

Indian Institute of Technology Kanpur

National Programme on Technology Enhanced Learning (NPTEL)

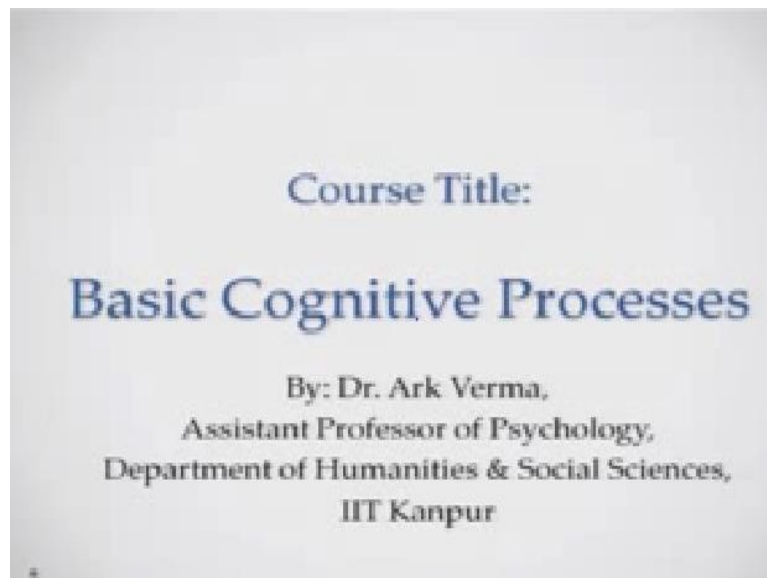
**Course Title
Basic Cognitive Processes**

**Lecture: 02
A Brief History of Cognitive Psychology**

**by
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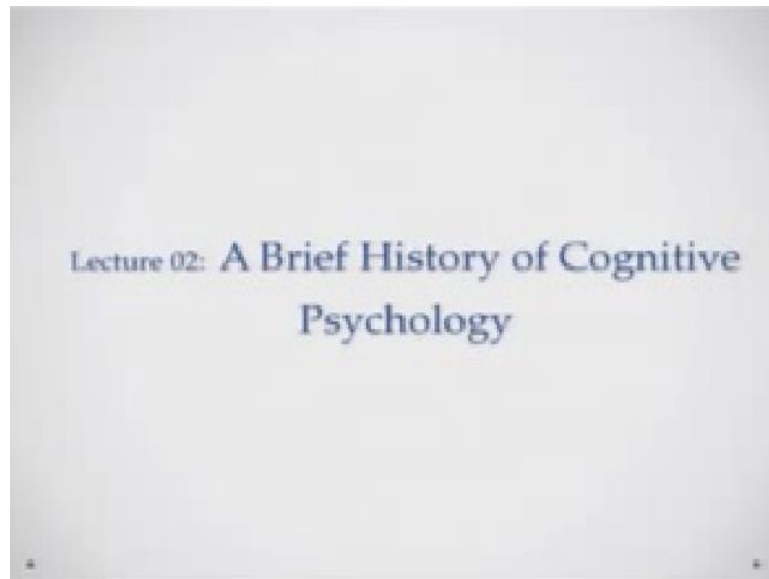
Welcome to the second lecture of the series of this course called basic cognitive processes.

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I am Dr. Ark Verma, assistant professor of psychology in IT, Kanpur.

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The title of today's lecture is a brief history of cognitive psychology. In this lecture, we will talk about the historical antecedents of cognitive psychology. But even before we do that let us spend a moment to think about why history of cognitive psychology is important. In today's lecture, what I will do is I will you through the development of the ideas of cognitive psychology.

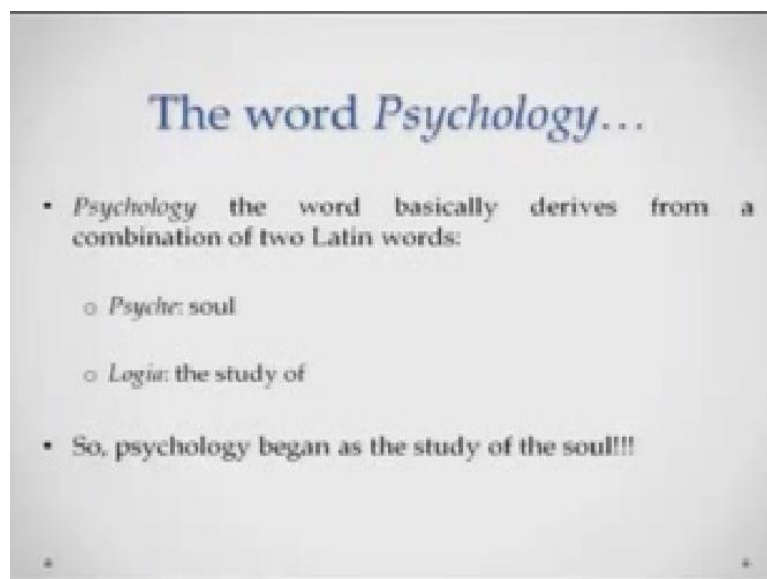
I will talk about how the ideas related to mind and behaviour originated in the ancient Greek schools of philosophy. We will also see how later philosophers contributed to the growth of this idea and then we will going to various schools of thought that emerged in psychology from their will go to the place where the ideas about cognition and cognitive psychology, the ideas about mental processes take shape and that basically leads to the kind and contemporary form of enquiry that is cognitive psychology.

Now why is doing all of this necessary. Why do I want to actually do this in today's lecture? There are two simple reasons, one of them is that going through this historical chart of how these developed what we will be doing this, we will be seeing how a particular idea which seems to rather commonsensical has been approached through a variety of perspectives from ancient times to the times to the more recent times.

We have to talk about also that how various people contributed in the growth and the development of this idea. They have been contributors for variety of disciplines towards this discipline of cognitive psychology, and in this lecture today I would ask you to make those connections.

So it will be very important that you pay attention to how this particular idea of cognitive psychology actually develops from philosophy onwards, and it comes and with the inputs from even feels like artificial intelligence of computer science takes form of enquiry which is known currently as cognitive psychology. Let us go to the routes of this word called psychology.

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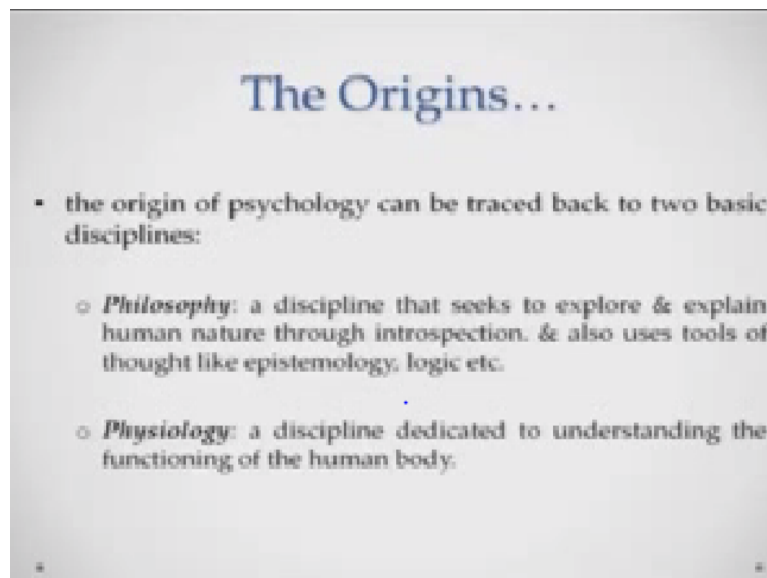


The word psychology basically derives from the combination of two Latin words. The first word basically is psyche or soul. The second word is logia which is the study off. So psychology basically defined means the study of the soul. Now I would like you to take a moment and wonder what soul would mean here. Basically by referring to the soul, those Asian Green philosophers were basically talking about what we probably today refer as the mind.

Anything that a person does we actually look for causes, we actually look for reasons, why and how the person is being able to do that or accomplish that particular behaviour. All of

that in ancient times was basically attitude to this thing called the soul. So that is why it is logical to expect people to start talking about the soul as the seat of human behaviour. We will see how that actually pans out in ancient philosophy.

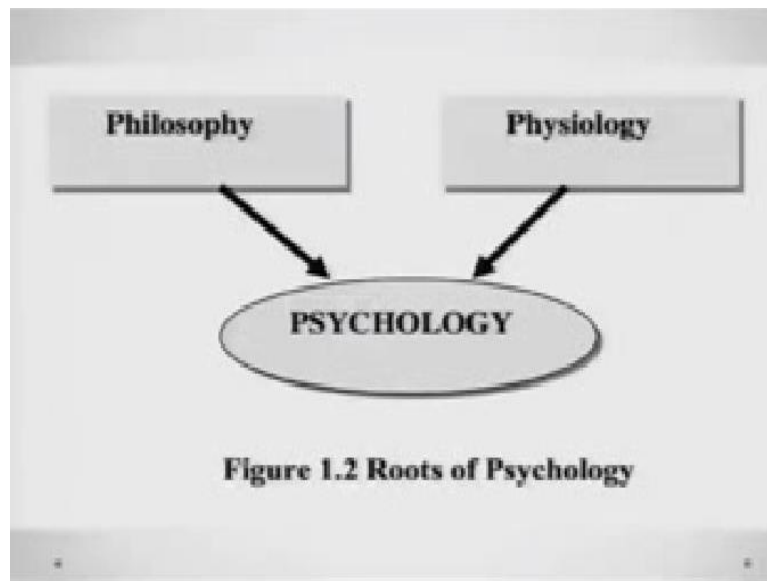
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So origins of psychology then basically can be actually trace down these two more basic disciplines which are philosophy and physiology. Now philosophy as you know is a discipline that seeks to explore and explain human nature through introspection. It also uses the tools of thought like epistemology, logic etc. Now the subject matter of philosophy if you see is basically thought okay.

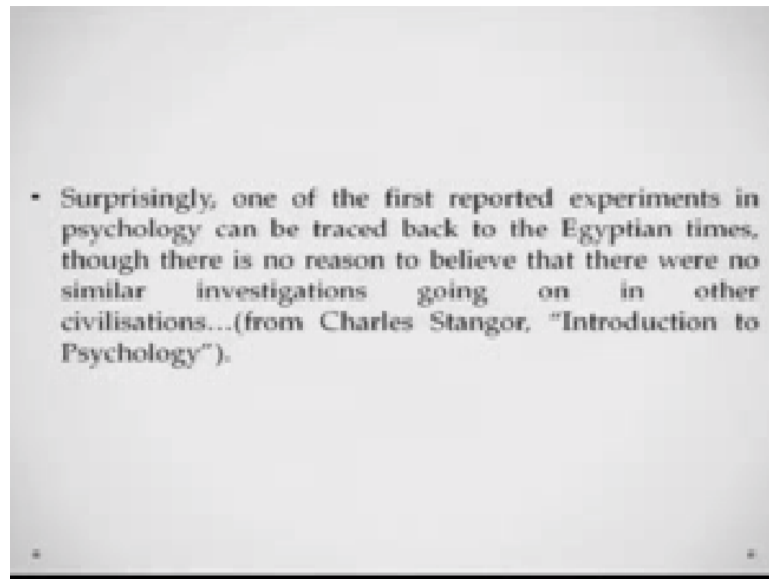
So philosophy is concerned with how a human behaviour, or how this world can be explained by analysing and reanalysing what we think okay. And philosophy also uses tools to actually analyse this process of thought. Say for example, tools like logic. Physiology on the other hand focuses on the body. It is a discipline that is dedicated to understanding the functioning of the human body, the biological aspects of it how a particular organ is constituted how it functions and those questions.

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So psychology you will see basically focuses on the interaction of the mind and body. That is why psychology takes into account approaches both from philosophy and physiology. So this is basically what the roots of psychology are.

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Now surprisingly actually if you go back in time one of the first reported experiments in psychology can actually be traced back down to the Egyptian times. There is no believe that similar experiments were not being done in the different other civilizations.

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The First "Psychological Experiment"

An ancient King of Egypt, as far back as the seventh century B.C., can be considered the first psychology experiment. The king wanted to test whether or not Egyptian was the oldest civilization on earth. His idea was that, if children were raised in isolation from infancy and were given no instruction in language of any kind, then the language they spontaneously spoke would be of the original civilization of man – hopefully, Egyptian.



The experiment, itself, was flawed, but the king deserves credit for his idea that thoughts and language come from the mind and his ambition to test such an idea. While the experiment failed to support the king's hypothesis, Morton Hunt (1993) suggests that it does illustrate perhaps the first evidence in written history that as long as 2700 years ago there was at least one individual who had the "highly original notion" that mental processes could be systematically investigated and studied.

[source: Morton Hunt, The Story of Psychology, 1993, p.1]

But had is this experiment. An ancient king of Egypt, as far back as the seventh century B.C actually wanted to conduct the first experiment. He had this idea that if children will raise in isolation from infancy and were given no instruction in language of any kind. The language that they actually end up speaking will be the original language of man or the language of the original human civilizations. So you wanted to test this out okay.

So he actually raises a child in isolation and does that and basically finds out that the child ends up not speaking anything. So this is hypothesis is actually not confirmed. But even though, this experiment fails to support the kings hypothesis observes that it does illustrate perhaps the first evidence in return history that as long as around 27 hundred years ago there was at least one individual with this highly original notion that mental processes could be systematically investigated first.

And mental process could be in a studied and we have something to do with the body okay. So this is a very interesting piece of anecdotal evidence that actually tells us that people have been in treat with this subject matter of human behaviour of human mind and that is something which is basically been around with us for a long, long time.

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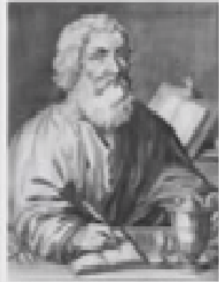


Now let us visit the philosophical Antecedent of the psychology that basic thought processes in psychology that actually gave rise to the questions we ask now.

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The Early Thinkers...

- Hippocrates (460 – 377 B.C.) proposed that mental illness was not caused by demons but physical malfunctions.
 - he dissected human cadavers & living organisms to conclude that *mind* controlled the body.
 - further, that *mind* resides in the brain.



Hippocrates
460-377 B.C.

You might be aware that one of the basic, one of the first things in earlier days when we are, somebody was trying to explain a mental illness of thought was that person aches who is basically experiencing mental illness of kind why he is basically effected by some demon some ghost or some spirits. Now those kind of explanations were very popular in which led to things like witch hunting and people being prosecuted and those kind of things.


Hippocrates as far back as 463 BC basically one of the first to process that mental illness was not cause by demons, but by genuine physical conditions. So you see hippocrates is basically where the first who was making this connection between the mind and the body. Hippocrates actually worked by dissecting human corpses and living organisms and through his experiments in these kinds of physiology concluded that it is the mind that control the body.

Further he proposes that mind basically resides in the head or in the brain. Now this is one of the first times that actually behaviour is being link to something with body.

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The Early Thinkers...

- Plato (427 – 347 B.C.)
 - Suggested that reality exists in our minds & the head is the seat of the mind.
 - Knowledge is gained through thinking & analysing as an effort to understand the world.
 - mind and body are different, but they interact.
 - A rationalist.



Another person Plato, another philosopher who is basically also one of the most influential philosopher of all time suggest that reality basically exists in our minds completely and that head is the seat of the mind much like hypocrites as observed recently. Now Plato is basically suggesting that knowledge is gained through thinking and analysis of thought and this is what basically is our effort to understand this world or the happenings of this world.

So Plato basically suggests that minds and body are different things, but they might interact in some way or the other. Due to his emphasis on this whole process of thinking and thought as the source of knowledge, Plato has been turned as a rationalist. Moving ahead, Aristotle who is basically a disciple of Plato actually felt quite the opposite. Aristotle felt that mind and body were one in the same concrete to what his teacher Plato is talked about.

Aristotle actually says that we can understand the mind by studying the body. So he is saying that mind and body are basically the same thing, and if you studying the body you might eventually end up studying the mind as well. He says that relying on concrete objects and actions rather than thoughts should be our scope of enquiry or should be our scope of study. He says that reality lies in the concrete world. His methods are basically built up on observations of concrete fax numbers and those kinds of things and that is why Aristotle was regarded as an empiricist.

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Now let us move a more modern bunch of thinkers philosophers, but not from the Greek era, but from somewhere close to us in time.

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The Modern Thinkers...

- Rene Descartes (1596-1650)
 - a French mathematician & philosopher.
 - introspection & reflection are better methods than observation.
 - mind & body are two separate things, spiritual & material.
 - *Cogito ergo sum.*



One of the most invention philosophers who basically really shaped the subject matter of psychology was Rene Descartes. Rene Descartes basically was a French philosopher and mathematician. He said that introspection and reflection are better methods than observation node. Now Descartes you might want to know basically believed that are observation are a result of the working of our senses.


And he believe that the sense can actually make mistakes. He talked about particular kinds of illusions where in your senses will end up making say for example, if stare at point of light for a few minutes and after that you will experience sensation of darkness even though there is no darkness outside. So Descartes basically believe that because our senses can be fooled or our senses can actually make mistakes we should actually reliable observation rather than the information coming to us from our senses.

Descartes said that mind and body are two separate things, though he said that these two thing interact through seat in the head will in a pineal gland. Descartes relate so much importance on thought and analysis and that importance can actually be seen reflected in this statement that he makes which is *cogito ergo sum* which basically translates to I think therefore I am. So for Descartes the source of reality of this world basically lies in your thought and in your analysis of the world. Using which you understand the happenings of the world.

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The Modern Thinkers...

- + John Locke (1632-1704)
 - relationship between mind & body is an equal relationship of the two aspects of the same phenomenon.
 - mind depends upon the body through the senses for its informations, while the body depends on the mind to process & store sensory experiences.
 - empiricist & believed in *tabula rasa*.



John Locke came after Descartes, he basically said that the relationship between the mind and the body is sort of an equal relationship wherein these two things are the forms of one in the same thing. Locke basically says that mind depends upon the body through its senses and the body depends upon the mind to process and store this information that is gain through the senses.


So Locke actually is giving something which is you might say rather evaluate study because he is actually going on and saying that mind and body are one in the same thing and there is definite way through is this interaction is taking place. Locke was also an imperishes and he believed in the thought of *tabula rasa*. *Tabula rasa* basically means that all human beings are born as blank slates in this world.

Everything that they learnt, everything that they finally achieve or accomplish any kind of behaviour is learnt by their interaction with this world.

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The Modern Thinkers...

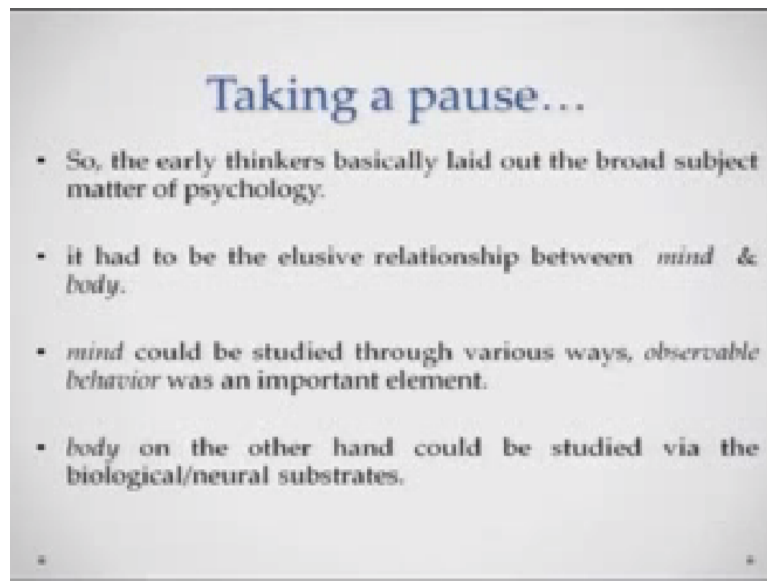
- Immanuel Kant (1724-1804)
 - proposed that humans have a set of faculties - senses, understanding & reasoning, which work together to control the link between mind & body.

A portrait of Immanuel Kant, a German philosopher, shown from the chest up. He is wearing a dark coat over a white cravat and has a serious expression. The portrait is set within a white border on a slide.

Another important philosopher was Immanuel Kant. Immanuel Kant. Basically says the human have a set of faculties. Things like mental functions we talked about in the last class. So you said that these faculties which are your senses the faculties of understanding, faculties of reason. These are the tools which basically work together to control this link between the mind and body.

So by now it is clear that mind and body are two things may be same, may be separate, but there is an interaction certainly going on between them. And different people now are proposing different ways in which this interaction is taking place. So Immanuel Kant basically says that these are the faculties these are the mental functions through which there is interaction between mind and body that is going on.

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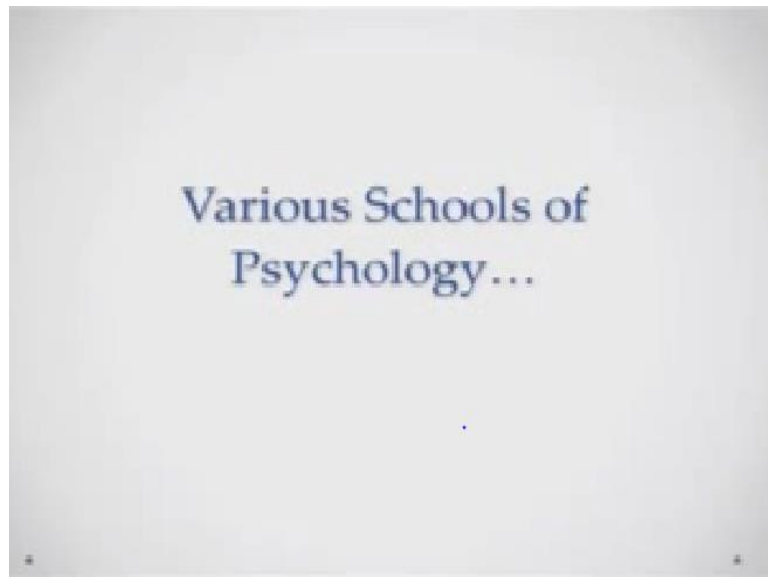
Now let us a brief pause, let us look back and let us see where we have from ancient Greece to more contemporary philosophers or not only contemporary to modern philosophers. So early thinkers, these early thinkers which we talked about have basically laid out the broad subject matter of what psychology is. And the subject matter is nothing other than this relationship between the mind the body.

We will elaborate upon this issue in more detail when we actually talking about the foundational assumption in cognitive psychology, but by this point you should be clear that this is something which is most important to ask questions to cognitive psychologies, even now people are constantly investigating what is mind, how does it relate to the body. Mind in the earlier days could be studied through various ways, observable behaviour was to be one of the more important ways.

Also body on the other hand could be studied by the biological or the neural substrates. So if you want to study the connection between the mind and the body and say for example you want to investigate the body which is basically the brain, you have feels like neuroscience which will actually tell you about how the brain is constructed or how the brain really effects your behaviour.

Mind on the other hand is this body of mental functions which we will see how they evolve and how they are actually structured. Now this entire preface of philosophy actually led to development of various kinds of thought or various kinds of thought systems in psychology.

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These thought systems have been organized as vary as schools of thought each school of thought has one or more prominent thinkers and it is these thinkers whose opinion forms the basis of this entire school of thought. So we will see we will examine how these different schools of thought contributed to the growth and to the evolution of something that is cognitive psychology.

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Structuralism

- Wilhelm Wundt (1832-1920) developed the first psychology laboratory in Leipzig, Germany.
- focussed on the nature of consciousness itself.
- believed that it was possible to analyse the basic elements of the mind & conscious experience.
- founded *structuralism*.

A black and white portrait of Wilhelm Wundt, a man with a full beard and glasses, wearing a dark suit and a bow tie. He is looking slightly to the right of the frame.

One of the first and the foremost schools of thought in psychology was structuralism. Structuralism was found at by Wilhelm Wundt who is basically a psychologist in Germany who also established the first psychology lab in Leipzig, in Germany. Wilhelm Wundt basically focussed on the nature of consciousness. He actually wanted to explain what consciousness is, he actually wanted to explain the components which form human experience.

Wilhelm Wundt believed that it was possible to analyse the basic elements of the mind and conscious experience. If you talk to one, he might be able to tell you that the feeling of happiness is composed of X, Y and Z smaller components, or the experience of actually being in a particular place in a particular time can actually be boiled down to these smaller components.

On the basis of this main stream of thought want found this a school which is basically known as structuralism.

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- **Structuralism**
 - aimed to identify the basic elements or structures of the psychological experience.
 - to create something like a *periodic table* of elements of sensations.
 - used the method of *introspection* to attempt a map of human consciousness.
 - asked participants to describe exactly what they experience as they work on mental tasks, such as viewing colours, reading etc.

Now structuralism basically aimed to identify the basic elements or of the cognitive psychological experience. They wanted to create something similar to periodic table which basically had all of these elements of consciousness. Structuralism used the method of introspection to attempt this map. They basically in a typical want a lab if you are a participant there the psychologist might just ask you to relax to sit down, and to report as truthfully as detailed manner as possible whatever your experiencing at any point in time.

Or for example whatever you are experiencing while you are engaged in a particular task. Say for example you have given a flower to a see, and you are actually experiencing this flower you might want to a record that you are actually seen a shape you are seeing a particular colour, you are smelling a particular order and you actually feeling texture when you touching or holding that flower. This is the detail, this is the componential structure of experience that the structuralism were actually emphasizing on.

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- also used *reaction times* as a measure to systematically assess the workings of the mind.
 - identification of sound took longer than detection (Wundt)
- distinguished between *sensation & perception*.
- **Edward Titchener (1867-1927)** claimed to identify more than 40,000 sensations, as vision, hearing & taste.

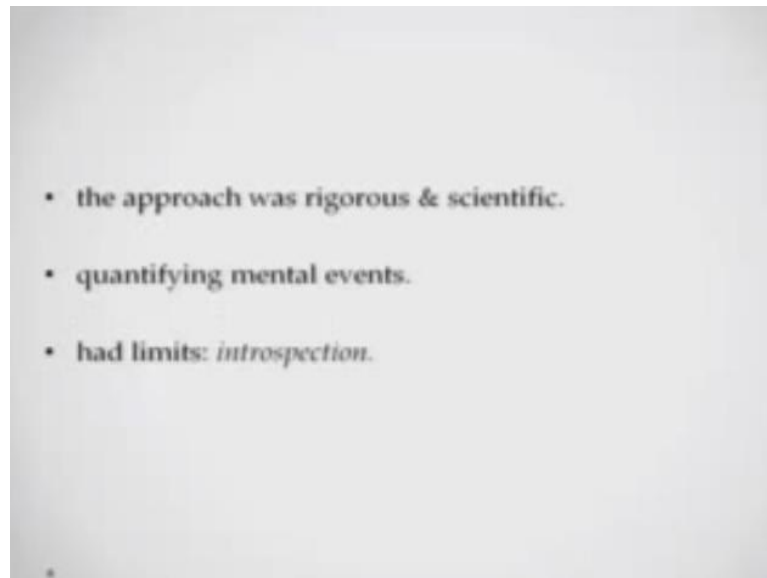
Further structuralisms were actually using things like reaction times as a measure to systematically assist the workings of the mind. So what they would do is they would actually try and log while your experiencing certain steps and with that they will did use how much time a particular step took and they could actually try and did use then that what are the basic components of any experience and how much time it took everyone to go through those sets of experiences.

Say for example if I actually play a sound in your head phones say for example if I play a sound here and if I ask you to identify that sound one of the first that you will be able to register is that there is a sound being plate. So the first thing that you will do is actually deduction of the fact there is a sound. This basically refers to what sensation is. The second thing that you might go on to experience is that you might be able to actually recognize the sound or the song let us say which I am playing.

This recognition of that song is basically identification that is what perception is when the knowledge is in the scope of your awareness. So and the structuralism basically found that identification took longer than detection. You might logically try and connect that first you detect it takes a bit of less time, and then you try and identify what the song is, it takes a bit more after you have really deducted at there is a sound at least.

So this is how the school of a psychologist distinguish between sensation and perception. There actually following are other scientific method. Edward B. Titchener one of the disciples of Wilhelm Wundt basically claims to identify more than 40000 sensations such as vision, hearing, taste and so many others.

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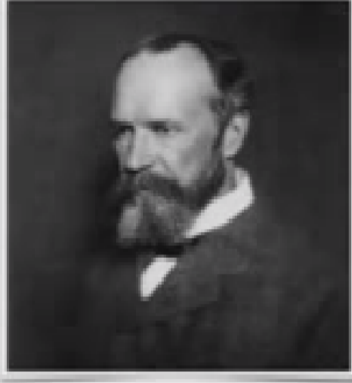
This method or this approach followed by the structuralism were other regress and very, very scientific. They were actually trying to quantifying mental events. They were actually trying to quantify the human experience. But they had a bit of problem because the main method they were actually using was that of introspection. Now you may take a pass and ask yourself what is wrong with introspection.

And might now tell you that introspection basically one of the things that is wrong with introspection is that knowledge gain through introspection is not verifiable. Science is about verifying proving to the others that something exist, in that sense introspection was probably known the best of the methods to follow that is one of the short comings that this structuralism schools of psychologist were having.

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Functionalism

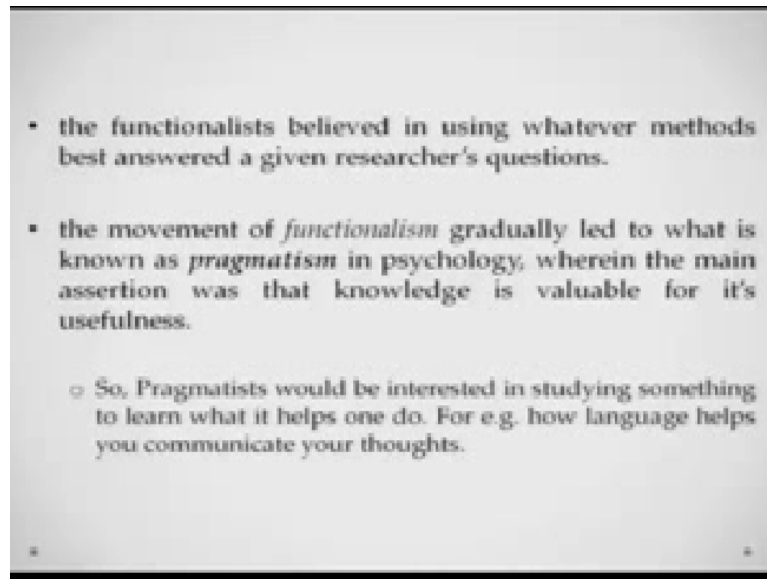
- William James (1842 – 1910)
 - founded *functionalism*.
- seeks to understand what people do & why they do it.
- Interested in studying how the mind works & why the mind works as it does.

A black and white portrait of William James, a man with a full beard and mustache, wearing a dark suit and a white shirt with a dark tie. He is looking slightly to the left of the camera.

Let us move to the next school Functionalism. Many of few would have heard that William James is sometimes refers to as the father of psychology. William James basically belongs to this school of thought which is turned as functionalism. Now functionalism is characteristic in a way that functionalist seeks to not only understand what people do which the structuralism were also trying to do.

But the functionalist would also concern with why people do certain things. Why do certain behaviours take place okay. So they are interested in studying how the mind works, yes but also why the mind works as it does. So the questions this structuralist and the functionalist were asking was slightly different and let us say a bit more advance then the questions earlier asked.

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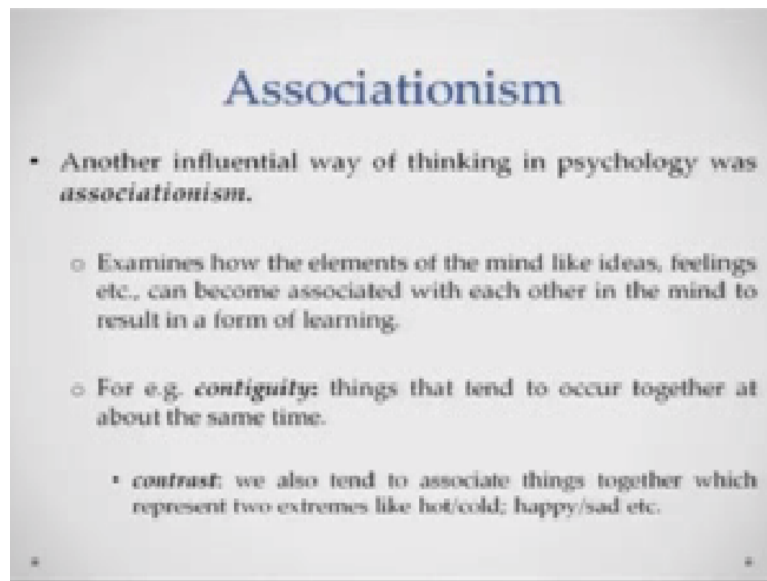


The functionalist believed in using whatever methods that would have answer a particular researcher's questions. They are not really too much about the methods but more about the kind of questions that are being asked. Now this movement or this stands of functionalism gradually leads to what is known as pragmatism. Now pragmatism is also one of the popular approaches in psychology which basically is concerned about the fact that knowledge is valuable only for what it is usefulness.

You might know certain thing you might have certain skills, but what are you using there before. That is basically what is the functionalist wanted to say. So pragmatist wanted to say. The pragmatist therefore would be interested in studying phenomena in a way that how this phenomena will help you do attain certain things. Say for example if you ask pragmatist to study language pragmatist would want to study language to actually understand how language helps you communicate your thoughts.

So they would really want to study language, but only to the extent that it tells you or that it helps you accomplish particular kinds of behaviour.

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Now from structuralism and functionalism gradually they are developed another school of psychology or another school of thought in psychology that is associationism. Another influential way of thinking in psychology was associationism basically examines how the elements of the mind like ideas, feelings, etc., can become associated with one another.

One of the way say for example how thing is get associated with each other is contiguity or happening close in time, say for example some of you might while you are going somewhere there is a cat that crosses your path. May be just after the cat cross your path you meet within accident. Now just because these two events happen close in time together, you might want to or some of us might want to really link these two events.

So this is one of the way is people generally link two events that happen close in time together. Another way could be by virtue of contra. So there could be feelings or ideas that could be exact opposite of each other. Say for example, feeling very elated or feeling very depressed or feeling happy or feeling sad, or say for example things like experience of hotness or experience of coldness. So this is also one of the ways we actually link two ideas or two experiences together.

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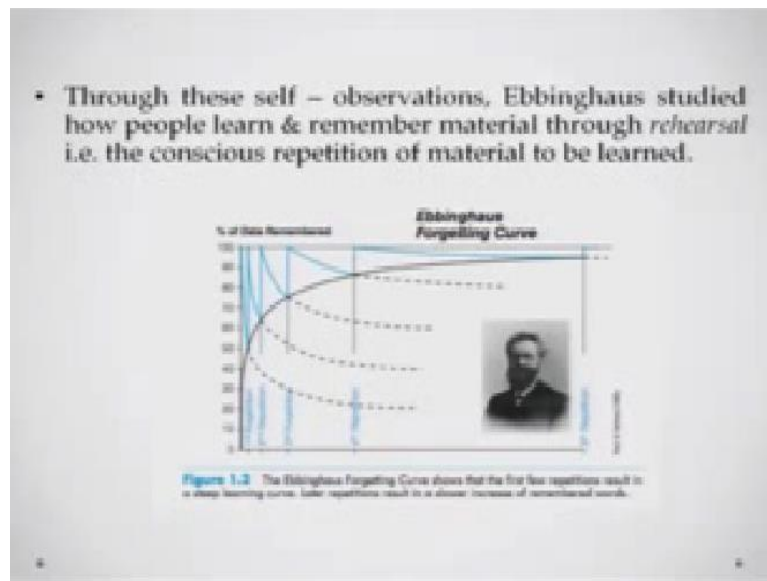
- Hermann Ebbinghaus (1850 – 1909) applied the associationist principles systematically.
- He studied his own mental processes & made up a list of nonsense syllables that consisted of a consonant followed by a vowel and then a consonant. E.g. zat, cax, nad etc.
- Took careful note of how long it took him to memorize those lists, counted errors & recorded response times.

A black and white portrait of Hermann Ebbinghaus, a man with a full beard and mustache, wearing a dark suit and a white shirt with a tie. He is looking slightly to the right of the camera.

Hermann Ebbinghaus was the earlier psychologist who basically use these associationism more systematically. He studied his own mental processes and made up a list of nonsense syllables that consisted of a consonant of vowel and then a consonant. He basically constructed list of words like these zat, cax, nad, etc., which basically he try to later memorize.

He was basically he was very careful, he took careful note of how long it took him to memorize each of these list, how many errors he would make and he recorded the response times as well.


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Through these self observations Ebbinghaus studied how people learn to remember material through process like rehearsal which is basically the conscious repetition of material something which we mostly in commonly do. Through his experience Ebbinghaus actually finds out that it is the first few repetitions of the first early form of rehearsal that actually leads to most learning by later times at rehearsal basically do not give us that kind of output.

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- Edward L. Thorndike (1874 – 1949) proposed that the role of “satisfaction” is the key to forming associations.
- termed his principle as *the law of effect* (1905): “a stimulus will tend to produce a certain response over time if an organism is rewarded for that response”.
- an organism learns to respond in a given way in a given situation if it is rewarded repeatedly for doing so.

A black and white portrait of Edward L. Thorndike, a man with a mustache, wearing a suit and tie, looking slightly to the right.

Edward L. Thorndike was another psychologist who was basically working with these principles of associationism. He basically was interested in investigating the rule of satisfaction; he says that he basically gives out of principle called the principle of law of effect which says that a stimulus will tend to produce a certain response over time if an organism is rewarded for that response.

So an organism basically learns to respond to a particular stimulus in a given situation if it is rewarded to behave like. Say for example, if there is a kid and you want to teach the kid something or say for example if there is a animal or a pet and you want to teach that animal something, you might want to teach that animal to stand up on his two hanging legs.

Now you will have to reward the animal repeatedly over time to actually make him learn that kind of behaviour. Now we will wrap up over here and we will in the next class talk about other aspects in the history of psychology that finally let to the shaping of what cognitive psychology is. Thank you.

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