

Language, Culture and Cognition
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Module - 04
Part 1
Lecture - 09
Image Schema

Welcome to the Module 4 of this course, today we will look at Image Schema, which is the part 1 of this module.

So, a quick recap. Till now we have had 3 modules covered. Module 1 talked about the introduction to the course, where we gave the background, the historical ah stories about how the say how this field came into being, the contribution of different contributing disciplines and so on and so forth.

Then we started with the topics one by one. The first topic, we looked at, was Categorization; the reason we looked at categorization in the very beginning is that, this is a fundamental mental process, which is at the core of many other mental processes. So, this is the reason we looked at categorization first.

So, categorization covered all the theoretical aspects, various kinds of examples were also discussed, various newer developments, newer additions to the theories and so on were discussed. And then we moved on to module 3, which was the discussion of the domain of Frame, as to how the idea of frame builds up on the basic notion of feature based semantics.

And then, we saw that frames gives a better and bigger holistic picture to any kind of categorization process be it a simple mechanism, be it a simple object, a concrete object or a complex phenomenon or a even an experience all together and so on and so forth. How frames help us give the give a structure to our experiences, events, people, objects and so on.

So, this is frame basically took the idea of categorization, idea of organizing knowledge, worldly knowledge into language because language is what we are worried about in this course. So, how language actually looks at how language takes us to the domain of the

bigger picture, the gamut of all the information that is part and parcel of meaning, as we understand meaning, because we understand ideas situated in a contextualized fashion. So, that is what we talked about in terms of frame.

So, now, we will move on to yet another take on this matter, yet another way of looking at the organization of knowledge, the schematization of knowledge and so on and so forth. So, roughly we will call this the image schema, because in as far as language is concerned, this is the term that we use. However, there are many other names, there are this is called schema, the schemata theory, then there is also a name called script and so on and so forth.

So, this is the history of schemata and schema theory is very long, and the contribution of various disciplines have actually shaped to where it is now. So, like every other module, we will have a roadmap to follow in this. So, as we see, we will first and foremost chart the history of schemata theory, of course, this has to be also in brief due to brevity of time, that itself makes a very interesting understanding and story in itself and then we will look at the idea of schema or schemata from various other disciplines apart from language.

So, language is, of course, our primary focus, but we will look at the philosophical underpinning the contribution of psychology as a discipline, cognitive psychology to be more precise, and also the neural aspect of schema theory. And then after discussing these things, we will move on to the primary object of our understanding, of our study which is language. So, how schema is present in language, how we can back-form from language structure to the underlying schematic representation and so on.

So, history. Now the idea the notion of a schema or a kind of a graphic representation of event, of knowledge system, is something very fundamental to cognitive psychology. This has been, this has been studied this has been discussed, about this has been written about and theorized for a very long time and this and hence it makes it one of the fundamental notions.

So, basically, what it tries to do, the schema theory what it tries to do is tries to explain how our minds organize knowledge. So, see we are looking at the knowledge system, organization of knowledge system from the very beginning has to you know through categorization, through frame, and then through schema.

So, we have already seen that categories often fail and then there is idea of frame. But frame is kind of a detailed understanding; frame means that you know you have all the associated knowledge with respect to one particular item. So, if I talk about a college student, just a simple word a college student it is not simply you do not understand it in it is in a vacuum, you understand it in a larger set up.

But that is not what is schema. Schema are basically refers to the skeletal part of the entire idea, the entire experience. So, do we have a fundamental, you know schematic image in our mind, how do we go about you know understanding many things that are probably similar in experiential domain and so on, this is where schema theory comes from.

So, how do we, how does our mind organize various different kinds of experiences into let us say, small boxes. Like you know let us say it is a file cabinet. So, you have you know a file cabinet has many smaller drawers, which has each of them can be called a schema let us say. So, there is a schema of travelling from one place to another, there is a schema of going to an office or going to a college and so on and so forth.

So, these are certain things, certain kinds of experiences that probably has a schematic understanding, schematic underpinning. So, this is where it basically it takes us. So, but the fundamental notion is still the same. So, how do our minds organize knowledge, information and memory; it is very difficult to put them separately. So, I have put them as with a slash they are not the same, but they are also not very different so they are intertwined.

So, how do we go about you know the store knowledge and information and then you know put it in memory and then we retrieve the same, when we need to use it for a later purpose and so on. So, and which of course when we use it we use it for cognition and for behaviour. So, behaviour is the output that is visible, whether it is a linguistic behaviour verbal behaviour as is as I am showing right now, but behaviour can be many of many other types as well, gesture. For example, my gestures accompanying my speech so on and so forth.

So, various kinds of behavioural output and there are also action that has to be taken, with respect to certain kind of a scenario. For example, we you know the schema for, let us say, the schema of coming face to face with the dangerous animal. So, there is a; there is an

action that is necessary on our part to take into account if we have to have the proper schema in place.

So, this is what we mean by the knowledge, the information about, the so the knowledge about the understanding that you face an animal that is potentially dangerous to you. So, this is your knowledge will depend on your information structure with respect to what that animal basically signifies, what it can do, what it does, what it has been doing and how the previous interactions between human and that animal has been.

So, this will form the parts of the information structure that will eventually create your knowledge base on that particular event, about that particular event and then it will be, it is understood to be stored in your long term memory. And then when you face with you face a similar situation in a later scenario or either literally or metaphorically, then you are able to understand it, make sense of the new scenario by you know going back to the same schema and then that will result in your behaviour.

So, this is why it is very important to understand the fundamentals of an event, object or a scenario and this is where the idea of schema comes in.

As I said in the beginning, there have been it is not the work of any one person or anyone discipline. This has been this field also the understanding of schema and schema theory has also been enriched by a number of notable scholars from different disciplines different fields within cognitive science. So, we have philosophers, psychologists, neuro- scientists and linguists all of them contributing. So, these are some of the notable names. Of course, there are some more, but these are the names that are most commonly cited, these are the people whose work commonly most commonly cited, when we talk about the schema theory the way how it came into being.

So, let us start with philosophy, like all the other domains that we have done so far, because this is the one of the reason in this particular case is that the initial idea was given by philosopher Immanuel Kant. So, let us go back a little bit and then remember our the, let us refresh our memory in terms of the disembodied cognition versus the embodied cognition, there we saw that disembodied cognition fails to understand many aspects, may fails to negotiate many aspects of how language is learnt and used and processed in real life; similarly many other processes.

So disembodied cognition and symbolic cognition with respect to language and its use has been criticized at many levels. So, we can kind of summarize that entire finding from a philosophical standpoint by looking at the later philosophers, some of them are I have mentioned here.

But this is by no means an exhaustive list, but Patricia Churchland, Maurice Merleau-Ponty, John Dewey and many others have significantly, you know, put forward their point and which has you know with a very severe critic critique of the both ontological and epistemological dualism.

Dualism has been of many kinds like, Cartesian dualism that we talk about, it has had many facets. So, mind-body dualism versus you know mind-matter dualism, subject-object dualism and then cognition-emotion. So, is it, is cognition devoid of emotion? that is what you know that is that kind of a duality of symbolic cognition and so on and so forth.

So, knowledge-imagination this kind of dualism that have been proposed by a particular section has been severely criticized by many other philosophers. So, theories from disembodied perspective of mind, motivation, value reason have been seriously questioned by findings from later this psychological findings as well, as we have already seen in the background, in the module 1.

That when psychology developed in and it got a new branch of cognitive psychology, with respect to various newer paradigms of research, newer experimental methodologies and a lot of new findings, empirical evidence and so on. Then the this kind this kind of dualism started getting questioned. So, not only from philosophy, but also from psychology, as a result of which there were new questions to be talked about and new ways of looking at how do we resolve this problem.

Then of course, there is an embodied understanding and there is a abstract understanding. Let us make one thing clear here, even though we say that disembodied cognition the or the symbolic cognition, the proponents of symbolic cognition do always do prefer a dualism between what is objective and what is subjective. And the later day embodied cognition proponents have said that knowledge and cognition is primarily embodied.

There is always this ah basic agreement between these two schools of thought that even if the mind is embodied, even if cognition is embodied, we series we still cannot deny that

there are certain abstract concepts, abstract notions, there are certain abstract and objective mechanisms that are of course part of the minds machinations. So, there is certainly an objective domain and there is a subjective domain.

The interaction is what the point of, bone of contention in this case is. So, on the one hand, symbolic cognition says that there is hardly any you know relationship, the embodied cognition hypothesis says there is a relationship. Now, the problem after the philosophers like Merleau Ponty have criticized heavily the disembodied cognition group.

Now, the question is ok if that this is embodied if the mind is embodied, cognition is embodied, then how do we arrive at reason and cognition through an embodied understanding what is the connection? So, there is an embodied sensory motor experience that informs that modulates our understanding.

But and then how do we go from there to the objective, how do we go from the lived experiences to the abstract understanding of it. Because understanding has to be the, fundamental understanding cannot be always it can be informed by, but there is an abstract manifestation, representation.

So, how do we arrive at that? So, if the mind is embodied, how is it capable of abstract thoughts? This has been the question that philosophers have asked. This is of course, we are kind of simplifying the idea, this is not as simple as I am telling you this there has been you know many arguments and disagreements and controversies on this, but roughly this is the idea.

So, the question that later philosophers are faced with, is that from going from sensory motor capacities to abstract thinking, what is the pathway? how do we arrive there? This is a philosophical question. One of the philosophers who tried to answer this is Emanuel Kant, Immanuel Kant looks at this issue very carefully in his 'critique of pure reason' where he talks about a third entity a kind of a connecting link, sort of a missing link sort of a link that connects the abstract and the lived the higher the objective and the subjective.

And this third thing is kind of a sort of a schema. So, this is and how is it structured how is it you know what is it what is the nature of this particular third element, this is what is he says is a 'procedure of imagination'. He calls it a procedure of imagination that

structures images in accordance with the concept; this is the fundamental aspect. So, on the one hand you have concept at the abstract level.

So, this is, let us say concept and at the lived experience level, at the embodied level, you have the experiences. And here there is imagination that plays a very important role to abstract, to kind of to take out the fundamental parts of that particular experience that is and creates a kind of an imagination, creates a kind of a picture that sort of is in accordance with the concept, even though it does not have the fleshed out look of the concept.

This is roughly what he talks about. So, it is neither the concept itself nor the actual instance. So, it is the let us say the concept of a dog, for example. So the in between the imaginary abstraction imagination the abstraction, through imagination of a dog is neither the entire gamut of information about being a 4 legged animal, you know the behaviour of a dog and what all it can you know the loyalty aspect of dog, the fury aspect of the animal, the other you know aspect that it walks on 4 legs, it wags his tail and so on and so forth that is the concept that is the entire gamut of information.

But what is the and this is but this is not what Immanuel Kant is talking about, he is also not talking about a particular dog and your own experience with that dog. So, this is where the idea comes in. So, you abstract certain fundamental ideas of that. This of course, he fleshes this out in many in great detail in his work.

However, many of his ideas were later criticized because on the one hand one particular aspect of criticism was that, Immanuel Kant in spite of his support for embodied hypothesis embodiment as a serious domain to look at in terms of knowledge, generation still kept the form and you know the form and the concept separate.

There was still a very different, the dualism was still maintained in a very strict sense albeit with a connecting link. But later philosophers do not always agree and they say that the there is more of fluid give-and-take there is a mode of connection between these two domains. But what has remained favourable what the idea of the basic idea however has remained favourable. The recognition that there is a form giving schematizing role of human imagination.

So, it is like there is a; there is a contribution of the human imagination, that can create a schematic representation of a particular experience; this is the fundamental takeaway that

has found support in the later philosophers, later even psychologists and linguists and so on and so forth. So, that understanding that it is the human imagination that is the locus of meaning, thought and judgment.

So, this particular aspect has been has been, has still been carried forward. Now let us look on go ahead to the domain of psychology. Kant's ideas were later on taken up by Piaget and he actually was one among the first to use the word 'schema' in his 1923 book he talk he basically introduces this idea of a schema, that underlies our understanding.

So, he this is and I quote from his book 'a cohesive repeatable action sequence'; he gives it a better a much more formulated, structured way of looking at it. So, basically what it is, what is a schema? A schema that underlies our understanding and which is a cohesive, repeatable action sequence. So, many of our actions many of our day to day you know lived experiences are a recurring pattern. This is what Piaget is talking about.

So, a possessing components, component actions that are tightly interconnected and governed by a core meaning. So, there are many actions which are repetitive in nature, which the humans typically go through in their life in many manifestations. So, there are certain actions in terms of you know sequences. So, let us say an action of going from one place to another, this is a for this is a very simple kind of an action.

So, I might move from in this point of the room to that part of the room or I can move from this building to another building. Similarly I can move to you know one city to another and so on and so forth. I can also go from being very happy to being very sad, within a matter of a few moments, provided I you know as somebody tells me a sad incident or something.

So, these all are whether it is a mental state or a physical change of you know place, physical locomotion of a particular agent and so on you see there is a recurring pattern of the same type of sequential actions. So, we start, so if we move from point a to point b, what it means is that there is a starting point and then there are in between intermittent points, through which we finally, arrive at a final point. So, this is the sequence of repeatable sequence of events that is typically part of various kinds of experiences.

So, this is just one of them. So, this is a cohesive, this structure remains kind of constant with minor modifications here and there. And so the core meaning remains that 'I move'.

So, x goes from point a to point b; this is the core meaning. So, that point a to point b might be a physical location, in terms of spatial location or it can be a mental state as later on have been utilized. So, this is what Piaget talks about, when he when he gives an explanation as to what schema is.

Later another important person, whose contribution has been also very significant in this domain is the psychologist Frederic Bertlett. He also says that this is an unconscious mental structure that each individual carries in within his or her mind. So, this is an unconscious structure, that is already there. So, they notice that psychologists talk about a structure, on the other hand philosophers like Immanuel Kant talks about our imaginative and a particular level of imagination where the human abstracts the notions.

So, here there is a clearer picture emerging, when by 1930 in the 1930's. An active organization of past experiences, this is very crucial he actually gives it in words. So, there is a schematic representation, a mental structure of an event, which has been built up, through various past experiences of the individual.

So, each individual, now this because of his focus on the individual he also gives an angle which was which is very interesting actually, that individual each individual might have slightly different schematic representation of the same event. Of course, there are fundamental schemas that are universal, but an individual's understanding of the thing might be different.

So, depending on the experiences past experiences the schema is created and it creates a generic knowledge about things and events. So, basically you can generalize like I just said. So, one can generalize going from one point to another simply by saying that you know there is a schematic representation, which is a later which we called 'source path goal- SPG' schema which will look about it in a while.

But this is what happens, so over a period of time your past experiences has shaped an understanding a generic idea of movement of one object across space and then this creates a core meaning of that particular experience.

And then what happens is that, when you have new information coming in, so you basically it is understood through this schema of old information. The schema is already there and

the new information comes in and we kind of try to understand this with respect to the existing schema.

And of course, there are, he goes on to talk about his the his work in various languages that he has worked on. But we will leave it at that and then in the, after 1930's, the as we have discussed before, that behaviourism was the most important theoretical was most a most powerful theoretical point at that time. And which of course, as a result of which this understanding schema theories and all did not find favour with behaviourism and gradually after a period of time this was kind of fading away.

So, for some time it was not there was not much of consideration on this, as not in the not the way it later on came back. So, after a while in the 70's, Marvin Minsky we have talked about Marvin Minsky before. So, Marvin Minsky and David Rumelhart are credited with the revival of this schemata theory in the 70's.

So, after a brief period, because in the in the intervening years behaviourism was holding sway and then we saw that in the 50's and 60's onwards, when behaviourism was very strictly criticized and then cognitivism and innateness and all those ideas came back again and so did the idea of schema.

So, Rumelhart in fact Marvin Minsky and Rumelhart's contribution are contributions have been very significant, in Rumelhart to the extent that Rumelhart actually considered schema as the building block of cognition. So, we understand everything knowledge is based on smaller building blocks of schema. So, larger amount of knowledge can be, you know, boiled down to smaller schemas and that is how we store the information. So, this is why it has been given a lot of importance by many people later on.

So, also important is the contribution of Abelson and Schank under the 1970's, where they called this understanding 'script', they give it a different name script, script is largely abstract, it does not have it is largely abstract. So, a large amount of knowledge in our brain is structured around routine experiences. So, even the 70's also the same ideas are carried forward that large amount of our activities are recurring patterns of interaction between an organism and its environment; this is the fundamental aspect.

So, as it was in the 1930's the 20's and 30's like Piaget and others and then even at the in the 70 the same idea was getting you know carried forward that large a large chunk of our

experiences are actually repetitive. And this is what remains, that which holds even today that because of this sequential, temporal sequence of various events or many other kinds of activities that they are repetitive and hence this can create something like a script.

So, one of the important, one of the interesting scripts that we that has been referred to in many textbooks, is that going to restaurant script. So, going to restaurant has a kind of a sequential nature of various things happening one after another, in that particular order. In ah for example, you enter the enter the restaurant you will be greeted by the person at the gate, in these days they also ask for your mobile number invariably.

And then if you are unlucky enough the restaurant will have a dress code, which obviously do not match with yours, sometimes they might match and then there are many other activities like going getting a seat and so on and so forth. So, largely they remain the same wherever whichever restaurant you go to these things remain same so this is the script that Abelson and I will talk about.

So, these are and later on Gibbs and Colston also gives, also talk about the same thing. So, they call it experiential gestalts. So overall, the entire experiential understanding of a particular event is what is the schema, that is the which underlies thought and language. So, we understand, we cognize an event because we understand it as a sequence of repetitive events.

So, which means to all of these, the findings of all of these psychologist basically refer to the same point that schemas are psychologically real, it is not something we are making up, this is psychologically real. For example, this is yet another very commonly cited example of the schema, of a Japanese girl let us say. So, what do you immediate, what is the schema in your mind of a Japanese girl.

Now, for a person who has never met a Japanese girl, who has never watched Japanese films, who has absolutely no idea about Japanese culture, costume, food and anything will have a very very limited understanding of the concept of Japanese girl. So, it will probably include a kimono and a particular hairstyle that you see in books and that is it you do not know much and you will create your schema around that.

As you gradually let us say now you know the same person goes on to meet some Japanese people in his life later on and gets to experience Japanese food and so on and so forth and then the schema gets further enhanced and then you accordingly change.

So, this is a; this is what we this is how schemas are created. Now one individual might have a different experience from another person. So, their individual schemas might differ. So, this is where we talked about a little while ago about the individual differences that Bertlett talked about that also comes in.

However, there are also disagreements, though largely psychologists agree that the schema are created out of our experiential domain, out of the typically recurring, sequential patterns of experience. However, how these things are represented in the brain or are they represented in the brain at all or are they created on the go, there are many such disagreements that are also there.

So for example, Gibbs and Colston do not really agree that there is an explicit abstract representation of the same, they have always they have in many of their papers they have highlighted this, that of course there is a schema, but probably it is not a good idea to look for a permanent explicit mental representation of the same. So, they argue the point of argument of Gibbs and Colston is that, this these gestalts, this schemas arise momentarily during the interaction, when brain body and the world interacts, that is when the schema arises.

So, there are all these final nuances, which of course we cannot get into for the brevity of time. So, let us quickly now move on to our main the main point here which is language. So, we have already seen that with respect to philosophy, with respect to psychology, there is a lot of support that talks about understanding the world through a kind of a schematic representation in our mind.

So, there is a schematic representation that can take care of. So, one schema can take care of various manifestations of similar kind of experiences. So, we have many schemas for different kinds of experiences. So, this much, more or less, everyone agrees upon. Now when it comes to language studies, when it comes to the role of schema in language one of the first one of the first scholars to look into it was Leonard Talmy.

Leonard Talmy's work is phenomenal, his contribution is extremely important in terms of understanding spatial language, which we will look into greater detail later. We need a separate segment on it in its own right. So, Leonard Talmy and Ronald Langacker's work showed they were working independently of each other. But they showed the same thing: that closely connected languages may vary significantly in the meaning of spatial terms.

What it means is that as I said Leonard Talmy's work primarily is in the domain of spatial language. So, how do we talk about let us say, the bottle you know swam into the cave, he walked out of the room, I exited the room and you know, he I am going to the kitchen, he has gone the.. child went into the garden and so on and so forth. So, there are various ways of talking about a movement of object in space. So, motion verbs basically they are the domain of motion verbs. So, how human locomotion or any other kinds of movements of objects, how do we define them, how does a language talk about it, how does it describe it?

So, spatial terms in very many languages are actually different. So, it is perfectly fine to say in English 'he slithered away'. Now this is not just something that a person just moved, there is a whole range of information that is part of that particular word 'slithering'. Similarly, you can also say he exited simply he exited, now these are and then these are various kinds of ways you can in which spatial terms in language can be manifested,.

Now what Talmy found out was that across the world's languages there is a lot of variation in the way we talk about spatial language in the way we use spatial language.

There is a lot of variation languages differ in the choice of the words, in the way the structures are created and so on and so forth. But the crucial point however is that in spite of all those differences the terms all the languages that all the languages use all the different kinds of languages use they can all be analysed in terms of certain universal schemas.

For example, there is something, an important schema of movement includes the 'path' information, there is a path that I went into the room which means which signifies that the movement of the agent has been towards the inside of the goal, so this is the path information.

Similarly bounded regions bounded versus unbounded whether it is a field or whether it is a room. So, the moment you say I went into the room you specify that the goal is a bounded

entity, it has a, it has a boundary which has an inside and has an outside. Similarly, there is something called a contact.

So, let us say an object is on, so there is a computer on the table. So, the table and the computer are in contact with each other and there is a particular arrangement of those objects. Then there is force and so on. They go on to list various universal schema that can underlie all the differences, all the different manifestations of various kinds of spatial terms in any language that you take.

So, for example, the English 'on', simply the preposition 'on' has the schema of above contact and support, the moment you say, 'x is on y', 'the bottle is on the table', there you have to understand these are the schematic representation. So, it is something like this is a table and this is let us say a glass bottle, there is a glass on the table and this is the table.

So, this is above it this is the orientation part that is taken care of, there is a contact that is important in order to talk about in order to be you know in order to use the word 'on'. If there is no contact English will prefer the word 'above'.

So, the moment you have used on; that means, this configuration is has to be satisfied that it is this is above one is above another and then there is a contact and there is a support element in the picture as well. So, this is what Talmy primarily means that, in another language you might have a different way of expressing it, but this kind of configurations will be part of that as well.

So, basically he talks about 3 kinds of schemas that all these possibilities can ultimately be like ultimately can converge upon. So, there is a Topological aspect to it, there is Orientational aspect and there is a Force dynamic aspect. So, what is topological aspect? Topological aspect is the a relative nearness like on above and so on the kind of arrangement that you have.

Orientational ah aspect is typically with respect to the relative to the body orientation. So, we typically talk about things being above and below and you know to the right, to the left, in front of, behind and so on and so forth.

So, these are more often they are not dependent on the bodily orientation, which we sometimes superimpose on another object and which by which we give rise to different

kinds of frames of reference, which we will see later. And then there is also a third type of image schema, third kind of image schema which is dependent on force; on the he calls it force dynamics.

So, force dynamics also is very very important and crucial a type of, crucial category of schema. So, largely most of the schemas we image schemas, with respect to motion verbs, talk about, with respect to spatial terms, will fall into any of these three or sometimes a combination of many of these so this is the background.

So, by 1980's, research from many different domains converged on the idea of image schema and so there was an agreement by 1980's, the agreement was there that there is this kind of. So, language, psychology, philosophy, all... everybody agreed that there is an there is something called a schematic representation in the brain, which arises out of the experiential experiences of the of people and then it also helps us understand language and then there is a connection to language and thought.

Now different kinds of origin were suggested for the same. So, fine we have this, but how does it originate? One is of course, that everybody talks about is that recurring bodily experience which Johnson and his colleague also agrees. Johnson's work has been seminal again in this area. So, we are talking about only him even though everybody has talked about the same thing.

So, Johnson and his colleagues will say that the origin, where it starts from is the bodily experiences that is fine. But on the other hand, there are other people who say that human brain is structured. So, so if the human brain had no capacity to create such abstractions, out of the experiences then it will not be possible.

Now, it is important to remember that both of these can be correct at the same time, it is not that they are you know mutually exclusive. So, if on the one hand human brain is capable of abstracting that kind of a schematic understanding, from various you know recurring pattern of physical experiences and give it a schematic understanding.

So, Johnson again, is a very important a scholar in this domain. So, Johnson and Lakoff, George Lakoff they popularized the idea that the term called 'Image schema'. So, so far we were talking about only a schema or a schema schemata or script, when it comes to language, the scholars in language they talk about 'Image schema'.

So, they have popularized the term Image schema to underline the same bodily and sensory nature of the structure of conceptualization. So, this is now getting a little more clearer with respect to. So this is an as if it is a; it is a kind of an image, it is a schematic image where which underlies all the bodily and sensory experiences and which is, which also gives a structure to the conceptualization. Like I said, all kinds of movements can be understood through a simple schema of 'source path and goal'.

So, there is a source there is a path and there is an ultimate goal to attain by going through a particular path. However, Johnson's idea slightly differ from that of his, that of the earlier scholars. So, as far as Immanuel Kant is concerned they do not agree that it is a purely form making capacity, similarly they also do not agree with Abelson's understanding, that it is a mere you know abstract knowledge structure.

So, there are differences. However, the basic understanding remains the same. So, this image schema arises out of recurring experiences and is used to make sense of the experience and reason about it and also can be used to structure abstract notions and even metaphors.

So, this is very important because, so far we have seen that schemas are at the core of experiences, which are created out of the recurring pattern and then we use the same schema to understand a new experience, a novel scenario and then not only we use it in language in real term. But also in to understand abstract notions and sometimes even metaphorical understanding of scenario.

And then let us move on to the neural grounding of image schema, like we said in the beginning that there are two sources that have been proposed, one of them is the brain mechanism that the brain is capable of creating this. So, recent findings from neuroscience research has revealed that the brain areas that were thought to be primarily dedicated to other functions, other functions apart from language.

So, like sensory motor areas and so on they have been found to be active you know they have been found to be busy while doing even a language processing task. This has been a remarkable finding in the last few decades, that the brain areas that are active when we are, when we are carrying out a language task, is not only the language areas that we already know, that there are Broca's area and Wernicke's area and so on.

So language areas are of course getting activated, but simultaneously, we also activate many other brain regions, even when processing a very simple sentence. So, we are activating the sensory motor domains as well, this remarkable finding actually takes us to understanding schematic representation in the brain in a better way.

So, in other words, language processing includes processes of spatial, visual and mental imagery; this is what the latest research has shown. So, in this domain, the work of Regier proposed that spatial relations primitives, which Talmy talked about, are a result of brain structure. As to how the neural network actually makes connections between the, what it is called and how it is structured, what is the you know what is the alignment of various objects, various points in that structure, is worth how the brain looks at it.

So, this is what he did in a very simple this is a very simplistic representation of what Regier did. he proposed that spatial relation terms can be learned as different complex combination of primitives. It is not that if you just train the computer to look at various kinds of spatial relations with some primitives, as to exact the kind of primitives that Talmy talked about.

So, it can be a 'path' it can be a connection, it can be a force and so on the. If you train a system if you train a computer to learn those spatial terms through these primitives. The computer can the program can generate names for novel scenario as well.

So, how did he show that? He showed this by creating a computer program that could learn a wide variety of spatial relations from labelled scenes. Basically he the program emulated a child learning you know spatial terms, looking at objects looking at you know a simple geometric scene and then told a word that describes. Often we show a child like this is a you know 'this bottle is on the table'.

So, what the child sees is a particular kind of an arrangement. So, something like this a notion of 'above', so there is this is what this is called landmark, LM is for landmark and this is for trajectory. So, the trajectory is the object that is understood or looked at or conceptualized with respect to the landmark. So, the bigger object is the landmark, smaller object is the trajectory.

So, one with respect to another so the car is in front of the building, so the car is the trajectory, the building is a landmark and so on. So, we understand trajectory with respect

to the landmark. So, in this case, this is the arrangement between the trajectory and the landmark and this is what the name is given. So, 'above' see that is it is not touching. So, the above is slightly, so this is the arrangement of these two of these two things, with these two primitives, trajectory and landmark are primitives and this is how a child would look.

Child will look at two simple geometric scenes and then be told that this is the name; he used the same pattern to train the computer. So, in his program, perceptual mechanism were modelled on the basis of two main classes, just like here. So, this is an orientation, this is 'above' this is above, the orientation of verticality is used here and then topological feature like contact. So, in this case it is minus contact there is no contact. So, he utilized these two classes of visual feature and then had various arrangements.

And then he had many subjects, people from many languages came and looked at those objects and gave and spelled out what it is and the computer started and it learned. And gradually it will receive many such inputs from various languages and ultimately learnt the spatial conceptual systems and their names. And then the system, the model was exposed to new configurations, newer novel ideas, novel configurations of objects and their spatial arrangements and the system gave out the correct.

So, and there was an input data and there was the training data and then there was a test data, on which the model was tested and the model successfully gave out all the names. So, this basically his work was one of the initial works that showed that the meaning of a given spatial relation word involves not only a word, but a complex a combination of primitive schemas.

So, we understand these things and we store that information through that schematic understanding and that schematic understanding involves two primary visual schemas: one is that of orientation another is that of topology.

So, this is how the background stands, this is how the contribution of scholars from different domains have shaped the idea of what is an image schema, how image schemas probably come into being, how it actually is understood, how the brain probably represents it and so on and so forth in a rather brief format.

So, now let us go about, so how do we define image schema now? as of now, as of today how what it is? So, a textbook example will be like this: 'a dynamic an image schema is a

dynamic recurring pattern of perceptual interactions and motor programs', these two are very very significant aspects.

So, this is a pattern a dynamic, because it is constantly evolving. So, we basically in get more and more input and get it engaged, but it is a recurring pattern, the fundamental pattern is recurring that involves perceptual interaction. So, we know what to do with it and then the actual action. So, the motor program, that is part of that schema that part of that experience and the perceptual interactions.

Sometimes, of late, Image schema and frames have also been kind of understood to be related. So for example, frames are often understood as a 'fleshed out' look fleshed out aspect of Image schema. So, Image schema is a skeletal under-structure of the frames, that is also another take that has been given.

So, basically deals with physical relation, motion and perception this is a dynamic analogue representation of spatial relations and movements and so on. This is something we have already seen this is the definitional these are the definitional aspects as it stands today.

So, these are imagistic in nature, because and it is schematic. So for example, if we talk about we have been talking about movement. So, let us say there is a source and there is a path and there is a goal. So, this is the image schema of source, path and goal which is at the root of our understanding, our recurring pattern of movements, whether of ourselves or of others or of objects across space and so on. So, a lot of experiences can be clubbed together through understanding, through this understanding through this image schema of 'source- path- goal'.

So, you see this is image is very very skeletal and this is very schematic it has no detail, whether you see trees on the way or you see meadows on the way or nothing of that sort is necessary. But that is where frames will come into being, so the frame of you know going for a long drive, it still utilizes the same image schema that there is a source and that and there is a path, but the path is more important here. But then in that case, you will also have other information that is part of the frame.

So, the environment, the kind of you know music you might listen to and so on and so forth. But at the very core of that experience, that schematic representation is only this. So, all you need is a source there is a goal and there is a path.

So, this is what I mean by a very schematic and non detailed look at. So, this is something I have already talked about. So, there is, there are types of image schema: there is perceptual and there is the orientational and there is of course the force dynamics.

So, perceptual image schemas primarily refer to the simple structures, that recur in our everyday bodily experience. So, sometimes that is container image schema, we will see each of them in shortly. So, there is the idea of containment, one thing containing another.

So, I have you know this room has many tables and chairs, similarly, the you know we are inside a building and the many such other configurations. Similarly, we also understand things of like you know emotions are in the heart, you know I have anger in my you know, my mind has memories, so on and so forth.

So, one thing containing another. Similarly, we have the idea of paths and links and balance and so on. So, perceptual understanding of various experiences can be grouped together in the type called perceptual type and then there is various kinds of orientation and relation like front-back, part-whole centre periphery and so on. Orientational metaphor orientational image schemas are at the root of various metaphors that are dependent on orientation, like prices go up, you know I feel down and so on and so forth.

And then of course, as we said force dynamics is yet another type of image schema that creates all that can take care of various kinds of recurring experiences.

And now, when we talk about schemas individually we have to look at three aspects of an image schema, each schema has three primary aspects: one is called the structural element, then there is a logic and there is a perceptual experience. Why do we talk about perceptual experience? Because we are looking at this entire issue from the perspective of embodied cognition, how lived experiences.

So, lived experiences are the basis of creating image schema, that is why perceptual experience needs to be talked about. And then logic of course, there is a logic because we how do we you know, what is logic here logic is how we actually connect different

experiences through one schema and put them in one category: that is a logic and then the structural elements. So, for example, in the word 'in' it activates the container schema.

So, when you say that you know there is the office the 'research and development section is *in* the administrative building'. So, this is something like administrative building is of larger entity which houses the research and development section. So, this is inside, one is in another, so this is a container which has a boundary and within that boundary the second object. So, the R and D office is within the boundary of the administrative building and so on and so forth.

So, this is what is called a Container image schema. So, this activates this, every time in English language we talk about we use the preposition 'in' we activate the container schema and which includes the aspects of the 'containing' with specific affordance. Affordance basically means about what are the things that can be that are doable we talked about affordance before. So, like you know containing it, like having a boundary having an inside and outside and so on and so forth.

So, this is the a way we will look at the some of the common image schemas. So, 'container' image schema is perhaps the one of the most commonly utilized image schema I have been talking about it already. So, this the structural elements are like interior, exterior and boundary. So, there is a, you know, there is a boundary it is a bounded entity, the moment it is a bounded entity, there will be an interior and there is an exterior.

So, x can contain y so this is the structural aspect of it. And the basic logic for this schema is that everything is either inside or outside a container. So, if A is inside B and B is inside C, then A is inside C and so on. So, logic similarly I can say I have a you know coin in my hand, then I put the coin in my purse and then the purse went inside the bag and the bag then went into the you know in into the car and so on and so forth.

So, this the logic remains the same, so x is inside y and then that thing goes inside another thing. So, in all cases, we are basically formulating the same kind of schematic representation to that satisfies the word 'in' every of every of those instances of that sentence, every time we put something inside another we can use 'in'. So, that is the basic logic of this schema.

And how do we come at this schema how do we arrive at this simple schema? That is because we have, we experience this contentment, the idea of contentment all through our life. How we have bodies, that are bodies it bodies our physical body itself can be thought of as a container, it has all the vital organs and all the processes that are inside it and so on and so forth.

Secondly, we function within larger objects, like buildings, rooms, forests etc. So, not only the body itself is it is like a container, it also is contained by other objects and more and more superimposed categories can be thought of. So, basically containment the idea of containment is a fundamental lived experience which gives rise to the container image schema.

Similarly, Source Path goal I have been giving example of source path goal as well. Often you will see Source-Path-Goal is written as SPG, in many textbooks they use SPG image schema.

So, as we have seen this has a source it has a path and it has a goal and of course, there is a direction. Now the bodily experience that motivates this schema is our movement in space, again a very a human personal experience of movement in space. So, moving from one place to another along a continuous sequence of continuous location, so this is what movement all about is. So, the basic logic again there is a logic as to why we can connect, how we connect various kinds of instances of movement within one schema this is what logic is all about.

So, you see if A moves from you know if one moves from A to B and then it passes through all the intermittent points, then this satisfies the SPG schema.

So, various kinds of movements can be grouped together under this schema. Similarly there is a schema of link. So, bodily experiences again there are various kinds of link so on and so forth.

And then there is of course, centre-periphery, centre periphery we have already seen in metaphor we will look at metaphor also metaphor relationship with of image schema with metaphor.

So, this is yet another centre-periphery, simple to understand part whole understanding of schematic understanding also.

We have seen Trajectory-landmark we have just seen. So, two entities, in which one is being described relative to another is the trajectory, trajectory-landmark image schema. So, we experience ourselves and our surroundings in relative terms.

So, right now I am in this room I after some time I might be outside the room, I might be standing in front of a building and so on and so forth. So, this is at a very basic personal, human lived experience and then this is an asymmetric relationship. So, trajectory, we always talk about the trajectory in terms of the landmark and not the other way around. So, there is a 'the ceiling fan is hanging from the ceiling', but we never say the ceiling is above the fan like that.

So, this is an asymmetric relation, asymmetric relationship and then comes the Force dynamics.

Force dynamics as we were talking about a large number of image schemas are centered around the idea of force, 'force dynamics' as in one thing exerting force or pressure on another. So, many aspects of language in fact a lot of emotional language, language that describes emotion, the metaphors that talk about emotion of various kinds, can be understood in terms of 'force dynamics'. So, what is basically force dynamics is this.

It should be; I should be having.

So, that is this schematically speaking the force dynamics will look like this. So, there is a cause of motion, there is so let us say this is self and then this is a force, this is agonist and this is antagonist.

Now, the tendency, the default tendency of the self of the person, of anything is to be at the rest position. Now if the force from the antagonist is strong enough, then we will have one kind of reaction, if there is and if we can you know still contain the if we still manage to retain balance, then we will be having different kinds of output in terms of emotion.

So, self has emotion and then the rational self, the graph here has gone a bit wonky, so for self-force tendency and then the force tendency of emotion. So, this is the self and it is

force it is tendency is to be balanced, it is tendency is to be stable, but this one tries to imbalance you the emotion tries to imbalance you and then the emotional response.

So, as a result of this, let us say somebody comes and fights with you early in the morning and depending on and your tendency is to remain balanced. The fight, the all the quarrel disturbs your mental balance and then you become sad.

Or and there can be another response, the force resists the temptations of you know getting into the grip of sadness throughout the day, so you remain balanced. So, this is how various kinds of emotions can be understood. So, this is agonist, which is inactive the rest position, the self is always in rest position. Antagonist is the active force.

So, something happens to you somebody says something to you, so the emotion that it generates exerts pressure on the self and then as a result of this force interaction, the ideal condition is balanced. But when there is balance when it is off balance we have various kinds of various kinds of emotion language, like this.

‘He was gripped by emotion’, so this is something a very common way of understanding how one cannot come out of you know how you are dealing with emotions. So, this is how it happens. So, there are two opponents in this interaction, that is the opponent one is the rational self, the opponent two is the emotion trying to throw the self off-balance and this leads to the metaphor above.

Now, because the passive objects in this case of a strong mental force is helpless. In this case the agonist could not fight back, as a result of which the emotion has ‘gripped’ the person. So, the emotion in this case the antagonist in this case has exerted it is force, and that is the force dynamic understanding of it.

So, emotion has larger you know has an upper hand in this case and the self is under it is control, when this is the image schema, that is the force dynamic image schema that we use to understand a particular mental scenario, this is how we express it through language: he was gripped by emotion. You could, the person could not shake off the force of the emotion at that particular case. It can be any kind of emotion.

So, there are various kinds of forces that are utilized, but the fundamental understanding remains the same. Antagonist, agonist versus antagonist and creating force, creating, exerting force on each other and the resultant outcome. But they can be of various types.

So, gravitational force, when we use gravitational force as the type of force, then we have sent words like 'revolves around', 'my life revolves around this' and so on and so forth. 'Gravitated towards each other', mechanical you can use this kind of word it 'when I found out it hit me hard', this is a mechanical force we are talking about. Natural force again 'he was swept off his feet', 'deluged' then 'magnetic', 'drawn', 'attracted', 'repel', 'irresistible' so on and so forth.

So, various kinds of emotional states or the self's, the ego's understanding of the, of his own position with respect to 'emotional atyachar,' basically can give rise to various beautiful linguistic expressions. So, this is not only utilized in case of simple understanding of emotion, but also in terms of many other domains of, you know functions, like talking about morality, talking about rational thought and so on and so forth.

So, this is not only in terms of primary emotion category of primary emotion, but also in terms of many other categories of human understanding, like morality. So, very often we use words like the 'resisting temptation', we often talk about 'politicians stooping too low' and you know 'fall for temptation' and so on.

Similarly, rational thought also uses this kind of various ways of looking at scenario through the use of force dynamics. So, this is the basics, basic understanding of image schema in various domains of various domains of experiential, perceptual, interaction of the body and the environment and so on and how this actually looks like in language. In the next class we will look at it more in a more detailed fashion with more examples from many other domains.

Thank you.