

[[The following is a collection of notes and handouts from two or three different lectures given in 2000, some repetition, not organized into publishable form.]]

The Brain and the Soul

Some things we know about the human brain:

overhead cartoon: brain function / summer movie season

overhead cartoon Calvin&Hobbes, my personality depends on proper functioning of my body

- The brain is extremely complex, with a huge capacity for storing and processing information.
- Nerve cells signal each other chemically and use electrical signals (electric fields and the motion of electrically charged ions) to process and transmit information.
- Every mental event (perception, memory storage, memory retrieval, emotional reaction, problem solving, decision making, action planning) seems to have a physical correlate in electrical and chemical changes in the brain.
- Mental events can be induced by external electrical (or chemical) stimulation.
- Different parts of the brain are specialized for particular tasks.
- Brain damage (due to disease or injury) can cause loss of function and/or changes in behavior and personality.
- Every part of the brain studied so far seems to follow natural laws. Scientists have not found evidence for non-physical, non-material forces acting the brain.
- We still only understand a tiny fraction of the brain's functioning. The "big questions" -- such as the source of our conscious self-awareness -- are still wide open.

**** ARE RELIGIOUS EXPERIENCES "NOTHING BUT" BRAIN ACTIVITY?**

[[overhead of science "proves" religion is just brain activity]]

- Let's look at this one particular scientific observation:
- Every mental event (perception, memory storage, memory retrieval, emotional reaction, problem solving, decision making, action planning) seems to have a physical correlate in electrical and chemical changes in the brain.

- Some other claims you might hear based on neuroscience go like this: Every subjective experience we have, including religious experiences, are correlated with some specific activity in our brains. This PROVES that religious experiences are "nothing but" brain activity.

- We talked about the fallacy of "nothing buttery" several weeks ago. But let's spend a little more time with this argument, because it does raise some interesting issues.

Scientists at UC San Diego reported about a year and a half ago that one part of the human brain is especially active during intense religious experiences. ((1 V.S. Ramachandran et. al., "Neural

Basis of Religious Experience," 1997 Society for Neuroscience Conference Abstracts, p.1316.)) There are a variety of techniques used to study which parts of our brains are specialized for different tasks -- techniques like electroencephalography and functional MRI. These techniques are pretty widely used by researchers, and it is hardly considered news anymore when scientists locate specific brain regions that are especially active when we read words, or solve equations, or listen to music. Finding a "religion region" in the brain, however, caught the media's attention.

Experiments were performed on three patients suffering from a type of temporal lobe epilepsy in which seizures are often accompanied by intense mystical or religious experiences. These patients were sometimes preoccupied with mystical thoughts between seizures as well. The scientists found that increased activity in a particular brain circuit was associated with a heightened involuntary response to religious symbols and words.

It really shouldn't surprise us that our brains show specific activity during religious experiences. The Christian worldview doesn't teach that our relationship to God occurs entirely within immaterial souls, of which our bodies are mere vessels. Rather, our whole being --- soul and body, mind and brain --- should respond to God. Nor do our brains have a singular "God module" as the site of all religious activity. Our relationship to God is personal and complex, not limited to just one kind of experience. No doubt many parts of our brain participate in many kinds of religious experiences. The temporal lobe, for example, is known to be important for intense emotional experiences. We should expect it to participate in intense religious experiences. It is certainly intriguing that a particular sub-region is rather specialized, at least in these patients, for religious imagery.

This experiment did not prove that God exists and communicates with us. Neither did it prove that God doesn't exist, and that religious experiences are reducible to nothing but brain chemistry. That's a simple logical fallacy. Our experience of sunlight causes electrical and chemical changes in our brains, but it does not follow that the sun is reducible to nothing but brain chemistry. The same is true of religious experiences.

So that deals with the "nothing but" assertion. However, the fact that we can begin to find brain activity correlates for religious experiences does raise some other interesting questions.

God's activity in our brains.

--Does this mean that when God speaks to us personally, when the Holy Spirit brings about a change in our mental lives, that God is influencing our brains?

--Why not?

--We do it to each other all the time. When we communicate with each other, we cause changes in each others' brains.

--God is sovereign over all of creation, including our brains. God can work through natural laws, "random" events, and God can perform miracles.

The brain and religious responses.

These patients, due to a brain abnormality, had strengthened involuntary responses to religious words and symbols. What does that imply for all of us, and our responses to God? Well, it may be true that much of our initial, emotional response to any situation, religious or otherwise, is strongly influenced by factors outside our conscious control. Our genes and childhood experiences have shaped our personalities. Fortunately, as Christian theology teaches, God's gift of saving grace does NOT depend upon how our brain is wired. Our personalities do not merit saving grace; our actions do not earn it. We are commanded to live lives of faithful obedience, but our faith in God is not measured by the strength of our emotional responses; nor is our obedience to God determined solely by our personalities. The predispositions which are hard-wired into our brains may hinder or help us to live obediently. By God's grace, through a life of faith, those predispositions will increasingly conform to God's will.

The brain and religious experiences

During seizures, these patients had what they described as religious experiences. Was God really communicating during these seizures? Perhaps, but perhaps not. Do we, also, sometimes experience "neurological events" in which we incorrectly perceive God's personal communication? Perhaps we sometimes do. As Elijah the prophet learned before he heard the gentle whisper, God does not directly speak to us in every windstorm, earthquake, or fire --- appropriate as those events might seem (I Kings 19:11-13). God is in control of every event, but God does not always communicate personally in the way we expect. Discernment is an important part of biblical faith.

Determinism and choice

We'll talk more about this on Monday.

overhead of determinism proves no free choice

--The scientific claim of determinism is premature.

--Donald MacKay's response: Brains (nerve cells) obey physical laws, brains do not choose and decide. *People* choose and decide. The physical and the mental are different and *complementary levels of description*. The physical *embodies* the mental, analogous to how computer hardware embodies software. It is not at all clear that predictability on the physical level and choice on the mental level are mutually incompatible descriptions. "Lack of choice" means *inevitability for the choosing person* (on the mental level) rather than predictability to an outside observer (on the physical level). If the different levels of description are seen as incompatible, then the mental level of description should take priority, since "knowledge" (including knowledge of science and natural laws) is a conscious, *mental* activity.

--[[[Donald MacKay's arguments, including logical indeterminacy of claims about the cognitive mechanism.]]]

--John Polkinghorne's response: A system as complex as the brain is not entirely determinate, due to quantum mechanics and classical "chaos" effects. Given a brain's physical state in the present, there are *many* possible future brain states consistent with physical law. This allows

higher-level "organizing principles" to exert "top-down" influence in a meaningful way which does not violate physical laws.

**** WHAT ABOUT THE "SOUL"?**

But what about the "soul"? Some people would argue this way: Brain activity can account for everything we think of our "mind" or "soul" doing. That PROVES that there is no soul, no life after death.

--[[overhead of science "proves" no soul]]

Well, of course it's still far too soon to say that science has proved that brain activity can account for EVERYTHING our "mind" does. But for now let's leave that question aside. Let's suppose that every mental event, which we experience subjectively, has a physical basis in brain activity. Is this a problem for the Christian worldview? I don't think so.

As a neuroscientist, I study how nerve cells use chemical and electrical signals to process and transmit information. There's a profound concept lurking in that sentence. Cells are wet, squishy, biological things. "Information" is usually thought of as an abstract, mathematical, non-physical thing. Yet the function of nerve cells is to process and transmit information. Nerve cells in your eyes, ears, hands, and feet encode information about the environment, send it to the brain, where the information gets split up and sent to different parts of the brain, processed by networks of connections, recombined, split up, and processed some more, and finally the brain might permanently store some version of that information, and it might send a signal telling your body to do something in response to the information. But where, in all of this processing and transmitting and storage of information, is the information's *recipient*? Where is the "me" inside my brain?

This question points to another age-old debate: Is human nature fundamentally dualist (immaterial soul animating a material body) or monist (all of one united nature)? For centuries, in Western culture at least, most people believed the dualist picture. Some ancient Greek philosophers and some medieval scholars chose dualism. They hypothesized a very long list of mental activities which they believed must happen in our immaterial "souls," as separate from our bodies.

Modern neuroscience is finding that those same functions appear to be done by our brains after all, so it looks like modern neuroscience favor monism.

What about the Bible? Most of the Old Testament uses a monistic, unified picture of human nature. A lot of passage in the New Testament -- using the Greek language and using Greek ideas to express theological teachings -- uses dualist pictures of human nature.

But dualism and monism can EACH be cast in ways which are compatible, and incompatible, with the biblical picture of human nature. The ancient Greek dualist picture, which is not compatible with biblical teachings, said that the soul is intrinsically eternal, trapped in a

perishable body. A Christian version of dualism --- consistent with biblical teachings --- instead would insist that our souls are created things (not existing from eternity), and our bodies are part of the good creation (not a trap), and in the resurrection our souls will be united with new bodies. A modern, materialist version of monism, not compatible with biblical teachings, asserts that the "soul" is just an idea we made up but should now discard; there is no life after the death of our bodies. A Christian version of monism could be the following: God created our remarkable brains in such a way that its functioning is what allows us to do "soul" activities. Our brain's functioning allows us to be intelligent and self-aware. God can relate to us personally and hold us accountable for our actions. Upon death, our consciousness either "soul sleeps" or is given some temporary form. Our transformed bodies in the resurrection have some continuity with our old. (Partial analogy: the way a computer program can be transferred to run on a new machine.)

--In either the dualist or monist picture of human nature, some qualities of human nature typically assigned to the "soul" could be embodied in brain activity. (*e.g.* verbal ability, tool-making ability, complex inter-personal interactions, perhaps even self-awareness and empathy.) Other "soul" qualities require God's supernatural activity. (*e.g.* the establishment of a personal relationship between creature and Creator; moral accountability; life after death.)

Modern neuroscience is pointing towards monism, towards the hypothesis that the mind is what the brain does. But raises a difficult question. How could the functioning of our brains give rise to our subjective, mental, self-aware experiences? I don't know the answer to that question. Some neuroscientists like to speculate on answers to that question, but we're a long off from having a scientific answer, if a scientific answer is even possible. But that question isn't really a problem for the Christian worldview.

Because so much Christian theology has been couched in dualistic terms over the centuries, the continued scientific study of the brain --- which seems to favor the monist picture --- may seem to some as an attack on our Christian doctrines. My main point here is that this need not be so. Biblical revelation does not clearly spell out whether monism or dualism is the best picture of human nature. God's revelation does clearly teach that our continued existence, BOTH in this life now AND in life after death, depends upon God's constant sustaining grace. That is surely true no matter how we define the "soul" or imagine its relationship to the body. God's revelation also clearly teaches that our bodies and souls will continue after death. We will be resurrected into new forms. And what we do in this life has eternal consequences. Those are the central points behind the idea of the "soul," whether you picture it in monist or dualist form. In either picture, despite our limited understanding of how it might be accomplished, we can surely trust God's promises.

The Brain and the Soul

Some things we know about the human brain:

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- We still only understand a tiny fraction of the brain's functioning. The "big questions" -- such as the source of our conscious self-awareness -- are still wide open.

Claim: Religious experiences have correlates in specific brain activity ==>
"proves" that religious experiences are "nothing but" brain activity.

- This is "nothing but-tery." Our experience of sunlight causes electrical and chemical changes in our brains, but it does not follow that the sun is reducible to nothing but brain chemistry. The same is true of religious experiences.
- The Christian worldview doesn't teach that our relationship to God occurs entirely within immaterial souls, of which our bodies are mere vessels. Rather, our whole being -- body and soul, mind and brain -- should respond to God. No doubt many parts of our brain participate in many kinds of religious experiences.
- God is sovereign over all of creation, including our brains. God can work through natural laws, "random" events, and God can perform miracles.
- Much of our initial, emotional response to any situation (religious or otherwise) is strongly influenced by factors outside our conscious control. Genes and childhood experiences have shaped our personalities. But our faith in God and obedience to God is not measured by the strength of our emotional responses.
- God is in control of every event, but God does not always communicate personally in the ways we expect. We must use wise discernment in evaluating our religious experiences.

Claim: The brain obeys deterministic physical laws ==>
"proves" free choice is an illusion.

- The scientific claim of determinism is premature.
- Donald MacKay's response: Brains (nerve cells) obey physical laws, brains do not choose and decide. *People* choose and decide. The physical and the mental are different and *complementary levels of description*. The physical *embodies* the mental, analogous to how computer hardware embodies software. It is not at all clear that predictability on the physical level and choice on the mental level are mutually incompatible descriptions. "Lack of choice" means *inevitability for the choosing person* (on the mental level) rather than predictability to an outside observer (on the physical level). If the different levels of description are seen as incompatible, then the mental level of description should take priority, since "knowledge" (including knowledge of science and natural laws) is a conscious, *mental* activity.

--John Polkinghorne's response: A system as complex as the brain is not entirely determinate, due to quantum mechanics and classical "chaos" effects. Given a brain's physical state in the present, there are *many* possible future brain states consistent with physical law. This allows higher-level "organizing principles" to exert "top-down" influence in a meaningful way which does not violate physical laws.

**Claim: Brain activity can account for everything we think our "mind" is doing ==>
"proves" that there is no soul and no life after death.**

-- The scientific claim is premature.

--Christian beliefs about the soul do not rely on a "ghost in the machine" picture of its activity.

Dualist view of human nature: we have immaterial souls united with a material body.

Monist view of human nature: we are all of a single unified nature.

--Most ancient and medieval philosophers and theologians favored dualism. Modern neuroscience, as it learns more about brain activity correlates for mental activities, seems to be favoring monism.

--Both monism and dualism can be pictured in ways compatible, and incompatible, with Christian theology. Biblical revelation does not clearly spell out which is the better picture of human nature.

--*Christian dualism* would say that our souls are created (not existing from eternity). Our material bodies are part of good creation (not a "trap" for the soul). In the resurrection from death, our immaterial souls are united with a new suitable body.

--*Christian monism* would say that God created our remarkable brains such that its functioning allows us to be intelligent, self-aware beings to whom God can relate personally and whom God can hold accountable. In the resurrection from death, our bodies will be new and transformed, but with some appropriate continuity of "self" with our old bodies.

--In either the dualist or monist picture of human nature, some qualities of human nature traditionally assigned to the "soul" could be embodied in brain activity. (*e.g.* verbal ability, tool-making ability, complex inter-personal interactions, perhaps even self-awareness and empathy.)

In either picture, other "soul" qualities require God's supernatural activity. (*e.g.* the establishment of a personal relationship between creature and Creator; moral accountability; life after death.)

--Our continued existence, *both* in this life *and* in life after death, depends upon God's constant sustaining grace. However we picture the body and the soul, we ultimately rely on God's grace and the promise of the resurrection.

Some non-technical readings about the brain and consciousness:

"The Problem of Consciousness" by Francis Crick and Christof Koch, in *Scientific American* 1997 special issue "Mysteries of the Mind" p.19-26.

"The Puzzle of Conscious Experience" by David Chalmers. *ibid* p.30-37.