

ON BRAIN, SOUL, SELF, AND FREEDOM: AN ESSAY IN BRIDGING NEUROSCIENCE AND FAITH

by Palmyre M. F. Oomen

Abstract. The article begins at the intellectual fissure between many statements coming from neuroscience and the language of faith and theology. First I show that some conclusions drawn from neuroscientific research are not as firm as they seem: neuroscientific data leave room for the interpretation that mind matters. I then take a philosophical-theological look at the notions of *soul*, *self*, and *freedom*, also in the light of modern scientific research (self-organization, neuronal networks), and present a view in which these theologically important notions are seen in relation both to matter (brain) and to God. I show that religious insights expressed with *soul* and *free will* bear a remarkable resemblance to certain insights from neuroscience and the science of complex, self-organizing systems, including emphasis on corporeality and emphasis on organization as a form of that corporeality, and that they also show an interesting parallel—albeit described in different terms—concerning the crucial role of a valuation principle that generates attraction. With that, the commonsense idea that freedom simply is the same as indeterminism is refuted: freedom primarily means self-determination. I bring to the fore that the self is not a static thing but a “longing.” Such longing springs from something, and it is the relationship to this source that constitutes the self. The main concern is to point out the crucial role of *attraction* with respect to being and to life, and to draw attention not only to the astonishing parallel on this point between Thomas Aquinas and Alfred North Whitehead but also to a surprising—albeit more implicit—analogy between these philosophical-theological views and scientific theories of self-organization (such as those concerning neuronal networks). In short, being attracted toward what appears as “good” is what constitutes us as selves and what thereby signifies the primary meaning of our freedom.

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With a certain flair for drama one could say that we find ourselves in an intellectual fissure. On the one hand are statements coming from some quarters of neuroscience in which it is said, for example, that it has been established experimentally that the mind, or consciousness, is a product resulting from the functioning of neurons and that mind, or consciousness, in itself does not produce anything—in other words, that our *brains* do the deciding and not *we*.¹ The soul does not fare any better. Consider, for example, the words of the director of the USC Brain Project, professor Michael Arbib: “Yes, people have religious longing; yes, they have a sense of soul. Nonetheless, I believe that all of this can be explained in terms of the physical properties of the brain” (Arbib 1999, 81). Along with this, talk of “free will” is suggested to be no longer meaningful. Consider the words of the director of the Netherlands Institute for Brain Research, professor Dick Swaab: “Even in case of complete consciousness there is no question of freedom (even though one may perceive this to be the case), but rather of extensive determinism brought about by the structure of the brain. We are highly complex, ‘conscious’ robots. The structure of the brain is the result of genetic determinateness and of competition among developing brain cells” (Swaab 2001, 92, trans. from the original Dutch). This results in a uniqueness of the brain structures of each individual, but, although all individuals are in this way unique, they are not “free,” according to this neuroscientist.

On the other hand, and opposed to the reductionist view expressed by these neuroscientists, is the language of faith (and the reflections thereon in theology), which continuously speaks of personal choice, of mind and free will, of responsibility, of the soul as the most profound expression of the experience of being a living person, of life after death as a preservation of the soul (that is, of ourselves) in God, of love, of commitment, and of so much more.

This gap seems very wide indeed. In this article I explore, against this background of fissure, the possibilities of how, in an intellectual sense, we can remain whole human beings, how we can view the experiences and insights of our faith in relation to our scientific insights. What kind of bridge can we build between them?

I explore the possibilities of a bridge in seven steps. First, I demonstrate that some conclusions drawn from the neuroscientific research are not as firm as they seem. Concretely, I show that some neuroscientific data leave room for the interpretation that mind matters. After that, I take a philo-

sophical-theological look at the notions of *soul*, *self*, and *freedom*, also in light of modern scientific research, and present a view in which these theologically important notions are seen in relation both to matter and to God.

THE POSSIBILITY THAT MIND MATTERS (“SUPERVENIENCE”)

As a starting point for further analysis I make the same basic assumption as neuroscience: viz., that which we call the consciousness, or mind, has its material basis in our brains. That there are brain activities underlying mental experiences can be seen from those images in which the lighting up of a brain area indicates that roughly this area is active when the person in question is figuring, listening, speaking, experiencing fear, and so on. We think, feel, will, and decide with our brains. This makes a neuroscientist say, “The mind is the product of the functioning of our neurons” (Swaab 2001, 91, trans. from the original Dutch).

Brain research fascinates us and confuses us. Why the latter? What we regard as a profound thought or as a uniquely private feeling seems nevertheless to be easily and openly demonstrable. Our thinking or feeling is visible and locatable by means of those brain images. The confusing thing is that our feelings and thoughts seem to be nothing other than neural activities, or by-products of these activities, shown by those imaging techniques, whereas it is our common-sense conviction that our feelings or thoughts are something different from the neural activities.

In seeking a possible solution to this incongruity, we can use the insight that the correlation of consciousness to neural activity does not per se imply that consciousness can be reduced to such neural activity. By means of the notion *supervenience*, which indicates that certain properties “emerge,” this insight is elaborated in the philosophy of mind.²

The notion of supervenience is a very difficult and sophisticated notion, and I will only roughly introduce it by way of an example. If I have a coin, a material dollar, I can buy something with it. It could serve as a means of payment for, say, a piece of cake. If someone else has an object with precisely the same physical properties—made of the same material, weighing exactly the same, with the same shape—that person could also buy a piece of cake with it. So, two things with exactly the same physical properties are identical with respect to the dependent property “being a means of payment with a specific value.” This correlation is called supervenience. Although the (supervenient) property’s “being a specific means of payment” clearly depends on the specific physical properties of the coin (the subvenient property), such dependence does not prohibit that the property’s “being a means of payment” could be something *new* with respect to the material properties of the coin (cf. Midgley 1998, 247). Similarly, a piece of music, to take a different example, has properties that the underlying set of tones does not have. For example, it has a melody.

Now, that which supervenes, or emerges, can have its own causal role in some cases. I can use the metal coin to pay off my debts or to buy that piece of cake. Or, the piece of music as such can influence the further development of musical styles, or it can move me. In short, form or organization add something new to the material substrate, not separate from the substrate but as in-form-ation or modeling of that substrate.³

When we look at the relationship between the brain and the mind from this supervenience perspective, we see the following: Neural activities are the physical basis of what we call the mind (which refers to, e.g., perception, consciousness, personal identity, thinking, willing). The mind is not separate from the neurons (and from all other things involved in the physical contacts among the neurons), but nevertheless the mind has properties that cannot be reduced to them. It has added (supervenient, or emergent) properties. And, because there are plausible reasons to think that some emergent properties play causal roles within their own domain (as the piece of music does), the fact that the mind requires a material basis does not preclude it per se from playing a causal role within its own domain. So, it is conceivable that “mind matters” (cf. Meyerling 1999).

In the preceding it is shown that some neuroscientific facts leave themselves open to more than one interpretation. I now explore the specific term *soul* and related notions such as *freedom* and *self* from a philosophical-theological standpoint but also in light of neuroscience. What should we think of them? Have they to be abolished in light of neuroscience?

THE SOUL—TWO MAIN TRADITIONS

The notion of the soul has a variegated tradition of meanings, which, roughly speaking, follow two main avenues. One views the soul as something immaterial, with an independent existence apart from the body—an idea supported by Plato, Descartes, and many others.

The second sees the soul not as an immaterial substance separate from the body but as something that reflects the deepest core of living entities as living beings. One could refer to the Old Testament, Aristotle, Thomas Aquinas, and many others. It is characteristic of the biblical understanding of *nefesh* (the Hebrew word traditionally translated as “the soul”) to interpret *nefesh* not as something immaterial but as something thoroughly corporeal, namely, as the vital living person or living animal itself. Aristotle, who carried out many nature studies, also considered the soul not as an immaterial substance—in contrast to his teacher, Plato—but as “the form of the body,” as the essential characteristic of a living entity. Aquinas pressed ahead and differentiated this biblical and Aristotelian line of thinking.

I begin my investigation with this second line of thought, because I am concerned with our self-comprehension as physically living and acting persons, not with speculations about an immaterial substance, and also because this second line of thinking clearly rumples some current ideas,

including religious ones. Certain Platonic insights are also included. I show that there are interesting parallels with the conceptions of some contemporary thinkers schooled in the natural sciences. In the end, even the commonsense view of freedom will not be left undisturbed.

The objective of this enterprise is to show that linking the soul, or mind (in the sense of the living person itself), to matter or to neurons is not a barrier to a linkage to God.

THE SOUL AS THE ORGANIZATIONAL FORM OF THE BODY

Aquinas considered the soul as the form of the body and was thus in line with Aristotle and opposed to the previous and later dualistic traditions (even though Aquinas drew upon them to some extent). In this school of thought, form is a companion to matter and stands for that which every entity needs apart from matter in order to be that particular entity. A ball of clay without its round form would not be a ball at all. Matter without form is a conceptual construct. Together, matter and form are two aspects of something that exists, not parallel things but two perspectives that are inseparable. I readily admit that this is not our everyday conceptual context—but neither are neurons and synapses! I intend therefore to continue along these lines, because they lead to a fascinating parallel, which will become clear.

So, the scheme of form and matter was the conceptual framework of Aquinas, after Aristotle. In living entities this form is called the soul. In this case, the form is to be seen as something like the organization by virtue of which something is what it is. By way of illustration: many people, bricks, and computers together constitute “an office” or “a university” only by virtue of the organization or network that brings them together. In this way of thinking, form is not primarily the form of a drinking cup or a ball—that is only the lowest kind of form—but rather the structure or organization whereby something is what it is and can function accordingly.

To repeat, the form of a living entity, its living identity, was called the soul. For Aquinas, plants and animals, not only human beings, therefore have souls! The human soul has capacities that correspond to those of plant souls, capacities shared with animal souls, and capacities that are typically human. Aquinas distinguishes between vegetative faculties (such as growth and reproduction), animal faculties (locomotion, perceptions, and lower appetites, such as fear and appetites for food or mating), and typical human faculties (including the intellect and the will) (*STh* I, q. 78). For Aquinas, the will is also an appetite (a higher one); willing implies being attracted by that which is perceived as good, and thus ultimately, albeit indirectly and in a veiled manner, by God.⁴

So, in this view, the soul enables us to eat, to make love, to think, and to have a relationship with God. The soul does not restrict itself to the latter,

although later traditions placed the greatest emphasis on this aspect. Indeed, contact with God, which indirectly comes to expression in the will's appetite, is only one aspect of the soul in the midst of other corporeal concerns.

We of the twenty-first century must recognize that all of these things, including the religious aspect, are now seen as functions of the brain, with their own localized aspects (see Murphy 1997, 52–55). Should we therefore say “We now know better. It is not the soul that accounts for this but the neurons!”? By no means. For, in the view presented here, the soul does not oppose the body but is precisely the organizational structure or form *of* the body.

An organizational form makes functioning possible. The soul as organizational form of the body enables people to think, understand, desire, perceive, and experience things. It is remarkable that, in the case of the brain, many neuroscientists recognize something similar and follow a similar line of thought: it is not the neurons as such but their very mutual organizational structure, their network structure, that makes them a functioning conceptual and emotional organ. In other words, it is—also according to the neuroscientists—thanks to their organizational structures in neuronal contact that our brains produce our minds (Swaab 2001, 80).

This emphasis on the importance of the organizational form of the body by virtue of which, among other things, something like the mind is possible, can thus be found both in medieval theological reflection (in the writings of Aquinas) and in contemporary neuroscience (with its neuronal networks). Instead of contradictions on this point, we find a certain parallelism, albeit expressed in different terms.

SELF, CONSCIOUSNESS, AND THE VALUATION PRINCIPLE

It is this, perhaps unexpected, parallelism between some insights from classical theology and modern natural science that I want to explore in more detail, in view of the following question: How can the notion of self, of an inner, subjective, coherent experience (which is thought to be a main characteristic of the soul and of consciousness), be viewed in connection with the emphasis on organization?

The idea of the coming into existence of some coherence, of something like a self, out of interactions between many different components is an idea that modern science has begun to elaborate during the last decades under the term *self-organization*.⁵ A system is called self-organizing if, at a global level, the emergence and maintenance of some order and coherence are to be seen, without the system being centrally or externally controlled (often referred to by the term *spontaneous*). Indeed, the global coherence results from the interactions between initially independent components of the system, all of which follow their own local laws. The capacity for self-

organization enables a system to develop or change its internal structure spontaneously and adaptively in relation to its environment. Biological evolution may count as an example par excellence of such an adaptive self-organizing process. As to the emergence and maintenance of coherence, the behavior of a flock of birds, starlings for instance, may serve as a simple illustration. A flock of starlings reacts, flies, and moves as if it were a single organism and yet does so without a “conductor.” Such coherent operation (or synergy) is also demonstrable in physics and is a fundamental aspect of laser beams, for example. This very general description of self-organization should not suggest that these phenomena are already fully understood; indeed, self-organizing processes deserve closer scrutiny to understand their “how.” Improvement of understanding is the aim of much dynamic-system and complexity research. However, for the line of thought developed here, the important point is that, in the process of the mutual fine tuning of the many processes involved in the activity, such a level of coherence appears, that something like a unity emerges. The self we are talking about here could be seen not as a preexistent changeless central controlling unit but as the emerging effect of the interactions of the brain units (neuronal networks). In the same key, neuroscientist Michael Arbib states that “the you” is constituted by the holistic net of schema interactions in the brain (Arbib 1985, 118) and not by a central organizer.⁶

I make a short detour here because, even if the phenomenon of self-organization is the principle underlying the event of unification in which a multitude of things more or less behave as a self, we still have not reached a self that subjectively experiences things or is conscious. As long as it is assumed that reality consists of things or objects—and that still is the current view of reality—it will be utterly impossible to arrive at the subjectivity of consciousness, according to John Searle (1992, 99–100). For David Chalmers, this is reason enough to view “experience” as a fundamental feature of the world, alongside mass, charge, and space-time (1995, 216).⁷ Philosopher Alfred North Whitehead, who was also a mathematician and natural scientist, took experience to be even more radical—as *the* elementary hallmark of reality. In Whitehead’s view, everything that “really is” is a process of experience, a process that forms itself out of previous processes of experience, and which, in turn, itself forms an element in successive processes of experience ([1929] 1978, 18, 22, 142–43). Understood in this way, all reality has an elementary experiential nature. This makes intelligible, at least in principle, that in certain complex processes—as discussed above in the context of self-organization and neural networks—this elementary experience condenses to *consciousness*.

Let us continue to explore the idea of self-organization as such. We just emphasized that it involves the arising and maintenance of coherence as the result of the interactions of a multitude of units or processes becoming

cooperative by following their own local rules. However, this development of coherence through local interactions may tell only half the story. The following also is often characteristic for self-organization, and this adds an extra dimension of interest to our discussion, as we shall see.

In complex, adaptive self-organizing processes—processes that develop and change their internal structure adaptively in relation to their environments—often an *implicit criterion* is involved, such as a criterion of minimum energy use, or of optimal mutual distance, or of maximum benefit. For instance, in biological evolution a “fitness function” is involved, expressing the different fitness values in relation to the environment of the many possible genotypes of a species. Such a fitness function is not something “from outside,” but it expresses the immanent fact that in a certain kind of environment one solution fits better (produces more fertile offspring, for example) than another. Complex self-organization often entails such a kind of fitness function, or “credit assignment algorithm,” to use a term of John Holland (1996, 87), as an *immanent valuation principle*. That is to say, something is involved that indicates a development in one direction as more attractive than a development in a different direction, so that the one is felt as more beneficial than the other. And because of that difference in attractiveness, the course of the process becomes oriented and gains direction.⁸

This function or algorithm is mostly hidden, because it functions in an immanent way. One may be better aware of this fitness function and its role, in the case that one might build an artificial-intelligence device—a learning robot, for example. In this case, in order to create a system whose components vary relative to each other in such a way as to discover configurations with a higher fitness, one must explicitly make and implement such a valuation principle in the form of a computer program that distinguishes better from worse solutions (Heylighen 1999, 23).

What I am saying here is that self-organization, and with it the generation of a self, often is a product of interactions in relation to an immanent valuation principle. This insight will reappear in the context of our reflection on human will and freedom.

FREE WILL? CHOOSING-FROM DETERMINED BY CHOOSING-FOR

The term *human will* mentioned above, especially the characterization of this will being *free*, is something that many neuroscientists posit as a misunderstanding. In doing so, they implicitly assume that it is well known what free will is, namely nondeterminism, and that believers and theologians endorse such a free will. However, the issue is not that simple.

In the argument against free will, determinism and predictability are core notions. The aforementioned neuroscientist Swaab repudiates the freedom of human will, pointing out that we are determined to a large

degree by the combined actions of our genes, our brains, and environmental factors. Such determination reveals itself in the predictability of our behavior, according to him (2001, 84). This line of reasoning implies that unpredictable behavior should be the hallmark of free will. I refute this position below.

However, I begin by affirming that the determining effects of genes, brains, and environmental factors are indeed immense. And if free will should mean indeterminism, and consequently the unpredictability of decisions, one would be forced to conclude that free will does not exist. This is not what free will means, however—at least not primarily.

In themselves, indeterminism and unpredictability are not signs of free will. I do not refer to a friend as being “free” if he or she adores the music of Bach one day and detests it the next or takes up a course of study only to drop it shortly thereafter. These are indeed examples of utterly unpredictable behavior, but they bear little relationship to being a free person. More likely, one would say that this friend had a screw loose.

On the contrary, we refer to someone being free when she or he makes a certain commitment and does not abandon it the first time the going gets rough. We call someone free who, when facing serious threats, does not abandon her political convictions. And, if such a person is tortured to the point where she makes pronouncements contrary to her convictions, we do not talk about freedom but about coercion. Apparently, one of the essential characteristics of freedom is that it has to do with remaining loyal to the things one considers to be good. This finds expression in such statements as “This is what I do; my consciousness leaves me no alternative.” Paradoxically, the no-alternative declaration functions as a sign of a person’s inner freedom, according to which one cannot accept anything other than remaining true to oneself and to the things one values. There are, of course, less dramatic examples. When I am trying to solve a problem that requires a great deal of reading and time to reflect on it, I do not behave freely if I am readily distracted by any given television program. If I were so frequently distracted, I would more likely be seen as not being my own boss, or as being enslaved, rather than as being free.⁹

Therefore, something is at odds. Although determinism seems to contradict freedom, indeterminism and unpredictability apparently do not go well with freedom, either. However, freedom and loyalty to oneself—sticking to one’s commitments (no matter how difficult such notions are to define)—go hand in hand more clearly, even though in the first instance freedom and commitment seem like strange bedfellows. It merits further exploration.

In discussions such as this, one often approaches freedom from the perspective of *freedom of choice*, which is the freedom to *choose from* various alternatives; you are free, for example, if you can decide whether to visit a

museum or to stay in bed. Freedom then implies that none of these alternatives is firm, and one speaks of lack of freedom when one thinks that the choice is predetermined. However, we just saw that this is not so simple.

To clarify this issue, we must focus on the fact that this choosing-from alternatives is secondary, because it depends on another choice, namely a *choosing-for*, which precedes it.¹⁰ The following is noteworthy. In principle, the choosing-from is paired to a multitude—the multiple alternatives. The choosing-for, however, is more or less focused on one option. It is an inclination toward something, a desire for something, a longing for something—viz., for that which is thought of as good. In choosing-for, freedom takes on a different—and, I am tempted to say, a more fundamental—meaning. Here, freedom means that I am free if I am not forced to refrain from what I consider good, if I am not tempted or forced to betray my deepest convictions (myself), if I am not alienated. In this sense, freedom means an unthwarted orientation of the will on that which is thought of as good.

It is this choosing-for that drives the choosing-from-alternatives. Freedom is therefore definitely not the same as indeterminism, since its core meaning is to be determined in one's choices by one's own commitment. Therefore, the fundamental meaning of freedom is *self-determination*.¹¹ That is why freedom also clearly does not simply coincide with unpredictability. For, to the degree that I am free, my choices will correspond to the things for which I choose, to the things that I desire. So, if I want to write a book, to the extent that I am not thwarted and therefore free in this sense, my behavior will be fairly predictable: I will mainly sit at the computer and write most days.

The question now arises: What is this choosing-for, this desire or commitment, based on?

AN APPETITE FOR WHAT APPEARS AS GOOD AS A DESIRE THAT CONSTITUTES THE SELF

According to Aquinas and other medieval theologians, one's own unthwarted pursuit, one's free will, is a longing for that which is thought of as good. It is the good as understood by our intellect (and which indirectly refers to God) that operates as an attractor. You are attracted by it; you want it. It forms your will. It is therefore an attraction that does not compete with your self, does not alienate you from your self, but in fact constitutes you as a subject, as a self. Aquinas expressly states, by the way, that what the intellect is capable of understanding as a particular good and what the will aspires to, have *not* to be morally good, nor good in an objective sense, precisely because of the particularity and limitation of the intellect involved. Moreover, in Aquinas's view, God could certainly appear to us in the guise of the *non*attractive. That which the intellect considers as a

particular good is therefore by no means a direct and unproblematic “knowledge of God” (cf. Copleston 1982, 185–93).

What now about that attraction constitutes you as a self? To be sure, you are not free vis-à-vis this attraction (you are not free to say yes or no to it), but it *makes* you free because, based on and from this will that comprises your individuality, you can make your choices. Thus, the will is intrinsically linked to what appears as good; it *is* the being attracted by this good, according to this view. Where this is thwarted (by an external physical or spiritual cause), there is lack of freedom, because you cannot then be “yourself” and you become, in traditional terms, a “slave” (of sin, for example). However, even when such interference does not take place, you can also be termed a slave, but in a completely different sense, namely enslaved to the good.¹² There is thus a double movement: you make choices out of yourself, but that self is not in itself an independent entity: its individuality is constituted by its attachment to the good. (Note that this is the second time that we have seen the notion of self put into perspective.)

In the twentieth-century philosophy of Whitehead, we encounter a line of thought that is to some extent similar. Now, however, not only does it apply to human selves but to all selves. For Whitehead, being a self is characteristic of any event (including atoms, molecules, living cells, and organisms). In Whitehead’s philosophy each elementary process of experience is seen as having been attracted and consequently oriented by what I will call an *ultimate valuation principle*.¹³ Also for Whitehead, the autonomy of an event does not conflict with the purposiveness that it acquires from that ultimate valuation principle. On the contrary, it is precisely the longing for the most preferable possibility (relative to that event) that constitutes the self and the subject-nature of the event. Whitehead calls this ultimate valuation principle—in certain contexts—*God*,¹⁴ and I am comfortable with his decision to follow the religious usage at this point. However, we have to realize that, despite the designation *God* or *divine*, this valuation principle is an immanent working one, and moreover, that this “best possibility” is only best from the perspective of that particular event, not at all best in any objective, divine, or universal sense.¹⁵

Here we have an interesting resemblance to Aquinas.¹⁶ Aquinas describes the will as one of the typical capacities of the human soul. As we saw, the will is committed to what is thought of as good and therefore, albeit indirectly and veiled, to God. Whitehead says, with similar sensitivity for the role of attraction, that the contact that each event has with the divine valuation principle is the subject-constituting, mental aspect of that event.¹⁷ In other words, for Whitehead, a longing for, an orientation toward, is the *conditio sine qua non* for being a “subject.”

In this way of thought freedom and attachment go hand in hand. It is comparable to the way that loving a person binds and liberates simultaneously, drawing you into a dynamic where you become yourself.

Clearly, this goes further than neuroscience can say! Still, there is again an interesting analogy between these philosophical-theological views and some neuroscientific insights. Earlier we mentioned resemblance with respect to the emphasis on corporeality and the organizational form of that corporeality; now we have discovered in addition some resemblance between what is said here about orientation toward what appears as good, as constitutive of the self, and the need for a valuation principle that as a fitness function generates attraction in self-organizing processes, such as neural networks.

PRESERVATION IN GOD

In closing, I want to make two brief remarks about the religious hope that is expressed in talk about the continuing existence of the soul after death or in terms of eternal life.

In the foregoing I emphasized that the soul is not something apart from the body but is the form or organizational pattern of the body. Organizational patterns require physical realization. Without a material basis, references to a soul would therefore be improper (at least, as far as the strict Aristotelian tradition is concerned). This would mean that without a body a soul could not exist. However, simultaneously we know (particularly because of our experiences within the modern information and computer society) that information structures also have a certain independence from their materialization—not from materialization as such, but from each specific materialization. In order to write a letter, I need materials, such as paper and ink. However, the meaning of the letter, which supervenes the physical characteristics of ink and paper, does not depend on that singular material basis. I can create the same contents of the letter in my computer, again with a material basis, this time not paper and ink but electricity and silicones. The computer example makes us sensitive to the fact that organization, even though it constantly requires a material basis, can be fairly independent of each factual basis. The contents of the letter can be easily transferred from one computer via a disc or a telephone line to another computer and then perhaps printed out again on paper. Analogously, it is at least conceivable that our specific organization, our own form or identity, requires a basis yet can be fairly independent of the factual existing basis. In short, I do not see any compelling reason why my organizational form, my soul, could not transfer to another carrier or Carrier.

So far the first point. In conjunction, it may be noted (although this leads us somewhat beyond the scope of this article) that in the philosophical-theological view that I have presented here *existence* is something relational and experiential. Existence always involves both experience (of the other) and being experienced (by the other). I have referred to God as the source and object of desire. However, if experience is the hallmark of

really being, then there are good reasons—both philosophical and theological—to conceive of God as also a *subject* of experience. That would entail, according to this working hypothesis, that everything we do and indeed each particular event in the world is experienced by God and remains preserved in God as its carrier.¹⁸ In this way, events not only come and go in a temporal flux, but they are also everlastingly treasured and summed up (as it were by an integral calculus, albeit an experiential one), all of which makes it at least conceivable that they leave more of a “record” than we ordinarily may think.

CONCLUSION

I would like to summarize the foregoing as follows.

- Neuroscientific facts are open to different conclusions, not only to those suggested by many neuroscientists. For example, the discussion about supervenience implies that to call the mind a product of neurons, which therefore causes nothing, is not the only conclusion possible.
- We saw that experiences expressed with the term *soul* and with the problematic notion of *free will* show a striking parallel with insights from neuroscience and the science of complex, self-organizing systems, such as neural networks. We saw similarities in the emphasis on corporeality and on organization as a form of that corporeality, and we also saw a potentially interesting parallel concerning the crucial role of a valuation principle that generates attraction. There is a certain affinity therefore, albeit described in different terms and placed in a different context, instead of the contrariety that may have been expected.
- “Well, that is interesting, but does this philosophical-theological reflection also *add* anything?” asks the skeptic. Yes, it does. It refutes the common-sense idea that freedom simply is the same as indeterminism, by elaborating that freedom primarily means self-determination. And it brings to the fore with more emphasis the insight that this self is not a static thing but a longing. Longing is the heart of our dynamic, of our being, and perhaps the heart of all dynamics, of all reality. But this longing springs from something. It is the relationship to this source that constitutes our self. Desire springs from the tension between what is and what can be. And with the latter, we sometimes refer to God.
- Notwithstanding my emphasis on the soul as the form of the body, I argued at the end of the essay that this is not per se at variance with the possibility of the preservation of our identity in God—after death, but equally before!

- My main point was to draw attention to the crucial role of attraction with respect to being, to life; and to the noteworthy parallelism that this is seen both in Aquinas and in Whitehead, *and* more surprisingly and hidden in scientific theories of self-organization (such as those concerning neuronal networks). In short, being attracted toward that which appears as good constitutes us as selves, and therefore with the primary meaning of our freedom.

NOTES

I wish to thank my colleague Dr. Menno Hulswit for his critical and stimulating comments on earlier drafts of this essay.

1. The often-mentioned experiments of Benjamin Libet (1985) would support this; so, too, the related experiments of Grey Walter (see Dennett 1991, 167–68).

2. On the concept of supervenience see Russell 1999, particularly the articles by Nancy Murphy and Theo Meyering, and Gregersen 2000, particularly the contributions from Dennis Bielefeldt and Niels Gregersen. These publications also contain many references to the most important primary literature, including the contributions of Donald Davidson and Jaegwon Kim.

3. This does not preclude different physical realizations leading to identical supervenient properties. The above-mentioned value of the means of payment is, for example, realized in one dollar coin but also in four quarters and approximately in one Euro, but it can also be realized in magnetic information on bank cards. In this simple case of supervenience, the supervenient property could therefore take many material forms. However, it is also conceivable that the supervenient property *can* only be realized in one way (“logical supervenience”), or *is* actually only realized in our world in one way (“natural supervenience”).

4. To avoid an oversimplification of Aquinas’s ideas on will, goodness, and God, see the section beginning below on page 388.

5. For more information about self-organization see Kratky and Wallner 1990; Holland 1996; Kauffman 1996; Heylighen 1999; Oomen in press; and the literature referred to in these publications.

6. Roger Penrose (1994, 367–68) refers to comparable ideas.

7. Chalmers (1995, 216) suggests that the link between the experiential feature and the remaining physical features was made possible by “information” as the ultimate basic principle, since information has on the one hand a physical aspect and on the other a phenomenal aspect. Precisely because of this dual character, information could serve as an explanation for the emergence of experience from physical processes.

8. For a description and further explanation of the role of the fitness function in adaptive evolutionary processes, see Kauffman 1996, esp. 162 ff., or Heylighen 1999, 20–21.

9. However, the reverse holds, too: If someone cannot be persuaded to abandon a particular intended course of action, regardless of the argument or facts presented, we do not praise such an attitude as a form of freedom but reject it as a type of obstinacy. In short, it remains more complex than it would at first seem.

10. Cf. the traditional distinction in philosophy between *arbitrium* (“choice”) and *voluntas* (“will”), which shows strong similarities with the classification given above, although the traditional one is more complex (Aquinas, *Summa Theologiae* I, qq. 82–83).

11. Incidentally, this assumes, if talking about self-determination is not to be empty talk, that the external determination leaves room for choice and is not a complete one, as is sometimes the case in abnormal situations under the influence, for example, of brain damage or drugs.

12. Cf. Saint Paul’s parallel wordings “freedom of the children of God” and “being slaves of Christ” (Romans 8:21; 1 Corinthians 7:22).

13. Initially, Whitehead introduces this principle under the designation “principle of concretion” or “principle of limitation” ([1925] 1967, 178–79). Later, he places stronger emphasis on the attraction aspect and speaks of “Eros” and “object of desire,” and, in technical jargon, of “God’s primordial nature.” Also see n. 14 below.

14. To be more precise, Whitehead calls that side of God, which as an immanent valuation function provides for differences in attraction, and therefore for direction, “the primordial nature

of God.” However, he conceptualizes God not only as related to the world in this primordial way but also as consequent upon the world, taking in and treasuring the world as an “integral”: the “consequent nature of God” (Whitehead [1929] 1978, esp. 342–51).

15. See Whitehead [1933] 1967, 130; [1929] 1978, 244. Elaboration may be found in Oomen 2003.

16. Along with the similarity between Aquinas’s view and Whitehead’s concept of the divine primordial nature, a small but noteworthy difference should be mentioned. For Aquinas God functions as the attractor itself (albeit veiled); for Whitehead the divine primordial nature is not so much a given attractor itself but rather that valuation function which, relative to each situation, makes us feel what is the most attractive possibility for that situation—that is to say, a valuation function that generates variable attractions. However, because every possibility is felt by God and is therefore part of God, according to Whitehead, the difference is not that large.

17. For Whitehead, each event has a mental aspect. However, the significance of this can be relatively small. He reserves the term *soul*, or *mind*, for that sequence of processes in which this mental aspect is dominant (Oomen 1998, sections 8.2.3 and 8.2.4).

18. Cf. Whitehead’s concept of “God’s consequent nature” in n. 14, and Oomen 1998, esp. section 6.4.

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