

Fundamentals of language Acquisition

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Week 05

Lecture 025

Lec 25: Emergentist coalition Model

Welcome back. Today we are at the last lecture, Lecture 5 in this module, Module 5, where we are looking at the word acquisition process among children. Now, until now, we have covered a number of theories, a number of assumptions, and we have also looked at the various kinds of issues that children might face while acquiring words. So, for example, we have started by looking at how children's word acquisition begins at a very low pace; in the beginning, it is a very slow process, and then they reach a stage called the naming explosion when they learn about nine words per day. Starting with a very slow segmentation of the speech stream, we eventually become able to speak in words. This takes a little bit of time, but it reaches a very important juncture where we can call it a naming explosion.

So, innate linguistic constraints explain the process with the hypothesis about how there are some linguistic innate linguistic biases in place that could handle this. For example, we looked at the whole word hypothesis, taxonomic assumption, and so on and so forth. So, there are various innate linguistic processes. So, that is about how language acquisition at the world level is dependent on language-related constraints.

They were not talking about any other kinds of process. So, that was the one that we first looked at in terms of theory. Then we looked at the other kinds of theories; for example, there is another theory of an innate learning mechanism, which is a general-purpose learning mechanism. Now this theory discusses how the general cognitive processes through which the child goes during the developmental stages take care of the acquisition of words as well. So, there are no linguistically specific innate constraints needed, but general-purpose mechanisms can take care of language acquisition.

And then there was another theory where we looked at the socio-pragmatic factors that said that socio-pragmatic factors can take care of the entire process. Neither do we need much of a linguistic innate hypothesis, innate bias, nor do we need the social general purpose cognitive mechanism, but more of it in the social domain. So, children learn by looking at others, the social cues that are present in any kind of conversation scenario; that is what the child picks up, and eventually they learn to figure out how the novel word maps onto an object and to which part of the object or the whole object, or the part of the object, whichever is relevant. Those cues are given by the environment, and that is what the child is smart enough to pick up. So for each of these theories, we have seen a lot of studies that have verified the hypothesis, as well as some theories that have not found proof for this kind of position.

The last theory that we discussed was socio-pragmatic theory. If you recall, we looked at the widget experiment where the experimental setup itself created two kinds of scenarios: one was action-oriented, and the other was object-oriented, and we analyzed how the children performed. So, these are the three major domains of theoretical positions that we have already discussed. So, as a result of which, what we are looking at is when we talked about the linguistic constraints; we are talking about what is natural and what is inherently built in. Because when we are talking about anything that is universal, anything that is innate, we are going back to the nature-nurture hypothesis, and this is the stance that nature, the nature part of the nature-nurture debate, talks about.

So, children are born with that capacity. Children are born with the capacity for those linguistic constraints in place, and because we are calling them universal, that means all children have that capacity. So, that is one part of it. On the other extreme, we have our socio-pragmatic factors, which talk about nurture. So, the learning happens in the environment, the socio-pragmatic cues, and the social cues, which means the larger environment plays a role rather than the linguistic constraints.

So, this is the other side of the story where we talk about nurturing. So, the nature-nurture debate has been going on, and that is what we have seen so far. Now, one of the important takeaways from these theories is that they take some sort of either-or position. So, either you need a linguistic constraint, or you need socio-pragmatic cues; that is what we mean by "either/or." So, it is not a combination of various things; on the one hand, we have universal bias, which is good enough as per the theory; on the other hand, the socio-pragmatic theory says that this is good enough.

So, this is either/or; they are mutually exclusive. So, this is one kind of position that these theories have taken. On the other hand, they also focus on specific issues. For example,

there are issues with verb learning and then extension, and so on. We have seen and discussed at length the extension issues, the factors involved, how overextension happens, how underextension happens, the possible parameters the children follow, and so on.

So, there are those specific language-related issues, the word-learning issues that these theories have addressed. They have not addressed all of them. That is why we can find that there are certain issues and criticisms with each of these theories, because a particular theory may not answer a particular concern, and so on. So, on the one hand, they take either/or position in terms of what process they are addressing; on the other hand, which aspect of language learning is their primary concern. So, this is how they were mutually exclusive.

Recently, there has been a development of a hybrid theory called the emergentist coalition model. Now this model seeks to find some sort of middle ground. The primary premise of this theory is that the debate between nature and nurture can be solved if we take a middle ground. Now the middle ground means that we do not completely discard any of the theories that have been there before, but we can, you know, take the best out of each sort of understanding, which is what they are proposing. Now this theory came out in the year 2000.

The emergentist coalition model is, and I quote, "sensitive to the multiple strategies children use to break the word barrier and to move from novice to expert learners." So, that is the gist of the entire theory. They say that until now we have seen that each theory targets one particular kind of cue, and that targets one particular kind of language learning process. This theory says that it takes a very different view; it states that the child has access to a number of strategies, multiple strategies, and that is what they use. They do not use only one strategy; they use a number of strategies in order to go from the novice learner to the expert speaker of the language.

So, expert speakers let us say that they will be 2 and a half to 3 years of age when they figure out the meaning of words, nouns, and verbs, and they can even speak in simple sentences. In some cases, they even use complex sentences. So, to reach that stage from the speech segmentation stage, they actually need to use more than one strategy; that is what the primary idea of this theory is. Let us break it down into parts. So, the question they start out with is whether infants begin as associative animals and then later understand the importance of social cues.

So, while they have access to a number of cues and a number of strategies, they do not use all of them at the same time. The idea is that in the beginning, they use one set of strategies, in the middle they use another, and they eventually move on to different strategies from

one to another. So, this theory proposes that children do take social cues into consideration, but at a later stage. So, 12-month-olds avoided mismapping and were sensitive to, but did not recruit social cues as the 19-month to 24-month-old children did. So, this is from a particular study that they carried out, which we will discuss later.

So, the idea is that social cues are also used; children similarly use the universal bias as well. So, this theory positions itself, theoretically speaking, in the larger domain of how the theory is positioned. So, on the one hand, you have the innateness hypothesis; we talked about this at the beginning of this course, where we discussed Chomsky's theory, which states that the innateness hypothesis says that language learning is an innate capacity we are born with and that we are bioprogrammed to learn language. That is one particular kind of state. On the other hand, we have also looked at Vygotsky, Piaget, and others who talked about how language acquisition is basically done through some sort of constructivism, a construction process where the child is an active member of that entire process.

A child is not a passive absorber of information from the environment, nor are they pre-programmed to speak flawlessly or to do anything on their own. So, in psychology, there is something called the radical middle that says that you do not need to take the extreme positions on either this or that side; you can actually take a middle ground. This theory also draws parallels to other emergentist models in developmental literature. So, this is not only in the domain of language learning; we are talking about ECM in the domain of language acquisition, but ECM positions itself in the radical middle understanding of psychology. The same psychology and the same understanding have also been used in various other domains, particularly within the developmental literature, including the developmental processes of children, psychological development, mental development, cognitive development, and so on.

So, a few of such studies, a few such domains are spatial development, number theory, and language development, of course. So, this is just to tell you and give you an idea of where and how the theory is positioned. Now, there are three ideas that are central to this model. First, children are sensitive to multiple cues in word learning, which include attentional, social, and linguistic cues. So, it is unlike the Markman's constraints, which are only linguistic cues, or you have the attentional cues, or the socio-pragmatic.

This theory says that children are sensitive to all the different kinds of cues in the environment. They can be linguistic, they can be social, they can be attentional, and everything. Secondly, children weigh certain cues more heavily than others in the course of word learning. So, even though they start out with access to all the different kinds of cues in the environment, they are born with those constraints. However, which cue or which constraint to use depends on the developmental stage they are at.

So, as a result, each stage will give more weight to one of those cues or one of those constraints. So, not every cue is utilized to the same degree in each stage of word learning; that is what they mean. So, they weigh the cues differently depending on the stage of acquisition. Constraints on word learning develop from the process itself. So, the kind of constraint to be used depends on the processes, the stage they are in, and also the process.

So, it may not be universal, for example. So, depending on the child, the language, the environment, and the kind of categorization they follow, they might need, you know, one cue before the other or one cue in a higher degree than the other, and so on and so forth. Now, what is most important about this theory is that by putting it in this way, this theory gives a wide range of possibilities for children to utilize. It is not one size fits all; it is a plethora of choices that the child has, and depending on the child's developmental stage, he or she will utilize this or that kind of cue more. They will be utilizing all the cues, but depending on the situation, they will use either cue 1 or cue 2 to a higher degree; that is the idea.

So this is why this theory has found supporters across many domains. So they explain this with the whole-object constraint. This is something we have already discussed, so I am not explaining it again. Now we will look at it from the ECM perspective. So children have a bias toward distinguishing whole objects from their surroundings.

Now, why do they have this? Because it helps them identify objects from their surroundings. They need to identify discrete objects. Now, this is not just a linguistic capacity; it is also a cognitive capacity. It is also part of your visual-spatial cognitive apparatus. For example, when a child is born their visual system is not very well developed.

It develops over a period of time. Now, one of the primary things to understand about visual cognition is that if you are given a scene, you need to be able to identify the discrete entities in the environment. So, in a classroom, when we are facing the classroom, for example, if we are not able to distinguish between each of the chairs and each of the desks, then there is something problematic with our visual system. Typically, it does not happen; we generally go through these developmental stages smoothly. So, that is what this theory says: that a whole object constraint is not just a linguistic constraint, but it is also dependent on the developmental stages of the child because they need to understand the discreteness of objects and differentiate it from, let us say, substances.

So that is the idea. So, this in turn will be helpful in learning language. So, this is not just one process, but an interaction; this is a dynamic process between language and other

cognitive developments. But there is a problem; this idea is not helpful in learning about parts of the objects. We have found that objects are discrete; from the scene, we can identify one instance of the object, but how do we proceed when we are talking about parts of the same object? So, they grow up; when they grow up, they need to now use different cues to understand that aspect of the scene. For example, social cues may not be used in the beginning, but at a later stage, by the time basic TOM is in place.

I hope you remember TOM. We discussed theory of mind; TOM stands for theory of mind. Understanding social cues is dependent on joint attention. Joint attention and theory of mind go hand in hand. So, by the time before the theory of mind, at least the basic tenets of theory of mind are in place, they will not be able to make good use of the social cues. So, even if social cues are present in the environment, they will not be able to utilize them properly.

That is what the theory states. So, this theory is based on a dynamic model. This dynamic model is not just dependent on linguistics, but it also has other domains that have used it. I have given one example here and one reference here. So, that includes what the dynamic model basically includes? It includes multiple cues to arrive at a complex process. So, the underlying logic here is to call this model a dynamic model because it gives you different levels of cues.

All the queues are around you, but you utilize them level-wise, and there is a lot of interaction across them across the levels, and that makes the entire language learning process a complex process; it's not a linear kind of system. So, this is the coming together of the components of which theory best describes children's word acquisition. So, the model's essential features are the three tenets of this model that look at the developmental stages of the child's language learning. The focus is on the origins of word learning as well as the transformations that take place in the second year of life when the child becomes an expert word learner. So, starting at 12 months, the findings have typically been that this is the time when they start to learn words.

So, starting from that position, which is the origin, and until the second year of life, that is when they become expert learners. So, that is the time frame that this model addresses. And how do they address it? They have this kind of hypothesis of stage-wise developments. I have called it a growth hypothesis. Of course, the authors do not call it the growth hypothesis.

It is just that they provide you with stages of development. So, how will the children typically start and what will follow what? So, in the first stage of learning words, which is from 10 to 12 months, children will have access to multiple cues: attentional, social, and

linguistic. Thus, this is the novice stage. So, in the novice stage, perceptual salience would be more heavily weighted than social cues. This is the stage when they are novices; 10 to 12 months, they are beginning to speak in words and understand words.

So, at that stage, perceptual cues will be most favored; let us say that will be what the children will depend on more. So, this is the first stage, right? Perceptual salience, as in looking at a bright object as the most important object in the environment, is what we mean by perceptual salience or attending to perceptual cues. So, word-learning principles would develop along a continuum from immature to mature. So, in the most immature state, this will be the perceptual, and as they grow up and mature into an expert learner, this occurs in the second year of life according to this theory.

That is when they will eventually go to others. So, they start with what is perceptually salient and only later figure out what is actually important, which is easily understandable because when they are very small, they have not developed a full understanding of the environment or what is important. Then whatever is salient in the environment catches their attention. That is what they will focus on. So, at an even later stage, they will be guided by associationist laws. Remember how children are expected to learn through association.

So, they see, they hear a word, and they see an object, and when these two things co-occur across scenarios and across contexts, they try to map it so that associationist views or laws will be attended to at a later stage. And finally, when they mature into veterans, these are their words: veteran word learners are guided, though not completely, by socio-pragmatic strategies. So, starting from perceptual cues to associations to social pragmatic cues is how the journey goes. So, that is why I have called this the Growth Hypothesis. So, there are many studies the authors themselves have provided some experiments where they show this.

So, the evidence has already been provided. So, how does it go? one study I have added here. So, the children were between the ages of 10 months and 24 months. The task was to check if children attach a novel word to a boring toy or an interesting toy. So, because we are dealing with children, the experiments, even though the underlying question was whether perceptual cues are more salient for children, and at what age, that was the main question. So, the perceptual cue, for example, how they manipulated the perceptual cue, was creating an interesting toy and a boring toy.

So, there were two kinds of toys that were used. The boring toy had a dull beige color with no moving parts. The interesting toy was brightly colored and had moving parts. The method they used was the preferential looking paradigm, which I have discussed before.

So, the experiment went like this: there were two phases. By now, you are already familiar with the phases; there will be a training phase, and there will be a test phase.

During the training phase, the children saw both the toys attached to a blackboard with Velcro. So, there was one dull toy, one interesting-looking toy, and the experimenter looked at one of the toys and gave it a novel name. And this activity was carried out five times. The novel name was Danu.

This word did not exist; does not exist. It is a new word, and the children had not heard it before. So, the scenario is as follows. So, the two toys are present at the same time. The experimenter gives one of them a name.

In the test phase, the children were shown the toys again. Now, the experimenter is not in the environment. She is hiding behind the blackboard, and they ask the child where Danu is. Now, the child has to pick up either one or the other, either the boring or the interesting toy. That is what was dependent; DV is the dependent variable.

So, what is it? That is our result. The result is where the child will look because this is a preferential looking paradigm that they used. Now, there was another very interesting manipulation in this experiment that is called the conditions. They used two different conditions that were part of the design. One is called the coincident condition and the other is called the conflict condition.

A coincident condition is when the interesting toy is labeled. So, in the training phase, we said that the experimenter named a toy. So, in some cases, she named the interesting toy; in other cases, she named the boring toy. So, that is how the conditions were created. So, the coincident condition is when the interesting toy is labeled.

So, the perceptual cue and the social cues are in sync. What it means is that the boring toy is obviously perceptually low in salience, while the interesting toy is perceptually of higher salience. So, in this case, by labeling the interesting toy, they were connecting both the perceptual cue and the social cue in the same object, which is the interesting toy. In the conflict condition, the boring toy was labeled. Now, the interesting toy obviously has a higher perceptual salience, but the name was given to the boring toy. So, the naming activity is the social cue, but the appearance of the toy is the perceptual cue.

So, the social cue and perceptual cue in this particular case in the conflict condition are mismatched; they are not matching. So, these were the conditions that were created. What did they find? Quite an interesting finding. So, at 24 months old, children successfully ignored the perceptual cue and focused on the social cue. What does it mean? It means that for the 24-month-old children, in most of the cases, they could correctly identify the boring toy.

That means remember our target condition is the conflict condition. The coincidental condition was basically a kind of control condition. So, the actual main part of the experiment was the conflict condition. So, in conflict conditions, most of the time, 24-month-old children successfully ignored the perceptual cue, meaning they did not look as much at the brightly colored toy, but instead looked at the boring toy because that was the toy that was mentioned, the toy that was labeled by the experimenter. So, if she is asking for that, then they will be looking at it. Slightly younger children at 19 months were also successful but had more tendency toward perceptual cues compared to the 24-month-old children.

And then 12-month-olds failed to identify the boring object. However, this is a very interesting phase of life, apparently, because the 12-month-old children could not find the boring object. So, when they were faced with the conflict condition, they could not identify meaning; they did not look at the boring object long enough to give us the indication that they understood. However, they also did not label the interesting toy, which was taken as proof that they were probably aware of the social cues but did not know how to use them yet. So, they were in a very interesting position in the developmental trajectory. 10-month-old children looked longer at the interesting toy irrespective of what the experimenter focused on.

So, this means that 10-month-old children completely ignored the social cues and focused entirely on the perceptual cue. So, you can see the entire trajectory of 10-month-old children focusing primarily on the interesting toy, irrespective of the command or the social cues; 24-month-old children could ignore the perceptual cue and focus on the social cue. So, this is taken as proof of the ECM theory because it is said that in the initial stages of life, children will focus more on perceptual cues, and as they grow up, they will be able to take social cues into consideration. And this is part of their growing up, part of their maturational stages. There are, of course, even though this theory has been received pretty well, very few criticisms, but still, there are some.

So, one of the criticisms is that why do we need too many mechanisms to be in place when one theory could take care of all the problems. This criticism has primarily come from the

sociopragmatic theory groups. For example, Akhtar and Tomasello said in another paper that the sociopragmatic mechanism is good enough to tackle all the issues that we are talking about. So, rather than having you know 3 or 4 stages, why don't we just look at one theory that is one of the criticisms? However, they do acknowledge that there might be a few more processes, but they are ancillary; they are not important; they are not core.

ECM makes everything core. So, universal bias is also considered a core mechanism of the entire process, which is relevant at the beginning, in the first stage. So, 10-month-old children will be showing that kind of thing, that kind of tendency, and eventually others. But the social pragmatic theory group says that these other things are ancillary; they are not part of the core mechanism. The other kind of criticism that this theory has faced is with respect to universal bias. So, remember when we talked about universal bias, we looked at how certain basic categories are also understood differently across the world's languages.

Not every concept is categorized as the same concept. So, categorization is a fundamental mental process. So, if languages can differ there, then the universal bias probably does not hold. So, the same idea has been applied to this theory as well: that universality is not beyond question, especially because languages differ in some fundamental aspects, like categorization. For example, in one such paper that has been described, they have explained how in a particular language there are three different words for the concept of eating. So, in English, the word "eat," whatever it refers to, can be broken down into three different categories in this particular language.

For example, ingesting crunchy food like carrots is one term; another term for food that is less crunchy but still solid, like bananas, and then for tortillas or other bread-like foods, there is a third kind of word. Now, this means they have three different categories of ingesting food: eating. So, eating can be broken down, and we are not even considering the liquids and the other kinds. So, it is only about ingesting, which is typically the core domain of what we call eating.

So, that is how we can question universal bias. So, these categories are probably not good candidates for universal bias. Researchers like Bloom, for example, propose that based on this kind of evidence, there are certain languages that do not seem to obey the universal bias very well; because of this, ECM may not even need the universal bias. So, the rest of the features of ECM are fine; they have not been criticized a lot, but universal bias probably is not needed. So, there are some studies based on that and they have shown that may be it can be gotten rid of. So, to sum up what we have learned in this module, we have discussed how children go from segmenting the speech stream into phonological word forms to

acquiring

lexical

entities.

So, starting from speech segmentation to acquiring words, word by word we mean word forms with meaning. So, that is what becomes the actual word. And then we explain the possible issues that children may face while forming their understanding of meaningful words. Then, theories based on constraints, general-purpose cognitive mechanisms, and socio-pragmatic factors have also been discussed. And finally, today we discussed a model that attempts to arrive at some kind of middle ground by incorporating essential aspects of the previous theories and proposing a dynamic model in their place. So, with that, we complete this module, which focused on word acquisition. Thank you.