

Freedom AND Science!

The Presumptuous Metaphysics of Free-Will Disdainers

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“Science, however, must be constantly reminded that her purposes are not the only purposes, and that the order of uniform causation which she has use for, and is therefore right in postulating, may be enveloped in a wider order on which she has no claims at all.” (James, 1890, Vol. II, p. 576)

Abstract

Introduction

The title, “Freedom *and* Science” alludes to one of Wolfgang Prinz’s lectures from 1996, called “Freedom or Science” (Prinz, 1996a). That title was in turn a spin-off from the German conservative party’s slogan, “freedom, not socialism”. Seeing himself as a scientific psychologist, Prinz strikes back at the “metaphysical impertinence” of philosophy, which “takes folk-psychological notions of the freedom of will at face value” (Prinz 1996a, p. 86). He concludes that “the game of scientific explanation of actions and their causes [...] has no place for the idea of free-will. It is misguided to think that freedom of will functions as a theoretical concept in scientific explanation.” (Prinz 1996a, pp. 86 and 91.) Considering that freedom of will exists merely as something felt and that its existence is thus guaranteed only subjectively, our purported last resort is to declare it “an illusion,” as some brain researchers do (cf. Roth 2001, p. 452f.), “a cultural construct” (Singer 2001, p. 156), or “the product of social construction, a tool for socially regulating actions.” (Roth 2001, p. 452f.; Prinz 2003, p. 7; Prinz, 2006).

In response to a manifesto by eleven leading neuroscientists on the present state and the future of brain research, published in the German journal *Gehirn & Geist*, 6/2004 (pp. 34f.), Prinz (2004, 2006) now dismisses the inadequately reflected naturalism behind many neural researchers’ idea of man as in need of revision, and states that brain research is unsuitable as a new model discipline for the human sciences. Prinz also strikes new chords in the third part of an enhanced and reworked version of a paper published in 2004 (Prinz, 2004, 2006). Nonetheless, this chapter takes Prinz’s earlier essay as its starting point, because it states most clearly the arguments to which I would like to respond here.

Meanwhile, we have been flooded, especially in Germany, with conferences and papers, newspaper articles, features, and books by experts in brain research, scientific psychology, even science in general, ardently claiming to prove compellingly that man does not and cannot have free will. Fascinated, yet fearful, triumphant and sermonizing, they conjure up the consequences that recent findings in pertinent sciences allegedly have for the traditional idea of man. No end to this controversy is in sight (see Roth 2001, Singer 2001, Singer 2003, Roth and Brumlik 2004, Singer and Nida-Rümelin 2004). Interestingly, the rebuttal obviously demands constant repetition. In mathematics, the provision of counterevidence suffices once and for all. But in this case, it seems almost as though the deniers of free will, philosophizing as they please, are haunted by uneasiness; it takes unceasing mutual enthusiasm to revise the idea of man.

Philosophers fall easily into this theme's traps and patterns of argument. One can point out that certain concepts involved are muddled, that its advocates are oblivious to one or the other important philosophical argument and should take note of it, that science includes some methodical maxims which actually *support* the notion of free will, that there are numerous relevant philosophical theories showing how freedom is compatible with determinism, and so on. But all of this is in vain when dedicated scientists thump on their facts like drummers on their drums, arguing that if philosophers cannot refute those (which they can't, because philosophers do not do empirical research), then all philosophical objections are merely "metaphysical impertinence". Philosophers are thus condemned to be hopelessly backward scholars, barred from the tough business of scientifically studying reality, with its "guiding value of truth" (Prinz 1996a, p. 100).

Can a philosopher approach this topic, avoiding the traps and without an air of defense? If freedom of will is real and is crucial for our actions as humans, that fact must also somehow be mirrored in scientists' actions. If that is the case, then we can turn the tables and present a so-called *tu quoque* argument: *Even you*, my worthy scientist, must, for your own actions, assume that you are free-willed, unless you wish to saw off the branch on which your theory is perched. In denying freedom of will and continuing to sort reflection about the world into two different games, namely the "game of scientific explanation", geared solely to pursuing truth, and the "game of moral evaluation and behavior regulation" (Prinz 1996a, p. 100), a celebration of social rituals, you demand metaphysics of yourself and revert to an obsolete position.

The *tu quoque* argument implies that if natural science intends to remain an enlightening and significant part of our daily lives, it cannot be in its own true interest to deny freedom of will. Precisely the metaphysical zeal that declares free will to be scientifically meaningless deprives any alleged "proof" of free will's non-existence of any consequences at all. If scientists, instead of declaring that freedom of will is insignificant for science, thought that (based on relevant findings) fewer individuals exercise free will or that they exhibit it less than we commonly imagine (a pet notion of neurologist Antonio Damasio, cf. Damasio 2000), then I would immediately agree. That would constrain our notion of free will, but not question it fundamentally; and this would allow scientific arguments to become effective in the first place.

But if, on the contrary, science impedes itself by prematurely denying the freedom of will, taking in stride the detriment to possible allies in philosophy and other disciplines that this causes, that is, indeed, lamentable, even annoying. Considering the current state of science, it might be wise to cooperate with philosophy. Of course, such eye-catching denials of free will might simply reflect a strategy for securing research funds. In that case, polemical opposition to philosophers' alleged backwardness would be part of the strategy and any effort at cooperation would be fruitless.

These points dictate this chapter's outline. I begin with some thoughts on how action and behavior are related, and describe the central components of our intuitions of free will. Next, I will show how scientific experiments are based on voluntary action; this is the core of the *tu quoque* argument. There I will also bring in Hermann von Helmholtz, who thought it impossible to do experiments without some degree of self-awareness. In the subsequent section, I reply to an objection to the *tu quoque* argument, which attempts to diffuse the difference between action and behavior. Then I show why a metaphysical denial of freedom of will deprives science of any relevance at all for our idea of man and therefore cannot be in the interest of its own advocates. In conclusion, I would like to express why, considering the present joint interests between philosophy and cognitive science, denying free will is particularly regrettable as a research policy.

Ascertaining Intuitions of Freedom

Before arguing that freedom of will is a real aspect of natural science, I must first clarify our intuition of freedom somewhat and name the phenomena we consider to be indicative of that freedom. The concept of freedom is simply too multifarious for us to assume that when we use it, both speaker and hearer, author and reader, mean and understand the same thing.

Yet before doing this, I must first introduce another thought, about how freedom is related to the concept of action. Prerequisite to freedom are the concepts of *action* and *agent*. Since John Locke we know that it is not the will that is free, but an action that is in accord with the will, or not. Locke does not deny that human beings have the capacity to set priorities or make choices. To him, though, the concept of will means the power or the ability to choose (Locke 1690, vol. II, xxi, 17). By freedom he means the power of a person to execute or not execute actions depending on his or her will (Locke, p. 15). Man is free in this sense, but *actions* must be distinguished from mere *behavior*.

The ancient Greeks distinguished action from behavior; perhaps the distinction has always been an element of occidental language. In *Phaedo*, Socrates, sitting in his cell, ponders, on the side, the concept of the cause of an action. More precisely, he reflects on the *explanation* of action and shows how it goes wrong when we use behavior instead of acts to do so. The occasion is an explanation given by a physicist, who makes a similar mistake:

“It seemed to me that he was just about as inconsistent as if someone were to say ‘The cause of everything that Socrates does is Mind’ and then, in trying to account for my several actions, said first that the reason why I am lying here now is that my body is composed of bones and sinews, and that the bones are rigid and separated at the joints, but the sinews are capable of contraction and relaxation, and form an envelope for the bones with the help of the flesh and skin, the latter holding all together; and since the bones move freely in their joints the sinews by relaxing and contracting enable me somehow to bend my limbs; and that is the cause of my sitting here in a bent position. Or again, if he tried to account in the same way for my conversing with you, adducing causes such as sound and air and hearing and a thousand others, and never troubled to mention the real reasons; which are that since Athens has thought it better to condemn me, therefore I for my part have thought it better to sit here, and more right to stay and submit to whatever penalty she orders... (Plato, *Phaedo* 98 c-e; trans.: Hugh Tredennick).

Whoever turns to bent knees, or – in today’s jargon – subpersonal neural processes, to explain why Socrates is sitting in prison, is headed down the wrong road. The real reason for his imprisonment is another. An explanation for an action cannot be given by indicating the causes of behavior, it must be done by giving reasons and must therefore (assuming that they are good reasons) be based on reason. To act, then, means to act for reasons. Naturally, I must not always be aware of those reasons. I get in the car every morning because I want to drive to work, but I need not manifest and update that reason with a conscious mental act every day.

Now we can begin to ascertain our intuitions about freedom. Three components stand out and are at least necessary, if not sufficient, for the concept of freedom. Two of them can be found in most discourse about freedom, while the third is not mentioned quite as often. But the third component is important, perhaps even crucial, for assessing and evaluating Libet’s experiments (see below). Whether these three components are

logically independent of one another or whether one implies the other, cannot be investigated here.

1. *Freedom is the ability to choose between alternative actions (or options); freedom of choice.* When a person acts freely, he or she may also do otherwise. He or she has more than one option. Since omitting to do something is also an action, every positive option automatically implies the option of inaction.
2. *Freedom is the ability to cause one's own actions; genuine authorship.* When a person acts voluntarily, she or he is the author of his/her action. The action is not caused by the will of some other person, or by an event not brought about by the author of the action. The cause of the action in question lies within the person himself and not outside of him; he or she has his/her actions under control, they originate within him/her.
3. *Freedom is the ability to think of oneself as being capable of action; reflexive cognitive ability.* When a person acts voluntarily, he thinks of himself – perhaps not at that very moment or in every situation, but basically – as someone who does not just consist of mechanical, movable, body parts, but as someone who is *capable of action*. She thinks of herself as a person who can take a stance towards herself, a being who reflects upon her doings. Very young children and probably all animals may be said to have freedom of choice and genuine authorship of their actions (we might say that generally their actions are voluntary), but they are not capable of the awareness of their agency that must be present for a full attribution of freedom. Even the actions of some adults are considered not voluntary, if those persons lack a reflexive awareness of self due to ignorance, overwhelming emotionality, or other powers.

Why, John Locke asks, do we not think that a tennis ball flying through the air or lying on the ground is an object acting according to its own free will; why is it not a free agent, although it is mobile? “If we inquire into the reason, we shall find it is because we conceive not a tennis ball to think, and consequently not to have any volition” (Locke 1690, *Essay*, II, xxi, 9). Voluntary action, then, is tied to a very specific cognitive capacity that tennis balls do not possess and that small children and animals cannot summon up to the fullest extent. And the agent himself must think of himself as someone who has just that cognitive capacity.

These three components of freedom: freedom of choice, genuine authorship, and self-reflection apparently constitute the central elements of voluntary action. A drug addict cannot choose among various alternatives, even if he considers himself capable of action and injects the substance himself. A pilot threatened by an armed terrorist is not the genuine author of his action while nose-diving the aircraft, someone acts “in his place”. A child who sets a barn on fire may have had a choice among different options and may not have been misled into doing it. And yet we would not say that she acted voluntarily, we would say that she was unaware of the outcome of her actions – she does not yet think of herself as of someone whose actions have consequences for herself and others.

Scientific Experiments as Voluntary Action

Scientists claim, and rightly so, that they have a source of knowledge unavailable to philosophers, namely, experiments, which makes their work in some ways superior to philosophy. But experimenting is an act, it is not simply limb movement or behavior, and it is *the* act through which scientists essentially distinguish their own kind of work from that of others. The question, then, is whether these acts are voluntary or must be voluntary in order to fulfill their purpose. My brief outline of the phenomena of freedom has prepared us to answer both questions in the affirmative. Experimental action is voluntary and would miss the point if it were not. To deny free will, then, is to deny the possibility of experimental natural science!

Consider *freedom of choice*: Part of experimenting is trying out various alternative ways of doing things. In contrast to simple observation, an experimenter deliberates which options are available for varying conditions by different arrangements of an experiment; she selects from among various ways of altering the phenomenon under investigation. If we, as human beings, had no such choices and options for manipulating something, we would be unable to experiment. As Ernst Mach puts it, “The fundamental method of experimenting is *variation*” (Mach 1905, p. 202).

Consider *genuine authorship*: The *art* of experimenting is to control the effects of systematic and unsystematic disruptive factors on dependent variables: either to cancel them entirely, or, when that doesn’t work, to either minimize or keep those factors constant, or to get them under control by randomizing and balancing. An experimenter wants to make certain that the only effects happening are those which *she initiated by manipulating*; she wants to prevent any other causes from being effective, whether unnoticed or caused subconsciously by herself. This means that the experimenter wants to secure *personal authorship* of the desired effect, she wants to see *her own* plan put in effect! Mach put it this way: An experiment is an “intentional, self-motivated extension of experience” (Mach 1905, p. 202).

And consider *reflexive cognitive capability*: The requirement that experiments must be *reproducible* shows us that when experimenting, the experimenter must think of herself as a being who is taking action, as someone who is aware of herself and her actions. In doing the experiment, the experimenter must be capable of being replaced by any other person with appropriate instruction. Autonomy and options may not be used arbitrarily in experiments, they must follow a deliberate plan that is related to the state of the art already achieved in the corresponding field, as well as to previous and established experimental actions. The experimenter must be able to communicate her plan; the act of experimenting includes a cognitive and reflexive relationship to oneself. Ernst Mach continues: “The intentional autonomous extension of experience gained by doing physical experiments, and deliberate observation, are therefore always guided by thought and can never be clearly demarcated or severed from thought experiments” (Mach, 1905, p. 202). It is true that we say small children must experiment with the world around them. But if that is to be more than a metaphor, a child must also have an idea of himself as an experimenter.

The way scientists critically evaluate each other’s experiments also immediately reveals that they believe that each of the three components of freedom of action is at work in experimenting. An experimenter made a poor selection, overlooked disruptive factors, neglected the prerequisites or the consequences of her experimental activity – such objections illustrate that colleagues make an experimenter responsible for her actions, they think of her as a person who acts freely. If they did not assume that her actions, while experimenting, were voluntary, then this type of criticism would be

irrelevant. This also reveals the methodical openness of natural science in the sense that, as an empirical science unwilling to acknowledge free will, it is incapable of adequately describing its own practices. Science is at liberty to do this within the scope of a philosophy that originates on its own soil (and I consider myself to be one such philosopher), but the authority with which science should do so can never be exclusively the authority of the natural sciences, it must come from another source.

Hermann von Helmholtz also saw experimenting as voluntary action. It is surprising – and grist to my mill – that a scientist so fond of reductive explanation (from biology to physics, for instance) saw a connection between experimenting and self-awareness. And his notion of experimenting is neither purely ornamental nor of no consequence for science; rather, it constitutes the foundation on which he erects his theory of perception as a constructive *interpretation* of sensations from past experience. The pertinent passage can be found in his most important philosophical lecture, “The Facts of Perception” (Helmholtz, 1878). Here Helmholtz takes up a thought expressed eleven years earlier in §26 of his *Handbook of Physiological Optics* (Helmholtz, 1867):

“However, the conclusiveness of any experiment [in which we change an object’s appearance] is primarily so very much greater than that of observing a process taking place without our intervention, because during an experiment, the causal chain also runs through ourselves. Through intuition we are familiar with one link of the chain, namely our volitional impulse, and we know which motives made it come about. The chain of physical causes, then, starts with this impelling force we are acquainted with and at a time we know and is effective all the way down to the outcome of the experiment. But an essential prerequisite for the knowledge we want to gain is that our volitional impulse itself is neither already influenced by the physical causes that simultaneously determined the physical process, nor has it, itself, psychologically influenced subsequent perception.” (Helmholtz 1878, p. 241)

By “subsequent perception” Helmholtz means modifications of perception that follow from action taken by the experimenter. Experimenting is not done only by natural scientists. According to Helmholtz, once they are born (perhaps even sooner), all humans experiment with movement and this provides them with perceptions, i.e., the interpretation of sensations as signs of spatial objects. So not only the way natural scientists experiment, but even spatial perception, which itself is a result of experimenting, is closely tied to the ability to develop an awareness of self. This is exactly the theory of perception the tradition of which Wolfgang Prinz endorses. He writes: “The contents of perception are the result of constructive processes in which the perceptual apparatus comprehends the initial information using its own categories and means of representation” (Prinz 1996a, p. 94). Even construed perception contains, to a certain extent, a *judgment* (also about oneself), and it is not a concept that can be captured purely causally. Unfortunately, Prinz has apparently lost sight of how this kind of self-awareness is involved in the work of scientists, including himself. I admit that Helmholtz only mentions a fragment of the phenomenon of self-awareness, but that does not depreciate his argument or its relevance here.

In another text Helmholtz tries to prove that experimental activity understood in this way offers the only way to distinguish between real causal relationships and mere correlation. In his opinion, passive observation alone will never lead to reliable knowledge about causes; it takes conscious intervention on the part of a person doing something. He illustrates this using the simple law that mercury expands when heated:

“When I claim that, if unrestricted, all liquid mercury expands when heated, I know that the mercury’s higher temperature and expansion, no matter how often I have observed them together, were not due simply to the effect of some unknown, mutual, third cause, as I might believe if I relied on observation alone. By doing an experiment I know that warmth alone is sufficient to bring about this expansion. I have heated mercury often, at different times. According to my own will [!], I chose [!] the time to start the experiment. So if the mercury expanded at that moment, that expansion was a result of conditions that I [!] brought about through my [!] experiment. I know by this, that heating it up was, by itself, a sufficient reason for expansion, and that no other hidden powers were needed to get this result. By doing relatively few, well arranged experiments I can discover the causal conditions of an event with greater certainty than by observing it a million times, where I am not able to change the conditions at will.” [!] (Helmholtz 1867, pp. 451f. *My exclamation points.*)

John Stuart Mill does not share Helmholtz’s opinion that only experiments (mediated by self-awareness) can be seen as reliable indicators of causality. Mill thinks that each experiment could also be substituted by passive observation; we rely on experiments only because the human life span is limited. Man cannot wait as long as it takes for the relevant observable events to occur in order to enhance his empirical knowledge of natural laws. Mill is right about experiments speeding up insight. But Helmholtz, who otherwise was heavily influenced by his contemporary, Mill, is also right that passive observation alone is insufficient for science, and that experimenter intervention is crucial (see Heidelberger, 1997 for a detailed discussion). Out of touch with areas of knowledge accessible by experiment, other sciences that – for contingent reasons – must rely on observation alone would be unsuccessful (compare the relationship of astronomy to physics since Johannes Kepler). This thought can be broadened to make a fundamental objection to Mill’s empiricist approach, but that lies beyond the scope of this essay.

Action and Behavior

The paragraphs above show how scientific experimentation must be thought of as voluntary action if it is to be successful. Experiments manifest all of the components found in phenomena we associate with freedom. For present purposes, I understand freedom of will to be the human capacity to set priorities and make choices – to decide from among alternatives. This means that freedom of will is a necessary component of freedom of action. The denial of free will undermines science itself and would make its quintessential activity, the experiment, absurd. The section above also shows that denying freedom of will does not work the same way we abandon a hypothesis in natural science, for instance the way Lavoisier, in chemistry, proved that phlogiston, or Einstein, for classical electrodynamics, proved that ether does not exist.

The only objection I can imagine coming from freedom-denying scientists at this point does not relate specifically to the thesis I advocate, but takes up, in general, the distinction between action and behavior. The objection could be phrased as saying that action must be expressed by intentional vocabulary, which, in turn, presupposes the existence of persons. Future science, so the objection goes, will do entirely without this jargon and will describe all processes related to humans on a subpersonal, i.e., neural level. For domestic purposes we will still go along with intentional vocabulary that

takes actions and thus persons for granted, for a while. “In order to make myself understood with just a few words”, writes Wolfgang Prinz, “I cannot avoid using [...] mentalistically tinted vocabulary. But that does not change the fact that the processes I am sketching can be conceived of as subpersonal mechanisms” (Prinz 2003, p. 13).

Apparently the claim is not simply that subpersonal processes neither *accompany* nor *realize* processes of an intentional nature, but that intentionality itself is dispensable, or that it is at least reducible without residue to a subpersonal level. “Reality” with respect to human beings is the “functional reality of subpersonal volitional mechanisms” (Prinz 2003, p. 11). The idea is that subpersonal processes (being the only scientifically tenable hard core of action description) are necessary and sufficient for correctly explaining action. This is why, so the argument goes, we can skip the personal level in explaining action; and in the future we will discover a subpersonal explanation even for the act of experimenting. Prinz (1996b, p. 453) does say that cerebral processes are “not *sufficient* for explaining the development of consciousness,” because they must be complemented by “certain social and political conditions”. I find this dilution of the argument inappropriate and insincere, because precisely these conditions are supposed to explain what it is about the self that is construction and illusion!

It appears that we are being asked to explain away any phenomena that steadfastly resist scientific metaphysics. Yet one of the most prominent founders of scientific psychology, William James (1890), insisted that natural science, particularly psychology, is obligated to adopt a “radical empiricism” that takes human reality seriously, and that does not shrug it off as a mere illusion, as “not really” reality (Prinz). It looks as if the skirmish over freedom of will actually reflects a dispute about the reality of intentionality. We are expected to follow presumptuous metaphysics that negates the obvious: the reality of intentionality and its (empirical) success at explaining action. (As noted above, recent work by Prinz is much more cautious in this respect.)

In the best case, arguments that explain intentionality *away*, instead of *explaining* it are mere hand-waving, a promise that in ten years all will be known. That is the kind of claim that we have also heard from artificial intelligence, gene technology, brain research, and a number of other fields – promises that have meanwhile been mercifully muffled by the cloak of oblivion. And yet one leading neuroscientist, Gerhard Roth, makes precisely such claims: “I believe that in ten years, at least, it will be widespread knowledge that there is no such thing as freedom meaning subjective capacity for guilt. Atoning guilt will become obsolete because a person will no longer be ‘guilty’ in the traditional sense of the word” (Roth and Vollmer 2000, p. 25).

With respect to *hand-waving* intentionality: From the fact that when I move my little finger a so-called “readiness potential” *precedes* my conscious “decision” to do so (as indicated by Benjamin Libet’s experiments in 1983, and Haggard and Eimer’s work in 1999, all of which build upon Kornhuber’s work (1965) in Ulm), it is concluded that all action is controlled sub-personally, such that there is no longer need for a category called “person”. “We don’t do what we want, we want what we do” (Prinz 1996a, p. 87; also pages 98 and 100). Disregarding the fact that moving my little finger is not exactly a prime example of demonstrating voluntary action; besides the fact that, as the evidence lies, not one subpersonal characterization has been found for a process described in terms of intentionality that can achieve fully the explanatory performance that intentional explanation of the same phenomenon accomplishes; to my knowledge no one has ever shown that such a readiness potential is either empirically necessary and/or sufficient for *action*. It might just as well be an expression of the subconscious

deliberation process that precedes voluntary, although perhaps fairly automatic, action (cf. Keller and Heckhausen 1990, p. 360; Zhu 2003).

In the worst case, such arguments will have to deal with the *frame problem* as known to computer science, particularly from work in artificial intelligence. Any programmer can tell you how difficult it is to design a program that will enable a computer furnished with equipment for perception clearly to discriminate actions in normal everyday situations. To this day every child is better than any computer at distinguishing, under the appropriate circumstances, physically different kinds of behavior that are one and the same action, and kinds of behavior that physically look alike but are different actions. The more artificially purified the surrounding context, such that a particular action matches only one particular behavior, the easier it is, of course, to design the corresponding program.

It would be hopeless, for example, to program a computer to recognize reliably a certain action as a greeting. There are hundreds of different ways to greet someone, and who knows how many forms mankind has yet to develop? Now, a military greeting may be limited to jerking the right hand towards a visor. A program might accomplish recognizing that, but it only works at the cost of ignoring the generalities and genuine variability of real life – rather like the super-intelligent Martian described by Daniel Dennett (1987), who wholly comprehends the material level, but does not understand the intentional level of action. The trouble is very likely related to the problem of induction and to the difficulty in defining precisely what it means to “follow a rule,” analyzed by Ludwig Wittgenstein.

These and similar facts have prompted Jerry Fodor to think that the central processes of the brain, which determine our beliefs, are *not* modular (Fodor 2000, p. 64-78). Many cognitive scientists were shocked by this alleged change of opinion, because since *The Modularity of Mind* appeared in 1983, Fodor was seen as a representative of the “massive modularity thesis” (although that publication itself already questioned the thesis, as Fodor notes). According to the thesis, all human cognitive abilities, conceived as encapsulated information processing modules, developed under the problem-solving pressure experienced by our Pleistocene progenitors. If this were true, we might, in fact, come to the conclusion that human cognitive abilities can be explained entirely at the subpersonal level.

By objecting to the massive modularity theory for the central part of mind, Fodor has taken a step back toward Descartes. In his *Discours* (1637), Descartes wrote that action based on insight and reason is distinct from behavior that results from the design and structure of organs in animals and machines. For precisely this reason human beings are mentally superior to animals and machines: reason is a “universal tool” that “is available in all circumstances, while these organs [in animals, etc.] need a special device for each particular action” (Descartes 1637, 5.10; AT VI 56f.). Today we naturally no longer view animals as Descartes did. But anthropologists and cognitive scientists have begun supporting the view that by intentionally understanding the other members of his own species, man came to use symbols and develop culture, which in turn gave him a decisive advantage over his closest relatives in the animal kingdom (Tomasello et al. 2003, Povinelli and Vonk 2003). Of course, even if the brain does not function non-modularly, that does not guarantee that the mind is non-reducible.

Thus, it is more than questionable whether the subpersonal level can provide sufficient descriptions for action, including our entire perception of reality and causal order, as some scientists claim. This is at the heart of the presumptuous metaphysics that present-day disdainers of free-will are asking us to endorse.

Freedom in the Interest of Science

It cannot be in the interest of natural scientists to deny so radically the freedom of will as seems to be happening today, and in such a metaphysical manner. This is true even if one rejects my argument that scientists who disdain freedom of will are eroding the methodological foundation of their own science.

I suppose that natural scientists really are interested in their own theories being relevant for normal life and human activities, because I cannot imagine what else would justify doing science at all. This interest is legitimate, even very important, and, as I said from the start, something that we must vehemently defend, if we still feel even a trace of the mission of enlightenment within ourselves. And I agree wholeheartedly with Prinz, that “the ethos of enlightenment [...] is constitutive of doing science” (Prinz 2003, p. 11).

But *nothing* at all follows for our actions from allegedly showing that there is no freedom of will capable of scientific proof. Particularly because this step in itself has such far-reaching metaphysical implications, by proposing it science is tying its own hands and abandoning enlightenment to boot. It is voluntarily foregoing any chance of talking about our idea of man at all. Even the Ancient Stoics knew that metaphysical determinism lacks any consequences; they tell the story of a teacher chastising a lazy pupil by thrashing him with a stick: “Why beat me?” the pupil cries in pain. “All I can do is follow the order of causes laid out in the universe from the very beginning!” “Stop complaining” the teacher replies. “By beating you, all I am doing is following that very same causal order!”

The lesson of this anecdote for the deniers of free will is plain to see. If they desire to be consistent in the future, they too may make no demands of society based on their findings; they may derive no “valuable insights” from their own science for our actions. If there is no such thing as free will, what sense does it make to demand that lawyers and judges abolish their “narrow concept of guilt” (Roth, cited above) and revise their practices, that philosophers stop talking about freedom of will, that parents stop admonishing their disobedient children, and so on? According to the theory, not only the agent, but also those evaluating actions, such as judges, philosophers, parents, and others, even scientists themselves are subject to the “conditionality of genes, early childhood experience, and social environment” (Roth and Brumlik 2004, p. 24) that made them what they are. How then, can a brain scientist, a scientific psychologist, a neural physiologist *demand* of us that we act other than we do, just because we now know about our subpersonal processes?

What can a scientist do who wants to review social practices related to free will effectively? He or she should abandon the unreasonable metaphysical demand that we forsake our notion of free will and acknowledge that free will is an empirically very successful instrument of explanation. Then, and only then, can scientific criticism of free will unfold its full potential and successfully and consistently debunk our illusions. Posthypnotic suggestion and behavioral disturbances in cases of schizophrenia, like the cases Prinz lists along with the Libet experiments as proof of his thesis, can only be seen as *involuntary* if they are contrasted with voluntary (or at least *more voluntary*) actions.

Since the nineteenth century forensic doctors, in particular, have unearthed ample evidence that under some circumstances people are not as free as society, particularly philosophers, judges, and scientists have thought. As a result, in court we now take account of circumstances that diminish a person’s accountability for particular actions. I imagine that, in the future, brain science, empirical psychology,

neurophysiology, and any other relevant sciences will be able to develop solid scientific reasons for revising our legal concept of guilt, in court and elsewhere, making it more precise and thus more useful than it is today. Perhaps it is actually true that we should make people much less often responsible for their acts than we normally do. But that stance, in itself, presupposes that freedom of will is not an illusion, no matter how rare it may be; otherwise, we could not discern more or less of it.

It is incomprehensible that Prinz, on the one hand, demands that science be relevant for enlightenment, but on the other castigates the commingling of “two entirely different social games” governed by differing rules – the game of scientific explanation that has no room for freedom of will, and the game of moral evaluation and action control that “relies on the idea of free will” (Prinz 1996a, p. 86, p. 101). This reminds me of Rudolph Wagner, the physiologist, neurologist and brain researcher from Göttingen, who triggered a famous dispute on materialism with his speech before the “Association of German Scientists and Physicians” on September 18, 1854 (Wittkau-Horgby, 1998). That dispute, which continued until the turn of the century, “almost repeated the spectacle made by the great dispute on religion during the time of the Reformation,” writes Friedrich Albert Lange (Lange 1875, p. 536) in his talented chronicle of the debate.

Wagner did not deny free will, but rather did just the opposite; he fought for the reality of the immortal soul, which he said was “a product resulting from combining Divine Mind with matter to make an individual, independent being.” His reason was religious belief, which he saw as a “new organ of the mind,” a new “method for knowledge alongside thinking, natural reason,” which science must do without. “For both”, he continued, “reason and belief are just as different from one another, [...] as the senses, as vision and hearing” (Wagner 1854, p. 18, p. 14f). As early as 1852 he advocated the idea that belief and science are two different spheres, overlapping only a tiny bit at the periphery. As a scientist, one is sometimes forced to accept insights that contradict belief, but as a believer, one can ignore that (Wagner 1854, p. 10). An “immaterial individual soul substance” is indispensable for “moral order in the world,” even if the natural sciences do not suggest it (Wagner 1854, p. 21).

In his idiosyncratic style, the philosopher Hermann Lotze, with whom Rudolf Virchow and many other contemporaries agreed, called Wagner’s standpoint “a queer sort of double-entry bookkeeping”: “To follow this principle in science,” he says, “and to compensate for desolation by embracing a *different* result in one’s belief, has always seemed to me an unworthy fragmentation of our mental powers” (Lotze 1852, p. 36). Despite the excesses of the materialism debate, we can be grateful that Lotze, the materialists, and other Forty-Eighters of the nineteenth century (who were otherwise at odds with each other) criticized Wagner’s double-entry bookkeeping as dishonest and that they prevailed in this case, although their political revolution failed. If they had not won this battle, the dispute over the role of Darwinism in German secondary education that took place towards the end of the nineteenth century (see Daum, 1998) would not have ended as it did; in Germany today (at least), American “creationism” is not taken seriously by anyone – across all circles, and entirely independently of political creed or ideology. This is not an isolated episode, but rather one that characterizes the general attitude of the public at large towards natural science in German-speaking Europe.

But whoever uses double-entry bookkeeping, whether to strengthen and purify science or to defend belief and the immortal soul, *enfeebles* enlightenment and turns back the clock. Is this Prinz’s intention? I doubt it. He must, then, give up Wagnerian double-entry bookkeeping and acknowledge the relevance of one game for the other, or – to put it more pathetically – acknowledge that reason is indivisible.

Denying Freedom and Abandoning Explanation

To deny freedom of will is not only self-destructive for natural science, of no consequence to our practical lives, and disastrous for the idea of enlightenment, as I have tried to show; in light of the present state of the sciences it is also extremely unfortunate for science policy. This is so for two reasons. First of all, this kind of free will debate plays into the hands of those who advocate a strict demarcation between the humanities and the sciences, especially those who, since the days of Neo-Kantianism, continue to fend off all naturalistic influence on philosophy and want to protect philosophy from convergence with the natural sciences. (By the way: Few scholars take the time any longer to think about the division between the humanities and the natural sciences. It crops up when you ask them to decide whether mathematics (or informatics) belongs to the one or the other group. Mathematics naturally belongs among the humanities. Reliance on mathematics thus makes the sciences belong in some measure to the humanities, which shows that the entire demarcation is artificial and inappropriate.)

If freedom of will really has no place at all in science, then the only thing left for philosophers to do is to preach “values” unscientifically. They would become marked as apostles of one or another ethos, allowed to provide their followers with pious sayings and illusions of greater or lesser eloquence. That attitude is obviously inappropriate for building interdisciplinary bridges today; with a single whisk it brushes aside the whole tradition of philosophical enlightenment, which – we should not forget – was the cradle of natural science to begin with.

Another reason why it is unfortunate to exploit debate over free will to stress the divide between philosophy and the biological sciences is this: Present developments in cognitive neuroscience and in philosophy (which has been highly influenced by studies in cognition) are equally favorable for mutual respect and mature cooperation in many areas, including the freedom of will and related topics. In the nineteenth century, it was common to speak of physiologists and philosophers working on the mind-body problem as miners digging a tunnel from opposite sides of a mountain. Deep in the tunnel, philosophers can now hear the miners knocking out rock on the other side. There are signs that cognitive science, albeit of a more humble nature than that of the free-will disdainers, and philosophy that takes its duty to inform science seriously will some day meet in the middle of the mountain. I ask that we view our initial impression that free will and scientific method do not go well together as a *puzzle*, a scientific challenge that philosophers must also help to master. In fact, to adapt the statement by Lotze quoted above, it would be “an unworthy fragmentation of our mental powers” if we did not come together to solve this problem. A bit of modesty on the part of scientists would be welcome, of the kind exhibited by William James, who wrote: “My own belief is that the question of free will is insoluble on strictly psychological grounds ... He who loves to balance nice doubts need be in no hurry to decide the point” (James 1890, II, p. 572). Libet’s experiments have done nothing to diminish the value of James’s argument.

Research cooperation between psychology and philosophy could arise, for instance, in what has come to be known in recent years as the “theory of mind” in cognitive neuroscience, developmental psychology, anthropology, and primate studies (cf., for example, Frith, 1999). Around the age of four, children develop a sort of “theory of mind” that acknowledges the autonomy of mental life. This enables them to distinguish their own perspective from that of someone else and thus to understand that people can also act out of *incorrect* beliefs, or, more generally, that mental states (in this case: beliefs) play a causal role in explaining action. When asked where another

playmate would look for a ball that was first in a basket, but then secretly placed in a closed box while that playmate was absent for a moment, children under the age of four say that the playmate will look in the box. Older children realize that due to a lack of information, the playmate will first look for the ball in the basket. While chimpanzees do seem to grasp the intentional structure of actions, evidence indicates that they apparently have no – or only a very rudimentary theory of mind of this sort (Tomasello et al. 2003, Povinelli and Vonk 2003).

In terms of the third component of freedom discussed above, having a theory of mental life is certainly a necessary condition for having a free will. In order to think of oneself as an agent, one must accept that others are independent agents, too; this is a concept that has turned up in many guises throughout the history of the philosophical investigation of self-awareness. We do not consider a tennis ball a thinking being, as Locke says, but we do think of our fellow persons in this way. And we do so, as we could say with Locke, because “we conceive him to think and consequently to have volition.” If anywhere, this is where we should look for the freedom of will. It is tempting to go along with Michael Tomasello (2002) and see humans’ capacity to think of each other as intelligent intentional beings as the origin of human cultural life, and then to understand human free will *and* the capacity to experiment scientifically from there. Why should we sacrifice the possibilities offered by our theory of mind for very successfully explaining action, and through which evolution has raised us above our purely biological nature, for subpersonal mechanisms, as if they were unreal (cf. Prinz 2003, 2006)? Denying free will blocks many avenues; it means waiving explanation, which, unreasonably, is exactly what Prinz suspects of those who defend the notion of free will (Prinz 1996a, p. 92f.).

Cooperation between philosophers and scientists, however, requires that the latter be less fascinated by their own methodical determinism, which no one seriously questions, and stop thinking that they own it. Many wrongly believe that philosophers who accept free will automatically deny determinism. The fact is that most contemporary philosophers consider free will and determinism to be compatible, and perhaps even see determinism at the subpersonal level as being *indispensable* for freedom of will. Philosophers who advocate indeterminism are usually aware of the difficulties entailed by rejecting determinism, and bend backward to circumvent them.

The insinuation that philosophy is naïve in this respect is uninformed and unfair. Scientists need not instruct philosophers on determinism (as Prinz does in 1996a, p. 92). This might have been appropriate 150 years ago, when the law of the conservation of energy had just been discovered. But until that time even scientists, particularly physiologists and physicians, took at least physiological indeterminism for granted. If this were not so, the deterministic pathos in Claude Bernard’s major work (Bernard 1865, particularly vol. II, pp. i and v) would be unintelligible. The number of scientists, by the way, who lately feel called to revive philosophical disputes of yesteryear (most of which were settled in the nineteenth century) is baffling. Naturally scientists are welcome to voice their opinions on philosophical issues. But they should first inform themselves of the state of the discussion and refrain from inconsistency.

And scientists should stop assuming that philosophers continue to follow Descartes in the belief in a nonmaterial mental substance, “mind stuff” as William James, or “soul substance” as Rudolph Wagner called it. Hardly any colleague asserts that notion any longer. On the other hand, do not forget that it was Descartes who, by distinguishing the non-material from matter and thinking of it as an individual “substance,” was the first to overcome Aristotle’s doctrine of nature and thereby establish the modern science of physiology (which, in turn, nowadays has trouble

imagining how mind can be in matter)! Even Descartes did not think that the *res cogitans* is a controlling “I” or “self”, as the opponents of free will like to imply that he thought, or imagine that philosophers today still think.

Conclusion

This essay has not even touched upon the most important question of the freedom of will, namely, how it may be compatible with the causal order of the world. I have also said too little about how the errors in freedom-scoring scientists’ argumentation come about – except for criticizing the inappropriateness of reducing intentionality to the neural level. But it was not my intention to do such things. What I want to show is that even in science, as in everyday life, we have no other choice but to accept the existence of free will. Science cannot steal off and avoid the “game” of explaining action, and scientists cannot expect philosophers to keep their hands out of the “game” of science. We are all in the same boat. This essay, then, is more a product of contemplating science – the meaning of its business and its relationship to the world – than of contemplating free will. If science cannot get a grip on how to combine an explanation of action that includes free will with its own convictions about subpersonal processes, then that is science’s problem, not the problem of philosophers who have already done quite a lot and have quite a bit to offer towards finding a solution.

In conclusion I would like to let Socrates speak once more. As the passage quoted above continues, after rejecting an explanation of action in terms of stretching and extending sinews and muscles because it is “very strange, indeed,” he addresses the crucial point, namely our notion of causality:

“If it were said that without such bones and sinews and all the rest of them I should not be able to do what I think is right, it would be true; but to say that it is because of them that I do what I am doing, and not through choice of what is best [... that] would be a very lax and inaccurate form of expression. Fancy being unable to distinguish between the cause of a thing, and the condition without which it could not be a cause! It is this latter, as it seems to me, that most people, groping in the dark, call a cause – attaching to it a name to which it has no right” (Plato, *Phaedo*, 99a,b).

Today we would say that action is realized in subpersonal neural processes – no one doubts that. But it is a category mistake to think that they alone are the *causes of action*. The disdainers of free will are “groping in the dark” when they do not distinguish between causes and the material conditions that realize and embody them.

Translated by Cynthia Klohr

Acknowledgment

I would like to thank C. Brand, E.-M. Engels, E. Hildt, W. Prinz, J. Sautermeister, G. Schieman, and the editors of this volume for criticism of an earlier version of this paper, although I have not always heeded their suggestions.

References

- Bernard, C. (1865). *Introduction à l'étude de la médecine expérimentale*. Paris: Flammarion 1984.
- Damasio, A. R. (2000). [Interview], in: *Die Zeit*, No. 41 (5. October 2000), p. 43.
- Daum, A. W. (1998). *Wissenschaftspopularisierung im 19. Jahrhundert. Bürgerliche Kultur, naturwissenschaftliche Bildung und die deutsche Öffentlichkeit, 1848-1914*. München: Oldenbourg.
- Dennett, D. C. (1987). *The Intentional Stance*, Cambridge, Mass.: MIT Press.
- Descartes, R. (1637). *Discours de la méthode pour bien conduire sa raison, et chercher la vérité dans les sciences*. Leyden (Œuvres, Adam, Ch., Tannery, P. (Ed.), 12 vols., Paris 1897-1910, Vol. VI.).
- Fodor, J. A. (2000). *The Mind Doesn't Work That Way*. Cambridge, MASS.: MIT-Press.
- Frith, C. D., & Frith, U. (1999). "Interacting minds – a biological basis", *Science* 286, 1692-1695.
- Haggard, P., & Eimer, M. (1999), "On the relation between brain potentials and the awareness of voluntary movements", *Experimental Brain Research* 126, 128-133.
- Heidelberger, M. (1997), „Ist der Kausalitätsbegriff abhängig vom Handlungsbegriff? Zur interventionistischen Konzeption der Kausalität“, in: Breuninger, R. (Ed.): *Philosophie der Subjektivität und das Subjekt der Philosophie*. Festschrift for Klaus Giel's 70th birthday, pp. 106-116. Würzburg: Königshausen & Neumann.
- Helmholtz, H. v. (1867). *Handbuch der physiologischen Optik*, Vol. 1. Leipzig: Leopold Voß.
- Helmholtz, H. v. (1878). „Die Thatsachen in der Wahrnehmung“, in the same.: *Vorträge und Reden*, Braunschweig: Vieweg 1884, Vol. 2, pp. 217-251.
- James, W. (1890). *The Principles of Psychology*, 2 vols. London: Macmillan.
- Keller, I. & Heckhausen, H. (1990). "Readiness potentials preceding spontaneous motor acts: voluntary vs. involuntary control", *Electroencephalography and Clinical Neurophysiology* 76, 351-361.
- Kornhuber, H. H. & Deecke, L. (1965). "Hirnpotentialänderungen bei Willkürbewegungen und passiven Bewegungen des Menschen: Bereitschaftspotential und reafferente Potentiale", *Pflügers Archiv für die gesamte Physiologie des Menschen und der Tiere* 284, 1-17.
- Lange, F. A. (1875). *Geschichte des Materialismus und Kritik seiner Bedeutung in der Gegenwart* (ed. A. Schmidt), 2 vols., 2nd ed. Frankfurt am Main: Suhrkamp 1974.
- Libet, B., Gleason, C. A. et al. (1985), "Time of conscious intention to act in relation to onset of cerebral activity", *Brain* 106(3), 623-642.
- Locke, J. (1690). *An Essay Concerning Human Understanding*, 2 Vols. (ed. J. W. Yolton). London: Dent 1961.
- Lotze, R. H. (1852). *Medicinische Psychologie oder Physiologie der Seele*, Leipzig: Weidmann.
- Mach, E. (1905). *Erkenntnis und Irrtum. Skizzen zur Psychologie der Forschung*. Darmstadt: Wissenschaftliche Buchgesellschaft 1980.
- Plato (34 BC.), *Phaedo*. For the English version of this essay the translator has used: *Plato: The Last days of Socrates*, translated by Hugh Tredennick, Middlesex, 1954, 16th reprint, 1971.
- Povinelli, D. J., & Vonk, J. (2003). "Chimpanzee minds: suspiciously human?", *Trends in Cognitive Sciences* 7(4), 157-160.

- Prinz, W. (1996a), "Freiheit oder Wissenschaft?", in: Cranach, M. v., Foppa, K. (Ed.): Freiheit des Entscheidens und Handelns. Ein Problem der nomologischen Psychologie", pp. 86-103. Heidelberg: Asanger.
- Prinz, W. (1996b), "Bewusstsein und Ich-Konstitution", in: Roth, G. & Prinz, W. (Eds.), Kopf-Arbeit. Gehirnfunktionen und kognitive Leistungen, pp. 451-467. Heidelberg: Spektrum.
- Prinz, W. (2003). "Kritik des Freien Willens. Psychologische Bemerkungen", 5. Congress of the Society for Analytical Philosophy, September 23, 2003, manuscript.
- Prinz, W. (2004). Kritik des Freien Willens. Psychologische Bemerkungen. Psychologische Rundschau 55(4) 2004, 198-206. Revised version of Prinz (2003).
- Prinz, W. (2006). A Critique of Free Will: Psychological Remarks on a Social Institution. In Ash & Sturm (eds.) (2006), pp. xxx – xxx. Revised translation of Prinz (2003).
- Roth, G. (2001). Fühlen, Denken, Handeln. Wie das Gehirn unser Verhalten steuert. Frankfurt am Main: Suhrkamp.
- Roth, G. & Brumlik, M. (2004). "Hat der Mensch keinen freien Willen?", Chrismon 9, 24-26.
- Roth, G. & Vollmer, G. (2000). "Es geht ans Eingemachte" [Interview], in: Spektrum der Wissenschaft, October, pp. 72-75.
- Singer, W. (2001). "Das falsche Rot der Rose" [Interview], in: Der Spiegel No. 1 (January 1), pp. 154-160.
- Singer, W. (2003). Ein neues Menschenbild? Frankfurt am Main: Suhrkamp.
- Singer, W. & Nida-Rümelin, J. (2004). "Gehirnforscher sind doch keine Unmenschen. Aber vielleicht leiden sie an Schizophrenie". Frankfurter Rundschau, Magazin, April 3, pp. 4-5.
- Tomasello, M. (2002). Die kulturelle Entwicklung des menschlichen Denkens. Zur Evolution der Kognition. Frankfurt am Main: Suhrkamp.
- Tomasello, M., Call, J. et al. (2003). "Chimpanzees understand psychological states – the question is which ones and to what extent", Trends in Cognitive Sciences 7(4), 153-156.
- Wagner, R. (1854), Ueber Wissen und Glauben mit besonderer Beziehung zur Zukunft der Seelen. Fortsetzung der Betrachtungen über "Menschenschöpfung und Seelensubstanz". Göttingen: Wigand. First published in the Augsburg *Allgemeine Zeitung* on January 1, 1852.
- Wittkau-Horgby, A. (1998). Materialismus. Entstehung und Wirkung in den Wissenschaften des 19. Jahrhunderts. Göttingen: Vandenhoeck & Ruprecht.
- Zhu, J. (2003). "Reclaiming volition: an alternative interpretation of Libet's experiment", Journal of Consciousness Studies 10(11), 61-77.