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You, your neurons, and free will: Concerns about reductionism and the popularization of cognitive science

by Karl G.D. Bailey

Along with a longstanding Adventist commitment to the development of the whole person, as well as to the development of character through effortful practice, the Adventist position on human nature has much to offer cognitive science and the public at large, especially given the current state of popular cognitive science.

Imagine yourself lying on your back in a narrow tube. Your head is comfortably restrained, your ears plugged against the incessant banging of the machinery surrounding you. You are in a magnetic resonance imaging machine, and your brain is being scanned. Your task is to lie quietly and watch a stream of letters that, one after another, appear on a screen suspended before your eyes. Every half second, a new letter appears. You have been instructed that, at a time of your choosing, you should freely decide to press one of two buttons that lie beneath your left and right index fingers, and that you should then do so immediately. After about 20 seconds, if you are a typical research subject, you make that decision, and freely press a button.

As soon as you have pressed the button, the screen in front of you changes, and you see the last three letters that appeared before you pressed the button. This is no surprise — the

researchers told you that this would happen, and that you should indicate which of the letters was being displayed when you decided what button to press. Most of the time, you indicate that you decided what button to press about a second before you carried out your freely-chosen action. The task is simple; the choices are easy. The experimenters thank you at the end for your contribution of time to the study of free choice.

But all is not well, at least where your free choices are concerned. The researchers have been analyzing your data¹, and they have discovered that they are able to predict which button you will press by examining local changes in blood flow seven seconds *before* the button press. The researchers can also predict when you will press the button based on local increases in blood flow about five seconds before you press the button. And so, seconds before you reported your decision, there were signals in

your brain that indicated what and when you would make that decision. The implication: your brain decided what you would do long before any conscious urge.

This is not the only study to show this. An experiment conducted by Benjamin Libet and his colleagues in the 1980s² suggested that a brain wave thought to be a precursor of action (the readiness potential) preceded a hand movement by as much as a second, while estimates of the urge to act only preceded the hand movement by about half a second. In fact, over the last 30 years, the basic patterns of the Libet experiment have been replicated a number of times.³ And so it is that neuroscientists, cognitive scientists, and philosophers are settling on the conclusion — even dogma⁴ — that free will and consciousness are illusions.

This conclusion flies in the face of what most people believe about themselves. An illusory free will calls

into question the intents of education, of democracy, of law, of religious belief, and of a Christ who began His ministry with a call to repent — to literally rethink your thinking. When presented with the arguments for the illusion of the will under laboratory conditions, moral decision-making suffers,⁵ raising the possibility that the perceived truth about the illusion of free will threatens society itself. And yet this view of conscious free will as an illusion is being popularized on bestseller lists,⁶ in national newspapers,⁷ and in highly-respected scientific journals.⁸ All is, indeed, not well.

The speed at which popular cognitive science⁹ has arrived at the conclusion that free will must be an illusion is troubling. While the problem of free choice has often been discussed with respect to determinism (the claim that all events have prior causes),¹⁰ I will be examining the relationship between the claims of popular cognitive science and reductionism.

Reducing the mind to nothing (but neurons)

Reductionism is the view that phenomena at a given level of analysis can be explained in their entirety by phenomena at an underlying level of analysis. In this case, mental experiences (psychological phenomena) are being reduced to the firing of neurons (biological phenomena). Despite — or perhaps because of — the simplicity of this idea, reductionism is part and parcel of the claim that free choice is an illusion. If choices can be reduced to nothing but neural activity in a particular environmental context, and the neural activity and environmental context can be measured, then all future decisions for a person can be known. Of course, this assumes a relatively simple view of reality, where all causation is from simpler to more complex events and phenomena, but the explanation, in its simplicity, is intuitive. Indeed, although there is little evidence that reductionism results

in the best explanations in science,¹¹ reductionist thinking is being increasingly applied to the question of what it means to be human. For example, men and women have been reduced to purported differences in brain structure¹² (the corpus callosum is often blamed), even after those differences have been shown to be an artifact of publication bias and misinterpretation of single studies by talk-show hosts.¹³ Love, in all its many splended forms, has been reduced to blood-level concentrations of neurotransmitters and hormones,¹⁴ glossing over other, more-troubling studies that implicate the same chemicals in envy, gloating, and in-group bias.¹⁵ Such reductionism should be of great concern to Seventh-day Adventist Christians, because one of our core beliefs about human nature is that human beings are an indivisible integration of mind, body, and spirit — without any one of these, the human self cannot exist¹⁶ (this is known as holism). Indeed, unlike the majority of Christians,¹⁷ Adventists are (or should be) materialists — we do not appeal to a dualism of body and soul in this life, after death, or in the life to come. In this, Adventists are consistent with modern cognitive science. But, unlike increasingly-common popularizations of cognitive science in the press, popular culture, and even scientists' public comments, Adventists cannot condone the reduction of the human person to “nothing but a pack of neurons.”¹⁸

These concerns are not new. In 1893, Ellen White preached a sermon¹⁹ on the dangers of popular phrenology — the belief that the mind could be reduced to the structure of the brain and thereby read from bumps on the head — in which she spoke forcefully against popularizations of the cognitive science and psychology of her time (to wit, popular phrenology). In her sermon, she told the story of a Brother Butler, who was convinced by a phrenologist that he lacked the brain area for faith and thus was a hope-

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less case. When Brother Butler began to preach the gospel at White's (and the Holy Spirit's) insistence, he found that the hollow in his head filled in. (It was likely never there — modern attempts to replicate phrenological readings have shown that the reading was a function of the phrenologist's intentions and expectations.²⁰) White concludes that phrenology offers no hope for change — but God does.

It is worth noting that the popular phrenology of Ellen White's day provided the language that everyone used to talk about the mind — we still talk about people needing to have their heads examined, or about having hollow heads, both echoes of our phrenological past — and the language of popular cognitive science plays a similar role today. Indeed, the current state of popular brain science in self-help and purported “brain-based” books is no better than the popular phrenology that Ellen White spoke against in the late 19th century. Scott Lilienfeld, a psychologist who has studied popular understandings of psychology and neuroscience, reports that only 5 percent of popularized works are based on any empirical study at all.²¹ Indeed, most “brain-based” learning strategies and products are based on what Sashank Varma, Bruce McCandliss, and Daniel Schwartz refer to bluntly as “neuromyth”²² in their comprehensive 2008 review of the relationship between cognitive neuroscience and “brain-based” education; these myths have become pervasive in the 21st century.²³

Neuromyths and well-lit brains

Neuromyths are created through what Eric Racine, Ofek Bar-Ilan, and Judy Illes refer to as neurorealism and neuroessentialism.²⁴ Neurorealism occurs when brain imaging is used in order to decide what is real — it reduces the mind (and spirit) onto the brain, describes people as nothing but their brain processes, and interprets correlations between brain activity

and certain tasks as evidence for normative human behaviors. An example of neurorealism would be a description of love as nothing but chemicals in the brain.²⁵ In neurorealism, any aspect of mental life that cannot be (or has not been) imaged does not exist. Neuroessentialism involves making the brain into the self; again, the self is reduced into the brain, this time in order to describe people as they supposedly really are. Because neuroscience involves trying to understand the dysfunction of the brain as well as the function of the brain, this often leads to describing normal brain function using the language of pathology and illness — as when love is described as nothing but an addiction. Neurorealism and neuroessentialism are especially incompatible with an Adventist approach to human nature. To begin with, holism and reductionism are incompatible; moreover, if we believe in restoring human beings to the image of God, we cannot describe normal brain functions primarily in terms of pathology (if God is love, can love be an addiction?). Neuromyths are also a problem, because they disrupt our interactions with individuals and communities. If the poor and prisoners can be reduced to dysfunctional “packs of neurons,” why clothe or visit them; if our sins were predetermined by our brains, why try to repent or forgive?

So what can we conclude from this? Should Adventists shun anything to do with the popularization of cognitive science? I would suggest that we take Ellen White's advice — given in 1884 — seriously: “Be guarded on every hand.”²⁶ Adventists must think critically about the modern science of the mind. This will not be an easy task. Separate studies by Deena Skolnick Weisberg and her colleagues,²⁷ and by David McCabe and Alan Castel²⁸ demonstrate that when unsupported claims about the mind are presented in the context of pictures or even mere mention of a “brain

lighting up,”²⁹ people, even those with some training in neuroscience, accept those claims uncritically — even if they would otherwise be very critical of the same statements without the brain-based content.

The only people to critique appropriately “brain-based” claims in the Weisberg study were professional neuroscientists with extensive experience in thinking critically about the design and interpretation of brain-imaging studies. It was not sufficient to have merely taken classes in neuroscience; an interest in and familiarity with neuroscience made readers more apt, if anything, to accept poor arguments in the face of the mention of the brain. While these studies have recently been challenged,³⁰ they are consistent with longstanding evidence that people tend to accept empty statements in place of explanations as long as they have the right form — that is, unless habits of mindful, critical thinking are present.³¹ Training such critical thinking skills requires time, practice, and effort;³² nevertheless, such training is at the core of what we desire when we talk about the integration of faith and learning.³³

Along with a longstanding Adventist commitment to the development of the whole person, as well as to the development of character through effortful practice, the Adventist position on human nature has much to offer cognitive science and the public at large, especially given the current state of popular cognitive science. As we integrate a position that finds balance between eliminating free will and over-committing to self-sufficiency, we can provide a model that makes sense of the wealth of data about human nature discovered in the last few decades. In so doing, we can promote a view of human persons that neither excessively excuses nor blames individuals through reductionism. Several lines of evidence pointing toward the role of effort in human development,³⁴ the efficacy of prayer

for changing religious experience,³⁵ the role of practicing self-control in preparation for future resilience,³⁶ and, in my lab, work showing the importance of internalization of Sabbath-keeping for human well-being all suggest that a wholistic, developmental approach to human nature — such as that held by the Seventh-day Adventist Church — holds more promise for the task of making humans whole than the illusion of reductionism.

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