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**What is the Relationship Between Mind, Brain, Consciousness, and Soul?**

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**Outline**

Summarizes major sections.

**Overview**

The relationship between mind, brain, consciousness, and the soul may not be the first thing one thinks of with respect to science and religion issues but it is actually one of the oldest and, because of its intensely personal nature, also one of the most relevant. This is particularly true given the constant production of new scientific insights from those sciences devoted to a better understanding of brain and behavior. This study is therefore geared to help participants think about mind, brain, consciousness, the soul, and personal freedom from the perspectives of both modern science and Christian theology. The assumption is that enhanced understanding in this area is important to improved conceptions of God, the Bible, self, and others.

*What are we talking about?*

Slide suggests the task at hand—to juggle perceptions of these entities and their relationships to one another.

*Exploring possible relationships between mind, brain, consciousness, and soul*

This slide depicts several possible relationships between mind, brain, consciousness, and soul. In his book *Dimensions of Faith* (forthcoming), Steve Donaldson suggests using Venn diagrams such as these as a way to get individuals to think about their preconceived (or possibly poorly conceived) notions of the interrelationships between mind, brain, consciousness, and soul. Prior to showing this slide you may want to ask participants to draw their own versions as a way to stimulate thinking and engagement.

*Some actual responses…*

These responses gathered during an informal survey of some college students shows the diversity of thinking in this area (even in a small group). Consider some general conclusions that might be drawn from the results of this activity: placing mind, consciousness, and soul (regardless of arrangement) inside an all-encompassing circle for brain may indicate that the person takes a strong physicalist view (i.e., the other three are merely macro-phenomena of the brain). On the other hand, placing mind, brain, and consciousness inside an all-encompassing circle for soul could indicate that the person takes a strong non-materialist view (perhaps seeing the brain as a temporary mechanism through which the soul operates). However, it is important to keep in mind that some people may distinguish between real physical models and metaphorical models (i.e. a Venn diagram where soul subsumes brain might be taken metaphorically to suggest that the soul is more significant than the brain or physically to suggest that the brain is but a temporary repository of the soul, etc.). In any case, the point here is not to attempt to reconcile the various responses at this time. Note: it is interesting to compare responses from the same individual both before and after considering the issues covered under this general topic.

**Who Are You?**

*Who are you?* (2 slides)

These slides are oriented to help participants think about the source of their own identities. You may want to replace the photo with someone your audience knows. The key point is that we identify people by their physical presence as apprehended by our own sensory apparatus (e.g., sight, sound, smell, touch), yet the real essence of a person seems to be related to a number of other factors (some of which are less tangible) including: accomplishments, memories, relationships, hopes, fears, dreams, plans, thoughts, possibilities, and expectations. Where are these items stored and processed?

*What makes you, YOU?*

We can lose substantial parts of our bodies without losing our identities but that doesn’t include our brains (or key parts of them). Other illustrations of essence include the Cheshire Cat’s grin in Lewis Carroll’s *Alice’s Adventures in Wonderland* and the Black Knight in the movie *Monty Python and the Holy Grail*.

*What can a bodiless individual experience?*

It is one thing to talk about an immaterial existence and quite another to try to imagine one. Even with a mostly non-functional body, Stephen Hawking (about as close as one could come to a bodiless existence as we can imagine it; see photo) still relies on an embodied brain. Key: a body can change substantially (e.g., via weight loss or gain, trauma) and we call it the same person but if the brain changes we might have doubts.

As far as an answer to the question about what a bodiless individual can experience, the scientific answer is, “nothing.” This point has been made forcefully by individuals such as Francis Crick (co-discoverer of the structure of DNA) in his book *The Astonishing Hypothesis: The Scientific Search for the Soul* (1994, Simon & Schuster: New York) but is not new. As Crick notes in the introduction to his book (p. 1), Hippocrates noted (several hundred years before the time of Christ) that “Men ought to know that from nothing else but the brain come joys, delights, laughter and sports, and sorrows, griefs, despondency and lamentations.” None of this is to suggest that one would want to obtain his/her theology from Crick…

Note: Although we find it difficult to envision a bodiless existence, that is precisely what Christians traditionally attribute to God (e.g., based on Biblical passages such as “God is Spirit” John 4:14).

*The “Mind-Body Problem”*

The “mind-body problem” is most often associated with Rene Descartes but has a long and varied history (going back at least to Plato). The central issue is how the activity of the mind arises from the brain. The idea that the mind needs a body in which to exist and properly function is called “embodiment.” Thus we speak of embodied cognition. Note: Descartes is probably best known for his often quoted, “I think, therefore I am” (“cogito ergo sum” in Latin).

*Who’s watching?*

Descartes’ dualistic approach has led to explanatory concerns, captured in the idea of the so-called “Cartesian Theater”—when you observe something, for instance, what is it in your brain that is actually making the observation? Clearly there is not a little you (homunculus) inside your head doing the observing because that would lead to an infinite regress (i.e., what is inside its head?).

**What Do We Know About the Brain?**

What’s behind that handsome (or pretty) face?

*Old ways of thinking about the brain*

Phrenology (circa 1800) was a postulated (but discredited) way of associating regions of the brain (based on irregularities in brain size supposedly manifested in detectable bumps on the scalp) with behavioral characteristics. The map in the slide shows the location of various regions of interest to the phrenologist (and his subject). We now know better.

*New ways to think about the brain*

As it turns out, Gall was not entirely wrong. Although he was mistaken in the way he attempted to categorize brain regions, the idea that certain parts of the brain are involved with particular behaviors and processes is central to modern understanding. The color-coded maps of the brain show a fairly well accepted layout of brain regions (called Brodmann’s Areas) with respect to function. However, whereas Gall postulated regions for characteristics such as love, self-esteem, cautiousness, and hope, one finds a different type of classification of regions in the Brodmann scheme (e.g., vision, touch, muscle control, planning, emotional response, etc. Examples of a few specific regions are shown in the slide.

*What brains do*

The importance of the brain can be seen via a number of different (but related) activities. Some of these are identified and arranged in a loose (and debatable) hierarchy (from basic to complex) as shown in the slide and described briefly below:

Sensory processing

receives and coordinates limited impressions from the external world

Muscle control

enables muscles articulation including locomotion and speech

Memory

stores and retrieves sensory inputs and the products of thought

Categorization

groups items on the basis of common features, enabling generalization

Emotion

relates feelings to events and thoughts; provides motivation for behavior

Consciousness

awareness of personal existence; feeling

Symbolic processing

represents real and imagined items via symbols

Reasoning

the ability to think, comprehend, and make sophisticated predictions

Language

makes high-level communication possible

In general, we note a decrease in the number of animal species that show high levels of proficiency with respect to each feature as we move down the list. For example, all animals have some form of sensory processing capability but only humans show a fully developed language ability. (In fact, even computers can exhibit quite impressive abilities with regard to the first several features.) There is also a range of abilities across species boundaries for each feature (e.g., compare the sensory processing abilities of an ant and an ape). That should not, however, be taken to suggest that some of the items are less important than others. Helen Keller, for instance, is famous because she overcame some severe sensory processing limitations to lead a productive life but had she had no sensory processing abilities, that would have been impossible. In any case, it would be a mistake to infer too great a segregation of function based on this list as there are substantial overlaps between many of the features shown here.

*How brains work* (3 slides)

The human brain is composed of a vast network of some 1011 interconnected neurons with 1014-1015 connections. Everything we know about brains suggests that sensory sensations, thoughts, plans, and emotions are all the product of the transmission of signals between the neurons that compose them.

Neurons are a special type of cell that enables a form of electrical or electro-chemical signaling in the millisecond range. Changes to neuron parameters enable the storage of memories and form the foundation of the brain’s ability to adapt. There are a number of types of neurons but a typical neuron consists of a cell body having a number of dendrites (which act like tiny receivers for the signals from other neurons) and an axon (which serves as a transmitter for sending signals to other neurons). The actual process of signaling between neurons is enabled (in the typical case) by the passage of ions (charged molecules) between cells and the fluid that surrounds them.

If the signals a neuron receives are sufficiently strong, the neuron experiences a dramatic rise in its own voltage level (based on the rapid influx of intercellular ions) that is propagated down the axon as a signal to other neurons to which the “firing” neuron is connected. The signal is called an “action potential.” The neuron then experiences a short recovery period, after which it is ready to fire again.

*How do we know about the brain?* (5 slides)

Cognitive Science is an umbrella term for an interdisciplinary approach to understanding mind, brain, and consciousness using the tools from a broad range of scientific fields including (among others) neuroscience, psychology, linguistics, artificial intelligence, and philosophy. We can think of these disciplines in a rough hierarchical fashion as follows: Neuroscientists provide fundamental observations and theory pertaining to the actual structure and operation of the brain; psychologists observe and categorize higher-level behaviors; together they attempt to correlate one with the other; linguists focus on the faculty of language and are particularly interested in its relevance as a distinguishing feature of human cognition; artificial intelligence provides models to correspond to theories of brain organization and function but also search for underlying fundamental principles of intelligence and consciousness; philosophers help keep the big picture before all of the other researchers with respect to integration and meaning of the work being done. This is clearly an oversimplified but, nevertheless useful description of these areas. We can note that many questions pertaining to the soul, freewill, etc. have been around for a very long time but insights from the cognitive sciences can now help frame some of those questions in a new way.

In addition to drawing inferences about the brain from observations of high-level behavior, scientists employ a variety of techniques to learn about its physical structure and operation. Single-cell recording involves measuring the activity of a neuron when it or neurons from which it receives activation are subjected to a stimulus. (A variant permits recording from several cells at once.) Positron emission tomography (PET) and functional magnetic resonance (fMRI) imaging make it possible to observe which portions of the brain are involved in certain types of cognitive tasks. These methods are quite useful but their spatial and/or temporal resolutions are currently rather low. Significant knowledge of the brain has also been gained by correlating the effects of brain lesions (due to stroke or other head trauma) with the actual damaged region (determined via imaging techniques such as MRI or via autopsy). Animal studies have also played a large role in the growing understanding of brain function.

***Big Question: Mind, Brain, Consciousness, and Soul***

Insights into the physical nature of the brain including its controlling influence on behavior, consciousness, and emotion raise a number of deep questions with respect to religious views of personhood. Several of these are considered next.

**What is Consciousness?**

Don’t expect the dictionary to be of much help with this question! Although all of us have an intuitive grasp of the concept—for example, everyone has experience drifting in and out of consciousness (perhaps in the wake of a big meal) or of missing something that later seems so obvious (cf. the literature on inattentional/perceptual blindness)—scientists have found it difficult give a concise and mutually agreeable definition. However, there are some characteristics that are generally agreed to be components of consciousness.

*What do you see?* (2 slides)

One of the characteristics of consciousness is our sense of awareness of the world around us. One way to think about the interrelationship between some of the features identified in the previous slide and to pursue more fully the question “What is consciousness?” is to get participants to describe what they see in the photograph on this slide. After the obvious answers (e.g., “a mountain,” “a lake,” “some trees”), ask what they *really* see. Depending on a person’s experiences, hobbies, etc. people will potentially view the content of this photograph from a variety of perspectives.

|  |  |
| --- | --- |
| **Person** | **Sees** |
| climber | a mountain to be climbed |
| skier | snow to be skied |
| artist | a scene to be painted |
| photographer | a photo to hang on office wall |
| prospector | potential mineral deposits |
| geologist | history of the earth |
| settler | obstacle impeding progress |
| corps of engineers | obstacle to be removed |
| fisherman | supper (may not even see mountains) |
| pilot | low visibility threat |
| ranger | place to preserve |

We can think if this as a type of consciousness test (i.e. Of what are you consciousness?) but consciousness seems to be more than a basic (or even a deep) awareness of a sensory impression. Consider, for example, how sensory processing, memory, categorization, symbolic processing, emotion, reasoning, and language (i.e., things brains do as identified on a previous slide) are all involved in answering the question, “What do you see?” We would like to answer the question, “What is consciousness?” but it turns out to be very difficult to give a technically satisfactory answer, despite the fact that all of us have an intuitive grasp of the concept. What we do know is that there is an integral relationship between mental faculties and the physical substrate—in other words that one’s conscious experience (whatever form it takes) is the product of the brain and that consciousness is a limited commodity.

*Self-awareness*

It is not only a general awareness but self-awareness in particular that is recognized as a hallmark of human consciousness. Beyond infancy, normal humans easily recognize themselves in mirrors, acknowledge body parts as their own, etc.

This raises interesting questions about the range of potential conscious experiences of non-human species—questions that can help us think about our own consciousness. Scientists, for example, have tested a number of species for self-awareness using something called the “mirror test.” In this experiment a splotch of odorless paint is placed on a sleeping or anesthetized animal in a location on its body where it cannot be directly seen. When the animal is awakened, it is positioned in front of a mirror. Chimpanzees, some gorillas, and dolphins (among other species) notice the paint but most species apparently do not (including dogs, monkeys, and human infants). Interestingly, Magpies (a type of bird) pass the mirror test. The efficacy of the test as a true measure of self-awareness has been questioned but, whatever one’s feelings about it, it is hard to ignore the implication that humans (and a few other species) may share some elements of consciousness that are not universal in the animal kingdom.

One seemingly obvious conclusion is that there are levels of consciousness between species. Cognitive scientist Doug Hofstadter (Hofstadter, D. (2007). *I Am a Strange Loop*. Basic: New York) has suggested that this applies to humans as well—a conclusion that is not surprising if one considers the factors he takes into account such as age and experience, brain damage, etc.

*Qualia*

What is it like to see the colors in a rainbow, smell a forest right after a rain, hear the sounds of crickets in the evening, or feel the texture of a wooden fence? Australian philosopher David Chalmers describes what he terms the “hard problem” of consciousness, which is to explain what it is like to experience or feel something (e.g., What is it like to see a particular color or taste a specific food?). Philosophers use the term “qualia” to refer to such experience. The operative idea is that human consciousness entails an experiential component of which only the experiencing individual can have a full experience and that typical scientific explanations have thus far proven inadequate to fully describe it.

*Who (what) is Conscious?*

This slide provides a stimulating way to think about consciousness from a variety of perspectives: What makes one person more or less consciousness than another? How does human consciousness compare to that of animals of different kinds? Could a machine ever be conscious? Why or why not?

**How does meaning arise from mindless mechanisms?**

As we’ve seen, when we look inside a person’s head we don’t find a smaller version of the person that experiences life and controls action but rather an intricate biological organ.

*Mind from Matter*

Brains, as previously noted, are composed of neurons. One of the biggest mysteries in the scientific community is trying to understand how consciousness and the resulting awareness of the presence or absence of meaning and purpose can be the product of an electro-chemical process in the brain. How can a collection of neurons, none of which has a mind, produce the mindfulness that characterizes human intelligence, consciousness, and personality? One way to think about this is to consider that the information processing function of neurons can be abstracted from their biological operations. An “artificial neuron” simply receives inputs from a sensory processing device (eyes for a human, a camera for a robot) or from other neurons, sums the inputs, and produces an output if the activation is sufficiently great. (In the figure, the ai are the inputs and the wi are weighted connections corresponding to dendrites in real neurons. The products of the inputs and the weights are summed and passed to a function that determines the strength with which the artificial neuron fires.) Collections of such artificial neurons can be used to solve various high-level problems. Assuming we could replace real neurons in a brain with such devices, how many would have to be replaced before we no longer considered the person to be the same? Whether we are speaking of real or artificial neurons, we are faced with the issue of how semantic content arises from syntactic operations on mindless components and thus whether mechanistic views of humans can be reconciled with perspectives of meaning and value.

Many religious people may tend to be leery of such questions, thinking they sound too materialistic but our relatively new knowledge of the brain has not created this perceived dilemma. Although science continues to provide new insights, the relationship between matter and spirit has always been a difficult one to comprehend.

One final note: It might be well to resist the temptation to succumb to what we might label the “nothing more” syndrome. This is characterized by positions such as that of philosopher Daniel Dennett who postulates that consciousness is nothing more than a reflection of brain states and should therefore be amenable to a reductionist evaluation (Dennett, D. (2005). *Sweet Dreams:* *Philosophical Obstacles to a Science of Consciousness*. MIT Press: Cambridge, MA) or Giulio Tononi who believes “consciousness… is nothing more than integrated information” (Zimmer, C. (2010). Sizing Up Consciousness By Its Bits. The New York Times, 9/20/2010). There are good reasons for thinking that these perspectives might be right as far as they go but it is important to note that what Dennett and Tononi are also saying is that *they* cannot see how it could be anything more. Caught in the throes of reductionism, it is difficult to imagine any other way of seeing things. If consciousness is an emergent property of brains, however, it would by definition exhibit properties that exceed the sum of its parts.

**What is the soul?**

The material nature of the brain and its integral connection with personhood poses some interesting questions for some traditional views of the soul. In fact, the mind/body problem might be better framed in religious contexts as the soul/body problem. Considering the central role that the concept of the soul plays in Christianity and other major religions, it may seem surprising that describing the soul is every bit as problematic as defining consciousness, if not more so. (One might have expected that such a basic idea would be the most easily described.) Some people merely see “soul” as a synonym for “consciousness” (a position possibly expected from but not restricted to the non-religious) but most religious perspectives of the soul, no matter how poorly formulated, postulate attributes that transcend consciousness. Many, for example, will conceive of the soul as the true essence of a person (“the real me”) or the part that is potentially receptive to God and eternal but with only a nebulous idea (perhaps more like a feeling) of what either of the latter two concepts might mean. What are the sources of our ideas about the soul?

*Cartesian Dualism*

Associating the soul too closely with the brain seems to suggest a materialist position that many people find uncomfortable. Rene Descartes tried to solve the physical/spiritual problem by postulating a duality whereby the immaterial soul made contact with the material brain via a special entry point which he identified as the pineal gland. In light of current knowledge of the brain (i.e., the pineal gland is responsible for hormone regulation) this perspective is untenable but Descartes’ dualist ideas live on, nevertheless. Dualism is convenient in that it ignores the difficult issues associated with the empirical evidence that suggests human personhood is integrally linked to brain and body.

*Got Soul?* (2 slides)

The Bible itself raises questions about how to distinguish the soul from other cognitive features. For example, Jesus’ response to a query about the greatest commandment was (in Mark’s account) to love God with all of one’s “heart,” “soul,” “mind,” and “strength.” He did not, however, elaborate on those particular concepts (thereby enabling countless sermonic attempts to explain the details). Soul and mind, of course, are two of the primary areas on which we are focused in this analysis. The relation of mind to brain has already been discussed but we should note that “heart” and “strength” suggest emotional content and effort, both of which can also be seen as cognitive products of brains. This might make one wonder if the soul is not also somehow related to the brain. There is, of course, no need to jump to such a conclusion but, if one sees the soul as the mediator of a conscious decision to (in this case) love God, such a perspective might make some sense.

*How do you define things?*

As can be seen from a basic dictionary definition, we are not consistent in our use of the term “soul,” using it sometimes to refer to the essence of a person (with or without any explicit religious connotation) and at other times to mean the eternal aspect of a person. Doug Hofstadter, in his book *I Am a Strange Loop*, simply uses soul as a synonym for consciousness.

*The Bible and the “soul”*

We might ask where people get the idea that the soul is immaterial. Examination of the *Bible* provides some interesting insights. In the New International version “soul” is used more than 130 times (21 times in the New Testament) whereas in the King James version the word “soul” appears more than 400 times in the Old Testament alone and 39 times in the New Testament. For all but the ancient language scholar, *Strong’s Concordance* is a useful source for exploring the Biblical use of “soul” and related concepts. According to Strong, The Old Testament “nephesh” and the New Testament “psuchē” refer to conscious life in animals and may both be translated “soul.” The Greek word “pnӗuma” (“spirit”) in the New Testament (compare Hebrew rûwach in the Old Testament) may sometimes come closer to the concept most people have of soul, referring as it does to the “rational and immortal” aspects of humans (Strong, J. (1984). *The New Strong’s Concordance of the Bible*. Thomas Nelson: New York). It will probably come as a surprise to a number of folks, however, to discover that the *Bible* may not use the specific word they would have guessed in certain passages (cf. Matthew 10:28; 16:24-26 where “psuchē,” not “pnӗuma,” is used despite the common idea that it is the immortal soul that is being referenced). If souls alone are sufficient or all that matters, one might wonder why we have bodies (and brains) in the first place. It has not gone unnoticed that the idea of an immaterial (or disembodied) soul probably owes more to Plato than it does to the *Bible*. Paul, for instance, doesn’t promote an immaterial existence but argues that humans will have new bodies in the afterlife (cf. I Corinthians 15). All this might make us wary of forming too detailed a theory about the soul on the basis of a few select passages from the *Bible*. As with any interpretive undertaking, context is crucial. Furthermore, Biblical authors were not likely motivated by a compulsion to establish scientifically rigorous categories. (We don’t, for instance, find “brain” in the *Bible* unless it is in a paraphrase such as *The Message* or Job 12:3 in *The New International Reader’s Version* (translated “mind” in *The New International Version*) yet we do not thereby discount the concept of brain.) In passing, we should probably note that not a few individuals find the concept of an immortal soul problematic because of the physical nature of the brain (i.e., death of brain equals end of soul). This presents no problem for Christian theology if God is conceived capable of preserving the essence of a person and re-establishing it in some new body (cf. Green, J. (2008). *Body, Soul, and Human Life:* *The Nature of Humanity in the Bible*. Baker Academic: Grand Rapids, MI). Consequently, a physical instantiation of the soul is not (de facto) incompatible with the Christian faith. In other words, Christians should be wary of feeling a compulsion to believe that embodied souls are somehow less authentic or (worse) that the idea is sacrilegious.

**Do we have freewill?**

The problem of freewill has plagued philosophers and theologians for centuries. The basic issue for traditional theism is how to reconcile the attributes of an omniscient God with human freedom. The problem is equally acute for non-theists, who, along with theists, are faced with the prospect of trying to reconcile human freedom in deterministic or random universes. No pretensions are made here to resolve the problem. Instead, the goal is to identify how it arises, to describe some scientific observations that may bear on the understanding of freewill, to review various approaches to the issue by scientists, and to consider certain ramifications of exploring this fascinating topic. This remains an open area for both scientific, philosophical, and theological investigation.

*The problem of volition*

The Sphex wasp (a species that constructs its nest of mud) exhibits a very stereotyped behavior in preparations for its young. The parent wasp stings and paralyzes another insect (cricket, grasshopper, etc.), placing it in a form of suspended animation. The insect is then carried to the nest and deposited near the entrance while the parent goes inside (presumably to make sure that everything else is in order before moving the prey into the nest). In the normal sequence of events, the parent returns to carry the insect inside where it will serve as food for its young when they hatch. If, however, while the wasp is inside, the prey is moved, upon its exit from the nest the parent will relocate the prey to its original position (outside) and once again enter the nest (presumably to check things out). Apparently the wasp will repeat this process until the patience of its human antagonist is exhausted. The cognitive scientist Doug Hofstadter (Hofstadter, D. (1985). *Metamagical Themas: Questing for the Essence of Mind and Pattern*. Basic: New York) uses this example to illustrate the lack of any sophisticated form of awareness in creatures as lowly as insects but it is also a good illustration of a deterministic, built-in behavior that seems to deny any form of freewill on the part of the wasp. This is quite acceptable to most people but is the phenomenon limited to insects?

*Don’t complete the following:* (7 slides)

These slides provide an exercise that demonstrates how significant parts of our cognitive behaviors occur beyond our control—that is, they happen whether we want them to or not. The objective is NOT to complete each example. In general this turns out to be impossible for most adults raised in the United States although performance on one or two of the examples will possibly betray the age or enculturation of the respondents. (Technically this is true for all of the examples used here but will usually only be evident for some.)

*A couple of questions*

Another way to observe obvious restrictions on our freedom (i.e., to illustrate that our brains can take us on rides we may not have requested) is to call attention to the common experience of uninvited thoughts or uncontrolled verbal outbursts.

*What the brain tells us…*

It is clear that there are some things that our brains do for us that are beyond our immediate control. Raw sensory experience, for example is not a matter of choice—we see certain colors, hear certain sounds, experience certain tastes, etc., or we do not. There is a level below which our brains provide us information that we then assume is available for our free choices. One of the outstanding questions in cognitive science is whether this is really the case. In the 1980s Benjamin Libet devised an experiment that recorded brain activity during execution of a task in which a subject voluntarily chose when to press a button. He also recorded the time at which the subject became aware of his/her own intention to do so. What makes this experiment of particular interest is that the brain was already registering its intention to press the button approximately one-half second *before* the subject was aware of his/her own intention! This brain activity that preceded awareness was termed the “readiness potential” (as shown in the slide). The implications for freewill are obvious and were of concern to Libet, who was not especially pleased by them. His work seemed to show that there was in fact a period following conscious awareness during which the subject could “veto” the intention and hypothesized that freewill might be operative within that window (but only in “veto” mode). Others have suggested that the same result he obtained for the voluntary movement would probably also apply to the veto aspects if more careful measurements were made.

In 2008 scientists at the Max Planck Institute in Germany published the results of work in which they conducted a modified version of Libet’s experiment using fMRI technology to monitor brain activity (Libet used external electrodes attached to the scalp) and obtained results that confirmed Libet’s work with the exception that activity signaling the subject’s intention was observed as much as seven seconds before awareness of the intention (Soon, C., Brass, M., Heinze, H., Haynes, J. (2008). Unconscious determinants of free decisions in the human brain. *Nature Neuroscience*, 11:543-545.).

Over one-hundred years ago the psychologist/philosopher William James suggested that consciousness might not drive our volitional acts in the way we think it does. To illustrate his contention he suggested trying to relate the timing of a decision to get out of bed to the actual time of doing so. James noted that no matter how much he tried to make the act correspond with the intention, he usually just found himself suddenly getting up and unable to pinpoint the precise moment of decision. This is an interesting experiment that any person can do on any given morning and if, attended to carefully, will likely show just what James found.

*Does faith just happen or is it something you do?*

Whether we have freewill with respect to decisions about when to move may seem (from the previous examples) to be suspect but what about higher cognitive functions? What about faith? These slides show a couple of old (defunct at the time these notes were prepared) websites whose URLs suggest that faith is beyond a person’s control. (The first of these is now the site for a motion picture by the same name.) Such an idea presents a variety of interesting theological as well as cognitive dilemmas. Might the Bible provide some additional insight?

*Biblical perspectives against freewill?*

Here is a sampling of verses that might suggest freewill doesn’t exist. There are plenty of others…

*Biblical perspectives for freewill?*

Of course there are also a number of passages that have been used to support the view that we do, indeed, have the freedom to choose. Certainly this is a long standing theological debate with no clear resolution (except to those on each side!).

*Thinking about choices*

We might try to approach this another way by thinking about actual circumstances in which it appears that we have a choice. For example, imagine the options that might confront someone deciding what to do with vacation time.

*Should I paint the house?*

One of those options could be to paint the house. Is this a free choice? How is it made? One way to think about what the person contemplating such a decision will choose to do is to consider that the choice will likely be made on the basis of weighing the perceived pros and cons of the task. Some sample factors are shown in the slide where + denotes “pro” and – indicates “con.” Each factor, therefore, exerts an influence with a strength proportional to its perceived importance to the individual making the decision and whether the choice is to paint or not depends on the relative strengths of the overall results. Each factor, of course, is probably somewhat fuzzy and could be subjected to the same analysis as suggested for the main question (e.g., To what extent are concerns over potential respiratory problems justified?). However, this approach shows that there is a sense in which the decision is subject to influences that ultimately determine the result—that in some sense it is predetermined.

*Some Approaches to Freewill*

People have approached the issue of human freedom from a variety of directions. Some of these are highlighted in the following slides.

*A deterministic universe makes freewill problematic*

Isaac Newton’s (and subsequently Pierre Simon Laplace’s) rigorous mathematical treatment of motion resulted in conceptions of the so-called “clockwork universe”—the idea that we live in a deterministic environment where (at least in principle) everything is predictable.

*Might freewill not exist?*

The natural conclusion for many of those facing up to the deterministic elements of our universe is that there really is no such thing as freewill. Cognitive scientist Doug Hofstadter and neuroscientist Martha Farah exhibit this perspective in their comments on this slide.

*Is freewill an illusion?*

The bottom line for such views is that freewill is simply an illusion. According to some, we are tricked into thinking we have such freedom because the space of all possible influences on our decisions is enormous. This is captured by Stephen Hawking’s comments (in the slide) from his popular book *A Brief History of Time* and also by Mathematica founder Stephen Wolfram who notes that, “…the amount of free will associated with a particular decision is in effect related to the amount of computation required to arrive at it.” (Wolfram, S. (2002). *A New Kind of Science*. Wolfram Media: Champaign, IL, p. 1135) Linguist Stephen Pinker believes that, “Free will is an idealization of human beings that makes the ethics game playable. … Science and morality are separate spheres of reasoning.” (Pinker, S. (1997). *How the Mind Works*. W. W. Norton & Company: New York, p. 55)

*If there is no true freedom, get over it (if you can…)*

At this point one might be inclined to agree with physicist Max Planck that there is no such thing as freewill. If he is correct, of course, your decision to agree or disagree would not be free. One might wonder, however, if this is the whole story.

*Quantum mechanics?*

Quantum theory posits an inherent randomness (at the subatomic level) in the universe that makes indeterminism inevitable. Some individuals (including the physicists Harris Walker and Henry Stapp and the physician Jerry Satinover) think quantum mechanics provides a means of saving freewill. Randomness, of course, by itself offers little in the way of consolation over strict determinism. For quantum mechanics to have anything to do with freedom something a bit more sophisticated must occur. Discussing that is beyond the scope of a basic presentation but interested parties might want to consult the relevant literature.

*It’s in the anterior cingulate sulcus…*

According to Francis Crick (co-discoverer of the structure of DNA), this location in the brain is critical to our supposed ability to choose (albeit mechanistically) and he posited it as the locus for freewill. (Crick, Francis (1994). *The Astonishing Hypothesis*. Simon & Schuster: New York) In no way, however, did he espouse the dualism of Descartes—for him it is strictly a physical phenomenon.

*Who’s pulling the strings?*

As Ian Barbour (and many others) have pointed out, we are products of our history and environment and those factors affect our choices. (Recall the previous slides dealing with a decision about the use of vacation time.) Because such factors are stored in our brains, attempts to add something else to the decision process is not only difficult to justify, it raises the interesting question, “What would it mean to have freedom that went beyond the causal operating mechanisms of the brain?”

*Having one’s cake and eating it too*

In the philosophical literature the attempt to show that there need be no incompatibility between determinism and freewill is termed compatibilism. If standard compatibilist positions prove unacceptable to someone trying to salvage freewill, dualism provides an alternative. Earlier we considered views on mind/brain (or soul/brain) dualism. Another form of dualism suggested by physicist and priest William Pollard asserts that both freewill and divine (omniscient) providence are two realities to be accepted (despite the apparent paradox in doing so) because the evidence seems to support both (Pollard, W. (1958). *Chance and Providence*. Charles Scribner’s Sons: New York)). Pollard uses the quantum theory of complementarity as an analogy for this (i.e., just as there are complementary ways to consider light as wave and particle, so are there complementary ways to consider this issue). Walking this tightrope is an attempt not to fall into a stifling determinism on one hand or the lap of a limited deity on the other.

**What Does Brain Damage Mean for Conceptions of the Soul, Freewill, and God?**

One reason we have for thinking that the brain is intimately connected to who and what we are as individuals comes from observations of the sometimes traumatic effects that occur to personality and behavior when the brain is damaged.

*Minds as the standing waves of brains*

Whereas waves in the ocean move relative to the shore while the water remains more or less in the same place, river waves are relatively fixed in position in relation to the banks even though the water in them is constantly changing. Such phenomena in rivers are known as “standing waves” and, besides providing a place for whitewater enthusiasts to play, they furnish a nice metaphor for the relationship between brain and mind. For example, despite the fact that the molecules composing a brain are constantly changing, we have the experience of stability with respect to personal identity and memory—at least under normal circumstances. In a river, however, disturbances to the river bottom can result in significant long term changes to a standing wave. In analogous fashion, trauma to a brain can result in major changes to mind. Let’s consider this in more detail.

*Characterize the consciousness of a person with hemispatial neglect*

Lesions to the right parietal lobe can cause a person to lose awareness of half of visual space (the left half). This is not a deficit to primary vision—for neglect patients, objects in what would be their left field of view both in the real world and in their imaginations do not exist. If asked to draw an object, the left half is typically omitted. An attempt to bisect a line results in the mark being placed to the right of center (because they are unaware of the left half of the line).

*Some consciousness-changing events*

This slide lists a number of problems that cause potentially severe impacts on consciousness and personal freedom. Agnosia is an inability to recognize things based on sensory input (cf. http://spot.colorado.edu/~dubin/talks/agnosia.html and http://medical-dictionary.thefreedictionary.com/agnosia). A classic example is prosopagnosia where there is a failure to recognize faces but recognition of other items is largely unaffected. If the patient is unaware of the agnosia, it is termed agnosognosia. (Hemispatial neglect is an example.) In a split-brain patient the corpus callosum (the bundle of nerve fibers connecting the two halves of the brain) is severed (perhaps in an attempt to curb the effects of epileptic seizures). Because the two halves can no longer communicate, the patient may exhibit some rather strange behaviors. Patients with phantom limb syndrome experience sensation in a missing (amputated) limb as though it was still there. Korsakoff’s patients have lost the ability to form new long term memories and, as a result, live in the distant past (and the immediate present, which is quickly forgotten). Alzheimer’s disease causes a loss of memory such that a person’s past gradually evaporates. Schizophrenia is characterized by loss of touch with reality. Other problems listed may have genetic (autism), environmental (hypnosis), or self-inflicted (drugs) causes and represent significant effects on consciousness.

*“Where… is free will?”*

In alien-hand syndrome a person’s hand may appear to have a mind of its own. This problem was immortalized in Peter Seller’s character in the movie Dr. Strangelove where Sellers is forced periodically to combat the attempts of one of his own hands to choke him or produce a Nazi salute. Despite the humor, the problem is real and raises an interesting question about freewill.

A more serious problem occurs with Lesch-Nyhan syndrome, a genetically caused disease in which the patient may chew or pick at his own body (lips, nose, fingers), resulting to significant disfigurement (even though there is apparently no conscious wish to inflict personal damage). Neurologist H. A. Jinnah says of this disease, “…you have someone biting off tissue and bone in his fingers, biting off the whole finger, and chewing his lips off” and asks, “Where… is free will?” (Preston, R. (2007). An error in the code. *New Yorker*, August 13) Where, indeed? We are accustomed to acknowledging that we are prisoners of our genes in a variety of ways but this syndrome (and a number of others) suggest that the captivity may extend well beyond physical appearance or ability.

*Possible responses to the freewill paradox*

People can respond (and have responded) to the perceived paradox between freedom and determinism in a variety of ways. Here are some possible responses:

1. Most of us feel as though we have the freedom to make our own choices so why not just assume that any evidence suggesting that we aren’t free to do so has been misinterpreted?
2. Despite the fact that we feel we have freewill, how can we ignore the evidence that we are just the product of deterministic and random forces, subject to the laws of nature and beyond our control?
3. Why choose? There may be an explanatory gap between physical and subjective phenomena but isn’t it better to accept it? As Pollard puts it, there is evidence for both: “…any purely rational simplification of it which seeks to make one of the two elements dominant at the expense of the other simply fails to take account of all the facts of that life.” (Pollard, W. (1958). *Chance and Providence*. Charles Scribner’s Sons: New York, p. 136) Dualism never looked so good…
4. Define freewill as our capability to choose and don’t worry about the source of that capability. If a choice comes from deterministic processes in your brain, it is still you (as opposed to someone else) making the choice.
5. Live in the hope that, eventually, we will better understand consciousness, freewill, etc. based on improved insights into quantum uncertainty, chaotic systems (and sensitivity to initial conditions), computational complexity, or the recursive structure of neural wiring in brains.
6. If we drop the assumption that God has predetermined the future or even that he knows every detail about the future, part of the problem seems to go away. Of course, this introduces another, usually very distasteful problem, in that many people are not willing to ascribe any limitations on God’s power or knowledge. This can be made a bit more palatable for some if it is imagined that God may choose to limit his own powers, an activity that could in practice require more power than not doing so (as any parent can attest).
7. Libet’s results can be disconcerting for proponents of freewill but there might be some consolation in noting that (a) he didn’t test us (i.e., maybe you have freewill but your neighbor does not!); (b) there might be a deterministic nature to muscle movement but perhaps there is freedom in thoughts related to more sophisticated cognitive function; (c) perhaps the role of consciousness with respect to freewill has not yet been clearly understood.
8. What other possibilities might there be?

*What we can possibly agree on…*

Despite the various perspectives on freewill, there are some things on which many people (Christian or not) are likely to agree:

1. Most people think about this only occasionally, if at all. This is may be because it makes them feel uncomfortable and/or because of the item mentioned next.
2. Many people believe that this is beyond our understanding. Surely this is true of many things but how is one to decide what those things are?
3. Many people (including many scientists and theologians) deny free will verbally but not behaviorally. It is a bit ironic, for example, to find scientists such as biologist E. O. Wilson, psychologist Thomas McNamara, or linguist Stephen Pinker who disavow freewill yet plead that we take control of our destiny.
4. Most people are probably dualists (probably without giving the matter much thought and perhaps even though they deny it verbally).
5. We have a will but defining “free” will is problematic (cf. Hofstadter as quoted on a previous slide: Hofstadter, D. (2007). *I Am a Strange Loop*. Basic: New York, pp. 339, 340). Also, Consider the different ways in which we use the word “will” – God’s will (plan and/or desire), I will (intent), his will (wants, desire, legal document).
6. Our choices are heavily influenced by our past. As we’ve already noted, many of the things that happen to us are beyond our control. We may have free will in some areas but definitely not in all (i.e., it is constrained by genetics, education, illness, accidents, natural disasters, crime, etc.).
7. We are only free to the extent that we have the capability to actually do something. For example, I am not free to fly without additional paraphernalia. God may have some limits as well (e.g., is He free to not love?).
8. We might be free in theory but not in practice because we tie our own hands (educationally, morally, socially, spiritually). This is an extension of the previous point but focuses on the fact that, whereas some things that restrict our freedom are beyond our control, others are not. If someone spends each evening during the next year reading philosophy rather than watching television, she becomes more free to understand things that would otherwise be impossible. However, note that gaining one freedom may (as it does in this case) require the loss (sacrifice) of others.
9. The Bible is ambiguous as to the extent of our freedom (despite people with opposing views acting as though it is not).

**Alternative Perspectives on Freewill**

In the next few slides we’ll attempt to look at freewill from some different perspectives than we’ve employed so far.

*The problem with arrows*

Notice how we use arrows (mathematicians would call it a directed graph) to represent a variety of concepts including the interaction of objects in physics, the passages of neural signals, chemical reactions, propositional and predicate logic, the effects of decisions and, in general, anything that involves a series of events. Of course, it may be the passage of time that is really being highlighted by such diagrams (cf. Planck, M. (1981). *Where is Science Going*. Oxbow Press: Woodbridge, CT, p. 122) but, in any case, it is worth considering the extent to which such representations dominate our way of thinking and may inhibit our ability to see alternatives. Just wondering what possible alternatives there could be might be a sign that we are caught in a cause and effect paradigm (manifest by diagrams such as those shown in the slide). Are there other way to understand things beside modus ponens inferences and cause/effect logic? Alternatively, can logic itself be independent of our physical understanding or is it just an extension of it? Consider, for example, Max Planck on causation:

“We might mean by it a regular interrelation between effects that follow one another in time. But we can at once ask whether this relation be founded in the nature of things themselves, or is it totally, or partly, a product of the imaginative faculty? Might it not be that mankind originally developed this concept of causation to meet the necessities of a practical life, but afterwards found that if men were to confine themselves to an outlook exclusively based on this principle life would then turn out to be unbearable?” (Planck, M. (1981). *Where is Science Going*. Oxbow Press: Woodbridge, CT, pp. 116-117)

If cause and effect is not an explanation basis for our attempts (and struggles) to understand free will but merely a metaphor for doing so, then perhaps we need a new metaphor. Networking? Message passing? Ian Barbour notes that, “Writings in the philosophy of action contend that the explanation of actions by *intentions* is very different from the explanation of effects by *causes*.” (Barbour, I. (1997). *Religion and Science: Historical and Contemporary Issues*. HarperOne: New York, p. 318)

*Making freewill a choice*

Why do we think there are only two options (i.e., freedom or determinism)? Could freedom exist on a continuum or come in levels (cf. the discussion in Franklin, S. (1995). *Artificial Minds*. MIT Press: Cambridge, MA of Sloman (1988), “Disposing of the free will issue” in Connectionist List message on Internet, June 19). Could freedom be something we grow into? Could a desire and search for freedom actually be the catalyst that makes more of it possible? (Consider, for example, the freedoms acquired by politically motivated people.) In such cases one may acquire or exercise freewill but it probably seems like it is anything but free (i.e., because of the effort required).

Considering Maslow’s hierarchy of needs, we might wonder if there is a relationship between freewill and self-actualization. Is freewill like a muscle that must be exercised to be of any real use? Is freewill in some (paradoxical!) sense a choice? Can we choose to have it or not? Are we free to the extent that we actively evaluate alternatives and are creative? Is failure to do so an abandonment of our freedom? Consider how levels of chemicals in the brain affect our behavior and note that, once we know this, we have the chance to choose to modify those levels (through proper diet, prescription drugs, etc.) to help assure proper behavior. On a deeper level, note that it requires an act of the will to be loving, forgiving, etc. (i.e., to show these attributes of God). Isn’t the gospel about accepting freedom? According to Jesus (John 8:32), “You will know the truth, and the truth will set you free.” Besides the usual interpretation of being set free from sin, might this also mean being freed from a stifling determinism? In any case, if God is the only really free entity, then having a relationship with Him would seem to be the only door to real freedom for us… “If the Son sets you free, you will be free indeed” (John 8:36)

*The paradox of freedom*

Jesus’ prayer in the garden of Gethsemane raises an interesting question about what constitutes real freedom.

*The paradox of freedom (continued)*

A number of individuals have noted that constraints actually enable freedoms that would otherwise be non-existent. Consider, for example, the perspectives shown on this slide ranging from Pinker’s to Paul’s (or from atheist to theist).

*Consciousness limited*

Through the years, concepts of mind, brain, consciousness, soul, and freewill have advanced in significant ways. As noted at the beginning of this presentation, however, there is much we do not yet understand. There is sometimes a tendency to give up the pursuit in the belief that the problem is insoluble but that is merely an assumption that begs to be questioned.

The famous poem of the blind men and the elephant provides a timeless reminder that in all of our attempts to understand the world, whether oriented toward the scientific, philosophical, historical, or theological (or any combination of these), it is in our nature to see things incompletely. By implication, humility is always warranted but so is perseverance, communication, and openness. These will serve us well as we explore any difficult questions at the interface of science and religion.

He who gets wisdom loves his own soul; he who cherishes understanding prospers. (Proverbs 19:8)

Suggested Reading

*Minding God* (Peterson)

*The Man Who Mistook His Wife for a Hat* (Sacks)

*The Big Questions in Science and Religion* (Ward)