

Fundamentals of language Acquisition

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Lecture 028

Lec 28: Theories cont: constructivism

Welcome back. Now we will start with lecture 3 in module 6. In module 6, lectures 1 and 2, we have looked at behaviorism and nativism, which is generativism. We discussed some of the theoretical aspects of nativism, and let us now continue with the theories further. So, we will now talk about constructivism. Nativism: we have discussed the main points of nativism with certain examples and how they are found to be correct.

In some cases, some of the experimental evidence we have also discussed. Now we will move on to constructivism. In constructivism, there is a very important departure from the standpoint of nativism. In this theory, they say the syntactic categories are not innately specified in children but are conservatively learned based on the linguistic input to which a child is exposed.

So, in this theory, linguistic input is one of the most important aspects of it. So, there is nothing; there is no universal grammar, no innate grammar that the child is already endowed with; rather, the child builds up the knowledge bottom-up. Bottom up, as in it is a data-driven kind of structure that the child finally arrives at. So, this theory is based on the understanding that linguistic input is much more important than what you might be born with. Thus, learning the syntax of a language is not dependent on any innate rules; it is a matter of cognitive abilities.

General cognitive abilities are what is given more importance in this theory. So, while the generative approach emphasizes the innate knowledge of language structure,

constructivism, on the other hand, adopts a non-generative grammar approach for its core framework. Now let us keep in mind that, and this is true for nativism as well, though when we talk about the generativist framework, we primarily talk about universal grammar referring to Chomsky. But there are many versions of them, so principles and parameters also have a couple of different variations; there have been some updated versions of the theory and so on. So, it is not just one monolithic kind of structure; similarly, for constructivism as well, there are different grammars, different kinds of grammars that all come under the broader umbrella of constructivism.

So, what are those grammars? primarily, the cognitive grammar and the construction grammar that is what they depend on, the base which is part of the constructivism theory. So, this approach denies an innate knowledge endowment, but the ability to learn, of course, is innate; that is, what is denied is the universal grammar, which is an innate grammatical structure that we have; that part is denied in this structure. So, how does this theory take care of the bootstrapping and the poverty of stimulus that we have seen before? So, this theory provides a different approach to tackling the problem of poverty of stimulus and bootstrapping because this theory is based on linguistic input; they obviously do not believe in poverty of stimulus, as whatever input the child is getting is considered adequate in this theory. So, whatever is there, a child is able to, through some sort of statistical learning, notice the patterns over various occurrences; that is how they figure it out. So, data is not inadequate; data is adequate as far as this theory is concerned.

So, poverty of stimulus does not arise, and they do so because they generalize across words that behave in a similar way. So, they learn the syntax by taking into account the recurring patterns. So, that is how the problem is taken care of. So, what is the main problem and main question in this approach? In the generativist approach, the main question was not how they learn but what the innate features are. In this theory, the main question that they ask is how children analyze the input; this is important because the idea that they do analyze the input is already given.

So, how do they analyze it in order to arrive at the grammatical regularities? So, this is how they explain that this one is, of course, the most important semantic distributional analysis, and then we also have our usage-based model. There are a few more, but we are not getting there because, again, it is due to that paucity of time. So, semantic distributional analysis discusses the idea that children analyze the pattern of distribution of words in sentences and then extract the pattern that is generalizable. So, they notice they keep hearing sentences in various formats, and through that, they extract information about which is a noun, which is a verb, and how they behave. So, this is what leads children to start combining pivot words with open-class nouns.

Then, they create word order from this input, right? So, they pick up important words like the pivot words and the open class words from the data they gather through recurrence and distribution analysis, and then they start combining them; that is how they create their first sentences. And we also have a usage-based model that has many overlaps with distributional analysis and some added features as well. This model, usage based models actually, is not a single model. So, overall, we will discuss only the broader aspects. So, these models are often based on construction grammar, which proposes a different learning curve.

In this language, there is an inventory of constructions. Each construction has a specific purpose for communication. So, depending on that, the mapping happens. We will see them in slightly more detail. This approach models children's knowledge of basic word order in terms of stored hollow phrases like "I am kicking it.

" So, basically, there is I, the agent; then there is an action, followed by -ing, and then the eat. So, simple transitive sentences reflect a language's basic word order. In the case of English, a basic word order will be a simple transitive sentence. So, I read a book, I eat bread, something like this. So, that is a simple SOV structure that is understood to be a fundamental building block for the sentence structure in the English language.

So, children need to learn the transitive construction, which is a template for any adult-like transitive sentence; it will have this kind of template: subject, verb, object. That is what they have to learn in order to be able to speak or in order to have adult-level syntactic knowledge. But this is not where they start; they start at a different level. This is not an early schema that they learn; this schema is learned later. So, this explains why the children are not able to produce the transitive order in the initial stages, because this is what they have to approximate.

But they will arrive at it through semantic distribution analysis and other features. But this is one way to explain how children make mistakes and why they make mistakes. Because in the initial stages they are still figuring things out, they are still in the process of semantic distribution analysis; they are trying to identify the recurrent patterns of primary objects, the pivot words, the actions, the open class words, and so on. Data to support this prediction came from a number of different experimental paradigms. For example, this kind of experiment has been carried out in the case of naturalistic utterance, in the case of elicited production, as well as in the case of syntactic priming.

I have added some of the most influential work in this. This is one of the very, very important studies, all of them, of course. So, this has already been studied. Now, semantic distribution analysis needs a little bit more discussion because this is a constant part of

constructivist theory. Whether it is a usage-based model or other models, this is considered to be one of the building blocks.

So, this process is one by which children analyze the distribution of words in sentences. Then they use this information to link words that behave in a similar way and have a similar kind of meaning. So, Ram reads the book; the boy does this, you know, like various kinds of structures through a recurrent pattern. They will analyze this distribution in different kinds of situations. So, as a result, they will notice the similarity in behavior by using similar kinds of words.

This will help them extract a pattern that underlies this behavior right. So, that is the thing that we just saw. So, the agent acts and then a verb. For example, verbs occur in similar positions, such as "I want," "I like," "I need," and so on. They use similar inflections, such as "I wanted," "I liked," and "I needed."

"Based on this distribution, these verbs can be grouped together in the verb category. So, for them to arrive at something called a verb category, they need to go through, first, listening to all the inputs and then figuring out similar-sounding and similar-behaving words, and then they will be put together in one class, one group. One of the first studies in this regard was carried out by Braine in 1963. So, he was among the first to suggest that the distributional pattern of learning actually happens in children. So, as per his theory, children start making sentences with pivot words and open class words; that is what we mentioned in the very beginning; this is where it comes from.

So, pivot words are words like "more," "know," "again," "it," etc. These are pivot words. He calls them pivot words. And open class words, of course, we know nouns, verbs, and adjectives. So, that is why in the very beginning the children start with combining these two things.

They will combine like only one of these and one of those. So, that is how they will combine the two of them in a way that they have heard them to be used, which is from input. So, they have figured out these words in their heads, and then, depending on the kind of input they have had, they will combine them similarly. And then generalizing across these patterns, they can make more flexible structures over a period of time. Then we have a usage-based model; as per this model, the children's acquisition of syntax does not require any innate structure; rather, it is based on general cognitive and social abilities.

This is also an important factor. So, not only do we need cognitive ability, but we also need social abilities; why social, we will see in a minute. So, there are four important skills that are part of usage-based models, and we have distribution analysis, as I just said, which is part of many of the theories within the constructivism umbrella. So, they have distributional analysis; we have already talked about this, and we are not going back. Then there is analogical reasoning; this talks about comparing across different constructions and finding out the commonalities.

Like the subject in the initial position is often the agent, let us say in the case of the English language. Not always in all languages, but let us hypothetically say this is the structure that they notice. So, by analogy, their reasoning will be: if this is the position and this is how it behaves in a sentence, then this must be the agent and this must be the subject; that is what analogical reasoning is. and then there is a competition between input and the knowledge she has formed. So, every time she has a new input coming in, there will be a kind of cross-checking with the knowledge she has already formed.

and this leads to correction in her own knowledge. So if there was a wrong interpretation, let us say the verb will always come at a particular position in the sentence, and then with new knowledge, you will be able to update that information. So, that is why competition is important. The last but not least is what they call intention reading. Now this is where social abilities come into play.

If you recall, we discussed in detail joint attention, theory of mind, and social cognition as some important building blocks of children's general cognitive abilities; that is what they are talking about. So, we have social abilities where you have intention reading. Intention reading is important because if you need to figure out the intention of the speaker, then you can understand things a little bit better and the structure of the sentences a bit better. For example, you have this often-cited sentence, like "glorp the gavagai." So, when that is the case and there is, let us say, a rabbit scurrying by, there are only a few possibilities that the mother is talking about: either she is asking to watch the white rabbit, or, let us say, to chase it or stop it, something like that.

So, if the child is careful about the mother's intentions, then she will be able to get the correct mapping; this is why it is important. So, intention reading. These are the four important parts of the usage-based model that we typically see. So, how does it work? The child learns phrases directly from input, and then through distributional analysis, they get to what is called a lexically specific schema. So, this is the schema: "want" plus "drink" becomes "I want a drink."

" Over a period of time, they then build up an inventory of such schemas. So, what kind of

pivot word and what kind of open clause word can be connected and put together over a period of time, a schema emerges, and eventually, they build up an inventory with lots of such schemas. And as more and more schemas get linked together, the child approaches the adult knowledge state. As this knowledge is built more and more, the child is less tied to the lexical items and is able to have an abstract understanding of the language structure. So, starting with the lexical items, starting with the pivot items and the open class items, eventually she starts putting them together, which leads to the creation of some sort of specific lexical schema, and then that also gets, you know, more and more enriched through inputs again, and then that creates a, you know, inventory of schemas, and eventually she gets the basic idea underlying all of this schema, which is when the abstract notion underlying all these structures is built up.

That is when they can match the adult level of understanding in the case of various kinds of sentence structures. And this process is called abstraction because they have moved away from their dependence on the lexical level and have been able to create abstract knowledge; that is why this process is called abstraction. That is how this structure needs to be understood. Now, so far we have only talked about the basic aspects of these two most important theoretical standpoints in terms of the acquisition of syntax among children. Now, generativism, as I said, has many layers; even principles and parameters have undergone some changes and updates, as well as many other things that we have not discussed, such as minimalism and various other topics.

Similarly, for constructivism, we have also only stuck to the main ones. However, there are many other theories that we have not discussed. One of the most important omissions is, of course, the optimality theory within the generative framework and the competition model in the constructivist tradition. These are also important models; I just thought of adding them. And each of these theories has its subtheories, and there are data that have supporting and opposing evidence as well.

But we cannot go beyond these to look at them in more detail because we have to adhere to time. Let us move on to other aspects of learning syntax. Now, let us focus on how children learn to constrain their productivity. We have already talked about generalizing and how generalizations are handled by children; what methods do they probably apply.

So, now let us look at some more of them. Overgeneralization is something we have already discussed. Children learn to create sentences by following a pattern. Once they have figured out the pattern, they tend to generalize. They tend to use the same pattern everywhere. However, in the process, they sometimes create errors.

We have seen some of those errors. For example, we have already discussed this sentence:

"I spilled the carpet with juice". "I painted with a pen/pencil or brush", but spilling the carpet with juice is not fine. But the structure is fine. This is possible with other kinds of words, but not with this particular verb. However, this is a case of overgeneralization; "do not giggle me", "I said her no" and so on.

So, this is something that happens. This is where a paradox is also built in. So, this is related to the problem of generalization. Now, you need generalization in order to get to a greater number of productions and a greater number of sentences from a basic structure that you have already created. Whether it depends on universal grammar or on your input and semantic distribution analysis, you need generalization at some point to take care of your production, because you cannot have a one-to-one mapping of input and output. You need to generalize on some of the basic understanding in order to create N number of sentences.

So, generalization is an important part of learning. However, where do we stop? That is a problem. So, children learn through a type of generalization; for example, if they hear sentences like "Ravi glorped Rahul." Now, if that is the construction, various kinds of other verbs can replace that. So, this is a kind of generalization that the child will eventually need to utilize. Children then understand that "Rahul glorped Ravi" is also possible.

However, they also need to learn that this generalization is not possible in some cases. So, you need generalization, but generalization gets into some problems in some constructions that are not possible. So, this is the paradox that is called Baker's paradox. How do we solve this problem? What is the solution? There are different types of solutions that have been proposed.

There is negative evidence. Then, we have the semantic verb clause hypothesis and the role of frequency. These are the three types of solutions that have been proposed. Let us look at negative evidence. Negative evidence is crucial for correcting false beliefs.

So, negative evidence is when somebody corrects you. Somebody says that this is incorrect. So, your caregiver, parents, or somebody tells you that this sentence is not correct. This is not how you say it.

So, this is negative evidence. And then you correct the course. So, this negative evidence is used for all of us in all conditions for learning throughout life, not only for language but for all kinds of learning. So, when we make a wrong decision, for example, if you have a

good friend, and if you are lucky to have a good friend, that good friend might tell you that this is not a good reaction to the situation you are in; this is negative evidence correcting by others. So, this is something of an example that is also seen among children. Now, it is suggested that children may learn not to overgeneralize when they are stopped from doing so by parents. So, evidence in this regard actually shows that there is a range for parents.

Sometimes parents overtly correct; sometimes they do not correct, and sometimes they correct through different means. So, let us look at that entire spectrum. So, evidence ranges from not correcting at all to correcting using recasting. So we will look at all these possibilities. So, the first one is that there is no correction of grammar as the meaning is fine.

When the meaning is fine, sometimes children are not corrected overtly. There are reported cases where the parents do not stop the child from using incorrect grammar as long as the semantics are fine. So, for example, this is quoted from Brown and Handler (1970). So, the child's name is Eve; Eve says "mama is not a boy, he is a girl".

So this is the problem. So she should have used "mama isn't a boy, she is a girl", right? So, the mother does not correct her; "that is right", Mama does not correct the wrong use of the pronoun in this case. This was in 1970, so pronouns had not become problematic yet. So, this is a case where the parents do not correct the grammar because the semantics are fine; she understands the meaning properly, so they let them go. But then Eve says "this is the animal farmhouse". Mama: "no, that's a light house" So, when there is a wrong meaning, when the child gets the meaning incorrect, then the mother is correcting her that no, this is not an animal farmhouse, this is a lighthouse.

So, the case number 1, the first case of the first type of negative evidence, is when we have not corrected grammar and not corrected the production because of the semantics. Then there are also cases where they do not correct because, well, children's speech sounds sweet; some sounds are amusing sometimes. So, sometimes the parents just let it be. So, this is an example from a comparatively recent study, Anne: " I don't sure don't like it". The mother: "You don't sure you don't like it?" she is not correcting; she is just playing along; this is also possible.

Correction using recasting is yet another type. This is something like you are not overtly correcting; you are not saying that you are wrong, but you change the sentence structure, create a correct syntax, and then repeat it. So, evidence also exists in which parents correct the syntax of their children by using what is known as recasting. Parents reformulate the child's utterance by using the correct form of the words. So, the child says: "he wiped him",

and the adult says "He wiped himself".

Child: "Yes, he wiped himself". So this is a recasting. He said he is using the same sentence structure but with the correct grammar. This is called recasting. This is again from a study that was carried out by Saxton, so these are the possibilities. Thus, negative evidence may sometimes help children correct overgeneralization, but this alone cannot account for the entirety of it. Yes, sometimes negative evidence probably helps, but is it all or are there many other kinds of possibilities? Turns out there are other possibilities, other hypotheses.

So, let us look at some of them. Children and adults alike reject ungrammatical utterances made up of words even though they may have never heard them. So, if you have never heard them, then there is no possibility of negative evidence. Never used them; no, you have not used them and have not heard anybody else using them. So, there is no possibility of negative evidence; this study comes from another important study by Umbridge.

So, 5- and 9-year-old children and adults took part in this study. They used sentences like this: "The joke chortled me," using a less frequent verb; they have used a verb that is a very low-frequency word. Similarly, "the joke tamed Lisa". Use of a novel verb, the meaning of which was said to be 'laughing in a particular way'. This does not exist, right? So this is what they have created: this word, and then they created this sentence. Now these sentences were rejected as ungrammatical because both sentences were ungrammatical.

This was also ungrammatical because this is a case where the verb used is a less frequent verb. So, it is not a case of negative evidence, but rather the frequency factor that is probably playing its part here. So, negative evidence cannot answer all the questions. So, what do we have? How can we explain this? There is the theory of the hypothesis of the semantic verb class hypothesis. This theory hinges on the restrictions on which verbs can and cannot occur in certain syntactic structures.

Every language has some rules beyond the primary syntactic rules for creating sentences. There are certain verbs that cannot be used, even though it seems possible; we cannot use them in certain kinds of scenarios. For example, in English double object dative constructions like "X is transferred to Y," there are restrictions on which verbs can be used. So, "I told Ram something" versus "I said Ram something". So, when you are saying something to somebody, the verb to be used cannot be 'said'; it has to be 'told'.

So, this is the restriction that we have. In the English language, there are some pairs of words of this kind which are possible in some cases; in other cases, there are not. So, saying something "I said Ram something," is an ungrammatical construction. So, this knowledge

needs to be understood. So, the key to stopping overgeneralization is to learn these subtle differences. These are very subtle differences, and even with moderate proficiency in the English language, many people will make these mistakes, not just children.

So, this is extra knowledge that the child needs to have in the domain of semantic verb class. Another possible pointer or variable could be the frequency. As we just saw, if the verb is infrequent, they consider it ungrammatical. So, frequency becomes an important predictor. So, if the verb is of high frequency, then it is easy to understand when it is used ungrammatically.

But if it is low frequency, meaning you have fewer chances of ever hearing it, then it is difficult for you to reject it as ungrammatical. So, this example is again by Umbridge. So, less frequently used verbs are not as readily rejected, meaning they may be more prone to overgeneralization. So, low frequency words are examples; "the clown laughed Lisa"; now laughing is a kind of high frequency word.

So, this was not acceptable, but less acceptable. "The clown giggled at Lisa" was considered to be less bad. Even though both of them mean the same thing, giggling is less frequent than laughing. So, it was not as bad. Similarly, "the magician disappeared Bert", is less acceptable.

"The magician vanished Bert", less bad. So, this is how they checked whether the frequency level of the word, keeping the semantics similar, has an impact on the judgment in terms of grammaticality and acceptability; it turns out it does. So, high-frequency words will be more readily recognized when they are ungrammatical. But low-frequency words will not be used because, obviously, if there is low frequency, they probably do not know them very well.

So, they will be more prone to overgeneralization. Then a related idea is that of entrenchment. The more one hears a verb used, the more likely one is to consider it ungrammatical in unattested constructions. So, when it appears in a novel construction, you will be able to, you know, consider it as ungrammatical because you know this idea has been entrenched in your mind. This is called entrenchment; one that, when you hear something over and over again, you become more familiar with it and will be able to catch it more easily as well. So, overgeneralization happens with verbs that are not yet firmly entrenched in the child's mind. Overgeneralization is possible for those verbs that are not very frequent in the child's environment, and hence it has not been etched in the mind, so to speak.

So, the preemption hypothesis is again another idea related to the frequency effect of verbs.

So, this theory ascribes a special role to the similarity of meaning in two constructions. For example, "the magician made the rabbit disappear"; this is technically speaking called a periphrastic causative construction, and then "the magician disappeared the rabbit", which is ungrammatical and does not work. So, this theory ascribes a special role to the similarity of meaning in two constructions. These are the two constructions that you have.

So, in one case, the magician made the rabbit disappear; this is one type of construction. The other is that the magician disappeared the rabbit. Now, if the child hears the first construction, which is a periphrastic causative construction, more often, she will be able to preempt the use of this transitive. So, she will know that although a transitive verb also means the same thing, it cannot be used in such a construction. So, frequency, preemption, and entrenchment are three different sides of the same story.

So, it's the same idea. So, based on frequency, these ideas will be acted out. So, if you have heard them enough times, then you will be able to figure out how and where to use them and where not to use them; thereby, the child can get rid of the overgeneralization problem. So, these are some of the ideas in terms of how children know how to put a stop to overgeneralization, how productivity can be tackled, and how overgeneralization can be channeled in the right way. So, these are some of the possibilities. So, here we complete this in this lecture; in the next lecture, we will take up other topics. Thank you.