Behavior and Philosophy, *48*, 91-108 (2020). © 2020 Cambridge Center for Behavioral Studies

ON USEFULNESS OF THE USELESS: PHILOSOPHY AS THE CONSCIOUSNESS OF SCIENTIFIC KNOWLEDGE[1]

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ABSTRACT
This essay explores some possibilities brought by the question about philosophy's utility for science. We point to some arguments in favor of the importance of philosophy for science in general and Behavior Analysis in particular. We argue that philosophy is the consciousness of science. Without philosophical consciousness, science incurs epistemological naiveties; it uncritically defends scientific neutrality; it risks turning into a mere technique in the service of ideologies that endangers science's existence. As the philosophy of Behavior Analysis, Radical Behaviorism can play the role of conscience of that science.

Key words: science, philosophy, Behavior Analysis, Radical Behaviorism.

What is the utility of philosophy for Behavior Analysis? That question often comes from the more or less explicit belief that Behavior Analysis does not need philosophy to achieve its goals. According to this belief, behavior analysts could act without worrying about philosophical issues, whether in their research activities or their interventions. If that is the case, convincing the asker of the usefulness of philosophy will not an easy task because, as William James (1907) said, beliefs are conservative in nature: "Truths have once for all this desperate instinct of self-preservation and of desire to extinguish whatever contradicts them" (p. 78). However, if the questioning arises, there still is a possibility of conversation. There would have been no question if the interlocutor was already fully convinced of the uselessness of philosophy. Dogmatism does not allow any possibilities for dialogue. Skepticism does.

The belief in the uselessness of philosophy for science has a history. It goes back to modern science and its defense that the facts and not the religious authorities—who were the official representatives of the philosophy—must be the parameter to the knowledge's truthness (Mariconda, 2006). The Kantian criticism of transcendent metaphysics reinvigorated the doubt about the usefulness of philosophy, interdicting the possibility of traditional philosophy having a place in the scientific field. The

[1] The title is an explicit reference to Nuccio Ordine's book (L'unitilitá dell'inutile), although this essay does not follow the arguments presented by him point by point.

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repudiation of philosophy went on with different positivism versions, such as Comte's, Mach's, and Vienna's Circle ones. It also gained new contours with the consolidation of technoscience—a technological model of science that radically has changed the human being's relationship with the social and non-social world, inaugurating an era dominated by technology (Galimberti, 2009).

Some narratives about the emergence of modern scientific psychology also endorse the argument that philosophy is useless. Positivist historiography says that psychology was born as a science when it divorced philosophy and entered into an exclusive commitment with the experimental method. The historic milestone had been the establishment of Wilhelm Wundt's laboratory of experimental psychology in 1879, in Leipzig (Germany) (e.g., Boring, 1929/1957; Hothersall, 2004/2006; Schultz & Schultz, 2008).

Given the pervasiveness of the belief on philosophy's uselessness in science, asking if philosophy is of any utility for Behavior Analysis might have another meaning. "Show me why philosophy is useful for behavior analysts" might be a countercultural request that exhibits some skepticism, albeit mitigated, about the history that celebrated philosophy's uselessness for science. Exploring this possibility, we point at some arguments in favor of philosophy's importance for science in general and Behavior Analysis in particular. The central thesis to be sustained here is that without philosophy, science has no consciousness. Without philosophy, science ends up being condemned to the guillotine; it loses its head—it loses epistemological criticism, ethical criticism, and political criticism. Without philosophy, science loses its intellectual, moral, and social consciousness.

Science and philosophy: An essential tension

Science needs to have a consciousness, and philosophy precisely plays the role of providing consciousness to science. Why would science need consciousness? This question is sensible because science is a rational activity *par excellence*. Scientific knowledge is averse to intuitive responses, personal opinions, and statements without proper examination. Therefore, it is not in that sense that science needs consciousness. To understand our argument, we shall compare the *modus operandi* of science with that of philosophy.

When it comes to a new research field, scientific activity has many similarities with the philosophical one. The absence of robust data, the weak definition of concepts, and constant debates on crucial issues create a highly controversial scientific field (Latour, 1987/2003).

All of that changes when concrete results begin to be attained. If they pass the scrutiny of the scientific community, these results end up becoming consensual. Therefore, the advance of science consists of replacing controversies for consensus. Using an allegory proposed by Latour (1987/2003), those issues become "black boxes;" the science then starts to be done *with* them, and not *about* them.

Let us consider a specific case. In the early days of Experimental Analysis of Behavior, everything was open to discussion. Concepts, notions, procedures, and devices that were not already consolidated by former research traditions were objects of debate and controversy. For example, when initially proposed, the notion of "schedule of reinforcement" admitted a series of more or less direct questions. The first signal this concept is turning into a "black box" appears when behavior analysts reach a consensus

on the results of experiments concerning characteristics of different schedules (response rate stability, extinction time, "strength" of behavior in each schedule). The closing of the "black box" is complete when the notion of the schedule of reinforcement stops being a subject matter and becomes a part of a procedure that intends to investigate other behavioral processes (e.g., VI to guarantee a stable baseline or a fluctuation during the testing phase, Lag-N to investigate operant variability). As the community of behavior analysts builds lines of research, efforts become focused on producing more results that feed the process back: The more results are accepted, the less likelihood of scientists opening previously closed "black boxes."

In that social process of "blackboxing," science features itself as a first-order discourse—an explanation of phenomena supported by a conceptual and methodological composed of "black boxes" that must be kept closed. To philosophy, on the other hand, there are no "black boxes" or, at least, there is always a possibility of opening them and "discussing what is inside them." In this context, philosophy arises as a second-order discourse—a discussion, debate, and questioning about scientific statements. Science's discourses are affirmative; philosophy's discourses are critical and negative.

Described in that way, the relationship between philosophy and science is frankly an antagonistic one: While science tries closing "black boxes" and "moving on," philosophy always goes back, trying to open those boxes that were left behind. Parodying Kierkegaard's statement, we could say that while science knows forward, philosophy criticizes backward.

Examples of questions that seek to open Behavior Analysis' "black boxes" are: "What is behavior?;" "What is a stimulus?;" "What is a contingency of reinforcement ?" At first glance, asking these questions can seem counterproductive to a science of behavior, which explains scientists' tendency to abandon or reject philosophy in favor of scientific "progress." Nevertheless, the philosophical opening of scientific "black boxes" might help to overcome many of science's limitations and flaws.

We intend to demonstrate here that the tension between science (closing) and philosophy (opening) is essential for building enlightened scientific knowledge. Following, we will describe how a "philosophical consciousness" can contribute to science in different dimensions.

Philosophical consciousness of the theoretical assumptions of science

Science is a unique knowledge. Among other aspects, science is defined by incautious obedience to the "game rules:" Verification of logic coherence, search for empirical support, and exposition to the scientific community's criticism (Morin, 1982/2005). No matter who the scientist is, renowned or unknown, experienced or neophyte, everyone accepts the rules without exception. Indeed, there is no choice insofar as those rules determine the "scientific game."

Scientists also must learn to recognize that the results of their research will not necessarily match their desires and expectations; that they will not always be attained within the established time frame; and that even when the results are reliable (resistant to the scientific community's criticism), they cannot be taken as absolute truth. If any scientist cheats (falsifying, making up, or plagiarizing data), sooner or later, it will be discovered by science's obstinate search for mistakes and by the implacable sequence of test-retest-test that features scientific knowledge.

Nonetheless, following the "game rules" without a philosophical consciousness presents some risks. One of them is naïve empiricism, namely, the belief that data have a meaning per se, independent from theoretical assumptions (Furlan, 2008). Against this naïve empiricism, a philosophical consciousness shows that data only gain meaning concerning a theory. Without theory, data do not compose a coherent whole, and scientists can become mere replicators of procedures and accumulators of data.

Skinner (1969) had philosophical consciousness when he stated that observation depends on theory. According to him, if someone with no knowledge about Behavior Analysis were to be asked to observe an ongoing experiment, “our observer will find it hard to make any sense of these scattered facts . . . The fact remains that direct observation, no matter how prolonged, tells him very little about what is going on” (Skinner, 1969, p. 9). Without operant theory, one could not see an operant; it would not be possible for someone to see actions articulated with antecedents and consequences; it would not be possible to see the contingencies of reinforcement.

From a philosophical perspective, Skinner (1947/1999b) also argued that science is not a mere accumulation of facts: “There is no more pathetic figure in psychology today than the mere collector of facts, who operates, or thinks he operates, with no basis for selecting one fact as against another” (p. 347). Despite having rejected a specific sense of theory (see Skinner, 1950/1999a, p. 69; 1969, p. vii), Skinner (1947/1999b) endorsed that data would only be capable of providing an understanding of the studied phenomenon when they were articulated and integrated by a theory: “Behavior can only be satisfactorily understood by going beyond the facts themselves” (p. 347). Because of that, he concluded, “a theory is essential to the scientific understanding of behavior as a subject matter” (p. 348).

Besides fostering the acknowledging of theory, a philosophical consciousness permits scientists to identify less conspicuous philosophical assumptions. Without this identification, scientists might inadvertently commit to suspicious metaphysics. Wundt had already foreseen that. Differently from what is proclaimed by positivist historiography, the renowned “father of modern psychology” argued that if psychologists strayed far from philosophy, they would become technologists and, due to that, would risk complying with naïve metaphysics (Abib, 1998; Araujo, 2010).

That issue has also been discussed in one of the sciences considered responsible for purging philosophy from the scientific field: Newtonian physics. On the one hand, the Newtonian mathematical approach to strength and movement may have created conditions for the subsequent defense of the abandonment of philosophy by science. On the other hand, Newton’s work undoubtedly involved metaphysical and even theological issues—such as the relationship between God and the physical world, the notion of substance, and an ontology of space and time (Janiak, 2008).

The positivistic anti-metaphysical thesis has also been a target of criticism. Burtt (1925) highlighted that instead of taking metaphysics out of the equation, positivism ends up uncritically and unconsciously committing science to a kind of metaphysics:

> There is an exceedingly subtle and insidious danger in positivism. If you cannot avoid metaphysics, what kind of metaphysics are you likely to cherish when you sturdily suppose yourself to be free from the abomination? Of course, it goes without saying that in this case your metaphysics will be held uncritically because it is unconscious. (p. 225)

Burtt (1925) adds that such metaphysical commitment "will be passed on to others far more readily than other notions inasmuch as it will be propagated by insinuation rather than direct argument" (p. 225). In short, with the acritical and unconscious transmission of a metaphysical system, positivism fosters an impoverishment of scientific knowledge, making it difficult for science to recognize and openly discuss its philosophical assumptions.

Although Skinner had been economic when it came to metaphysical statements, he outlined an ontology of behavior by defining behavior as "a process, rather than a thing . . . It is changing, fluid, and evanescent" (Skinner, 1953, p. 15). He also sketched an ontology by considering "it is in the nature of [the] behavior, . . . that there are variations" (Skinner, 1989, p. 129). These assertions suggest Radical Behaviorism's commitments with a non-essentialism metaphysics, bringing it closer to other philosophies of this genre, such as pragmatism or contextualism (Lopes, Laurenti, Abib, 2018; Morris, 1988).

The lack of philosophical consciousness contributes to scientists' enclosure and isolation of their science. As Morin (1982/2005) said, ". . . fragmentation, disjunction, and esotericism of scientific knowledge tend to have the anonymity as a consequence" (p. 17). That anonymity is nothing more than the isolation that has historically accompanied Behavior Analysis (see Holth, 2014; Krantz, 1971).

A way to cope with the isolation is to abandon the rhetoric that Behavior Analysis brings an entirely new and original conception of humankind, nature, or even behavior to the table, one that does not find any equivalents in other philosophical and scientific proposals. Therefore, behavior analysts need to identify and acknowledge their philosophical "lineage," locating their research results in scientific and philosophical traditions. By doing this, possibilities of communication between different scientific theories that share similar philosophical assumptions open up.

One of these lineages appears with the Skinnerian adhesion to selectionism, which was made explicit in the selection by consequences model (Skinner, 1981). That new explanatory model exhibits a kind of naturalism that roots the psychological sphere (ontogeny) and the anthropological sphere (culture) in the biological sphere (phylogeny). That means that contingencies of natural selection set out the conditions of possibility for the occurrence of individual behavior and cultural practices: "The capacity to undergo the changes in behavior which make a culture possible was acquired in the evolution of the species" (Skinner, 1971/1976, p. 128).

The naturalism that pervades the model of selection by consequences is not reductionist but emergentist; phylogenic, ontogenic, and cultural levels have their own characteristics that cannot be understood by resorting to properties from other levels only. All three levels operate according to the principles of variation and selection. Despite that, each level has different consequences, temporality, and forms of transmission and retention (see section *Similarities and differences*, in Skinner, 1981, p. 502). For example, the ontogeny presents distinctive aspects comparing to the other levels: The evolution of operant behavior involves susceptibility to immediate consequences and happens in a specific temporality: "Only . . . operant conditioning occurs at a speed at which it can be observed from moment to moment" (p. 502). That emergentism also shows up in the fact that reinforcing consequences might threaten the survival of the species and the culture: "The behavior so conditioned is not necessarily adaptive; foods are eaten which are not healthful, and sexual behavior strengthened which is not related to procreation" (p. 501).

If, on the one hand, the selection by consequences model separates and distinguishes between different domains (the biological, the psychological, and the anthropological one), on the other hand, it articulates them in a multidimensional understanding of the human being: "The whole story will eventually be told by the joint action of the sciences of genetics, behavior, and culture" (Skinner, 1989, p. 56). This transdisciplinary articulation functions as a "communication-in-circuit" (Morin, 1982/2005, p. 138), in which the levels of variation and selection interfere with each other, and none of them has the last word. At the same time that biological evolution set out the necessary conditions for the advent of culture, reciprocally, "the culture determines many of the biological characteristics transmitted" (Skinner, 1971/1976, p. 128). Therefore, "the two kinds of evolution [biological and cultural] are closely interwoven" (p. 128).

In that communication-in-circuit, the relation between biology and culture must not neglect the role of behavior. As Skinner (1990) had already indicated: "The role of variation and selection in the behavior of the individual is often simply ignored. Sociobiology, for example, leaps from socio- to bio-, passing over the linking individual" (p. 1208). Differently, the selection by consequences model considers that the origin of a cultural practice is in the behavior of individuals: "The 'mutations' which account for its evolution [of culture] are the novelties, the innovations, the idiosyncrasies which arise in the behavior of individuals" (Skinner, 1968/2003, p. 167); for instance, "the food allergy of a strong leader may give rise to a dietary law, a sexual idiosyncrasy to a marriage practice" (Skinner, 1971/1976, p. 129). The behavior is also an essential vehicle for transmitting cultural practices because "a culture has no existence apart from the behavior of the individuals who maintain its practices. . . The individual is the carrier of both his species and his culture" (Skinner, 1971/1976, p. 204).

The behavior can play a role in biological evolution either. That point was highlighted by Skinner (1969) when he said that "Ontogenic behavior may permit a species to maintain itself in a given environment for a long time and thus make it possible for phylogenic contingencies to operate" (p. 203), and that "ontogenic contingencies were responsible for the topography of an inherited response" (Skinner, 1969, p. 204). These Skinnerian considerations approximate Behavior Analysis to contemporary evolutionary theories that acknowledge the role of behavior in biological evolution—e.g., "new synthesis" (Jablonka & Lamb, 2005, 2008) or an "extended synthesis" (Pigliucci, 2009; Pigliucci & Müller, 2010). According to these theories, the behavior might interfere with living conditions affecting the "material" of natural selection (see Odling-Smee, 2010; Shavit & Griesemer, 2011). Additionally, the behavior might have an evolutionary impact when it becomes a cultural practice or tradition, spreading through generations, affecting the population, and changing the organisms' relation with their living conditions (see Galef Jr. & Laland, 2005; Jablonka & Lamb, 2005).[3]

Despite the Skinnerian proposal having been (and still being) an object of discussion and philosophical broadening (e.g., Lattal & Laipple, 2003; Marr, 1993; Morris, 1998; Moxley, 2007), it is necessary to acknowledge that Skinner had

[3] This mutual rooting among the biological, behavioral, and cultural dimensions makes a transdisciplinary approach possible. Some studies in the area have explored that possibility, bringing Behavior Analysis closer to evolutionary theories in biology (Hull, Langman, & Glenn, 2001; Lopes & Laurenti, 2016; Reese, 2005) and other areas of knowledge (Biglan, 2003; Harris, 2007; Palmer & Donahoe, 1992).

philosophical consciousness. It becomes even more evident with his defense that a philosophy orients the science of behavior: "Behaviorism is not the science of human behavior; it is the philosophy of that science" (Skinner, 1974, p. 3). From this perspective, Behavior Analysis is not just a science, but it is both a scientific and philosophical corpus (Carvalho Neto, 2002).

The philosophical dimension needs to be acknowledged when behavior analysts follow the rules of the "scientific game." Because without philosophical consciousness, they risk seeing their science become fragmented in data and techniques. Without a philosophical consciousness, behavior analysts end up restricted to their ghettos, incapable of establishing ontological and epistemological connections with other sciences. The science of behavior without a philosophical consciousness might fall outside the game of scientific evolution and revolution, as that game is not played with data, charts, graphics, and procedures only, but also with paradigms that involve worldviews.

What is the utility of philosophy? Philosophy gives meaning to research activity itself because scientific data are only data concerning a theory, including ontological and epistemological matters. The observational base of the science of behavior is pervaded by behavioral concepts, by a particular conception of the nature of its subject matter, theory, and explanatory model. Without a consciousness about these aspects, science's chances for communication and, consequently, for evolution are diminished.

Philosophical consciousness about the values *of* and *in* science

Science has long been understood as the product of human's curiosity: "Science in its purest basic form is indeed driven by human being's innate desire and curiosity to know the wonders of nature. This scientific curiosity is akin to a child's curiosity" (Bast, 2020, p. 21). In that perspective, science's interest would be a primordially cognitive one; scientists would be interested in how nature works; they would pursue knowledge for the sake of knowledge (Marcuse, 1968).

On the one hand, science would amplify human curiosity through the invention of technical devices (telescopies, microscopies, particle accelerators, cumulative recorders) that make it possible to identify new dimensions of the investigated phenomena. These devices would satisfy scientific curiosity while allowing new cognitive interests to emerge. On the other hand, science would tame human curiosity. Scientific curiosity is not left to its own fate. Scientists are human beings; they have preferences, tastes, animosities, resentments, ideological inclinations. None of these scientists' biases should participate in the acceptance of scientific theories. A theory is accepted because it would satisfy scientific criteria (logic consistency and empirical support). In short, science deals with facts, not values; scientists would be motivated by a purified curiosity.

The scientific neutrality thesis supports the pure depiction of science (Marcuse, 1968; Mariconda, 2006). According to that thesis, the process of scientific knowledge production would admit cognitive interests only. Consequently, results would be neutral when it comes to values or, in the best-case scenario, restricted to their cognitive value. This way of conceiving science ignores that modern science was born with practical and technical interests (prediction and control), in opposition to the Aristotelian conception of knowledge as contemplation (Galimberti, 2009).

With the development of the experimental method, the ties between science and technique became tighter. The experimental method required the development of new techniques, which increased, in turn, the possibilities of dominating nature (Mariconda, 2006). The interdependence between science and technique, strengthened by the experimental method, created conditions for developing of new scientific rationality that would consolidate itself in the 19th century. It is technoscientific rationality, in which cognitive interests started to be shaped by their technological possibilities. Thus, the question "What is the use of this?" came to guide scientific production, turning science into technoscience.

Technoscientific rationality has been accompanied by a new morality in science: A technology-based morality. That kind of morality dictates that the worth of scientists' actions exclusively depends on efficiency; an action is "good" because it complies with methodological parameters and deadlines, it follows the established rules with accuracy, and nothing else (Bauman, 1996/1998).

There is an interrelation between technoscientific rationality and technology-based morality. In technoscientific rationality, scientists become sensitive to the experiment and its results only. That technical sensitivity is ascertained by scientists' competence in identifying the tiny gaps of the experimental design, by the "capture" of the phenomenon through the fine-tuning between the procedure and subject matter, and by precision in experimental manipulation and control. The more sensitive scientists are to the methodological rules, the greater the chances of their actions are considered "right," or the scientists being classified as "good." Conversely, this social classification contributes to increasing scientists' sensitivity to the method, making them evaluate themselves and their work by exclusively technical parameters.

The scientific neutrality thesis strengthens the symbiosis between technoscientific rationality and technology-based morality, making scientists "short-sighted" regarding other interests at stake in science. Indeed, by following the imperative of "to know to domain and control," science prevailed over prohibitions and taboos, especially over religious ones (Morin, 1982/2005). In doing so, science bequeathed extraordinary contributions to humanity. However, incautious obedience to that imperative and technology-based morality also made science indulgent with practices of exclusion, oppression, violence, inequity, and war (Abib, 1998).

A philosophical consciousness exposes the immorality of the scientific neutrality thesis while advocating for the need to include other ethical values as a control source of scientists' behavior. It means including social responsibility as one of the minimum criteria to guide scientific theories' acceptance, which would lead to a reassessment of the relationship between science and society. If scientific knowledge is "blind to its activities and its role in society, it is [also] blind to its humane responsibilities" (Morin, 1982/2005, p. 123).

Skinner was aware of the misuse of science. The inaugural topic of *Science and human behavior* addressed this issue: "Science has developed unevenly. By seizing upon the easier problems first, it has extended our control of inanimate nature without preparing for the serious social problems which follow. The technologies based upon science are disturbing" (Skinner, 1953, p. 4). Skinner seemed to believe that the developing of a human behavior science could help to prevent science from being misused:

> If we can observe human behavior carefully from an objective point of view and come to understand it for what it is, we may be able to adopt a more sensible course of action. . . It is understood that there is no point in furthering a science of nature unless it includes a sizable science of human nature, because only in that case will the results be wisely used. (p. 5)

That would only be viable with a philosophically conscious behavior science that puts technoscientific rationality and technology-based morality in check. It means behavior analysts should be sensitive to participants in their research and interventions. The participants cannot be a mere means of attaining some results or testing the procedure's efficiency. The procedure must be a means to a social end and not an end in itself. This thesis converges with the Skinnerian interpretation of values, which states that cultures' survival is a primordial value that should guide behavior analysts' actions (Abib, 2002).

However, the survival of a culture is "beyond the lifetime of the individual" and therefore "cannot serve as a source of conditioned reinforcers" (Skinner, 1971/1976, p. 142). It means that, in the context of the Skinnerian discussion, the primary value draws its justification neither from the pleasure nor from the strengthening produced by positive reinforcement. Why should anyone, then, worry about the survival of practices that subsist after their death? Here is Skinner's answer: "There is no good reason why you should be concerned, but if your culture has not convinced you that there is, so much the worse for your culture" (Skinner, 1971/1976, pp. 135-136).

Regarding its function, the Skinnerian defense of the survival of cultures is a mand (Abib, 2002). Among the controlling variables of that verbal operant, motivational operations, like aversive stimulation, stand out. Skinner's analysis of his time showed the imminent possibility of the extinction of human cultures: Overpopulation, pollution, environmental devastation, violence, and the possibility of a nuclear holocaust (Skinner, 1971/1976, 1987). The acknowledgment of these problems could have been a motivational operation that controlled the Skinnerian plea for cultures' salvation.

The survival of cultures thesis also demands a broadening of the behavior analysts' sensitivity. What is "good?" Skinner's answer had not been restricted to techno-methodological issues, advocating for a science that could "more effectively work for the good of the individual, for the greatest good of the greatest number, and for the good of the culture or of mankind as a whole" (Skinner, 1978, p. 55). Good science is a science that has "humanistic concerns" (p. 55), which means science that "is concerned for the future of mankind" (p. 54).

Skinner's ethical reflections gain even more relevance when some episodes from the history of Applied Behavior Analysis are reminded. In the 1970s, behavior modifiers were accused of misusing operant conditioning techniques on institutionalized individuals, especially in prisons and psychiatric hospitals (Rutherford, 2003, 2006). Eventually, behavioral interventions were only adjusting vulnerable people to the social system that excluded and punished them instead of changing oppressive cultural contingencies (Rutherford, 2006). In the same period, behavioral techniques, including aversive ones, were also being used in conversion therapy, endorsing a pathologizing notion of homoaffectivity (see Carvalho, da Silveira & Dittrich, 2011). In the late 1970s, Holland (1978) denounced that scenario in a critical paper, addressing the fact that Behavior Analysis had the potential of being part of the solution, but that it was part of the problem instead.

In her historical analysis, Rutherford (2003) demonstrated that American society widely accepted behavioral technologies, but not Radical Behaviorism philosophy. That selective reception could have happened for a reason. Radical Behaviorism has contested the individualistic values of a competitive society (Skinner, 1971/1976). It would not be easy to accept a philosophy that criticizes the initiating self of behavior, which is at the bottom of the notion of meritocracy. It would not be easy to accept a philosophy that asks people to behave according to a consequence that they are not going to enjoy and care about the survival of a world to which they will not belong anymore. Radical Behaviorism is an anti-individualistic philosophy:

> The individualist can find no solace in reflecting upon any contribution which will survive him. He has refused to act for the good of others and is therefore not reinforced by the fact that others whom he has helped will outlive him. He has refused to be concerned for the survival of his culture and is not reinforced by the fact that the culture will long survive him. In the defense of his own freedom and dignity he has denied the contributions of the past and must therefore relinquish all claim upon the future. (Skinner, 1971/1976, pp. 205-206)

Behavioral technology should be based on the philosophy of Radical Behaviorism. Such a philosophy does not limit itself to epistemological issues; it also discusses values regarding consequences, both for the individual and for the cultures (Abib, 2002). Thus, Radical Behaviorism is not only a philosophy of science but moral philosophy as well. What would become of behavioral technology without Radical Behaviorism? We already know the answer: It would tend to turn into technoscience, guided exclusively by a technology-based morality.

What is the utility of philosophy? Philosophy reveals science's impurities to avoid the risk of moral impurity. Science deals with facts, but these facts exist in a context of interests and values. A philosophical consciousness shows that cognitive, technical, and practical interests need to be articulated with ethical interests, which takes the Other (and not just techno-methodological issues) into account. Without a philosophical consciousness, scientific curiosity might become immoral and insensitive. Without that philosophical sensitivity, scientific development should no longer be called scientific progress.

The consciousness of compromises with society projects

Besides purity concerning values, science has traditionally been considered purified from any ideology as well. At first glance, that seems to be an uncontroversial subject, because ideology, like other individual biases, would be “neutralized” by the scientific method. However, science is not an individual activity but a collective practice, so the ideological question is addressed to the scientific field's commitments to a project of society. It is not a matter of a particular scientist’s convictions, but the scientific community’s inclinations towards a society project or another.

The belief in the scientific field's ideological exemption is based on a kind of "division of labor" in which political agents, such as governors, businessmen, and religious authorities, do not participate in science's "real" functioning. That division is expressed by the insistence on a difference between science and the uses of science’s products (Marcuse, 1968). It would not be the scientists' role to decide about the destiny

of what is produced by science; their role would be to create these products, answer "their" research problems, and "solve puzzles," to be rigorous to applying the scientific method. That is another facet of the previously discussed technology-based morality. The difference is, when it comes to ideology, that kind of morality diverts the scientists' gaze from a broader context that involves the functioning of society *within* and, sometimes, *for* which they produce knowledge.

A philosophical consciousness begins with the questioning of the radical split between politics and science. As political agents (governmental or not) are, quite often, responsible for research funding, it is reasonable to conclude that they have a considerable role in science courses (Latour, 1987/2003). The scientific method's application cannot eliminate this kind of influence because it appears in previous stages of research. That means that scientific activity is ideologically "contaminated" since the beginning: The definition of the problems to be investigated, at least concerning funding, is not based solely on the scientists' curiosity and interests, but also on its relevance to those who are "investing" in the research. As the word itself reveals, in most cases, "investors" are interested in economic profit. But other forms of "capital" also might circulate when it comes to the interest in science, as the search for scientific proof for controversial ideological matters (e.g., social Darwinism, eugenics, scientific racism, the pathologization of homoaffectivity).[4]

Even when research funding is not providing by an "interested" group, ideological matters can still intervene in science. Let us imagine that some scientists have full autonomy in the management of a fund received. What would they choose to investigate? According to the radical division between science and ideology, ideological issues, as the social relevance of research, should not guide scientific choice. If scientists choose to research a putative neutral theme, would they prove that science is not involved in politics?

A philosophical consciousness prevents an answer to that question from being a positive one. Informed by political philosophy, that consciousness shows that the "division of labor" between scientists and politicians have erased the history of science itself. Far from being devoid of ideology, modern science was born already committed to a project of society. The expression "scientific revolution" is accurate because modern science arose as a direct attack on that time's societal structure, which was based on the authoritative principle (Mariconda, 2006). Even the most "basic" research and discoveries were part of that countercultural movement: The criticism of Aristotelian-Scholastic cosmology represented an attack on a society organized and orientated by imposed religious dogmas. Hence, making decisions based on facts meant the weakening of those authorities, which had turned their opinions into absolute truths.

[4] It could be argued that these kinds of interest are undue appropriations of scientific results, that those "ideologists" remove discoveries from their context, that they distort scientific narrative to serve their interests. That happens sometimes, but that is not our point. Political groups might financially support (through donations, grants, research funding) certain kinds of research because their results are useful. For example, anti-abortion groups, whose ideological orientation is mainly religious, might invest in research about pre-natal learning to find scientific proof to their political cause (the finding strengthens pro-life discourse that intrauterine "life" already involves learning). That creates a paradox: Scientists that are assumedly uninterested in ideological matters can become supporters of a specific ideology—even when this ideology is historically antagonistic to science, as it happens in the mentioned example.

Eventually, the power of scientific knowledge was acknowledged, and the multiple attempts to destroy science failed.[5]

The governmental, economic, and religious agents' strategy then changed: Instead of rejecting science, why not use it for their gain? For that, it was necessary to make scientists suffer from a "collective amnesia," wiping their consciousness out, removing them from the political scenario, and neutralizing their power.

Two complementary strategies were used for this goal. First, technology-based morality was encouraged by restricting the judgment of scientists' actions to techno-methodological issues. Second, responsibility for eventual misuses of science and its products was stripped away from scientists. That "offer" became tempting after World War II when science began to be ostensibly accused of causing damage to nature and humankind. If scientists accepted that neutral position, they could and should remain inside their labs, "doing their job,[6]" without worrying about the political world.

Thus, a philosophical consciousness is also a historical one. It is a rescue of modern science's countercultural *ethos*, which one articulates scientific activity with a project of building a better world: A world free from dogmatism, authoritarianism, and obscurantism. As stated by Marcuse (1968), "the inner telos of science is nothing other than the protection and amelioration of human existence" (p. 444).

To pursue this telos, science needs to know which society it is a part of and, consequently, what needs to be changed. Political philosophy avoids a superficial gaze, revealing the predominance of stratified societies, composed of a privileged few people and many oppressed ones (see United Nations, 2020). They are societies still permeated (and sometimes even structured) by racist, sexist, and homophobic practices, in addition to other forms of prejudice that are responsible for the perpetuation of violence, segregation, and human suffering. It is in this type of society that many scientists do science. However, this does not mean they must do science *for* that society. That subtle linguistic difference has implications for science's consciousness. Without a philosophical consciousness, scientists tend to do science *for* that society, helping to maintain an unjust and unequal system instead change it.

Skinner was aware of the American society's problems when he wrote Walden Two (see Skinner, 1979/1984, pp. 292-293), describing a social organization quite different from Western capitalist societies (Skinner, 1948/2005). Long after publishing *Walden Two*, Skinner (1987) continued to consider that a better world would be very similar to that depicted in his novel:

> It would be a world in which people produced the goods they needed. . . It would be a beautiful and interesting world. . . It would be a world in which the population was kept at a safe level . . . It would be a world in which the social and commercial practices that promote unnecessary consumption and pollution had been abolished. It would be a way of life that would give the species a much longer lease on the planet Earth. (p. 11)

[5] Indeed, Church has never forgotten that defeat, and what we see nowadays is an attempt to "turn the tables" through a growing irrationalist and obscurantist discourse, boosted by social media. However, this is an explicit dispute that only reiterates the need for engagement from contemporary scientists, just as their ancestors did.

[6] According to Galimberti (2009), that expression became a symbol of the age of technology, with its ostensive use in Nazis' testimonies after the end of World War II. To be "just doing his job" was also the pilot's answer that dropped the bomb on Hiroshima when he was asked how he dealt with the idea of having been part of one of the greatest tragedies deliberately produced by humankind.

How could science help to build a better world? A philosophical consciousness leads science to examine its relationship with institutions or controlling agencies to answer that question. As a cultural practice, science needs to be valued and transmitted to survive. Insofar as the controlling agencies are the main disseminators of cultural practices in our society (Skinner, 1953), they might foster the science's survival by funding scientific projects (economy), using scientific knowledge to make decisions (government), and including the teaching of science in schools (education).

For that, the controlling agencies usually demand science match their interest. A philosophical consciousness would ask: Which interests are these? Being aware of that, Skinner (1987) answered: "Governments, religions, and capitalistic systems, whether public or private, control most of the reinforcers of daily life; they must use them, as they have always done, for their own aggrandizement, and they have nothing to gain by relinquishing power" (Skinner, 1987, p. 7).

Controlling agencies will not be interested in changing the world if that represents losing reinforcers to their representatives (namely, decreasing in their privileges or power). So, if they want to work for the controlling agencies, scientists should abandon any aspiration for social change, which means defending the current social system or, at least, exempting themselves from that matter (which in practice are the same). Skinner (1987) seemed to agree with this analysis when he concluded that science could contribute to building a better world only when scientists were not committed to the interests of the agencies:

> We [who can design a way of life that will have a better chance of a future] are the uncommitted – to governments, religions, and capital—and are therefore free to consider a more remote future. But we are free only to the extent that we are indeed uncommitted. If among us there are leaders in government, religion, and business, they are with us only to the extent that they are uncommitted to their respective institutions. (Skinner, 1987, p. 8)

On the other hand, being uncommitted to the controlling agencies' interests might threaten science's survival, as it loses the support of powerful agencies.[7] Maybe awareness of this paradox was at the bottom of Skinner's growing pessimism at the end of his life about Behavior Analysis' possibilities to solve social problems. In an interview, he made his pessimism quite clear:

> I used to believe that a science of behavior could show us how to solve the problems confronting us—pollution, overpopulation, poverty, the threat of nuclear war. But I am forced to conclude that what the science of behavior shows us is that we can't solve these problems." (Chance, 2007, p. 154)

A philosophical consciousness places science in the face of these impasses, making clear the risks of ignoring the agencies' blackmails and demanding that science takes sides.

Technocracy does not seem to be a promising solution (Lopes, 2020). The replacement of politicians by scientists in a system ruled by controlling agencies does

[7] In Brazil, we are agonizing with that possibility: Governmental funding for scientific research is being cut (Jucá, 2019); the teaching of creationism at schools is being supported by public policies (Sul21, 2019); and the vaccination rate is decreasing (Girardi & Felix, 2018).

not turn the government into a scientific one; but the likelihood of scientists turning into politicians is high. Scientists are not immune to the reinforcers (privileges and benefits) granted by a stratified system of social contingencies.

A hopeful proposal is the democratization of scientific knowledge so the population can discriminate strategies of oppressive social control (political, economic, and cultural ones). That is especially important when we talk about Behavior Analysis because of its potential for helping people in that task (Holland, 1974). Therefore, it is not about putting behavior analysts in power positions but about weakening them through a solid diffusion of scientific knowledge.

What is the utility of philosophy? Philosophy provides historical consciousness, helping science to remind of its countercultural past. In this recall, science rediscovers its ethos: improving human lives (and this must now also include non-human lives). With a philosophical consciousness, science not only remembers its past but can also guarantee its future. For that, science needs political consciousness, which allows scientists to recognize the society they are part of and the project of society with which they are committing themselves.

Conclusion

In a behavioral perspective, consciousness emerges from verbal contingencies: "Without the help of a verbal community all behavior would be unconscious. Consciousness is a social product" (Skinner, 1971/1976). That consciousness arises when the verbal community asks questions like "what are you doing?" or "why are you doing that?" (p. 187). It is precisely in that sense that philosophy can be responsible for the consciousness of science. A philosophically-informed verbal community asks behavior analysts questions without which the controlling variables of their behavior could remain unconscious. For example: What is their theory? What is the nature of their subject matter? How is it possible to know it? What is good *for* science and *in* science? Which society does science work for? Philosophy produces consciousness about the ontological, epistemological, ethical, and political commitments behind scientific theories.

A philosophical consciousness avoids a traditional conception of "science (pure, noble, beautiful, selfless), [of] technique (that, like Aesopian language, can be used for the best and the worst) and [of] politics (bad and harmful, perverting technique, namely science's results)" (Morin, 1982/2005, p. 120). Increasing this kind of consciousness puts the science back into society, articulating epistemological questions with ethical and political ones. Increasing this kind of consciousness prevents scientific knowledge from running away from its constitutive responsibility since its modern origins as a countercultural proposal. It is not the same as saying that science is mere ideology. A political positioning in science does not release scientists from following the scientific ground rules. A conscious science is not (and neither must be) less rigorous regarding methodological requirements.

If Radical Behaviorism is the philosophy of the science of behavior, it should also be the science's consciousness. As a philosophy, Radical Behaviorism asks questions for Behavior Analysis, like the ones anticipated by Skinner (1974): "Is such a science really possible? Can it account for every aspect of human behavior? What methods can it use? Are its laws as valid as those of physics and biology? Will it lead to technology, and if so, what role will it play in human affairs?" (p. 3).

Behavior Analysis without Radical Behaviorism is a science without consciousness. Additionally, Radical Behaviorism itself can be challenged by philosophical questions, thus enriching behavior analysts' consciousness. That enrichment happens through an inherent tension between science and philosophy, closing and opening, purity and impurity, the happiness of ignorance and the agony of consciousness. It is in that tension that science finds conditions to continue to grow, not as a technique, but as a "weapon and the most effective instrument in the struggle for a free and rational existence" (Marcuse, 1968, p. 444).

Would be our skeptic interlocutor convinced of the utility of philosophy for science yet? If not, we shall then continue the conversation. Maybe we shall now ask: What is the utility of science without philosophy?

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