scientists alike believe. *Science is epistemically speaking an enormous achievement* (emphasis added).

Likewise, Gordon (2018, 96) criticizes "the 'science is successful' argument for scientism," not by denying the fact that science is successful, but by claiming that it is not sufficient to establish the conclusion that science is "the ultimate source of knowledge about reality." Note that, like Peels (2017), Gordon (2018, 96) also defines scientism strongly as the thesis that science is "the *ultimate* source of knowledge about reality" (emphasis added), which she calls "unrestricted scientism," rather than the *best* source of knowledge about reality. Gordon (2018, 96) "grant[s] unrestricted scientism *the success aspect of the claim*" (emphasis added), but she goes on to argue that it is not enough to support unrestricted scientism. Again, this seems to be correct, but it is not a good argument against Weak Scientism. This is because Weak Scientism is the thesis that science is the *best*, but not the *ultimate*, source of knowledge about reality. On this view, non-scientific disciplines can be good sources of knowledge; it's just that scientific disciplines are better sources of knowledge than non-scientific disciplines.

While academic philosophers generally agree that there is significant progress in science, and that science is successful, there is no general agreement among academic philosophers that the same can be said about academic philosophy.[12] In other words, philosophers of science generally agree that there is significant progress in science, and so there is no question about whether science makes progress or not, but rather the question is what is meant by progress in science (Niiniluoto 2019).

As far as philosophical progress is concerned, however, it is an open question whether academic philosophy makes any progress at all. For example, Shand (2017, 284) argues that "[p]hilosophy makes no progress" because "[p]hilosophical problems never seem to get finally solved" (285), the "range of disagreement in philosophy is as wide as it possibly could be" (287), the "range of approaches to philosophy is" even wider than that (288), and there "is no commonly agreed method for settling philosophical problems or criteria setting out the conditions of their being settled" (288). Similarly, Nielsen (1987, 1) argues that, as an academic discipline, philosophy has not made any progress because there is nothing "that counts as philosophical knowledge."[13] In fact, some academic philosophers even go so far as to claim that "philosophy does not need a concept of progress" (Shan 2022, 177). Clearly, if

[12] In this paper, I use the phrase 'academic philosophy' to refer to the academic discipline of philosophy. According to Schwitzgebel et al. (2018, 22), "*Mainstream Anglophone philosophy* is vague-boundaried and nebulous. However, it can be characterized well enough to permit sociological examination. Participants in this group are philosophers who write primarily in English (regardless of their native language); publish in English-language academic journals that are widely regarded as prestigious by other English-language philosophers, such as *Philosophical Review* and *Ethics*; belong to PhD-granting departments that are ranked in the *Philosophical Gourmet Report*, or have close scholarly ties to people in those departments; and are highly cited in the *Stanford Encyclopedia of Philosophy* and in prestigious English-language journals."

[13] See Chapter 1 of Stoljar (2017, 2-6) for more examples of what he calls "near pessimism," which is the view that academic philosophy does not make progress.

academic philosophy does not need a concept of progress, then it cannot be said to make progress.[14]

On the other hand, there are some academic philosophers that have an optimistic view of philosophical progress. For example, Stoljar (2017) defends what he calls "reasonable optimism" about progress in academic philosophy. He thinks that, like practitioners of other academic disciplines, academic philosophers sometimes manage to find answers to their questions and he provides a few examples of what he takes to be solutions to philosophical problems. Likewise, Rapaport (1982, 296) argues that there "can be (and is) progress in philosophy, for *the central stumbling block*—viz., the apparent unsolvability of philosophical problems—*is illusory*" (emphasis in original).

Even if it is granted that academic philosophy does make some progress, however, academic philosophers tend to think that it is not comparable to the sort of progress that science makes. As Cohen (2007, 267) puts it, "Admittedly, science is successful, while philosophy has failed to resolve the problems on its agenda." Likewise, according to Chalmers (2014, 3), "there is some progress in philosophy" but "not as much as we would like." In comparison to science, there isn't as much progress in academic philosophy as there is in science (Chalmers 2014, 3). Why? Because "there has not been large collective convergence on the big questions of philosophy," according to Chalmers (2014, 7).

Chalmers provides empirical evidence for this claim, which comes from the 2009 PhilPapers Survey. The results of the 2009 PhilPapers Survey (Bourget and Chalmers 2014) reveal a "striking" degree of disagreement among philosophers about big philosophical questions (Chalmers 2014, 9). This empirical evidence suggests that there is "a significant difference in the collective knowledge that we have attained [in academic philosophy and in science]." Unlike science, in academic philosophy, "collective knowledge of the answers to [big] questions eludes [academic philosophers]" because of the absence of agreement among academic philosophers.

More recently, Bourget and Chalmers (2021) conducted another survey, following up on the 2009 PhilPapers Survey (Bourget and Chalmers 2014). In the 2020 PhilPapers Survey, Bourget and Chalmers asked academic philosophers to give their responses to the following question: "Philosophical progress (is there any?): none, a little, or a lot?" (Bourget and Chalmers 2021, 10). Of the 1775 academic philosophers who answered this question, 68 said "none" (3.8%), 827 said "a little" (46.5%), 740 said "a lot" (41.6%), and 149 said "other" (8.3%). According to the results of the 2020 PhilPapers Survey, academic philosophers disagree about whether, and to what extent, academic philosophy makes progress (Bourget and Chalmers 2021, 40).

[14] This is not to say that philosophy does not need a concept of success. In other words, even if philosophy does not need a concept of progress, and so it cannot be said to make progress, it can still be successful. See Shan (2022, 182-183) for the distinction between the concepts of success and progress as applied to philosophy. See also Frances (2017, 56).

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Now, if academic philosophers generally agree that there is significant progress in science, but they do not agree that the same can be said about academic philosophy, then that suggests that academic philosophers would probably agree that science makes more progress than academic philosophy does. To use Chalmers' (2014, 3) terminology, the results of the 2020 PhilPapers Survey, specifically, the responses to the question about philosophical progress, suggest that most academic philosophers would give a negative answer to "the Comparison Question" (namely, "is there as much progress in philosophy as in science?"), just as Chalmers (2014, 4) does. If so, that is, if there is more progress in science than in academic philosophy, as most academic philosophers seem to think, then it follows that science is better than academic philosophy in terms of making progress.

As Bourget and Chalmers (2021, 36) point out, however, drawing general conclusions from the results of their 2020 PhilPapers Survey would be premature because of selection bias. That is, the sample of academic philosophers who responded to the survey was not randomly selected, and thus it might not be a representative sample of the general population of academic philosophers. Bourget and Chalmers (2021, 36) attempt to correct for a version of selection bias they call "respondent bias," which they distinguish from "enthusiast bias," by controlling for Area of Specialty (AOS), institutional affiliation, and Ph.D. granting institution. After correcting for AOS and region of affiliation, as well as gender, Bourget and Chalmers (2021, 40) report that the results of the question about philosophical progress are as follows: "none" 4.88%, "a little" 46.76%, and "a lot" 38.28%. According to these corrected results, too, academic philosophers disagree about whether, and to what extent, academic philosophy makes progress (Bourget and Chalmers 2021, 40).

Again, if academic philosophers generally agree that there is significant progress in science, but they do not agree that the same can be said about academic philosophy, then that suggests that academic philosophers would probably agree that science makes much more progress than academic philosophy does. To use Chalmers' (2014, 3) terminology again, the corrected results of the 2020 PhilPapers Survey, specifically, the responses to the question about philosophical progress, suggest that most academic philosophers would give a negative answer to "the Comparison Question" (namely, "is there as much progress in philosophy as in science?"), just as Chalmers (2014, 4) does. But if there is much more progress in science than in academic philosophy, as most academic philosophers seem to think, then it follows that science is better than academic philosophy in terms of making progress.

3. Sentiment Analysis

For those who are concerned about selection bias in the results of the 2009 and 2020 PhilPapers Surveys, there is another way to gauge the disagreement about progress in academic philosophy among academic philosophers, namely, to study a digital corpus of philosophical texts. This is where computational, digital, and corpus-based methods of text mining and analysis can be useful. In particular, if we can gather a sample of philosophical texts about philosophical progress written by academic philosophers, and then classify them into pessimistic/negative and optimistic/positive, we can get a pretty good sense of the

disagreement about philosophical progress among academic philosophers. So this is precisely what I set out to do.

More specifically, I ran a sentiment analysis, also known as "opinion mining" (Liu 2017), on a sample of philosophical texts about philosophical progress to find out whether academic philosophers generally express optimistic/positive or pessimistic/negative sentiments toward—or have optimistic/positive or pessimistic/negative opinions about—philosophical progress in their published works. To do this, I searched the Scopus database[15] for philosophical publications with the terms 'philosoph*' and 'progress*' in the title, abstract, and/or keywords.[16] Then, I cleaned up the data by removing incomplete search results and results from publications that are not about progress in academic philosophy. For example, here is an abstract of a publication that was removed from the dataset:

> Perhaps the biggest disconnect between philosophers and non-philosophers on the question of gun rights is over the relevance of arms to our dignitary interests. This essay attempts to address this gap by arguing that we have a strong prima facie moral right to resist with dignity and that violence is sometimes our most or only dignified method of resistance. Thus, we have a strong prima facie right to guns when they are necessary often enough for effective dignified resistance. This approach is distinctively non-libertarian: it doesn't justify gun rights on the basis of (mere) liberty or security. Nonetheless it is compatible with libertarian defenses of gun rights based on a liberty right to guns, and, if sound, in fact lowers the bar for gun rights in some ways, as it justifies access to guns even when nonviolent means would better achieve the liberty or security aims of potential victims. And although this defense of gun rights is most readily categorized as "conservative" or rightist, it relies upon principles and intuitions about dignity popular among *progressives* in other domains, such as in disability, women's, or LGBT rights debates (Demetriu 2022; emphasis added).

While there is an occurrence of the term 'progressive' in this abstract, the term is not used to say that academic philosophy is progressive or to talk about progress in academic philosophy at all. Instead, the term is used in its political sense to talk about people with progressive

[15] The Scopus database was selected because it aims to deliver "the broadest coverage of any interdisciplinary abstract and citation database" and it covers "240 disciplines" (https://www-elsevier-com.portal.lib.fit.edu/solutions/scopus/how-scopus-works/content). Even though it aims for a broad interdisciplinary coverage, one might still worry that Scopus has a better coverage of science than philosophy publications. In that respect, other databases, such as Google Scholar, could have been used to mine textual data from philosophy publications about progress in academic philosophy. Unlike Scopus, however, Google Scholar does not allow researchers to easily download search results and it does not provide metadata, including abstracts, with search results. For these reasons, Scopus is a more user-friendly database than Google Scholar for a digital, corpus-based study such as the one I have conducted for this paper.

[16] The truncation operator * was used in order to include terms, such as 'philosophy' and 'philosophical', as well as 'progressive' and 'progressively', in the search results.

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political views.[17] After cleaning up the data, I got a list of 51 philosophical publications with the terms 'philosoph*' and 'progress*' in the title, abstract, and/or keywords.[18]

I used the Azure Machine Learning add-in in Microsoft Excel (Microsoft Office 365) to run a sentiment analysis on the abstracts of these 51 philosophical publications. Azure Machine Learning is a free analytics tool that uses Natural Language Processing (NLP) to run analyses, such as sentiment analysis, on unstructured text. A sentiment analysis "is a process of automatically extracting opinions or emotions from text, especially in user-generated textual content. Sentiment analysis is considered a classification task which classifies text into positive, negative, or neutral classes" (Kumar and Harish 2020, 1122).

The Azure Machine Learning text sentiment analysis uses the Multi-Perspective Question Answering (MPQA) Subjectivity Lexicon (http://mpqa.cs.pitt.edu/lexicons/subj_lexicon/), which is a commonly used subjectivity lexicon in NLP. The MPQA Subjectivity Lexicon includes 5,097 negative words and 2,533 positive words with strong and weak polarity annotations. As Wilson et al. (2005, 348) explain:

> The *positive* tag is for positive emotions (*I'm happy*), evaluations (*Great idea!*), and stances (*She supports the bill*). The *negative* tag is for negative emotions (*I'm sad*), evaluations (*Bad idea!*), and stances (*She's against the bill*). […] The *neutral* tag is used for all other subjective expressions: those that express a different type of subjectivity such as speculation, and those that do not have positive or negative polarity (emphasis in original).[19]

Accordingly, the output of a sentiment analysis performed by the Azure Machine Learning algorithm includes the sentiment tags of 'positive', 'negative', and/or 'neutral', as well as their associated scores between zero and one. A score close to zero gets a 'negative' tag, a score close to one gets a 'positive' tag, and a score approximately midpoint between zero and one gets a 'neutral' tag.

Accordingly, if we run a sentiment analysis on the text from the abstracts of the aforementioned 51 philosophical publications with the terms 'philosoph*' and 'progress*' in the title, abstract, and/or keywords, we can find out whether the authors express mostly optimistic/positive or pessimistic/negative sentiments toward philosophical progress. If this sample of 51 philosophical publications with the terms 'philosoph*' and 'progress*' in the title, abstract, and/or keywords is a random sample (that is, presumably, any philosophical

[17] This methodology may be too restrictive, since there could be philosophical publications that contain discussions of progress in academic philosophy even if their titles, abstracts, and/or keywords do not contain occurrences of the terms 'philosoph*' and 'progress*'. Moreover, philosophers who write about philosophical progress (or lack thereof) may be more inclined to see it as a problem worthy of treatment in writing. As we will see, the results of the sentiment analysis are consistent with the results of the 2009 and 2020 PhilPapers Surveys, which may go some way toward addressing this worry.

[18] The complete list of publications and raw data are available here: https://osf.io/85f6j/?view_only=218197447df94026894653f150504b63.

[19] See also Wiebe et al. (2005) for more details on sentiment analysis in NLP and the MPQA Subjectivity Lexicon.

publication with the terms 'philosoph*' and 'progress*' in the title, abstract, and/or keywords has had a roughly equal chance of making it into the search results on the Scopus database), then we can be quite confident that the results of the sentiment analysis will be fairly representative of the sentiments toward philosophical progress expressed in philosophical publications rather generally.

The results of this sentiment analysis are as follows. Of the 51 philosophical publications from the Scopus database, the Azure Machine Learning algorithm tagged 23 as 'negative' (45%), 19 as 'positive' (37%), and 9 as 'neutral' (18%). The mean score of the negative publications is 0.12 (M = 0.12, SD = 0.14), the mean score of the positive publications is 0.81 (M = 0.81, SD = 0.11), and the mean score of the neutral publications is 0.52 (M = 0.52, SD = 0.04). See Figure 1.

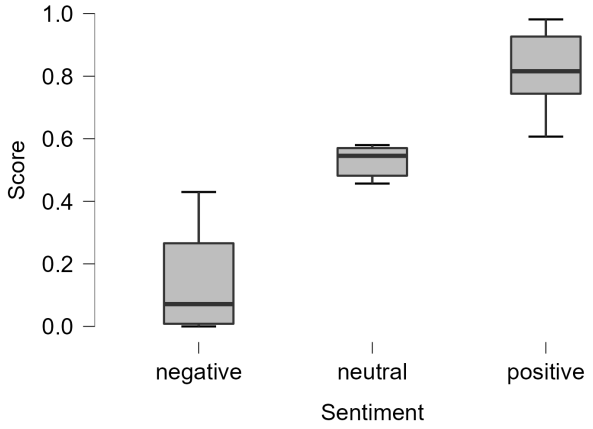

Figure 1. Classification of 51 publications on philosophical progress written by academic philosophers into negative, positive, and neutral sentiment classes based on their abstracts.

Although the Azure Machine Learning text sentiment analysis uses the Multi-Perspective Question Answering (MPQA) Subjectivity Lexicon (http://mpqa.cs.pitt.edu/lexicons/subj_lexicon/), which is a commonly used subjectivity lexicon in NLP, one might worry about the accuracy of the Azure Machine Learning algorithm in classifying texts into 'positive', 'negative', and 'neutral'. For this reason, I have inspected three results selected at random from the philosophy dataset–one tagged 'positive', one tagged 'negative', and one tagged 'neutral–in an attempt to verify the accuracy of the classification task. Here are the three results selected at random:

> 1. Positive: "This article argues, first, that there is plenty of agreement among philosophers on philosophically substantive claims, which fall into three categories: reasons for or against certain views, elementary truths regarding fundamental notions, and highly conditionalized claims. This agreement suggests that there is important philosophical progress. It then argues that although it's easy to list several potential kinds of philosophical progress, it is

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> much harder to determine whether the potential is actual. Then the article attempts to articulate the truth that the deniers of philosophical progress are latching on to. Finally, it comments on the significance of the agreement and (potential) progress" (Frances 2017).
>
> 2. Negative: "I argue that the best explanation of the multiplicity of available frameworks for treating any given philosophical topic is that philosophy currently (though not insuperably) lacks fixed standards; I then go on to identify three barriers to philosophical progress associated with our present epistemic situation. First is that the lack of fixed standards encourages what I call 'intra-disciplinary siloing', and associated dialectical and argumentative failings; second is that the lack of fixed standards makes room for sociological factors (including elite influence and disciplinary inertia) to be determinative of which philosophical frameworks are embraced; third is that the lack of fixed standards encourages (implicit and/or explicit) bias. I close by offering some suggestions about how to move beyond these barriers, even in the absence of fixed standards" (Wilson 2017).
>
> 3. Neutral: "Any adequate attempt to discuss progressivity in philosophy should provide some explanation of why philosophy persistently honours 'the old and the false' and deals with original texts in a way in which science does not. An attempt is made to answer this question by appealing to: (1) the aporetic character of philosophy; (2) the semantical solipsism of philosophy; (3) the subjectivity of philosophy, and; (4) poetical continuities in philosophy" (Woods 1988).

A χ-test for proportions indicates that the difference between the proportion of negative publications (0.45) and positive publications (0.37) on philosophical progress is not statistically significant ($\chi = 0.81$, $p = 0.42$, two-sided). These results suggest that publications on philosophical progress written by academic philosophers tend to contain both optimistic/positive and pessimistic/negative sentiments about philosophical progress with no significant differences between the optimistic/positive sentiments and the pessimistic/negative sentiments. In other words, the results of a sentiment analysis appear to bear out the fact that academic philosophers disagree about whether there is progress in academic philosophy: some academic philosophers are optimistic and have positive opinions about philosophical progress, whereas other academic philosophers are pessimistic and have negative opinions about philosophical progress.

By contrast, a sentiment analysis of scientific texts on scientific progress suggests that scientists tend to be optimistic and have positive attitudes toward progress in science. That is, unlike academic philosophers, for whom there is no question that science makes significant progress, but there is an open question as to whether academic philosophy makes progress (and if so, how much), scientists tend to be more optimistic/positive than pessimistic/negative about progress in science.

A similar sentiment analysis, but with text from scientific publications on scientific progress suggests that scientists tend to be more optimistic/positive than pessimistic/negative about scientific progress. More specifically, I ran a sentiment analysis on a sample of scientific texts about scientific progress to find out whether scientists generally express optimistic/positive or pessimistic/negative sentiments toward—or have optimistic/positive or pessimistic/negative opinions about—scientific progress.

To do this, I searched the Scopus database for publications with the terms 'scien*' and 'progress*' in the title, abstract, and/or keywords.[20] After removing incomplete search results and cleaning up the data from publications that are not about progress in science, I got a list of 174 scientific publications with the terms 'scien*' and 'progress*' in the title, abstract, and/or keywords.[21] Again, if this sample of 174 scientific publications with the terms 'scien*' and 'progress*' in the title, abstract, and/or keywords is a random sample (that is, presumably, any scientific publication with the terms 'scien*' and 'progress*' in the title, abstract, and/or keywords has had a roughly equal chance of making it into the search results on the Scopus database), then we can be quite confident that the results of the sentiment analysis will be fairly representative of the sentiments of scientists toward scientific progress rather generally.

The results of this sentiment analysis are as follows. Of the 174 scientific publications from the Scopus database, the Azure Machine Learning algorithm tagged 95 as 'positive' (55%), 67 as 'negative' (38%), and 12 as 'neutral' (7%). The mean score of the positive publications is 0.82 ($M = 0.82$, $SD = 0.12$), the mean score of the negative publications is 0.18 ($M = 0.18$, $SD = 0.15$), and the mean score of the neutral publications is 0.53 ($M = 0.53$, $SD = 0.03$). See Figure 2.

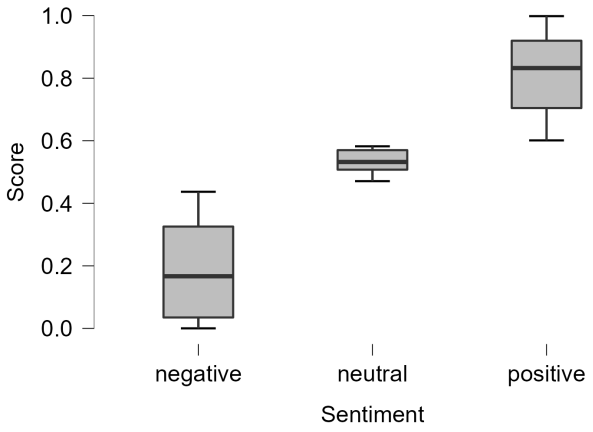

Figure 2. Classification of 174 publications on scientific progress written by scientists into negative, positive, and neutral sentiment classes based on their abstracts.

[20] The truncation operator * was used in order to include terms, such as 'science' and 'scientific', as well as 'progressive' and 'progressively', in the search results.
[21] The complete list of publications and raw data are available here: https://osf.io/85f6j/?view_only=218197447df94026894653f150504b63.

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1. Positive: "Today climate change has caused extensive concern of the whole society. Paleoclimate change studies in geological time (including Quaternary and "Deep Time"), in which continental scientific drilling plays a significant role, provide important references to the current climate change. This paper reviews scientific progresses in the study of paleoclimate change in continental scientific drilling projects. In advantage of the continuous sedimentary records acquired by the continental scientific drilling projects, high-resolution chronostratigraphic framework is established and multiple paleoclimatic proxies are applied. With the aim to decipher the process and mechanism of climate change, progresses have been achieved on paleoclimatic reconstructions on different timescales, detailed studies on rapid climate changes, and precise correlation between marine and terrestrial paleoclimatic records. It is predictable that continental scientific drilling will be more influential in the paleoclimate studies in future, especially in deep-time greenhouse climate studies" (Gao et al. 2019).

2. Negative: "We address the question posed in the title of this paper by investigating recent developments in the literature that estimates the NAIRU. A necessary condition for the existence of a NAIRU is dynamic homogeneity: the Phillips curve should be homogeneous of degree one in lagged and/or expected inflation. But contemporary approaches to estimating the NAIRU typically assume rather than test for dynamic homogeneity, thus assuming (rather than testing for) the existence of a NAIRU. We argue that these developments remove the NAIRU from the domain of testable hypotheses and transform the concept into an article of faith. This does not constitute scientific progress" (Lang 2020).

3. Neutral: "Stroke induced by middle cerebral artery occlusion in adult rodents induces the formation of new neurons in the damaged striatum, a region that normally does not show neurogenesis. Here we describe recent findings on the regulation of neurogenesis after stroke, in particular regarding the duration of the neurogenic response and the influence of age, as well as the molecular mechanisms influencing migration and survival of the new neurons. We also discuss some crucial issues that need to be addressed in the further exploration of this potential self-repair mechanism after damage to the adult brain" (Kokaia 2006).

A z-test for proportions indicates that the difference between the proportion of positive publications (0.55) and negative publications (0.38) on scientific progress written by scientists is statistically significant ($z = 3.01$, $p = 0.002$, two-sided). These results suggest that publications on scientific progress written by scientists contain significantly more optimistic/positive than pessimistic/negative sentiments about scientific progress. In other words, the results suggest that, like academic philosophers, scientists tend to express optimistic/positive sentiments about scientific progress in their academic publications.

To sum up, then, whether there is progress in science is not in question, as far as both scientists and philosophers of science are concerned. Philosophers of science tend to agree that science makes significant progress, although they disagree about how to construe scientific progress. On the other hand, whether there is progress in academic philosophy (and if so, how much) is an open question, as far as academic philosophers are concerned. Some academic philosophers are optimistic and have positive attitudes toward philosophical progress, whereas other academic philosophers are pessimistic and have negative attitudes toward philosophical progress. By contrast, most scientists are optimistic and have positive attitudes toward scientific progress.

Like the results of the PhilPapers Surveys (see Section 2 above), the results of sentiment analyses suggest that academic philosophers would probably agree that science makes much more progress than academic philosophy does, given that academic philosophers generally agree that there is significant progress in science, but they do not agree that the same can be said about academic philosophy. To use Chalmers' (2014, 3) terminology again, the results of sentiment analyses suggest that most academic philosophers would give a negative answer to "the Comparison Question" (namely, "is there as much progress in philosophy as in science?"), just as Chalmers (2014, 4) does.[22] But if there is much more progress in science than in academic philosophy, as most academic philosophers seem to think, then it follows that science is better than academic philosophy in terms of making progress.

4. Scientism and Progress

As we have seen, the results of the 2020 PhilPapers Survey, specifically, the responses to the question about philosophical progress, suggest that most academic philosophers would give a negative answer to "the Comparison Question" (namely, "is there as much progress in philosophy as in science?"), just as Chalmers (2014, 4) does, since most academic philosophers disagree about whether academic philosophy makes progress, and to what extent, but they agree that science makes significant progress.

Likewise, the results of a sentiment analysis also suggest that most academic philosophers would give a negative answer to "the Comparison Question" (namely, "is there as much progress in philosophy as in science?"), just as Chalmers (2014, 4) does, since some academic philosophers are optimistic and have positive opinions about philosophical progress,

[22] See also Hansson (2016, 215): "No one can doubt that there is progress in the natural sciences, but it is much more debated whether there is progress in philosophy."

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whereas other academic philosophers are pessimistic and have negative opinions about philosophical progress, and there are no significant differences between the optimistic/positive sentiments and the pessimistic/negative sentiments. When it comes to scientific progress, however, academic philosophers generally agree that there is significant progress in science, even though they define scientific progress in different terms.

Now, given that, other things being equal, it is generally better for an academic discipline to make progress than to make little or no progress, it follows that science is better than academic philosophy in terms of making progress, by academic philosophers' own lights. After all, an academic discipline that does not make progress is not attaining its epistemic goals, whether the goal is to approximate truth, to accumulate knowledge, to increase understanding, or to solve problems. As Jaspers (1951/2003, 7) puts it:

> For the scientific-minded, the worst aspect of philosophy is that it produces no universally valid results; it provides nothing that we can know and thus possess. Whereas the sciences in their fields have gained compellingly certain and universally recognized insights, philosophy, despite thousands of years of endeavour, has done nothing of the sort. This is undeniable: *in philosophy there is no generally accepted, definite knowledge.* [...] Nor is philosophical thought like the sciences, characterized by progressive development (emphasis added).

If there is much more progress in science than in academic philosophy, as most academic philosophers seem to think, then it follows that science is better than academic philosophy in terms of making progress because, other things being equal, it is generally better for an academic discipline to make progress than to make little or no progress.

Clearly, the fact that most academic philosophers seem to agree that science makes more progress than academic philosophy, as the results of the 2020 PhilPapers Survey (Bourget and Chalmers 2021) and the results of sentiment analyses suggest, given the consensus among academic philosophers about the former and the lack of consensus about the latter, does not necessarily mean that science actually makes more progress than academic philosophy. After all, what most academic philosophers generally believe could be wrong. So, it is important to emphasize again that the aforementioned the results of the 2020 PhilPapers Survey (Bourget and Chalmers 2021) and the results of sentiment analyses are not meant to support the claim that, as a matter of fact, science makes more progress than academic philosophy. Instead, they are meant to show that most academic philosophers would accept the premise that science makes more progress than academic philosophy.

Now, if they also accept the premise that academic disciplines that make progress are superior to academic disciplines that make little progress or no progress at all, then they would have to accept the conclusion that follows from those two premises, namely, that science is better than academic philosophy in terms of making progress. This is an argument for Weak Scientism because it identifies another dimension along which scientific disciplines can be said to be superior to a non-scientific discipline like academic philosophy. Mizrahi's

(2017a) argument identifies several dimensions along which scientific knowledge can be said to be better than non-scientific knowledge.

First, there are the quantitative dimensions of research output (as measured by number of publications) and research impact (as measured by number of citations); in particular, scientific disciplines produce *more* knowledge and the knowledge they produce has *more* impact than the knowledge produced by non-scientific disciplines.

Second, there are the quantitative dimensions of explanation, prediction, and intervention; in particular, scientific knowledge is explanatorily, predictively, and instrumentally more successful than non-scientific knowledge. To these we can now add progress. That is, if there is much more progress in science than in academic philosophy, as most academic philosophers would seem to agree, then science can be said to be better than academic philosophy in terms of making progress as well.

It is worth noting that the point of arguing that science is better than academic philosophy along the aforementioned dimensions, including the dimension of progress, is *not* to belittle academic philosophy in any way. Even if science is more successful and more progressive than academic philosophy, it doesn't have to be. In other words, that science is more successful and progressive than academic philosophy is not a necessary truth. Indeed, many prominent philosophers throughout the history of philosophy were impressed with science and tried to emulate its success (Voegelin 1948). For example, Thomas Hobbes' *Leviathan* (1651) introduced concepts from the new science of the seventeenth century, such as force and endeavour, into social and political philosophy. Baruch Spinoza's *Ethics* (1677) incorporated the geometrical method into metaphysics and moral philosophy. David Hume's *A Treatise on Human Nature* (1739-1740) was an "attempt to introduce the experimental method of reasoning into moral subjects."

These historical precedents suggest that there is no reason to think that academic philosophy could not be as successful and progressive as scientific disciplines are. Indeed, much like the aforementioned historical figures, some contemporary philosophers have argued that the adoption and application of scientific methods to philosophical inquiry has been quite successful. For example, according to Buckwalter and Turri (2018, 282), "Experimental, observational, and statistical techniques have significantly contributed to research in epistemology, action theory, ethics, philosophy of language, and philosophy of mind." Moreover, Van De Poel (2020, 231-244) argues that, if they want to make academic philosophy "societally relevant," academic philosophers need to incorporate the synthetic methods of designers as well as techniques of experimentation into philosophical inquiry. Accordingly, rather than pit science against philosophy, Weak Scientism emphasizes the continuity between philosophy and science.

5. Conclusion

In this paper, I developed an argument for Weak Scientism, which is the view that scientific knowledge is the *best* (but not the *only*) knowledge we have (Mizrahi 2017a). This argument

for Weak Scientism proceeds from the premise that academic disciplines that make progress are superior to academic disciplines that do not make progress. In other words, other things being equal, it is generally better for an academic discipline to make progress than to make little or no progress, given that an academic discipline that is making little or no progress is an academic discipline that is failing to achieve its epistemic goals. Now, if academic philosophers generally agree that science makes progress, and significantly so, but they do not agree as to whether academic philosophy makes progress (and if so, how much), then they would have to grant that science is superior to academic philosophy in terms of making progress. Empirical support for the premises of this argument comes from the results of the 2020 PhilPapers Survey (Bourget and Chalmers 2021) and the results of sentiment analyses.

Like the results of the PhilPapers Surveys (see Section 2 above), the results of these sentiment analyses suggest that academic philosophers would probably agree that science makes much more progress than academic philosophy does, given that academic philosophers generally agree that there is significant progress in science, but they do not agree that the same can be said about academic philosophy (see Section 3 above). If there is much more progress in science than in academic philosophy, as most academic philosophers seem to think, then it follows that science is better than academic philosophy in terms of making progress because, other things being equal, it is generally better for an academic discipline to make progress than to make little or no progress. This is not to say that academic philosophy cannot be as progressive as science is thought to be. Just as great philosophers of old, like Hobbes, Spinoza, and Hume, borrowed from the best sciences of their time, contemporary philosophers can do the same.

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