



Philosophy of Mind

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General Information

1. Course coordinator

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2. Schedule

Lectures

| | |
|---|-----------------|
| 1. The history of the mind body problem | Rob de Vries |
| 2. The two-dimensional argument against materialism | Rob de Vries |
| 3. Will be announced. | Manuela Heins |
| 4. Will be announced. | Manuela Heins |
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3. Introduction

Science and philosophy on conscious mind

Science and philosophy move out of phase. In the fifties and the sixties of the last century philosophers were very optimistic about the solution of the mind body-problem (which nowadays for convenience sake can be identified with the mind brain-problem or the consciousness-brain problem). In those days consciousness was not a respectable scientific topic. That's different today. Modern psychologists and neuroscientists study the relation between the body (especially the brain) and the mind (especially consciousness) in all its aspects and intricacies.

Today there is an Association for the Scientific Study of Consciousness, which every year organizes a big conference. There are two journals especially dedicated to the study of consciousness "Consciousness and Cognition" and "The Journal of Consciousness Studies". The Scientific American publishes regularly articles about consciousness, as do Science, Nature, the Journal of Brain and Behavioural Science and every psychological and neuroscientific journal from time to time.

Consciousness as a regular topic even appears in psychology textbooks.

I want to make a bet that within ten years there will appear articles in Nature Genetics about "consciousness genes". (If you Google, you will already find indications in that direction.) So here we have a science, which shows an overwhelming growth. The philosophers in the ASSC know that and many of them are intimately familiar with the results of the modern science of consciousness. Still some of the most prominent philosophers among them are not as optimistic as scientists are nowadays. They don't believe in a future reduction of our conscious mind to neuronal or to higher order functional processes. So historically the positions of philosophers and scientists seem to be each other's mirror image. In this course

you will meet the opinions of some optimistic scientists and some philosophers who put those scientists' opinions in perspective. It is up to you to sit in judgement of them.

We start our course with Descartes (1596-1660) substance dualism and other forms of dualism. According to Descartes nothing is more familiar to us than our own conscious mind. Rene Descartes believed that we are so familiar with our own consciousness that we have complete certainty about our mental activities. (We simply know that we think.) Descartes doubted everything else, even the existence of his own body, but he was convinced he could not doubt his own conscious activities. He could not doubt that he was thinking and by thinking he meant every mental conscious activity and from that he concluded that he existed: Cogito, ergo sum.

This course is a kind of modern commentary on Descartes' most important tenets on consciousness. After students have studied the literature of problems 1, 2, 3 and 4 in which a rough outline is given to give a of the essence of consciousness and the problems in the vicinity of "consciousness", the next problems are partly inspired by the Cartesian conception of mind.

According to Descartes:

1. Our consciousness is a unified entity.
2. Our entire mental life is conscious.
3. Our consciousness is transparent to itself.
4. Our consciousness is responsible for our free actions.

During this course you will find out that all these problems are in one form or another still controversial and hotly discussed by philosophers and scientists.

The take-over of consciousness by the psychologists

Psychology started as the science of consciousness. Nineteenth century psychologists were scientist, doing philosophy by means of a pre-eminently scientific method: the psychological laboratory experiment. That's the reason that the foundation of a first psychological laboratory by Wilhelm Wundt is widely seen as the starting point of the science of psychology.

Eighteenth- and nineteenth-century psychologists considered conscious perceptions, experiences, and feelings the most important topics of psychology. In the early days of its development as an academic discipline, psychology was not considered a behavioural science - that was a later and somewhat "vulgar" American development. Psychology was the science of consciousness; conscious perception was the outstanding object of psychology; and introspection was the royal road to consciousness. (This is a consequence of Descartes transparency thesis.) The German psychologist Wundt used fairly uncontroversial forms of introspection to study relatively simple perceptual phenomena. Later researchers were not satisfied with Wundt's modest objectives in the field of experimental psychology, as they wanted to study more complex processes such as thinking, reasoning, and acts of the Will. In order to do this, both introspection and retrospection were needed.

In their psychological experiments on thinking in the late nineteenth and twentieth century psychologists such as Oswald Külpe and Karl Bühler discovered forms of thinking that were imageless and wordless. This kind of thinking occurred in a kind of abstract medium.

The American psychologist Titchener, however, never found any forms of imageless or wordless thinking in his psychological laboratory. The American psychologist Watson did not believe that Americans thought less abstractly than Europeans and argued that the lack of consensus on just what consciousness may be was clear reason to reject consciousness as an object for psychological research and to reject both introspection and retrospection as methods of investigation. Behaviour became the paramount topic for psychologists, and Watson became the founding father of behaviourism.

Evil tongues claim that the preceding views may have something to do with differences in national character. The German psychology of consciousness reflects the true German buried in thought and primarily concerned with theoretical thinking. American behaviourism reflects the practical American simply concerned with how to attain a particular goal in the most efficient manner and therefore predisposed to act without thinking.

While all of this is no more than folk psychology, one thing is certain: With the increasing economic dominance of the USA and its increasing power within the scientific world, the psychology of consciousness basically disappeared. Some descendants, such as Gestalt psychology, continued to have some influence. The psychology of consciousness would undoubtedly not have disappeared so easily from the scientific world and the psychology curriculum had there *not* been methodological problems with introspection.

Philosophical problems concerning the concept consciousness

Anyone who has learned some elementary physics at school will recognize that the following problem has existed since Descartes: How does consciousness interact with matter and vice versa? Moreover, the problem has only grown since the formulation of the Law of the Conservation of Energy by Maier and Helmholtz. It is difficult nowadays to endorse a dualistic solution of this problem. As a consequence of the success of the natural sciences in the nineteenth and twentieth centuries, only a materialistic explanation for the development, nature, and structure of consciousness has become acceptable. A modern philosopher can no longer be a dualist without feeling guilty. Materialism is the default position. It is the current paradigm, and Descartes' question of "how interaction between mind and body is possible" has been replaced by the question of "how consciousness develops from matter and just how and why consciousness was created during the process of evolution?" The first evolutionists however did take Descartes serious. They opted for a dualistic solution. Thomas H. Huxley (1825-1895), the second great Darwinist, was, as were most of his contemporaries, impressed by the arguments for dualism. He conceived of an epiphenomenal mind that was inefficacious in the physical world, didn't affect behaviour and consequently didn't influence the evolutionary process. Epiphenomenalism made dualism and evolution theory compatible. After Huxley a lot of philosophical questions continued to be asked.

Under the influence of (neo)positivism, such questions disappeared for some time from the philosophical limelight as virtually impossible to answer.

But since the eighties of the former century consciousness has made a successful comeback in psychology and the neurosciences. During the last twenty years, both experts and laymen have been inundated by a tsunami of books and articles on the human, animal, mechanical and neuronal mind. The enormous number of publications suggests that at least some

progress has been made. Could this be true? Will the twenty-first century see another victory of Reason? Are we on the eve of a breakthrough? Will there be one intellectual mystery less to solve? Some contemporary philosophers like David Chalmers put those statements in perspective.

Simple problems and difficult problems

In his book *The Conscious Mind: In search of a Fundamental Theory*, the philosopher and mathematician David J. Chalmers distinguishes two types of problems: simple and difficult problems. The distinction itself is trivial and yet illuminating. Simple problems are those questions that *seem* to deal with consciousness but then *reformulated* in such terms as: "How does the brain process external stimuli?" "How does the brain integrate incoming information?" "How does introspective and retrospective reporting of our inner psyche occur, and how reliable is it?" "What are the cognitive effects of hard and soft drugs on our cognitive functioning?" and "What factors influence the content of our dream reporting?" (Note that this does not mean that the simple problems are not sufficiently difficult to solve.)

The difficult questions are, for example: "Why do the above mentioned information processing and information production involve conscious experiences?" "Do experiences play a causal part in our actions and our mental life, and if so, what part do they play?" and "How can a physical system create such a 'thing' as conscious experience?" According to the biologist Medawar, science is "the art of the soluble," the art of posing soluble questions. Chalmers' simple questions are often potentially soluble questions. That is, psychology and the neurosciences can supply answers to the simple questions, which leave the insoluble questions to the philosophers.

Many scientists and some philosophers hope that once the simple questions are answered, the difficult questions may also suddenly become soluble. Many other philosophers believe that the answers to the simple questions will hardly affect the answers to the difficult questions. These philosophers consider philosophy and science to be two autonomous fields although such a position is difficult to maintain. After all, the scientific conceptions of Galileo, Descartes, and Newton on the nature of the physical universe basically created the mind-body problem (the consciousness-brain problem). It was the Law on the Conservation of Energy that ruled out dualistic interactionism. It was the theory of evolution that made Huxley formulate his epiphenomenalism. It was Sperry's neuropsychology that shook the philosophers' view that consciousness functions as a unit.

It was Freud's 'discovery' of the subconscious that abolished the view of intentionality and consciousness as inextricably interlinked. Libet's experiments in the 1970s and 1980s upset many philosophical views on free will. In a similar manner, numerous scientific discoveries have refuted philosophical views on consciousness. This being an introduction, suffice it to say that the opposite has also occurred in the history of psychology and philosophy: Numerous psychological studies have been influenced during their initial stages by philosophical views and questions. However, it is not necessary to have answers to philosophical questions to solve scientific problems. In general, scientists do not know what they are doing. Advanced forms of science, such as modern physics, are a form of sleepwalking. Even the greatest achievement in the history of science Newton's classical physics used an ingenious, ill-founded branch of mathematics, that only got its foundations in the nineteenth century by mathematicians as Cauchy and Weierstrass. Quantum

mechanics is the most powerful piece of physics. But physicists don't agree on what it is about. All interpretations are strange.

4. Aims of the course

- To know and understand how, when and where the mind-body problem (the consciousness-brain problem) originated.
- At the end of the course students should understand the basic philosophical issues in the vicinity of consciousness.
- They should have acquainted themselves with some current scientific problems and theoretical views on the nature of consciousness.
- They are supposed to have learned how psychological and neuropsychological knowledge constrain philosophical views on consciousness and vice versa.
- And most important: they can think and reason about it.

The course does not give clear-cut answers. No final or true picture will emerge from this course. The makers of this course considered it a success if the students have less answers and more questions and also more intelligent questions at the end of the course than at the start.

This course is a *capita selecta* course. The course gives you only glimpses in the realm of philosophical and scientific problems in the vicinity of consciousness. **Students who want to read up to date introductions in the philosophy and the science of consciousness after this course, should read:**

Jaegwon, Kim, *Philosophy of Mind*, Third Edition, 2011

Stanislas, Dehaene, *Consciousness and the Brain, Deciphering How the Brain Code Our Thoughts*, 2014.

Both can also be used as reference work during this course. Both can be (illegitimately) downloaded from Libgen.

5. Assessment

1. A paper, (see writing assignment). Proportion of final grade: 40 %
2. A test with 10 open-end type questions at the end of the course covering all the material in the course, including the introduction, lectures, and the you-tube clips. Proportion of the final grade: 60%.
3. The test will be the literature from the e-reader, you tube clips, the lectures and the introduction. *

*NB. All those are real parts of the course.

6. Writing Assignment

The writing assignment consists in writing a paper of about 2000 words that is in *some way* related to one of the subjects or problems presented in the course. It is not enough to summarize the ideas of famous philosophers or psychologists about problems in the vicinity of mind and consciousness. You are supposed to scrutinize those ideas with a critical mind and to argue for or against your own opinions.

7. Attendance

The attendance requirement is 85%. Students who have not met the attendance requirement, but who have not missed more than 30% of the group meetings, will be given a provisional overall grade but will not receive credits for the course until they have successfully completed an additional assignment

PROBLEMS

Warning: Having an opinion is not enough!

On a very abstract level you can say that the means used by empirical scientists to do their jobs are experiments, observations and reasoning.

Mathematicians only use reasoning. It is the same for philosophers. Problems that cannot be decided by empirical science can only be dealt with by reasoning.

For a philosopher as philosopher it is not very important what kind of philosophical viewpoints you cherish, but how you argue for them.

There is of course a kind of relationship between empirical science and philosophy. Because they both are supposed to be about reality you cannot rule out that they clash from time to time. Not every solution for a philosophical problem is feasible according to empirical science.

A famous example is the law of conservation of energy. Since it's formulation in the nineteenth century interactionist dualism is not a very plausible solution to the mind body problem.

So some of you will have an opinion on the mind-body problem and some of you will develop one during this course. But just having an opinion is not of interest. Having or developing a good argument is meritorious. So whenever the problem is philosophical or partly philosophical, try to argue for your philosophical opinions or against other philosophical opinions or even better against your own opinion. It is worse not to argue than to formulate an unsound argument. It is the same with Arguments as with Love: 'It's better to have loved and lost than never loved at all.' Or to quote Karl Popper: "You can only learn from your errors."

A. Introduction

Problem 1a: Historical arguments for dualism

René Descartes (Cartesius) was not only one of the founding fathers of modern mathematics and physics but also the father of interactionist dualism.

The philosopher Yaegwon Kim extracted half a dozen of arguments from Descartes' philosophical work and paraphrased them in modern English. Here are some of them.

Argument 1

I am such that my existence cannot be doubted.

My body is not such that its existence cannot be doubted.

Therefore, I am not identical with my body.

Therefore, the thinking thing that I am, that is, my mind, is not identical to my body.

Argument 2

My mind is transparent to me – that is, nothing can be in my mind without my knowledge that it is there.

My body is not transparent to me in the same way.

Therefore, my mind is not identical with my body.

Argument 3

My essential nature is to be a thinking thing.

My body's essential nature is to be an extended thing in space

My essential nature does not include being an extended thing in space

Therefore, I am not identical with my body. And since I am thinking thing (namely a mind), my mind is not identical with my body.

Most contemporaries of Descartes agreed with his dualism, although they often didn't agree with his arguments.

His interactionism was even more controversial. His pen friend princess Elizabeth of Bohemia wrote to him:

“And I admit that it would be easier for me to concede matter and extension to the mind than it would be for me to concede the capacity to move a body and be moved by one to an immaterial thing.”

If this not enough, there are still other problems with dualism.

Problem 1b: An Unfortunate Dualist

A story by Robert Smullyan

Once upon a time there was a dualist. He believed that mind and matter are separate substances. Just how they interacted he did not pretend to know -- this was one of the "mysteries" of life. But he was sure they were quite separate substances.

This dualist, unfortunately, led an unbearably painful life-not because of his philosophical beliefs, but for quite different reasons. And he had excellent empirical evidence that no respite was in sight for the rest of his life. He longed for nothing more than to die. But he was deterred from suicide by such reasons as: (1) he did not want to hurt other people by his death; (2) he was afraid suicide might be morally wrong; (3) he was afraid there *might* be an afterlife, and he did not want to risk the possibility of eternal punishment. So our poor dualist was quite desperate.

Then came the discovery of *the* miracle drug! Its effect on the taker was to annihilate the soul or mind entirely but to leave the body functioning *exactly* as before. Absolutely no observable change came over the taker; the body continued to act just as if it still had a soul. Not the closest friend or observer could possibly know that the taker had taken the drug, unless the taker informed him.

Do you believe that such a drug is impossible in principle? Assuming you believe it possible, would you take it? Would you regard it as immoral? Is it tantamount to suicide? Is there anything in Scriptures forbidding the use of such a drug? Surely, the *body* of the taker can still fulfil all its responsibilities on earth. Another question: Suppose your spouse took such a drug, and you knew it. You would know that she (or he) no longer had a soul but acted just as if she did have one. Would you love your mate any less?

To return to the story, our dualist was, of course, delighted! Now he could annihilate himself (his *soul*, that is) in a way not subject to any of the foregoing objections. And so, for the first time in years, he went to bed with a light heart, saying: "Tomorrow morning I will go down to the drugstore and get the drug. My days of suffering are over at last!" With these thoughts, he fell peacefully asleep.

Now at this point a curious thing happened. A friend of the dualist who knew about this drug, and who knew of the sufferings of the dualist, decided to put him out of his misery. So in the middle of the night, while the dualist was fast asleep, the friend quietly stole into the house and injected the drug into his veins. The next morning the body of the dualist awoke-without any soul indeed-and the first thing it did was to go to the drugstore to get the drug. He took it home and, before taking it, said, "Now I shall be released." So he took it and then waited the time interval in which it was supposed to work. At the end of the interval he angrily exclaimed: "Damn it, this stuff hasn't helped at all! I still obviously have a soul and am suffering as much as ever!"

Doesn't all this suggest that perhaps there might be something just a *little* wrong with dualism?

B. Epistemological Problems

2. The problem of other minds: can we know other peoples mind?

When I was kid I endlessly looked to my dog trying to get into his mind. I tried to guess what he felt and ‘thought’. He was a real comrade who seemed to sympathize with me. I projected a lot of feelings, emotions and thoughts on him. But of course I was never sure. There was always doubt.

My relation to our cat was different. She seemed to me a proud animal rapidly insulted. By night she was lying on the foot of my bed. Even the slightest movement of my legs or feet could cause her to jump from my bed to the floor. She stayed next to my bed sitting with her backside turned to me. I interpreted that as a signal of indignation.

Later some ethologist friends of mine said it was a signal of submission. I don’t know...

Nowadays I am not so sure of the sympathetic mind and the rich mental, conscious life of pets. I am not so sure that at all pets are good friends that sympathize with you or can diminish your loneliness. I don’t think they are (philosophical) zombies, but...?

At high school I met a guy who was interested in philosophy, but in a strange way. He was not so much interested in the objective thought of philosophers, but in their emotional life. He wondered whether Descartes was in love with Princess Elizabeth of Bohemia and he wanted to know if people like Descartes felt the same way as he felt when he was in love. He wanted to get acquainted with Schopenhauer’s feelings: “Did the pessimistic Schopenhauer really felt desperate when was lying in his bed at night or could he look at the world with an ironic mildness not found in his books.”

To me this seemed a hopeless undertaking. You will never know their minds from their books. The pages of these philosophers’ books don’t really give you access to their feelings. Even the sonnets of great poets don’t give you a ‘Vulcanic mindmelt’¹ with those poets. He was also interested in the mental life of great dictators and cruel criminals. He was a weird guy. I never could identify with him or sympathize.

Later on when I had some unexpected quarrels with my girl friend, I sometimes looked at that smooth face of hers and thought what is dwelling in that head. I never was sure what she really felt. She stayed a sweet mystery to me. That made our relationship exciting.

Some philosophers of mind generalize from the examples above to a more general position: *we can have no knowledge of any other conscious mental states besides our own*. They even deny telepaths can.

¹ Star trek lovers know what that means.

3. First person data, third person data and neuronal correlates of consciousness

1. A team of researchers from the University of Groningen carried out the following experiment. They recruited 13 healthy heterosexual women and their partners. The women were asked to lie with their heads in a PET scanner while the team compared their brain activity in four states: simply resting, faking an orgasm, having their clitoris stimulated by their partner's fingers, and clitoral stimulation to the point of orgasm. The results of the study are striking. As the women were stimulated, activity rose in one sensory part of the brain, called the primary somatosensory cortex, but fell in the amygdala and hippocampus, areas involved in alertness and anxiety. During orgasm, activity fell in many more areas of the brain, including the prefrontal cortex, compared with the resting state.

Imagine a future science fiction world in which those results are well anchored in a strongly corroborated theory.

In this world men are still afraid their partners are faking an orgasm. However, based on the theory mentioned above little orgasm meters are fabricated. These meters are capable of detecting fake orgasms. Some women (well-known for their honesty) swear they really had an orgasm even when an orgasm meter contradicts this. Who do you believe? Can you think of a possible test to decide who is right and who is wrong?

2.

On 17 February 2012, Prince Friso was buried under an avalanche in Lech, Austria.



According to a formal statement of the Netherlands Government Information Service (RVD), given after some days the prince's condition was described as "stable, but critical".

On 24 February, an Innsbruck medical team announced that the prince had been buried for 25 minutes, followed by a 50-minute CPR to treat his cardiac arrest. His physician stated that neurological tests indicated significant brain damage due to oxygen shortage. It remained unclear whether the prince would ever regain full consciousness. On 19 November 2012, it was announced that the prince had started to show some signs of consciousness but it was still not certain whether he would ever wake up, and if he did, in what state. On 9 July 2013, Prince Friso was moved back to Huis ten Bosch in the Netherlands. It was understood that his

coma had then evolved into a minimally conscious state. On 12 August 2013, it was announced that Prince Friso died in Huis ten Bosch due to complications from the accident.

3.



A few years earlier there was a case of another person that was in coma Terri Schiavo. In the spring of 2005 her case was hotly debated in the world press. After an accident she lived in a hospital in a persistent vegetative state. Patients who are in this state are able of being wakeful. They can open their eyes and move their arms and their legs. They have a normal sleep-wake rhythm and can breathe by themselves. They can even react to some stimuli.

According to neuroscientists the lesions that are associated with a persistent vegetative state make it very unlikely that these patients have conscious experiences. All Terri Schiavo's abilities were regulated by subcortical structures as the medulla, the pons, the midbrain and the thalamus.

Schiavo's husband wanted her life terminated. There was protest from her parents and other adversaries. They insisted that Terri really had conscious experiences. On the portrait above she doesn't look very bright, but is she not conscious? In the end her husband and the doctors won.¹

There seems to be a common theme to these problems.

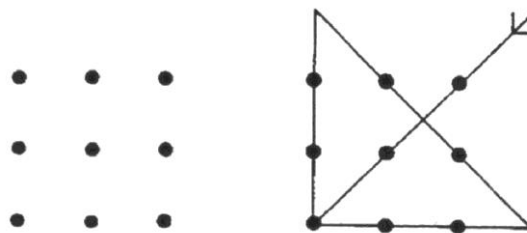
¹ Of course there are all kind of religious-theological or emotional reasons which forbid people or which make people to forbid other people to be merciful and end someone's life. But those are not the reasons that are important to this discussion, although I think it is quite possible that the reasons that are important to our discussion are not the *motive* for those religious or emotional attitudes, but that they are the *motivation* behind them.

4. Introspection: Other minds may be a problem, but we do know our own mind or don't we?

There are a lot of differences of opinion with regard to introspection. According to Descartes we have direct access to our consciousness. (It is the only thing we have direct access to.) Philosophers of mind sometimes describe their own experiences and use these descriptions as a kind of data for their thinking. Psychologists sometimes have a different opinion.

a. Puzzle solving

The Dutch psychologist Piet Vroon studied the so-called nine-point problem. The task is to connect all of the dots in a nine-point matrix of 3 x 3 by using four connected straight lines. The subjects were instructed to use a practice sheet on which more matrices were printed, while they thought about the problem. The problem is depicted below.



Subjects were divided into four groups, each group had to solve the problem under a different condition.

Group 1 was instructed to solve the problem as quickly as possible using the practice sheet.

Group 2 received the same instructions, but afterwards they were unexpectedly asked to make a retrospective report on their thought processes.

Group 3 also received the same instructions, but they were told in advance that they were expected to make a retrospective report.

Group 4 was instructed to record their introspective representation of the thought process while trying to solve the problem.

Predict what will happen in each group

b. A huge thermometer.

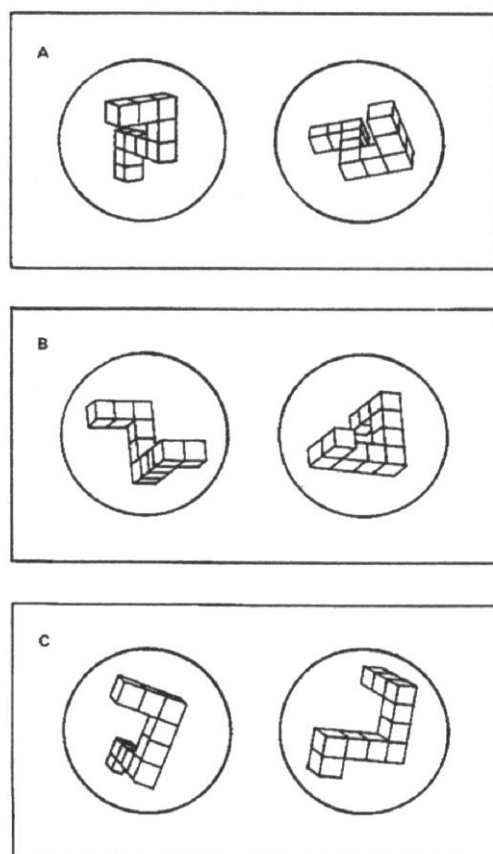
What happens when you put an enormous thermometer of 80 degrees Celsius in a very small cup of water of 5 degrees Celsius?

c. Rotation

It should be clear by now that introspection is riddled with problems. Nevertheless, most psychologists do not object to the use of introspection in the experiment below.

In an experiment by Metzler and Shepard, subjects were shown pairs of drawings (see below). There were three types of pairs: 1) a pair of drawings that are physically identical but differ by a rotation in the picture plane, 2) a pair of drawings that are physically identical but differ by a rotation in depth, and 3) a non-identical mirrored pair that also differs by a rotation. The subjects had to indicate whether the drawings in a pair were identical or not. In reply to the question of how they reached their decision, the subjects said they had rotated the drawings in their mind's eye until they were equally oriented. Only then did they make their decision. This was also confirmed by the reaction times, which showed a linear increase with the rotation angle.

With a rotation of more than 180 degrees, moreover, the curve became bimodal, which can be expected if such a strategy is being used.



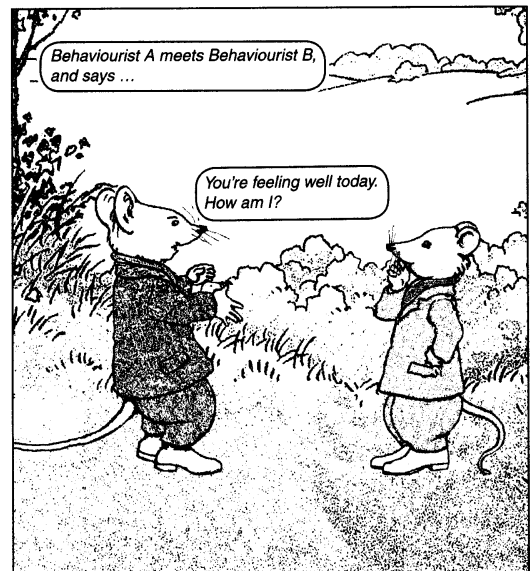
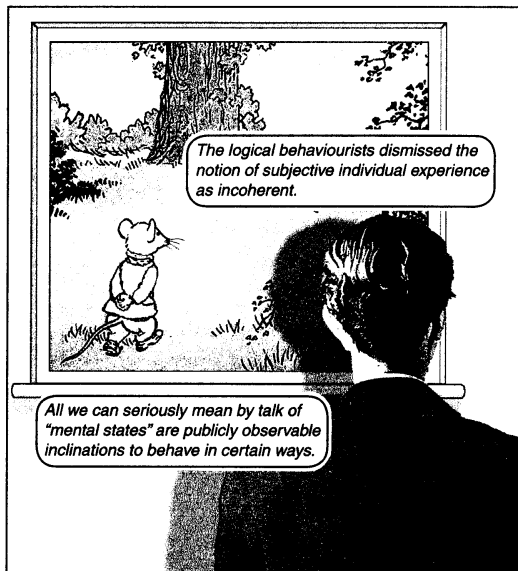
Psychology is impossible without subjective reports. According to Stanislas Dehaene they play an indispensable role in psychology of consciousness!

C. Philosophical Views on the Mind Body Problem

5. Behaviourism, Functionalism and Other Views

In the 1920's John Watson made the radical suggestion that behaviour does not have mental causes. Mind does not exist or does not play a role in our behaviour.

Behaviourism



Functionalism

But then there is a problem with behaviourism. Behaviourists search for lawlike regularities between stimulus and response (between input and output). But behaviourists can't even describe coffee-machine F.

Coffee-machine F gives you a cup of coffee if you put in 1 euro. Sometimes, when you put in 50 eurocents it gives you coffee. Sometimes it doesn't. You cannot formulate its behaviour in a lawlike way. It seems that the behaviour of the coffee-machine is not completely regularly. You don't *seem* to be able to describe the behaviour of the machine in functional laws.

Explain!

(Of course you can assume that the irregularity of the behaviour of the coffee-machine is due to the whimsicality of the machine. But mechanical coffee-machines don't behave in that way.)

Try to solve the next puzzle:

If you attribute two different internal states to the coffee-machine, you can describe its behaviour with the help of 4 (or better 8) law-like equations.

A gruesome fairy-tale

“Once upon a time very long ago, the unemployment rate in our country was so high that the ministry of social affairs, decided to take desperate decisions. The minister of social affairs F.Y.D. Egberts decided to replace coffee-machines by real people disguised as coffee machines. (They were sitting in the casing of a coffee-machine.) They got a rulebook with our 8 equations and they followed them as rules. So if you wanted to take a cup of coffee, you went to the coffee machine and followed the usual procedure. You put in one euro in the slot of the machine and you got a cup of coffee. Sometimes when you put in 50 Eurocents you got nothing and sometimes you got a cup of coffee.”

What can we learn from this fairy tale?

Functionalism is the official philosophy of cognitive science, but it is not the only extant view about mental life and consciousness.

D. The Unity of Mind

6. Two brains, two minds?

Complete commissurotomy is the surgical dissection of the corpus callosum and the anterior commissure. This procedure is sometimes performed on people suffering from serious epileptic seizures starting on one side of the brain and spreading to the other side. By splitting the hemispheres, at least one side of the brain will become free of seizures, which helps the patient.

A side effect is that the two hemispheres are no longer able to communicate directly. In everyday life, the patients may function well. However, when they are subjected to laboratory tests, curious phenomena can occur. Consider the following case from the work of Sperry.

Split brain patient NG was asked to wear so-called Z-contact lenses, which block the patient's right visual field. She looked at a series of cards, with each card containing several pictures. The instructions were: choose the picture you like best. First, she was shown a series of cards with relatively neutral stimuli such as food, flowers, animals, and children. Her reactions were rather neutral and routine. On a later card, four portrait photos of NG herself were presented. The ensuing protocol was literally as follows.

NG: "OK," and she paused silently for about seven seconds while she examined the test array. She then burst forth with an abrupt loud exclamation: Oh No!... Where did you g... What are they? This was followed by a very loud laugh, another exclamation "Oh God!", and a three-second pause. She then asked hesitantly, "Dr. Sperry... you sure there's people there?"

EXAMINER: "Which one do you like... that one?" (referring to the picture that the subject is pointing to).

NG: "Uh-huh."

EXAMINER: On removal of the test array, the examiner asked, "What was in the picture?"

NG: Still in a loud emphatic voice, "Something nice whatever it was... Something I wouldn't mind having probably." This was followed closely by another loud laugh.

Later, in response to yet another card with pictures of herself, NG gave the correct reaction. First, she guessed: "Probably me...", then she said determinedly: "Yeah, that's a picture of me."

Consider that 1) the language ability of this patient was located in the left hemisphere; 2) the lower brain structures in the brainstem, which regulate emotions, were not severed; and 3) the patient's own speech eventually reaches both hemispheres via the patient's ears.

E. Is our Mental Life Conscious?

7. Conscious or unconscious?

A.

1. You can learn a lot about the essence of consciousness by studying unconscious processes. If information can be processed and used without conscious experiences, than those processes are not essential features of consciousness. May be, you remember the examples that Stanislas Dehaene described in his “Consciousness Enters the Lab”.
2. Some brain disorders are also very informative: some amnesiacs show unconscious, emotional recognition. Blindsight patients and visual agnosia patients have some kind of visual knowledge they can use. Neglect patients have some unconscious emotional knowledge of the ‘neglected’ stimulus that influences their preferences.
3. Some people think that abstract mental tasks like playing chess, doing arithmetic or mathematics, using and understanding concepts, understanding meaning are typically conscious activities. But are they?
4. According to one well-known hypothesis: the essential feature of consciousness is binding.
5. According to another hypothesis: Attention is the essential feature of consciousness.

B.

A lot of information processing is unconscious. One may sometimes wonder: What do we need consciousness for?

8. Most dreams are fantasies, but when I wake up...

A dream story

"I am floating over a wide open field towards a chapel. I go inside. I am surrounded by the silence and the consecration of the enclosed space. In the shadows in the back, there is a sarcophagus, set up like an altar. Behind it, I see the statue of a saint, a man with a beard. On either side of the sarcophagus are two burning candles. I walk slowly to the sarcophagus. Suddenly it dawns on me: my mother is in there. I want to see her one last time. I bend over the sarcophagus to lift up the lid. But suddenly the candles flare up. Startled, I pull back, and the flames calm down. I wait... nothing happens. Again, I reach over to lift the lid. And again, the flames flare up, they only calm down after I have retreated. After a while I try again... The saint starts to reel, threatening to crush me. I try to run away, but I feel like I'm paralysed. And that's when I woke up with my heart pounding in my chest."

Two psychologists try to explain the dream.

It's simple. The chapel = the mother, going inside = regression into the maternal body or incest. The sarcophagus also needs little explanation: it is the womb that gives life, or (sarcoma = flesh, plagues = eating) that receives the penis and sperm. Lifting the lid in order to look inside is an attempt at incest, through which the mother will be found in the maternal body (after all, she's inside the coffin). But that will not happen since the father (the saint is a sublimation of the father) watches over her. At the same time, he keeps her prisoner between his burning phalli. His anger flares up in flames, which are also phallic shaped, threatening the bad son for his attempt at incest. Oedipus caught in the act.

It's simple. During the REM sleep, so called PGO waves occur (Pons-Geniculate-Occipital cortex). This stimulation of the occipital cortex is accompanied by perception of visual images. When the stimulation is relatively strong, burning candles are observed. Activation from the pons also affects the vestibular system, which may cause a sensation of flying. Most likely, the motor cortex is also stimulated, which may cause the feeling of wanting to flee. Meanwhile, the motor neurons in the spinal cord are tonically inhibited from the pons, preventing the running motion from occurring, which causes the feeling of being paralyzed. The anxiety is caused by a sensation of variation in autonomous arousal, such as the heartbeat. The rest of the story is constructed around memories of a visit to a chapel the previous day.

But why?

F. Complexity and information

9. My Girlfriend's complexity

I once had a girlfriend who believed in the theory of evolution. I don't mean that she only thought that the contemporary evolutionary framework is a powerful scientific research program with a lot of interesting subtheories. It was her religion. It dominated her life. Everything I did or she did was subjected to evolutionary explanations. And as most of you know superficial evolutionary explanations are easily obtainable. (Really evolutionary explanations need a lot of hard scientific work.)

The mind body problem was always a bone of contention. I think that if a proximate explanation of consciousness is not available, you certainly won't find an ultimate explanation. She always came up with recurring incantations like: During the history of life on earth organisms become more and more complex and at a high degree of complexity consciousness emerges. I always found this a superficial and muddleheaded idea. This theory doesn't give an answer to the questions: What degree of complexity, why that degree of complexity and why complexity at all?

But lo and behold this idea or part of this idea has made a glorious comeback. It is more fruitful than I ever could have imagined. The neuroscientist and psychiatrist Giulio Tononi came up with the idea of **Integrated Information**.

Nowadays the term Complexity is translated as Integrated Information and according to the Integrated Information Theory (IIT) Φ is **the** neural correlate of consciousness.

Information processing in itself is not very interesting.

An example by Tononi: Consider an idealized megapixel digital camera, whose sensor chip is essentially a collection of a million photodiodes. Even if each photodiode in the sensory chip were just binary, the camera could distinguish among $2^{1000000}$ states. That is a lot of information processing. But nobody would suggest that this camera is conscious.

The measure of integrated information is denoted by the letter Phi (Φ). Φ will be high when there is a lot of information generated among the parts of a system as opposed to within them.

A formula for Φ is:

$$\Phi(X(\text{mech}, x_1)) = H[p(X_0(\text{mech}, x_1)) \parallel \prod p({}^k M_0(\text{mech}, \mu_1))] \text{ for } {}^k M_0 \in \text{MIP (where } X \text{ is our system, mech is that system's mechanism, } x_1 \text{ is a state of the system, and } \prod(p({}^k M_0(\text{mech}, \mu_1))) \text{ is the product of all the probability distributions of each part of the system in the minimal information partition.)}$$

You are not expected to understand this formula. Its importance is theoretical. In practice it is difficult to apply it to real brain processes. It is only feasible to use it in simulations of very small networks.

But it is still important to try to test predictions of Tononi's theory and that's feasible.

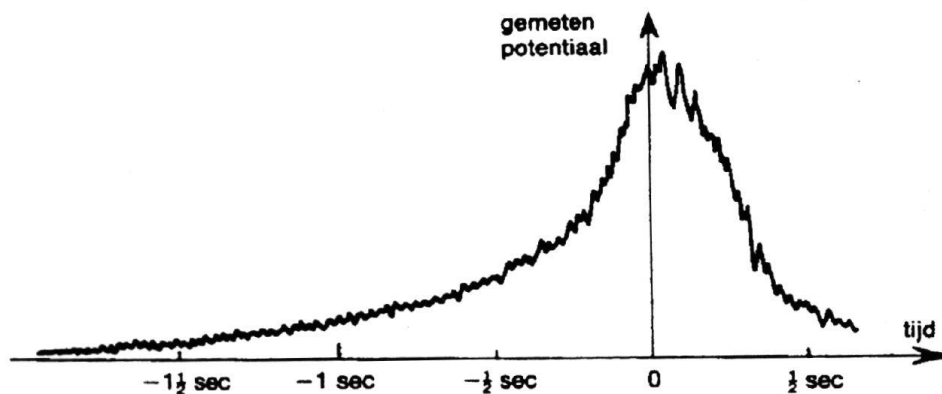
(Remember from the history of science most chemical processes were too complex to describe in quantum mechanical terms.)

G. Descartes Free Will

10. Free will takes time!

a. One of the most important arguments Descartes used to defend his dualism was that people simply cannot have free will if all of their behaviour is causally determined by their bodies. What we need is an autonomous mind, which in some way or another can act upon our body without being 'forced' to by the body. Most modern scientists and philosophers no longer believe in the existence of such an autonomous 'substance', but it is, of course, still possible to study acts of free will.

The German researcher Kornhuber subjected a number of subjects to an EEG and asked them to bend their right index finger repeatedly but only at moments of their own choice. Note that the subject was thus free to decide whether he wanted to carry out the motion or not. The EEG showed a gradual increase of about 1.5 seconds in the action potentials prior to occurrence of the motion itself. (See graph below.)



Kornhuber called this potential a *Bereitschafts* potential. Today it is known as the readiness potential.

Benjamin Libet (1985) was interested in the time parameters of Kornhuber's research. Using a special clock, he had his subjects indicate when they actually made their decisions. (Note that the founder of psychology, Wilhelm Wundt, already used this timing method.) The readiness potential was found to start 350 milliseconds prior to the decision to move.

In an earlier experiment (1979), Libet studied how long it took for a stimulus that reaches the somatosensory cortex to become conscious. This was found to take more than half a second.

A normal reaction to a stimulus usually lasts no longer than one fifth of a second. Anyone who can compute will probably therefore wonder: "What is the use of free will?"

b. Some philosophers say free will is not the problem, but responsibility is. That's something different from free will. Do you agree or disagree with both statements and why? What are the consequences if both are not possible?

H. The Future

11. The problems are difficult but the future is bright

Twenty years ago, introductory psychology textbooks did not have chapters on consciousness. Now, you will find a chapter on consciousness in almost every introductory psychology textbook. The same holds for introductory textbooks on cognitive psychology. During the last couple of years, articles on consciousness have even crept into *Science* and *Nature* and in psychological and neuroscientific journals. In other words, psychology and cognitive neuroscience seem to be bringing us closer to solutions of the mysteries of consciousness. But is this true? Do we really know more about consciousness than previous generations? And what do we know?

Now we have come to the end of this Course. You may ask yourself:

What have we learnt about consciousness?

Were the solutions scientists and philosophers created only solutions of the easy problems?

There are philosophers (among who Colin McGinn) who say that we don't have an organ to solve this type of problems. We are not evolutionary programmed to solve them in the same sense that a rat or a chimpanzee is not evolutionary programmed to learn a prime number maze.

Other philosophers think we make an antipathetic fallacy. (David Papineau.)

But the always-optimistic David Chalmers (the same man who made the distinction between easy and difficult problems) thinks it is possible to construct a non-reductive science of consciousness.

NB. Try to formulate three contradictory opinions about these three positions. Divide the tutor group in three different subgroups. In the next meeting every group will defend a different point of view.

7. Reading list

Problem 1

1. Kim, J. (2011) *Philosophy of Mind*, West View Press, Chapter 2. **This chapter explains dualism and Descartes arguments for it.**

2. David Chalmers in his Ted Talk <https://youtu.be/uhRhtFFhNzQ> explains conscious problem and the difference between easy and difficult problems of consciousness.

3. Bermudez, J.L. (2014) *Cognitive Science, An Introduction to the Science of Mind*, Cambridge University Press. 14.1-14.2 **Gives a short argument by Leibnitz against materialism.**

4. Dehaene, S. (2014) *Consciousness and the Brain*, Viking. Introduction 1-17,

And if you want qualitatively better e-readers of Dehaene and Bermudez. Their books are also downloadable on Libgen.

NB. If you don't understand a philosophical problem about the mind body problem or if you want to delve deeper into it, you can always go to Jaegwon Kim's "Philosophy of Mind". His book is a reference work.

For lovers and connoisseurs

Jackson, F. (1982) Epiphenomenal qualia. *Philosophical Quarterly*, 32, 127-136.

Descartes, R. Meditations on first philosophy. In Vesey, G.N.A. (1964) *Body and Mind*. London, George Allen and Unwin Ltd. 22-36.

Objections by Hobbes and Arnauld and Replies by Descartes. In Vesey, G.N.A. (1964) *Body and Mind*. London, George Allen and Unwin Ltd. 36-42.

Elizabeth von Bohemen, Correspondence with Princess Elizabeth. In Vesey, G.N.A. (1964) *Body and Mind*. London, George Allen and Unwin Ltd. 48-54.

Huxley, T. (1874) On the hypothesis that animals are automata. *Fortnightly Review* 95:555-80. In Vesey, G.N.A. (1964) *Body and Mind*. London, George Allen and Unwin Ltd. 134-144.

Problem 2

1. Carruthers, Peter (2004) *The Nature of the Mind: An Introduction*. London, Routledge.
6-26. **It is important that you understand the precise argumentation in this chapter. It helps you to understand the mind-body problem in general.**

2. Joshua Knob: Can a Robot, an Insect or God be aware?

<https://www.scientificamerican.com/article/can-a-robot-an-insect-or/>

Problem 3

1. Owen, A. M. et al. (2006). Detecting Awareness in the Vegetative State. *Science*, 313, 1402.

2. Monti, Marti M. et al. (2010): Willful Modulation of Brain Activity in Disorders of Consciousness. *The New England Journal of Medicine*, Volume 362, No 7, 579-598

3. Owen, A.M. <http://www.youtube.com/watch?v=Hz133pdwbOA>

Explains the content (1) and (2). It's nearly enough to understand the contents of those articles.

4. Chalmers, D. (1999) *First-Person Methods in the Science of Consciousness*
<http://consc.net/papers/firstperson.html>

5. Chalmers, D. (1998) *On the Search for the Neural Correlate of Consciousness*.
<http://consc.net/papers/ncc.pdf>

6. Summary of Chalmers (4) & (5): Power point presentation about bridging principles Rob de Vries. **If you find the argumentation in (4) and (5) difficult, this ppt. may possibly help you.**

Criticisms

Burton, R. (2007) *The light's on, but is anybody home?*
https://www.salon.com/2007/09/25/is_she_conscious/

Problem 4

1. Farthing, G.W. (1992) *The Psychology of Consciousness*, Englewood Cliffs, NJ, Prentice Hall. Chapter 3. 45-63

2. Hurlburt, Russell T. and Heavey, Christopher L. Telling what we know: describing inner experience, *Trends in Cognitive Sciences* Vol.5 No.9, 400-403.

3. Seager, W. (2009) *Philosophical Accounts of Self-Awareness and Introspection*. In: P. W.P. Banks, *Encyclopedia of Consciousness Volume 2*, Academic Press Oxford, 187-199.

3. Dehaene, S. (2014) *Consciousness and the Brain*, Viking. Chapter 1

4. Bermudez, J.L. (2014) *Cognitive Science, An Introduction to the Science of Mind*, Cambridge University Press, 40-43. (If you don't know the rotation experiment or are interested in it, you can find a summary [here](#).)

NB. Dutch members of the tutor group are supposed to report the results described in Vroon's article in their group.

5. P.A.Vroon (1976) *Bewustzijn, hersenen en gedrag*. Bilthoven, Ambo. (Dutch) 353-375

Problem 5

1. Marianne Talbot, A Romp through the philosophy of Mind,
<https://youtu.be/NuoGvNSkS5Y>

The lecture by Marianne Talbot seems elementary, slow and long-winded, but at the end of the lecture you have learned a lot.

2. Fodor, J.A. (1981) The Mind-Body Problem. *Scientific American*, 244, 124-133. **Fodor's article is tightly reasoned. It is important that you understand his argumentation.**

3. Chalmers, D (2010) *Consciousness and its Place in Nature*. In: *The Character of Consciousness*, Oxford University Press. 103-139. NB. If you want a better copy, you can illegitimately download David Chalmer's book *The Character of Consciousness*.

NB. Take your time to read (2) and (3). They are not easy, but if you understand them, you have a good insight in the modern mind-body problem. If you have problems to understand then try to transform your problems into questions that can be dealt with in the tutor meeting.

NB. A Quick reading will not help you to understand the problems.

For Lovers and connoisseurs

Chalmers, D. Idealism and the Mind-Body, forthcoming in W. Seager, (ed.). *The Routledge Companion to Panpsychism*. Oxford University Press.

Problem 6

1. Farthing, G.W. (1992) *The Psychology of Consciousness*, Englewood Cliffs, NJ, Prentice Hall chapter 5.
2. Gazzaniga, M. (2005a) Forty-five years of split-brain research and still going strong. *Nat Rev Neurosci*, 6(8), 653-659.
3. Wolman, David (2012) A Tale of Two Halves, *Nature*, 383, 260-263.

For lovers and connoisseurs

Pinto, Y al. (2017) Split brain: divided perception but undivided Consciousness, *Brain*, 140, 1231-1237.

In this article a lot of facts from Split Brain research are challenged, as are the theories of Baars, Dehaene and Tononi.

Problem 7

1. Bermudez, J.L. (2014) *Cognitive Science, An Introduction to the Science of Mind*, Cambridge University Press. 14.3-14.7
2. Dehaene, S. (2014) *Consciousness and the Brain*, Viking. Chapter 2, 47-88

For lovers and connoisseurs

Students who have still lots of time, because they already know most of this literature from other course can also read chapter 4 of Dehaene. if they want a more elaborated answer than Bermudez' to the question "What is Consciousness Good for?" read: Dehaene, S. (2014) *Consciousness and the Brain*, chapter 3, 89-114.

Dehaene, <https://youtu.be/Ad3EcYBYn2E>

Problem 8

1. Farthing, G.W. (1992) *The Psychology of Consciousness*, Englewood Cliffs, NJ, Prentice Hall. Chapter 12. E-reader
2. Solms, Mark (2004) Freud Returns, *Scientific American*, May 2004.
3. Nir, Y. and Tononi, G. (2010) Dreaming and the brain: from phenomenology to neurophysiology, *Trends in Cognitive Sciences*, Vol.14 No.2, 88-100.

For Lovers and Connoisseurs

Domhoff, G. William and Fox, Kieran C.R. (2015) Dreaming and the default network: A review, synthesis, and counterintuitive research proposal, *Consciousness and Cognition*, 342-353.

Problem 9

1. Koch, Christof (2009) A "Complex" Theory of Consciousness, *Scientific American*

2. Koch, Christof and Tononi, Giulio, reply by John Searle (2013)
Can a Photodiode Be Conscious? *The New York Review of Books*

3. Simone Sarasso, (2014), Quantifying Cortical EEG Responses to TMS in (Un)consciousness, *Clinical EEG and Neuroscience* 1-10.

The article by Sarasso shows the important empirical and practical consequences of Tononi's theory. It is not necessary to go in the statistical and mathematical details.

4. Searle, John (2013) Can Information Theory Explain Consciousness? *The New York Review of Books*, 10.

5. Tononi, G. (2009) Information Integration Theory. In: The Oxford Companion to Consciousness. 376-380

If you want to understand or know more about the mathematics of Tononi's theory, you can read:

Masafumi Oizumi, Larissa Albantakis, and Giulio Tononi (2014), From the Phenomenology to the Mechanisms of Consciousness: Integrated Information Theory, *PLOS Computational Biology*, Volume 10, Issue 5.

Tononi G, Koch C. (2015), Consciousness: here, there and everywhere?
Phil. Trans. R. Soc. B 370

Giulio Tononi (2015), Consciousness, information integration and the brain. *Progress in Brain Research*, Vol 150.

But that's a hell of a job.

Problem 10

1. Benjamin Libet, *Mind time: The temporal factor in consciousness, Perspectives in Cognitive Neuroscience*. Harvard University Press, 2004. Chapter 4
2. Chun Siong Soon, Marcel Bras, Hans-Jochen Heinze, John-Dylan Haynes (2008) Unconscious determinants of free decisions in the human brain, *Nature Neuroscience Advance Online Publication*.
3. Galen Strawson: *The Impossibility of Moral Responsibility*
4. Rigoni, Davide & Brass, Marcel (2014) From Intentions to Neurons: Social and Neural Consequences of Disbelieving in Free Will, *Topoi*, Springer Science+Business Media Dordrecht.

Problem 11

1. Chalmers, D. (2003) *How Can We Construct a Science of Consciousness?*
<http://www.u.arizona.edu/~chalmers/papers/scicon.html>
2. McGinn, C (1999) *The Mysterious Flame: Conscious Mind in a Material World*, New York, Basic Books. 31-77.
3. Papineau, D. (1995) The antipathetic fallacy and the boundaries of consciousness. In Metzinger T (Ed.) (1995) *Conscious Experience*. Exeter, UK: Imprint Academic/Paderborn: Schöningh. 259-271.