The Soul

Eric Steinhart

ABSTRACT: We review three theories of the soul. The astral body theory disagrees with science. It is false. The Cartesian theory disagrees with science and is also false. The Aristotelian theory of the soul as the form of the body is consistent with science. Hence the soul is the form of the body. As Aquinas argues, the soul has a part-whole structure. It is functionally divisible – the soul is the community of functions of the body. The parts of the soul are the functions of the parts of the body. The best way to think of the soul is to think of it in computational terms: the soul is to the body as a program is to a computer. The body runs a program; the body-program is a community of organ-programs; the organ-programs are communities of cell-programs.

1. Introduction

We review three theories of the soul. The first theory says that the soul is some sort of ethereal or subtle body. This theory is unscientific. The second theory is the Cartesian theory that the soul is an immaterial thinking substance. This theory is also unscientific. The third theory is the Aristotelian theory that the soul is the form of the body. We affirm this theory. The soul is the form of the body; it is like a computer program.

2. The Soul is an Astral Body

The most popular and perhaps most psychologically natural theory of the soul is that it is a kind of subtle, ethereal, or *astral body*. While the body is alive, the soul is inside of the body. It is an ethereal body inside the ordinary body. When a person dies, the soul rises up out of the body as if it were a ghostly image. The soul looks very much like the body – it has the same shape and visible features of the body. The soul is made of some kind of subtle or special stuff. It can walk through walls and vanish. The soul is often represented this way in movies (i.e. in *Ghost*) and in cartoons. The ethereal body is alleged to be a physical thing – it moves in space and causally interacts with other things.

Many people say they have near-death experiences in which various things happen to them. These stories often describe the release of the astral body from the ordinary body. Here is an idealized description by James Moody:

> A man is dying and, as he reaches the point of greatest physical distress, he hears himself pronounced dead by his doctor. He feels himself moving very rapidly through a long dark tunnel. After this, he suddenly finds himself outside of his own physical body, but still in the immediate physical environment, and he sees his own body from a distance, as though he is a spectator. He watches the resuscitation attempt from this unusual vantage point and is in a state of emotional

> upheaval. After a while, he collects himself and becomes more accustomed to his odd condition. He notices that he still has a "body," but one of a very different nature and with very different powers from the physical body he has left behind. Soon other things begin to happen. Others come to meet and to help him. He glimpses the spirits of relatives and friends who have already died, and a loving, warm spirit of a kind he has never encountered before — a being of light — appears before him. This being asks him a question, nonverbally, to make him evaluate his life and helps him along by showing him a panoramic, instantaneous playback of the major events of his life. At some point he finds himself approaching some sort of barrier or border, apparently representing the limit between earthly life and the next life. Yet, he finds that he must go back to earth, that the time for his death has not yet come. At this point he resists, for by now he is taken up with his experiences in the after life and does not want to return. He is overwhelmed by intense feelings of joy, love, and peace. Despite his attitude, though, he somehow reunites with his physical body and lives. (Moody, 1976: 21f)

There are many good reasons to believe that all near-death experiences are just *hallucinations*. The fact that people have similar experiences is no more surprising than the fact that they have the same kind of nervous system, which produces similar hallucinations under extreme stress. The best reason to think that these experiences are hallucinations is that if you take the drug *ketamine*, you will have a near-death experience. Ketamine and severe stress affect certain brain receptors (NDMA receptors) in the same way.

Science provides a powerful argument against the existence of astral bodies. It goes like this: (1) Astral bodies are supposed to exist in time and space (your astral body lives inside of your ordinary body). They are supposed to be able to move around in our universe and to causally interact with ordinary material things (e.g. to push them around). If something exists in space and time, and if it can causally interact with ordinary material things, then that thing also exists in our universe. So, if astral bodies, then they exist in our universe. (2) Science precisely describes our universe. Specifically, science describes our universe so accurately that, for any objects posited by any non-scientific theories, if science does *not* talk about those objects, then they *do not* exist in our universe. (3) Astral bodies are posited by non-scientific theories (by popular superstitious theories). (4) And science does not talk about any astral bodies. They do not appear in any scientific theories. They have never been detected by any means. It follows that (5) astral bodies don't exist in our universe. But if they don't exist in our universe, then they don't exist at all. You don't have an astral body. Nobody does – they don't exist.

3. The Soul is an Immaterial Ghost

The Cartesian conception of the soul involves at least the following claims: (1) The soul is a substance. The soul can exist on its own without any body. The soul can operate

without the body (that is, the soul can think without the body). (2) The soul is a simple substance. The soul does not have parts. It is not complex. (3) The soul is an individual rather than a society. (4) The soul is not defined in terms of the functions of the body. (5) The body is a soulless machine. (6) The soul interacts with the brain (by means of the pineal gland). (7) Animals do not have souls; they are merely soulless machines.

(1) *The soul is a thinking substance*. After arguing that he exists, Descartes wonders what he is. He denies that he is a rational animal. He says he is a thinking thing:

> Next I examined attentively what I was. I saw that while I could pretend that I had no body and that there was no world and no place for me to be in, I could not for all that pretend that I did not exist. I saw on the contrary that from the mere fact that I thought of doubting the truth of other things, it followed quite evidently and certainly that I existed; whereas if I had merely ceased thinking, even if everything else I had ever imagined had been true, I should have had no reason to believe that I existed. From this I knew I was a substance whose whole essence or nature is simply to think, and which does not require any place, or depend on any material thing, in order to exist. Accordingly this 'I' – that is, the soul by which I am what I am – is entirely distinct from the body, and indeed is easier to know than the body, and would not fail to be whatever it is, even if the body did not exist. (DW1: 127)

(2) *The soul is a simple substance*. Descartes denies the traditional division of the soul into its vegetative and sensitive parts. He finds no distinction between the rational soul (the mind) and the soul itself: "the mind or soul of man, between which I find no distinction" (Descartes, *Meditations*, Synopsis). In his reply to Regius, Descartes says:

> I approve of his calling the rational soul the 'human mind', for by using this expression he avoids the ambiguity in the term 'soul', and he is following me in this respect. . . . as far as I know, no one before me has stated that the rational soul consists solely in thought, that is, in the faculty of thinking or the internal principle by means of which we think. (DW1: 296)

The rational soul (the mind) is a simple thing. It is an indivisible monad. The indivisibility (simplicity) of the mind distinguishes it from the divisibility (complexity) of the body:

> we cannot understand a body except as being divisible, while by contrast we cannot understand a mind except as being indivisible. For we cannot conceive of half of a mind, while we can always conceive of half of a body, however small; and this leads us to recognize that the natures of mind and body are not only different, but in some way opposite. (DW2: 9-10)

(3) *The soul is an individual rather than a society*. Since Descartes has eliminated the vegetative and sensitive souls, he has consequently eliminated the internal political

structure of the soul. Since Descartes has reduced the traditionally complex soul to one of its simple parts, he denies that it is like a society:

> there is within us but one soul, and this soul has within it no diversity of parts: it is at once sensitive and rational too, and all its appetites are volitions. It is an error to identify the different functions of the soul with persons who play different, usually mutually opposed roles — an error which arises simply from our failure to distinguish properly the functions of the soul from those of the body. It is to the body alone that we should attribute everything that can be observed in us to oppose our reason. (DW1: 346).

(4) *The soul is not defined in terms of the functions of the body*. While the earlier philosophical tradition associated the body with the vegetative and sensitive parts of the soul, Descartes contends that the involuntary movements of the body (digestion, the beating of the heart, etc.) are not regulated by any vegetative or sensitive soul:

> all the functions I have ascribed to this machine — such as the digestion of food, the beating of the heart and arteries, the nourishment and growth of the limbs, respiration, waking and sleeping, the reception by the external sense organs of light, sounds, smells, tastes, heat and other such qualities, the imprinting of the ideas of these qualities in the organ of the 'common' sense and the imagination, the retention or stamping of these ideas in the memory, the internal movements of the appetites and passions, and finally the external movements of the limbs . . . I should like you to consider that these functions follow from the mere arrangement of the machine's organs every bit as naturally as the movements of a clock or other automaton follow from the arrangement of its counter-weights and wheels. In order to explain these functions, then, it is not necessary to conceive of this machine as having any vegetative or sensitive soul. (DW1: 108; see also DW1: 134)

(5) *The body is a soulless machine*. The animal machine is able to perform all the biological functions necessary for life. The soul is strictly the rational soul:

> our soul, in so far as it is a substance which is distinct from the body, is known to us merely through the fact that it thinks, that is to say, understands, wills, imagines, remembers and has sensory perceptions; for all these functions are kinds of thought. The other functions which some people attribute to the soul, such as moving the heart and the arteries, digesting food in the stomach and so on, do not involve any thought, and are simply bodily movements; . . . when all the bodily organs are appropriately disposed for some movement, the body has no need of the soul in order to produce that movement; and, as a result, all the movements which we in no way experience as depending on our thought must be attributed not to the soul, but simply to the disposition of the organs. . . . I will now try to prove the point, and to give such a full account of the entire bodily machine that we will have no more reason to think that it is our soul which produces in it the movements which we know by experience are not controlled by

> our will than we have reason to think that there is a soul in a clock which makes it tell the time. (DW1: 314-5).

(6) *The soul is associated mainly with the pineal gland in the brain*. Although Descartes has argued that the soul is not extended, he locates its activity in the brain, precisely in the pineal gland. After describing the mechanics of the human body, Descartes says: "when a *rational soul* is present in this machine, it will have its principle seat in the brain" (DW1: 101). And once again "when God unites a rational soul to this machine . . . he will place its principle seat in the brain" (DW1: 102).

Unfortunately for Descartes, science provides a powerful argument against mind-body dualism. It goes like this: (1) According to mind-body dualism, your immaterial mind exists in time and causally interacts with your body. Your body exists in our universe. Now, if something exists in time and causally interacts with anything that exists in our universe, then that thing also exists in our universe. So, if immaterial minds exist at all, then they exist in our universe. (2) Science precisely describes our universe. Specifically, science describes our universe so accurately that, for any objects posited by any non-scientific theories, if science does *not* talk about those objects, then they *do not* exist in our universe. (3) Immaterial minds are posited by non-scientific theories (by philosophical and theological theories). (4) And science does not talk about those objects. They do not appear in any scientific theories. It follows that (5) immaterial minds don't exist in our universe. But if they don't exist in our universe, then they don't exist at all. You don't have an immaterial mind. Nobody does – they don't exist.

4. The Soul is the Form of the Body

4.1 Aristotle: Soul as Form of the Body

Aristotle is well-known for his definition of the soul as the form of the body. Aristotle's conception of the soul is scientific. The soul is an object of scientific study. Aristotle begins his discussion of soul with a distinction of kinds of existence:

> There are three senses of existence: (1) existence in the sense of matter or stuff; (2) existence in the sense of shape or form or pattern; and (3) existence in the sense of that which is compounded of both form and matter. Now matter is the potentiality for some actuality (form). (Aristotle, *On the Soul*, 412a5-412a10).

Some matter is potentially a tree and is actually a tree when it instantiates the form (when it is arranged or organized so that it has a tree-structure). The relations between form, matter and composite are shown in the table below:

Form ABSTRACT	blueprint	shape	software
Composite = Form + Matter	cabinet	statue	computer
Matter CONCRETE	wood	blob of metal	hardware

Aristotle now asserts that the soul is a form or pattern:

> Of natural bodies some have life in them, others not; by life we mean self-nutrition and growth (with its correlative decay). It follows that every natural body which has life in it is an existence in the sense of a composite of matter and form But since the body is made of certain stuff, the body cannot be soul; the body is the composite of matter and form rather than just the form. Hence the soul must be an existence in the sense of the form of a natural body having life. (*On the Soul*, 412a15-412a22).

There are two kinds of actuality: (1) the actuality of some function that is possessed but not being performed and (2) the actuality of some function that is possessed and being performed. For instance: a person who is able to speak Spanish has that knowledge or skill whether or not he or she is using it. The possession of the skill is actuality of the first kind; the exercise is actuality of the second kind:

> Now the word actuality has two senses corresponding respectively to the possession of knowledge and the actual exercise of knowledge. It is obvious that the soul is actuality in the first sense, viz. that of knowledge as possessed, for both sleeping and waking presuppose the existence of soul, and of these waking corresponds to actual knowing, sleeping to knowledge possessed but not employed. (*On the Soul*, 412a22-412b21).

Actuality of the first kind is the functionality that a thing has because of its form, pattern, or structure. For example: an axe is sharp; its sharpness is the functionality of cutting even though the axe is not being used to cut; the axe is able to perform the function of cutting because it has the property of sharpness; the axe is able to perform its function because it has a certain form. Aristotle says:

> the soul is the first grade of actuality of a natural body having life potentially in it. A living body that has a soul is a body which is organized. The parts of plants in spite of their extreme simplicity are 'organs'; e.g. the leaf serves to shelter the pericarp, the pericarp to shelter the fruit, while the roots of plants are analogous to the mouth of animals, both serving for the absorption of food. If, then, we have to give a general formula applicable to all kinds of soul, we must describe it as the first grade of actuality of a natural organized body. That is why we can wholly

> dismiss as unnecessary the question whether the soul and the body are one: it is as meaningless as to ask whether the wax and the shape given to it by the stamp are one, or generally the matter of a thing and that of which it is the matter. What is soul?-an answer which applies to it in its full extent. It is existence in the sense which corresponds to the definitive formula of a thing's essence. That means that it is 'the essential whatness' of a body of the character just assigned. Suppose that what is literally an 'organ', like an axe, were a natural body, its 'essential whatness', would have been its essence, and so its soul; if this disappeared from it, it would have ceased to be an axe, except in name. As it is, it is just an axe; it wants the character which is required to make its whatness or formulable essence a soul; for that, it would have had to be a natural body of a particular kind, viz. one having in itself the power of setting itself in movement and arresting itself. Next, apply this doctrine in the case of the 'parts' of the living body. Suppose that the eye were an animal-sight would have been its soul, for sight is the substance or essence of the eye which corresponds to the formula, the eye being merely the matter of seeing; when seeing is removed the eye is no longer an eye, except in name-it is no more a real eye than the eye of a statue or of a painted figure. (*On the Soul*, 412a22-412b21)

The powers of the soul correspond to the different general kinds of biological functions performed by organisms. These powers are: "the nutritive, the appetitive, the sensory, the locomotive, and the intellectual." (*On the Soul*, 414a29-33). These powers of the soul are the different abstract biological operations of organisms. The powers are patterns that are found in the structure of the organism, in the arrangement of its parts.

4.2 Aquinas: The Complex Soul

Aquinas discusses the nature of the human person (the soul) in his "Treatise on Man" (*Summa Theologica,* Part 1, Q 78 - 84). The soul is closely related to the organism. It is a system of biological functions (a system of powers). It is a form that logically precedes the body: the structure of the soul explains the structure of the body. The powers of the soul are regulative functions of the body. For example: the endocrine system regulates behaviors concerned with the 4 Fs: feeding, fleeing, fighting, and mating. These are the powers of the sensitive appetite. That part of the soul corresponds to the regulatory functions of the endocrine system. It is like the software of the endocrine system.

Article 1 of Question 78 divides the soul into three parts which can also be thought of as five powers. The three parts are the traditional Platonic parts: rational soul, the sensitive soul, the vegetative soul. There are five genera of powers of the soul. The powers are the vegetative, the sensitive, the appetitive, the locomotive, and the intellectual. (Q 78; Art. 1). The rational soul is essentially free from the body: "There exists, therefore, an operation of the soul which so far exceeds the corporeal nature that it is not even performed by any corporeal organ; and such is the operation of *the rational soul*." The sensitive and vegetative souls are more closely connected with the body.

The powers of the sensitive and vegetative souls are like programs that regulate bodily operations. Bodily organs perform the operations of those parts of the soul. Article 2 of Question 78 analyzes the vegetative soul. It has three parts: (1) the generative part; (2) the augmentative part and (3) the nutritive part. The generative part regulates the sexual functions; the augmentative part regulates development; the nutritive part regulates metabolism. (Q 78; Art. 2). Article 3 of Question 78 divides the sensitive soul. The sensitive soul has five parts corresponding to the five senses. These are the functions of five systems of sense organs. (Q 78; Art. 3). Question 79 addresses the powers of the intellectual soul. Questions 80 through 81 address the powers of the appetitive soul. Article 2 of Question 80 distinguishes two kinds of appetite: (1) intellectual appetite and (2) sensitive appetite. Article 2 of Question 81 divides the sensitive appetite into two powers: (1) the irascible appetite and (2) the concupiscible appetite. The powers of the sensitive appetite appear to correspond to endocrine system functions (fighting, fleeing, feeding, mating). The irascible appetite deals with the fight or flight functions. The concupiscible appetite deals with feeding and mating. Article 3 of Question 81 discusses the political relations between the soul and the body and the political relations between parts of the soul: the soul rules the body by a despotic power (like a master rules slaves), while the rational soul rules the other parts of the soul by a political power (like a king rules free subjects). Article 2 of Question 82 identifies the will with the intellectual appetite. The remaining articles of Question 82 divide the will in various ways and discuss its functions. The will regulates the motor behavior of the body in various ways.

Divisions & Subdivisions of the Soul			**Part of Body**
intellectual (thinking)			brain
appetitive (desiring)	intellectual appetite (the will)		brain
	sensitive appetite	irascible appetite (fight or flight)	brain endocrine system
		concupiscible appetite (feeding / mating)	brain endocrine system
sensitive (sensation)	interior senses	imagination	brain
		memory	brain
	exterior senses	sight	eyes
		hearing	ears
		touching	skin
		tasting	tongue
		smelling	nose
locomotive (movement)			skeletal – muscular
vegetative	nutritive (energy)		digestive system respiratory system cardiovasculatory system
	augmentative (growth)		DNA
	generative (sex)		reproductive system

4.3 The Soul as a State-Transition Network

One way to describe the form of a machine (like the body) is to use a *state-transition diagram*. A state-transition diagram has circles for states and arrows for transitions. Each arrow is labeled with <input / output>. Figure 1 shows how a single disposition is presented as a state-transition diagram. Figure 2 shows the state-transition diagram the emotional robot.

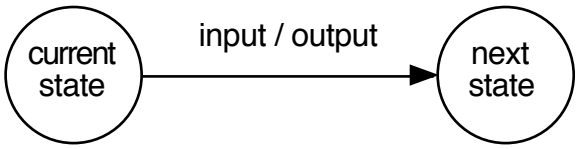

Figure 1. Diagram for a single disposition.

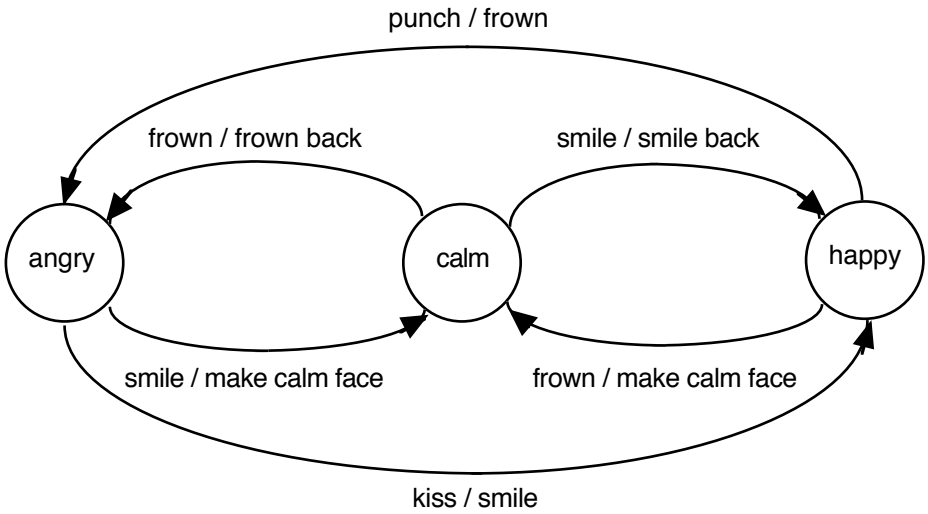

Figure 2. State-transition diagram for an emotional robot.

4.4 Barrow & Tipler: The Aristotelian Soul is a Program

The 20th century scientists Barrow & Tipler explicitly identify the Aristotelian soul with a computer program:

> an intelligent being -- or more generally, any living creature -- is fundamentally a type of computer . . . the really important part of a computer is not the particular hardware, but the program; we may even say that a human being is a program designed to run on particular hardware called a human body, coding its data in very special types of data storage devices called DNA molecules and nerve cells. The essence of a human being is not the body but the program which controls the body; we might even identify the program which controls the body with the

> religious notion of a soul, for both are defined to be non-material entities which are the essence of a human personality. In fact, defining the soul to be a type of program has much in common with Aristotle and Aquinas' definition of the soul as 'the form of activity of the body'. A living human being is a representation of a definite program rather than the program itself. In principle, the program corresponding to a human being could be stored in many different forms. (Barrow & Tipler, 1986: 659)

5. Conclusion

We reviewed three theories of the soul. The astral body theory disagrees with science. It is false. The Cartesian theory disagrees with science on every point. Cartesian mind-body dualism is false. The Aristotelian theory of the soul as the form of the body is consistent with science. Hence the soul is the form of the body. As Aquinas argues, the soul has a part-whole structure. It is functionally divisible – the soul is the community of functions of the body. The parts of the soul are the functions of the parts of the body. The best way to think of the soul is to think of it in computational terms: the soul is to the body as a program is to a computer. The body runs a program; the body-program is a community of organ-programs; the organ-programs are communities of cell-programs.

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