Course Title
Introduction to Psychology of Language
Lecture - 25
Parsing Sentence - 4

Welcome to the course introduction to the, 'Psychology of Language'.

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**Introduction
to the
Psychology of Language**

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I am Ark Verma from IIT Kanpur and we are on the final lecture of week five,

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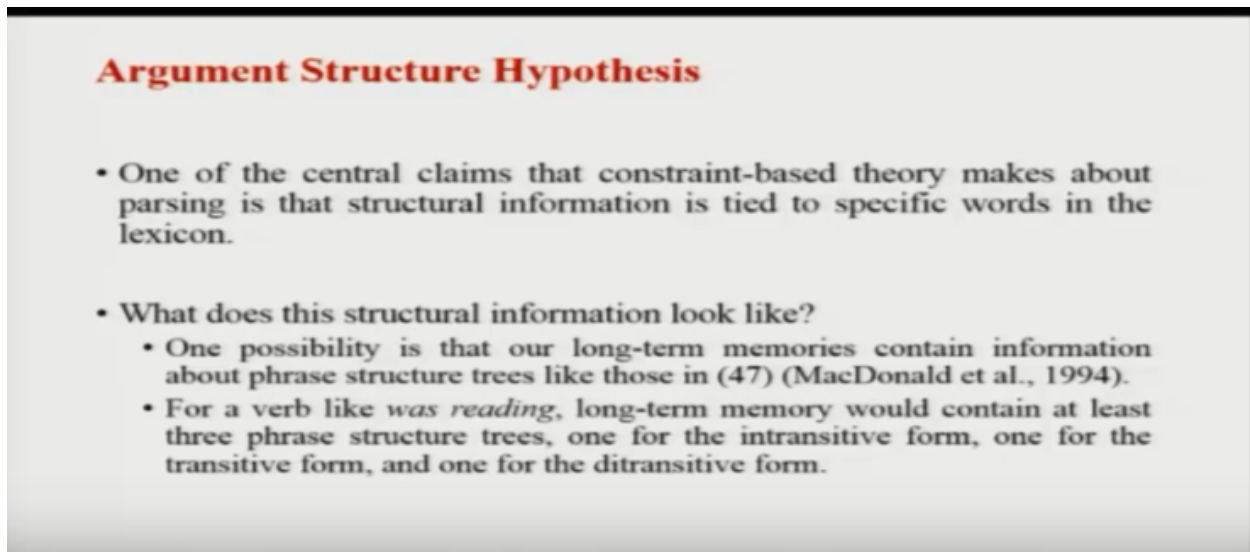
Week 5: Sentence Processing

week five we are talking about sentence processing. In the last lecture,

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Lecture 25: Parsing Sentences - 4

we talked about what is the sentence? We talked about the garden path theory of sentence processing, and in the two lectures we talked about various aspects of the constraint-based processing theory of parsing. In today's lecture we'll continue our discussion about the constraint based parsing models and also look at some alternative models of processing, or of achieving you know successful parsing. So, let us move ahead without wasting a lot of time. Now, one of the things that we discussed while we were talking about constrained waste parsing models, is that the verb structure kind of you know, has to be factored in while multiple you know, structures are being generated, following that one of the central claims of the CBB theory is that, this structural information is tied to the specific words, not only verbs but other words is well, but more specifically verbs. So, this structural information is tied to specific words in the lexicon, Okay? Let us look into this in word in a bit more detail, what is this structural information might look like? So,

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let us look at one possibility is that, we might be storing this structural information. Say for example, for the sentence like, Dr. Phil was reading or, Dr. Phil was reading the book, Dr. Phil was reading the little girl the book. So, for the verb reading, there might be multiple structural representations possible and what we might be doing is, we might be storing these structural representations into our long-term memories. So, whenever we come across the word was reading, we can kind of draw the structure from the memory and use it as such, in order to speak or to comprehend. So, for a verb like was reading just to kind of repeat it, for a verb like was reading long term memory would contain at least three phrase structure trees, intransitive, transitive and ditransitive forms, and that

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(47) "was reading"

basically, should look a little bit like this. So, Dr. Phil was reading, this is a simple verb phrase. Dr. Phil was reading the book, is the verb phrase two and, Dr. Phil was reading the girl the book, that's the verb phrase three. So, this is the possible structures that you could have, in order to store information for, the verb was reading. However,
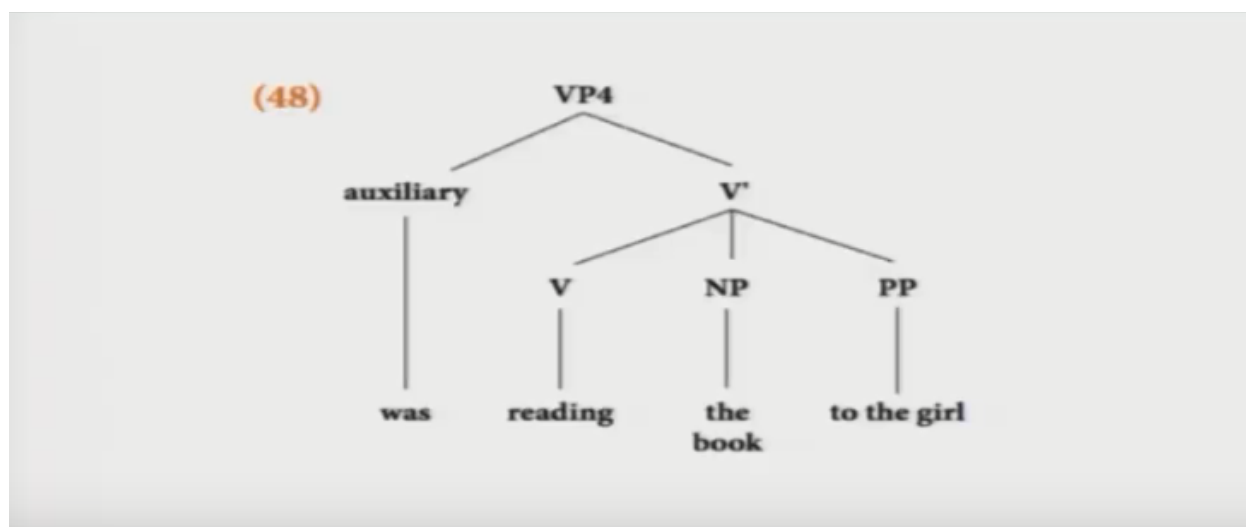
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- what about the dative form? Is that represented, too? If so, there would be a fourth tree, as in (48).

- what if the dative form is supplemented by information about location? Do we need another tree for *was reading the book to the girl at the park*? If so, we need the structure in (49).

- What if we had something like this? *Dr. Phil was reading the book to the girl at the park next to the fire station that was built by generous pilgrims from Burkina Faso who liked to take long walks with their vicious pet lizards.* If we wanted to prestore all of the structure that goes with the verb, then we would need something like (50).

this is not the only possibility that the verb posits, it can posit other possibilities as well. Say for example, in the dative form, Okay. Is that, will that be represented as well? If so, there will be fourth tree, what if the dative form is supplemented by information about the locations, the Dr. Phil was reading the, you know, the girl the book at a particular location something else. So, you know, reading the girl the book at the park, something like that. So, will that also create another structure? So, you'll have forty, you know, another structure, or what if the sentence is even slightly longer? So, something like Dr. Phil was reading

the book to the girl in the park, next to the fire station that was built by the generous pilgrims from Burkina Faso who liked to take long walks with their vicious pet lizards. Now, where do we go from here, how many structures will you generate, and how many structures will you store, and if you're going to store so many different structures for a particular verb form, obviously you will kind of get confused and that will be useless, you will not really be able to draw information, about the specific structure, from the long-term memory, in order to understand the producer comphre, you know a particular verb form. So, this is precisely what the problem is. So, you can see

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the girl was, was reading the girl, the book to the girl or,

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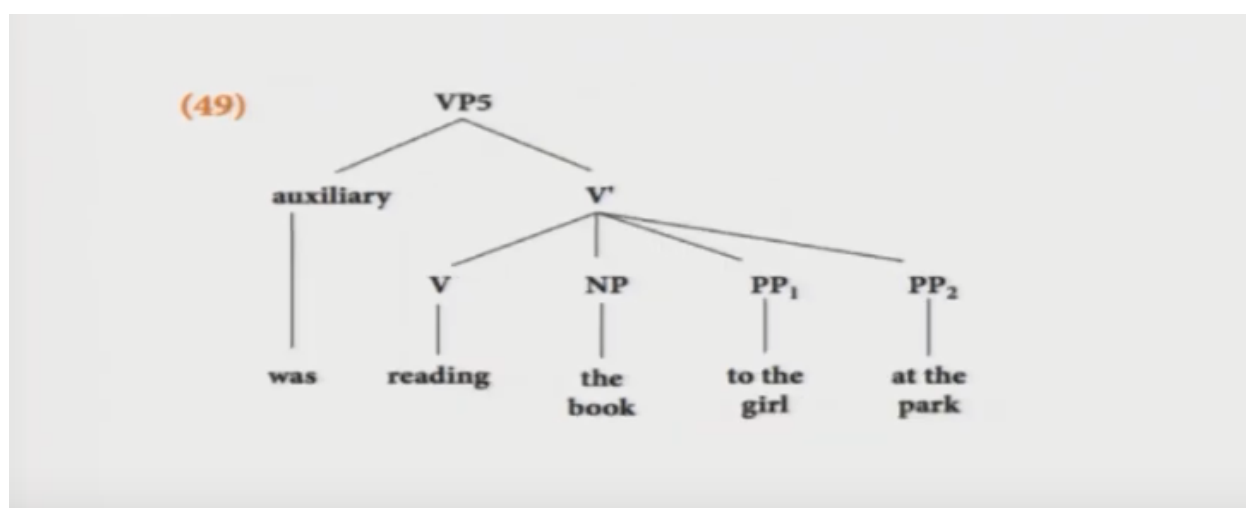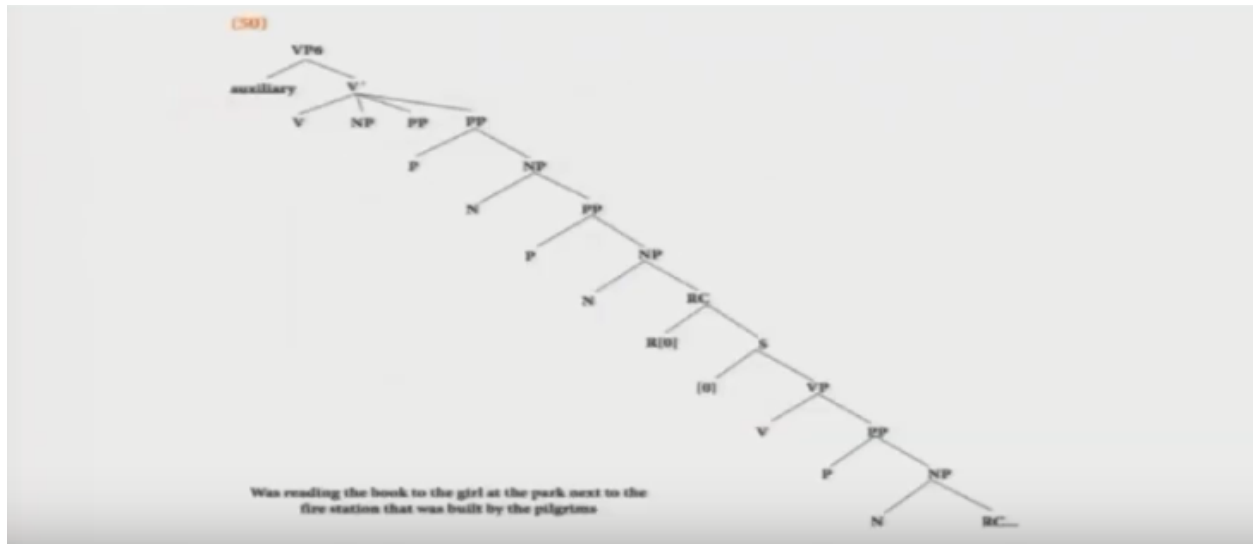

was reading the book to the girl at the park or,

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Was reading the book to the girl at the park next to the
fire station that was built by the pilgrims

say for example, was reading the book to the girl at the park next to the fire station etc., So, you can see that so many structure trees can be added.
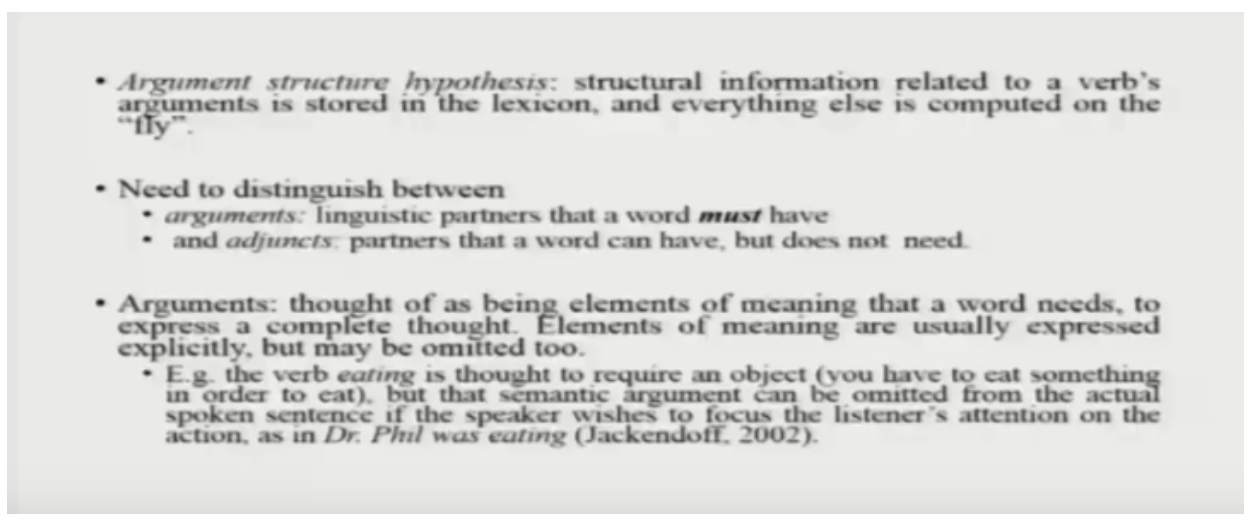
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- A possible solution might be to know where to stop generating and storing structures..., i.e. to come up with a *stop rule*.

- Referred to as the *leg – shaving problem*, i.e. Where do I stop? In leg-shaving, many people adopt the principle, "I stop below the knee."
  - This principle requires us to decide where, exactly the knee is, and that can be somewhat ambiguous, but now we at least have a clear "stop" rule, and we can proceed even if we have only a rough idea where the knee is.

- Can we come up with a similar principle for verb-related syntactic structure? One possible stop rule for storing syntactic representations is the *argument structure* hypothesis (Boland & Blodgett, 2006; Boland & Boehm-Jernigan, 1998; Tutunjian & Boland, 2008).

Now, what is the solution of this kind of a problem, a possible solution might be to know where to stop generating and storing structures you know, a stop rule. Now, referred to as the leg shaving problem, it kind of offers a way, to come at the, to arrive at a particular stop rule. And the leg shaving problem is in that sense easy, suppose say for example, you know female and you kind of shaving leg, where do you exactly stop shaving leg? Maybe just up to the knee, you know, something like that. So, that is just basically arriving at a sword of an, you know place, where you will stop with, generating so many

structures and storing so many structures in the long-term memory or, shaving the legs so truth be, Okay. So, this principle kind of tells us that, Okay. This is the broad criteria which I will use, to stop generating more structures that is basically what I am concerned with. Now, can we come up with a similar principle for verb related syntactic structures as you know for specific word, verbs, all verbs. Now, one possible stop rule for storing syntactic representations could be, the argument structure hypothesis, what kind of argument structures a particular verb has and on the basis of that, you decide, when and how many structures you have to store? Let's look in to this a little bit more detail.
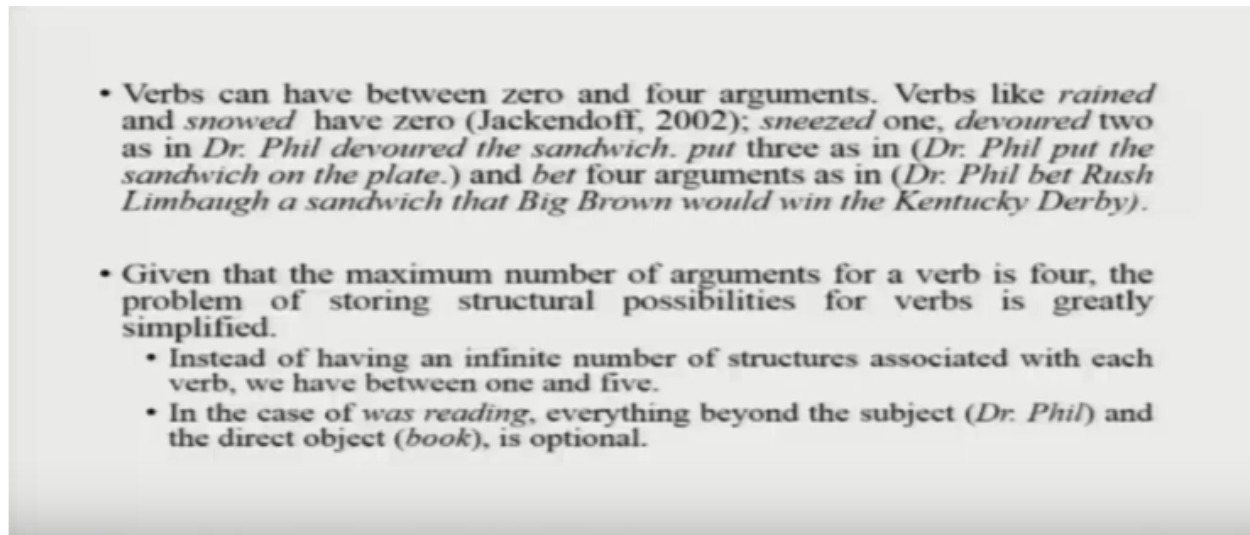
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- *Argument structure hypothesis*: structural information related to a verb's arguments is stored in the lexicon, and everything else is computed on the "fly".

- **Need to distinguish between**
  - *arguments:* linguistic partners that a word ***must*** have
  - and *adjuncts*: partners that a word can have, but does not need.

- **Arguments:** thought of as being elements of meaning that a word needs, to express a complete thought. Elements of meaning are usually expressed explicitly, but may be omitted too.
  - E.g. the verb *eating* is thought to require an object (you have to eat something in order to eat), but that semantic argument can be omitted from the actual spoken sentence if the speaker wishes to focus the listener's attention on the action, as in *Dr. Phil was eating* (Jackendoff, 2002).

What is the argument structure hypothesis? The structural information related to a verbs arguments is supposed to be stored in the lexicon. So, a particular the kind of arguments that a verb can have, in this structural information can be stored in the mental lexicon and everything else will be computed on the fly, structural possibilities this verb has, then everything else that kind of comes up will be calculated on the fly, as you are writing or reading the sentence, Okay. In this, you will need to do two things you need to distinguish between arguments and adjuncts. So, let us understand what the arguments are? Arguments are the linguistic partners that a word must have. So, something that without which the verb cannot world cannot be express it, must, must have it and the adjuncts are partners that a word can have but, does not really necessarily need. Say for example, I was sleeping is fine by itself, it can have I was sleeping at the bed but doesn't really matter, Okay? that kind of a thing. Now, arguments can be thought of as being elements of meaning, that a word needs in order to express a complete thought, I cut, Dr. Phil put, what did he put, where did he put that? So, you need some. So, those things that will be filled in there will be the arguments of these verbs, Okay. So, elements of meanings that are usually expressed explicitly, but can sometimes be omitted as well. Say for example, the verb, eating is thought to require an object it must, I ate, what did you eat is the natural question it must require an object, but that semantics argument

can be omitted from the actual spoken sentence, say for example, if you're saying Dr. Phil was eating, it does not keep it completely, completely necessary to have that, it might have was eating a banana or a pancake but if it does not have, really does not really you know, break the bones of the sentence. So, that is something you have to remember. Now, if you look at this, you'll find that,
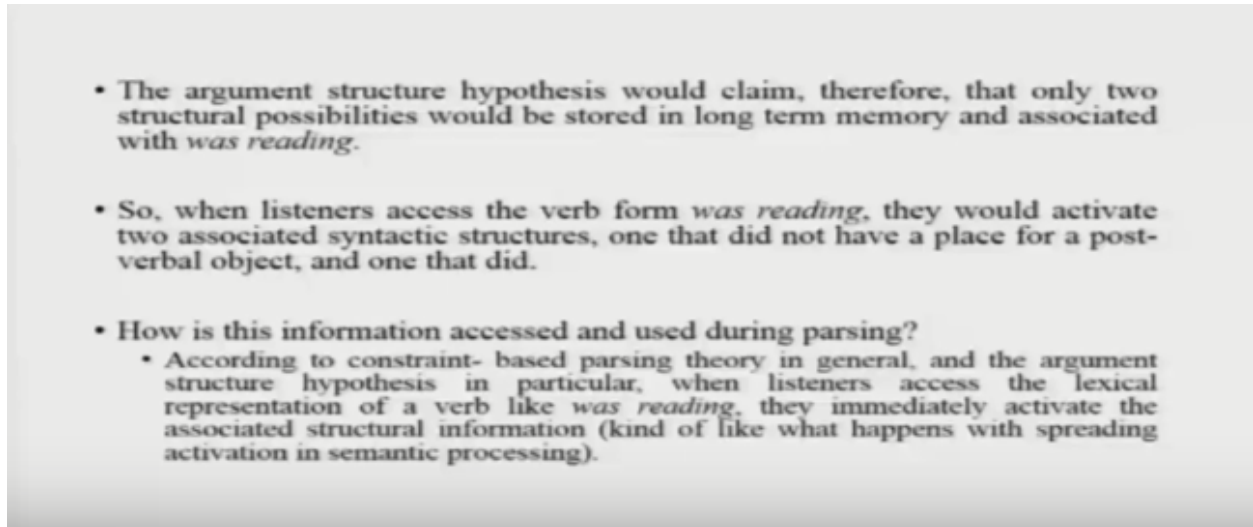
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- Verbs can have between zero and four arguments. Verbs like *rained* and *snowed* have zero (Jackendoff, 2002); *sneezed* one, *devoured* two as in *Dr. Phil devoured the sandwich.* *put* three as in (*Dr. Phil put the sandwich on the plate.*) and *bet* four arguments as in (*Dr. Phil bet Rush Limbaugh a sandwich that Big Brown would win the Kentucky Derby)*.

- Given that the maximum number of arguments for a verb is four, the problem of storing structural possibilities for verbs is greatly simplified.
  - Instead of having an infinite number of structures associated with each verb, we have between one and five.
  - In the case of *was reading*, everything beyond the subject (*Dr. Phil*) and the direct object (*book*), is optional.

verbs can have between zero and four arguments. Say for example, verbs like stained rained and snow have around zero argument. So, its snowed full stop, no need of another argument, it you know, rained no need for another argument, sneeze can have one argument, devoured can have two arguments as in Dr. Phil devoured the sandwich and then, you can have three say for example, that put will have three arguments. Dr. Phil put the sandwich on the plate. So, what did he put and where did he put? We needs three arguments and then, four arguments can be there in bet say for example, Dr. Phil bet Rush Limbaugh a sandwich that Big Brown would win the Kentucky Derby, what did he bet about and all of that detail needs to come in, Okay. So, the thumb rule is a verb can have anywhere between zero and four arguments, that is what, we take from here. Given that a maximum number of arguments is four, the problem for storing structural representations or possibilities, kind of gets a little bit simplified. Now, you can kind of store these representations, instead of having infinite number of these structures, you can have between one and five, you know, that kind of will seal you know, it will kind of seal the problem a little bit. So, in case of a verb like was reading, everything beyond the subject Dr. Phil and direct object book, is optional. So, Dr. Phil was reading the book, after every everything else Dr. Phil was reading the book to the girl or reading the book to the girl at the park or reading a book to the girl at the park by the fire station etc., etc., is all optional, what is most essential is Dr. Phil was reading the book to the girl, these

are the two things that need to be remembered. Okay? So this is the argument, everything else was the adjunct part. Now,

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- The argument structure hypothesis would claim, therefore, that only two structural possibilities would be stored in long term memory and associated with *was reading*.

- So, when listeners access the verb form *was reading*, they would activate two associated syntactic structures, one that did not have a place for a post-verbal object, and one that did.

- How is this information accessed and used during parsing?
  - According to constraint- based parsing theory in general, and the argument structure hypothesis in particular, when listeners access the lexical representation of a verb like *was reading*, they immediately activate the associated structural information (kind of like what happens with spreading activation in semantic processing).

the argument structure hypothesis would claim, therefore that only two structural possibilities would be stored in the long-term memory, for was reading and so when listeners access the verb form was reading, they would activate two associated syntactic structures. One that did not have a place for a post verbal object and one that did. So, Dr. Phil was reading, that will be stored. Dr. Phil was reading the book, that will be stored. And Dr. Phil was reading the book to the girl or Dr. Phil was reading the book to the girl at the park or Dr. Phil was reading the book to the girl at the park by the fire station and all of those possibilities will not be stored, and will be computed on the fly, as the sentence keeps coming in. Now, now how could this information be accessed during and used during parsing? Just look at that, according to the constraint based parsing theory in general and the argument structure hypothesis in particular, when listeners access the lexical representation of the verb like was reading, they immediately activate the associated structural information, the two forms that we said are stored. This different structure possibilities are then activated to the extent that, they have appeared in the past with the verb in question, suppose you know, you remember that example you're talking about, you know a verb coming with a sentence complete and Dr. Phil you realized that is goal. So, you know, so those kind of things on in the past, whether a direct object, object has come or a sentence compliment has come or, ditransitive two objects have come, those kind of things, depending on that frequency, things will be activated or, evaluated.

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So, the different structural response possibilities are activated to the extent that, they have appeared in the past, with the verb in question. So, if was reading has most often appeared with a direct and an indirect object, the ditransitive structure will be the one more active, than the intransitive structure, if it appeared most often with the direct object, then the structure will be more active, then that structure will be more activated, than any of the other stored alternatives. So, the idea is, you know broadly, how many arguments that a verb kind of comes up with, what are the most common argument that a verb comes with and this kind of solves the problem of storing so many structural possibilities anyways. Now, moving further,
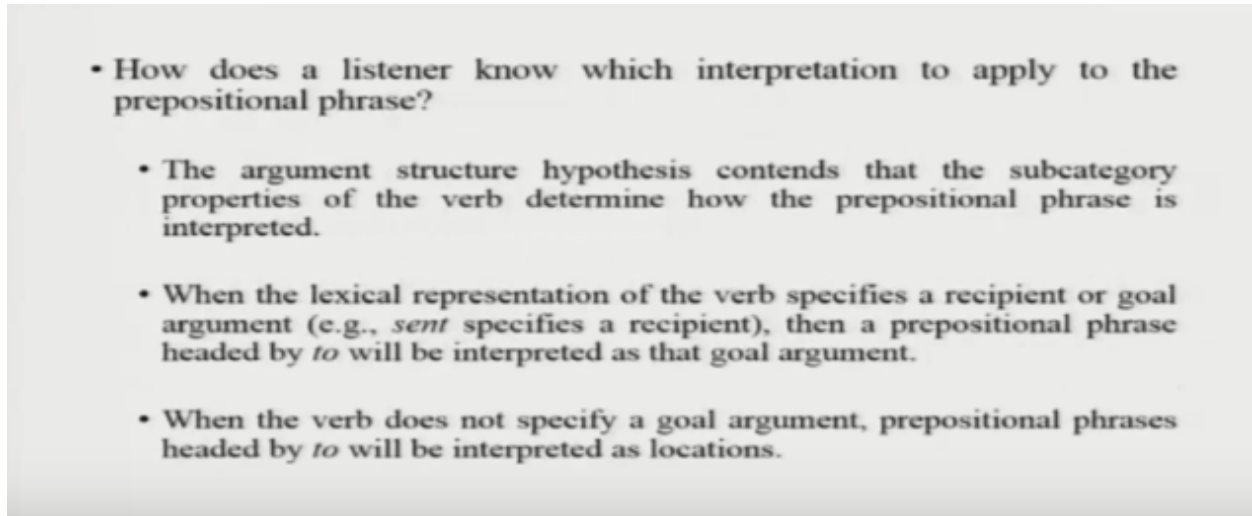
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- The *argument structure hypothesis* provides a somewhat more nuanced view of how argument-hood influences parsing.
    - According to the argument structure hypothesis, argument frames and their corresponding syntactic structures are important because they determine how some elements of sentences are interpreted.
    - For example, how should a listener interpret a prepositional phrase like *to Harry*? It could be interpreted as the goal of a transferring action, as in *The bully sent a threatening letter to Harry* (Boland & Blodgett, 2006, p. 386).
    - But the prepositional phrase could be interpreted instead as a location, as in *The bully stapled a threatening letter to Harry* (Boland & Blodgett, 2006, p. 386).

the argument structure hypothesis, it provides a somewhat more nuanced view, of how argument hood might be influencing parsing, let us look at that. Now, according to the argument structure hypothesis, argument frames and their corresponding syntactic structures are important because, they determine, how some of the elements of the sentences would be interpreted. So, argument frames and corresponding syntactic structures will be very important because, they will kind of help you interpret, the elements of the sentence, this is one. For example, how should a listener interpret a prepositional phrase like, to Harry,

you know, to Harry what? It could be interpreted as the goal of transforming action, as in the bully send a threatening letter to Harry, but the prepositional phrase could be interpreted instant also as a location Dr. Phil, you know the bully stabled a threatening stabled, stapled a threatening letter to Harry, you know. So, physically in that sense,

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- How does a listener know which interpretation to apply to the prepositional phrase?

  - The argument structure hypothesis contends that the subcategory properties of the verb determine how the prepositional phrase is interpreted.

  - When the lexical representation of the verb specifies a recipient or goal argument (e.g., *sent* specifies a recipient), then a prepositional phrase headed by *to* will be interpreted as that goal argument.

  - When the verb does not specify a goal argument, prepositional phrases headed by *to* will be interpreted as locations.

how would the listener know that this is a location, or it is a transferring action, anything? Now, how would the listener know, how do you know apply which of the interpretations? Let us look, the argument structure hypothesis contains that, the subcategory properties of the verbs determine how the prepositional structure needs to be interpreted. So, this subcategory information can kind of come in here and inform the, interpreter or listener which of the structures is more common. So, in the lexical representation of the verb specifies a recipient or a goal argument, then the prepositional phrase headed by to, will be interpreted as the goal argument, when the verb does not specify a goal argument then the prepositional phrases headed by to, will be interpreted as locations. So, now you have these two conditions, when lexical representation of the verbs specifies a res it, when it specifies a recipient or a goal, then it will be rep, then two will be represented as the goal argument, when it does not specify a goal argument, then it will be presented as locations, Okay? I think it is interpreted as, transferring action in the first case.

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- Consider:
    - (51) *The saleswoman tried to interest the man in the wallet.*
    - (52) *The saleswoman tried to interest the man in his fifties.*

- In sentence (51), *in the wallet* is an argument of the verb *interested* because people have to be interested in something. (Contrast that with the verb sneezed. You don't have to sneeze anything, you just have to sneeze.)

- In (52), *in his fifties* is an adjunct of the noun *man* because, although we can always think or talk about how old the man is, we don't have to.

Now, consider, let's take an example, consider the sales woman tried to interest the man in the wallet or, the saleswoman try to interest the man in his fifties, there are two sentences. In sentence (51) in the wallet is an argument of the verb, interested. Because, people have to be interested in something. So, it is a action, Okay. You don't have to sneeze anything, you just have to sneeze. So, that is intransitive. Now, in (52) in his fifties is an adjunct of the noun, man, Okay. So, it's, it's not, something that is happening to in his fifties or something, although we can always think or talk about how old the man is, we don't really have to do that, Okay? Just look at this again, the saleswoman tried to interest the man in the wallet, interest in the wallet, somebody has to be interested in something, so in the wallet kind of fits in interest. In his fifties it's not a necessary thing, the man, we can talk about how old a man is, but it is basically an adjunct noun, it's not really a, you know necessary relation here,

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- According to some accounts of parsing, including the argument structure hypothesis, comprehenders have a general preference or bias to interpret incoming phrases as arguments.

- Given this assumption, comprehenders will try to treat both *in the wallet* and *in his fifties* as arguments of the verb *interested*. Since *wallet* makes more sense than *his fifties* as something to be interested in, comprehenders should take less time to process *wallet* than *his fifties*.

- Indeed, when reading times were used to measure processing load, comprehenders were able to process sentences like (51) faster than sentences like (52) (Clifton, Speer, & Abney, 1999; Speer & Clifton, 1998; see also Britt, 1994; Schutze & Gibson, 1999).

- So, people appear to process argument relations faster than non-argument (or *adjunct*) relations.

according to some accounts of parsing, including the argument structure hypothesis, comprehenders or listeners have a general preference or bias, to interpret incoming phrases as arguments. So, what people do is, generally, any incoming phrase, the kind of try and you know treat that as argument of the verb. So, what will happen? Given this assumption, comprehenders will try to treat both, in the wallet and in his fifties as, arguments of the verb interested, that is one. Now, since wallet meets the, makes more sense, you know it meets the criteria then, in his fifties as something to be interested in, comprehenders should take less time, in processing the first sentence that is (52) versus the second sentence that is in his fifties, indeed when reading times were used to measure processing load, comprehenders were able to process sentences like (51), faster than sentences like (52), Okay? Yeah! (51) and (52). Now, so what happens people appear to process argument relations, faster than non-argument relations.

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- Other evidence for an effect of argument status on parsing and interpretation comes from studies showng that people infer a "missing" argument in cases where a verb requires an argument, but the argument is not explicitly included in the sentence (Koenig, Mauner, & Bienvenue, 2003; Mauner, Tanenhaus, & Carlson, 1995).

  - For example, consider the difference between the simple past tense verb *sank* and the very closely related past perfective *was sunk*. If somebody says, *The ship sank*, there does not have to be an external agent. The sentence describes a change of state (the ship goes from floating on the top of the ocean to sitting on the bottom of the ocean), but the change of state can be internally caused by the ship itself (maybe the hull was very rusty and sprung a leak).

So, in that sense, it kind of tells us that, the argument structures are being kind of, are being important and are being stored somewhere and people are processing on the basis of argument relations. Now, another evidence that for the fact that, an argument status has an influence on parsing, could come from studies showing that, people infer the missing argument in cases, sometimes people kind of, if the argument is not provided, they infer what the missing argument is. So, that's that's also done, Okay? So, let's take an example, consider the difference between the simple past tense verb sank and the very closely related past perfective verbs sunk, was sunk, if somebody says, the ship sank, there is no need to be an external agent, Okay? There's the ship sank it, it probably you know, sank by itself or, somebody sank it, we're not really interested, however, is it, and the sentence describes as change of state, but the change of state can be also internally cost. So, we don't really need an external agent here.

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- However, if somebody says, *The ship was sunk*, that means that somebody or something other than the ship was responsible for the change in the ship's state.

- Do people process sentences like *The ship sank* differently than *The ship was sunk*?
  - Gail Mauner and her colleagues showed that they do, in the following way: When people hear sentences like *The ship was sunk*, that need an agent but don't explicitly provide one, comprehenders immediately add or infer the presence of the unnamed external agent. So, they interpret the sentence with a missing argument as if it said, *The ship was sunk by somebody …*

However, if somebody says the ship was sunk, then it requires an external agent, who sunk the ship, you need to know that, Okay. So, do people process, process the sentences like the ship sank differently, than the process, and then they process the sentence like the ship was sunk. Let us look Gail Mauner and her colleagues showed that, actually people process these two sentences differently. So, when people hear sentences like the ship was sunk, that need an agent but don't explicitly provide one, comprehenders immediately add or infer an unnamed external agent, they kind of make it in their head that, Okay. This guy must have Son Kate or God Madison or something, something like that. So, they interpret the sentence with a missing argument, as if it said, the ship was sunk by somebody, they automatically assume that, somebody must have sunk it and that somebody could be any X, Y or Z.

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- sentence starts *The ship sank …* and continues *… to collect the insurance money*, then comprehenders have a hard time processing the sentence.

  - Why? Because the beginning of the sentence (*The ship sank …*) does not require people to infer an agent, so there's nothing in the listener's representation of the sentence to connect up with the purpose clause *… to collect the insurance money*.

  - There's no one in the listener's mental representation who could serve as the person with the insurance fraud motive.

However, if the sentence starts, the ship sank and continues to collect the insurance money, then comprehenders have a hard time processing the sentence, Okay? Then they don't know what to do with this, why is this problem coming? Because, the beginning of the sentence, the ship and the ship sank, does

not require people to infer an agent ,it does not pose the, you know a necessity that, you have to have an argument here, it can, the ship sank should stop there, if it is continuing it's probably leading to a little bit of a problem, Okay. So, there's nothing in the listeners representation of the sentence to connect up with the purpose clause, which is to collect the insurance money and stuff. Now, there's no one in the listeners you know, there's no sentence in the listeners in mental representation that, would serve as the, you know person, who has this motive of the fraud and has sunk the ship. So, we don't really know that. Now, this was basically about our human structured hypothesis, I hope at least two points are conveyed that, the argument structure information is very important for parsing and we, we at least saw a couple of examples where it kind of seems that, people are either inferring the argument or kind of they're filling up missing arguments, you know. So, those those kinds of things. Now, this is you know formally, the end of, you know the discussion about, the constraint based parsing models. Let us, look at some of their limitations as well. Now, it has been found, it has been shown that,

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Limitations of the CBP

- The parser may not always favor *likely structures* over *simpler structures*.

    (53) *The athlete realized her shoes somehow got left on the bus.*

    - The less likely structure is simpler [the..shoes]; but we know *realized* does not come with *direct object*, so the better configuration would be [the...realized][her..bus].

    - However, eye-movement studies suggest that subjects still consider the direct object version, before dismissing it.

a parser may not always favor likely structures, over simpler structures. So, the argument in the CBP model was that, the people would kind of prefer likely structures, over simpler structures. Because, likely structures make more sense. However, in some of the studies it has been shown, that sometimes people do prefer simpler structures, over more likely structures. Let us look, in this sentence the athlete and the athlete realized her shoes somehow got left on the bus, now just look at the sentence, the less likely structure is simpler, that is, you kind of keep that athlete and the athlete realize her shoes in one and somehow got left on the bus, as other, Okay?But we know realized does not come with a direct object. We know that it comes with sentence complement. So, the better configuration would be the athlete the athlete realized her shoe Somehow get you know got left on the bus. That is the correct kind of
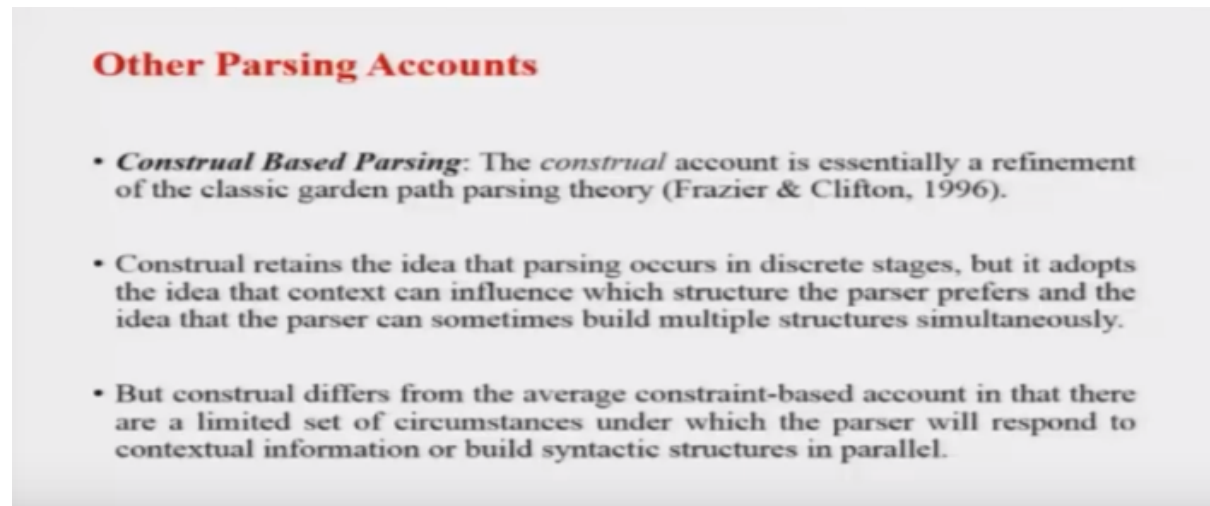
configuration. However, eye movement data suggests that subjects still consider the direct object version before dismissing it. It's not that the don't evaluate it. They do come up with it, they do evaluate it and then they dismiss it okay?

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- **There is absence of evidence that the sentences with *simpler structures* are hard to process.**

    - *the burglar blew up the safe with the rusty lock.*

    - **Remember, acc. to cbp, the right kind of story context, helps comprehenders to favor, assign more activation to, or activation to a more complex syntactic structure.**
    - **However, no such evidence has been found.**

- **The *testability* of the cbp accounts is unclear.**

Why should this happen now? There is this absence also. So, this is one problem with respect to the CBP kind of explanation. The other is that there is also an absence of evidence that sentences with simpler structures are harder to process. Sometimes we've seen that in some of the examples. I think with the context and you know the burglar blew the safe with a rusty lock those kind of examples ,we kind of saw that a simpler structure seemed more difficult to process .But it has been shown via experiments ,that that may not be the case all the time. Suppose, remember according to CBP the right kind of story context helps a person comprehend you know this particular sentence; you know it assigns more activation to or activation to a more complex syntactic structure. Because, with the context it seemingly supposed to be easy to understand. Now no such evidence has actually been found. So, people have kind of you know not really compare the two and found that one is easier or more difficult than the other. So, here also, the CBP claim does not really hold a lot of water. The final problem with the CBP accounts is that there is no real simple easy way, to test the influence of so many of this information that the CBP accounts talk about. So, visual Vontae, across linguistic influences, prosodical context, you know? Yeah, verbs structure information, frequency, all of those kinds of things that we've been talking about in the last two lectures. There's no easy way to test these things out, and so, the testability is not really very clear, and because the testability is not really very clear, you cannot be 100% sure of okay this must have been the case. Okay? So, this is this is something if you kind of talk about the problems with the CBP account. Although my personal opinion is that they still kind of doing a better job as compared to you know the garden path kind of theories. But okay. That's something to you know content with learn more about.

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Other Parsing Accounts

- ***Construal Based Parsing***: The *construal* account is essentially a refinement of the classic garden path parsing theory (Frazier & Clifton, 1996).

- Construal retains the idea that parsing occurs in discrete stages, but it adopts the idea that context can influence which structure the parser prefers and the idea that the parser can sometimes build multiple structures simultaneously.

- But construal differs from the average constraint-based account in that there are a limited set of circumstances under which the parser will respond to contextual information or build syntactic structures in parallel.

Now so we talked about two kinds of parsing theory. We've talked about Frazier's garden path theory, and we talked about the family of constraint based passing models. There are some of the others some other theories as well. Which I've talked about parsing, is slightly more different ways. So, let us look at some of those theories now. One of the first theories I could talk to you about, is the construal based parsing theory. The construal based parsing theory is essentially a refinement of the classical garden path theory. Which was given by Frazier and Clifton in 1996. Now construal, retains the idea that passing occurs in discrete stages. But it kind of a top adopts the idea that context can influence, which structure the parser would prefer? and the idea that the parser can sometimes build multiple structures simultaneously. See these were the two things that the garden power theory was not taken into account They were building each structure at one at a time and they were kind of not really taken into account context or similar information .However , construal theory kind of adopts these two things on the top of the discrete stage processing that garden path theory was offering .However construal differs from the average constraint based account, in that there are limited set of circumstances, under which a parser will respond to contextual information, or build parallelly you know parallel syntax structures. So, even though this model allows for both of these things. It says that there should be a particular criteria where in contextual information will be taken up ,or there will be a particular criteria where you can start generating parallel multiple parallel structures .So, that is where the construal based theory differs from the CBP kind of model ,and earlier we thought we talked about, how does it kind of incorporate some of the things in the older GPT kind of model. Okay?

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- Most of the time, the construal parser will behave just like the garden path parser. In fact, it will even use the same *late closure* and *minimal attachment* heuristics to make definite decisions about which structural alternative to pursue.

- How does the parser decide which strategy to use?

  - Construal says that dependencies between words can come in two flavors, primary relations and non-primary relations.

    - **Primary relations** correspond roughly to *argument* relations as defined above. *Non-primary relations* correspond to everything else.

    - All other things being equal, the parser prefers to treat incoming material as though it represents a primary relation. When the parser interprets an incoming word or set of words as representing a primary relation, it makes its structural decisions based on the standard garden path processing heuristics. But when the incoming material can't be interpreted as reflecting a primary relation, the parser will use a different strategy to deal with the material.

Now most of the time what the control-based parser would do is it'll behave pretty much like the garden path parser. In fact, it will even use the same the three heuristics that we talked about. Now how does the parser decide which strategy to use? The construal based parsing strategy says, that dependencies between words can come in two flavors. Primary relations and non-primary relations. What we have to actually figure out is? What are these two kinds of relations? Now the primary relations basically they are said to correspond, roughly to argument relations as we've defined earlier, and non-primary relations are everything else. So, primary relations are the things that are needed argument-based relations, and non-primary relations is all the adjunct things that you can add to it. Okay? So, all other things being equal. The parser would prefer to treat the incoming material. As though it represents a primary relation. When the parser interprets an incoming word or a set of words as representing the primary relation, it makes its structural decision based on the standard garden path processing heuristic. However, if the incoming material can't be interpreted as reflecting a primary relation. The parser will adopt a different strategy to deal with the material. So, the idea is the interpreter is kind of looking for whether they are primary relations in the incoming input, or not? If their primary relations and it goes typically by the garden path rule, if they are not then a different strategy needs to be adopted.

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- In the first stage, the parser will *affiliate* the incoming material to the preceding sentence context. During this stage, the parser will simultaneously consider all possible attachment sites for the incoming material—effectively building multiple syntactic structures simultaneously.

- During a following stage of processing, the parser evaluates the different structural possibilities in light of the story context, sentence-level meaning, and other possibly "non- syntactic" sources of information.

- To explore the construal parser in greater detail, consider sentences (55) and (56):

(55) The daughter of the colonel who had a black dress left the party.
(56) The daughter of the colonel who had a black mustache left the party.

Now in the first stage the parser will affiliate the incoming material to the preceding sentence context you know? Applying laid closure sort of things. You kind of affiliate whatever incoming is to the earlier sentence context. Okay? During this stage the parser will simultaneously also consider all possible attachment sites for the incoming material. Where all you can kind of attach this? effectively in that sense building multiple syntactic structures simultaneously. So, that is happening. Now during a following stage of processing in the next stage of processing once this has been done. The parser will evaluate the different structural possibilities in the light of the story context sentence level meaning, and also other non-syntactic sources of information. So, here is where the garden path theory kind of you know adopts a lot of the CBP kind of mechanism. So, story context and intense level meaning other kind of non-syntactic sources of information.

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To explore the how the gun control base parser works. Let us can consider these sentences. The daughter of the colonel who had a black dress left the party. The daughter of the colonel who had a black mustache

left the party. So, you have two sentences. (55) and (56). (55) is the daughter of the colonel who had a black dress left the party, and (56) is the daughter of the colonel who had a black mustache left the party. Let's see.

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- In (55), people generally interpret the relative clause *who had a black dress* as going with *daughter* rather than *colonel*.

- In (56), they interpret the relative clause *who had a black mustache* as going with *colonel* rather than with *daughter*.

- If listeners apply the late closure heuristic to parse (55) and (56), they should have an easier time processing (55) than (56).

- But the construal account says that *who had a black dress* and *who had a mustache* are adjuncts of the preceding noun, and so represent non-primary relations.
    - Under those conditions, the parser *affiliates* the relative clause to the preceding context and simultaneously looks for every place that the relative clause could attach.

In (55) people will generally interpret the relative clause who had a black dress, as going with the daughter rather than the colonel. In (56) they would interpret the relative clause ,who had a black mustache, as going with the colonel rather than with the daughter .If listeners applied in a closure heuristic to pass (55) and (56) .They would should have an easier time processing (55), because I had a black dress kind of gets to you know the daughter .Whereas (56) will not be able to you know you'll not be able to attach that to the daughter if you kind go with the late closure. But the construal account says, that who had a black dress, and who had a mustache, are adjuncts of the preceding noun .You know? and so, present non-primary relation .So, they are not primary relations. So, they have to be treated slightly differently. Under these conditions the parcel would have free affiliate the relative clause, to the preceding context and simultaneously looks for every place that the relative clause could be attached. Okay?

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- In (55) and (56), there are two possible hosts for the relative clause (*daughter* and *colonel*).

- In (55), the *daughter*-related structure works well given the meanings of all of the words involved, and in (56) the *colonel*- related structure works well.

- So, when it comes time to evaluate the different structural possibilities, there is always one good one. As a result, the construal account predicts no difference in difficulty between (55) and (56), and this is the pattern that actually occurs when participants' reading times are measured (Traxler, Pickering, & Clifton, 1998; for further evidence relating to the Construal account, see Frazier & Clifton, 1996.)

In (55) in (56) therefore there are two possible hosts for the relative clause. It could either be the daughter or it could be the colonel. In (55) the daughter related structure works very well. Given the meanings of all the words involved .Obviously a daughter can have a black dress ,and in (56) and even the colonel can have a black dress .So, that's all right .In (56) the colonel related structure would work well the mustache to the daughter does not really work .So ,that can be rejected. So, when it comes to evaluate the different structural possibilities, there is always one of the good ones. So, one is one seems usually more possible than the other. Let's say like that. As a result, the construal account predicts no difference in the difficulties between (55) and (56), and this is exactly the pattern that was found, when parts - reading times were compared on reading these two sentences. Okay. So, this is how the construal-based parking construal based parsing works, and kind of you know demonstrates that is sort of improved version of the GPT model taking up some characteristics from the CBP approach. Now the other method of parsing that I wanted to talk about, is the race-based parsing method.

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- ***Race Based Parsing*** : stipulates that the parser can build multiple syntactic structured in parallel. This is seen as a refinement of the cbp approach to parsing.

- Acc. to the race based account, parsing occurs in two stages:

  - In the first stage of processing, all structures that are licensed by grammar get activation from the input.

  - Rather than competing for a fixed pool of activation, the syntactic structures compete against each other.

  - So, the first structure to exceed some threshold amount of activation is taken to represent the input and that stucture is used as the basis for semantic interpretation.

Now the race based parsing method stipulates that a parser can build multiple syntactic structures in parallel, and this could be seen as a refinement to the CBP approach to parsing. Now according to this account, passing shall occur in two stages. In the first stage of processing, all structures at a license by grammar ,get activation from the input it's almost like a you know neural network tree it's kind of a model .Machine learning kind of a thing .So, multiple structures can be generated all in parallel as far as, the a they are permitted by grammar, rather than then competing for a fixed pool of activation.
The syntactic structures will compete against each other .So, they're not sharing activation from a big pool .They are just competing against each other ,kind of you know trying to push each other off .So, the first structure to exceed some minimal threshold account ,is taken to represent the input, and that structure is then used as the basis for the semantic interpretation .So, multiple structures are generated one structure kind of minister battles that becomes the base for analyzing input, and then kind of is used as a base for, the semantic interpretation .

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- Consider:

  (57) *The brother of the colonel who had a black moustache left the party.*

  - Now, while the readers did not have a preference for 55 or 56; in 57 it does not matter which structure gets to the threshold first. Both are valid.

  - The rbp account says, for 55 & 56, the winning structure will lead to a weird interpretation about half the time. So, readers will need to reanalyze their initial structure & semantic interpretation. Hence, 55 & 56 will be difficult.

  - Construal account says, that all should be equally easy.

Let's take this example .The brother of the colonel who had a black mustache left the party .Now while the readers ,did not have a preference in (55) or (56) in (57) this Indians .It does not really matter ,which structure gets to the threshold first .Because both the brother and the colonel can have a black mustache .So, the RBP account says, (55) and (56) for (55) in (56) the winning structure will lead to a weird interpretation ,about half the time .Obviously half the time the dress is given to the colonel or the most tire is given to the daughter ,that kind of lease were slightly weird interpretation. So, readers we need to re analyze their initial structure and semantic interpretation. Hence (55) and (56) will be slightly more difficult. However, (57) say for example the construal-based account says, that all should be equally easy. Okay? So, (55) in (56) says that, (55) and (56) will be difficult.

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- The rbp says, 57 will be easier than 55 & 56 as both accounts will be valid.

- Consider:

  (58) *This morning, I shot an elephant in my pajamas.*
  (59) *This morning, I shot an elephant with great big tusks.*
  (60) *This morning, I shot a poacher with a rifle.*

- As earlier, the rbp account says 60 will be easier. Indeed.

- The rbp & cbp, allow multiple structures; but in cbp accounts, the competing structures either try to inhibit or interfere with one another; but in rbp accounts they increase of decrease the activation based on cues from the incoming input. There is evidence against competition based accounts.

(57) a construal-based account says all three are easier, RBP however says (57) will be easier than (55) and (56) as both accounts will be valid. Let us see. yeah! Okay? So, that is that is what the RBP says. Moving on let's take some other sentences (58), (59) and (60). Which are this morning I shot an elephant in my pajamas. This morning I shot an elephant with great big tusks. This morning I shot a poacher with a rifle. Okay? As earlier here .The RBP account says (60) will be the easiest this morning I shot a poacher with a rifle kind of makes a little bit more sense as compared to the other two .The RBP and the CBP allow multiple structures, and to be generated .But in CBP accounts the completing and the competing structures either would try to inhibit with or interfere with one another .But in RBP accounts the increase or decrease the activation based on cues from the incoming input .There is evidence of competition based accounts. So, in that sense you would say, that the race based parsing account will kind of fit a little bit more closely. As, compared to the construal based parsing account.
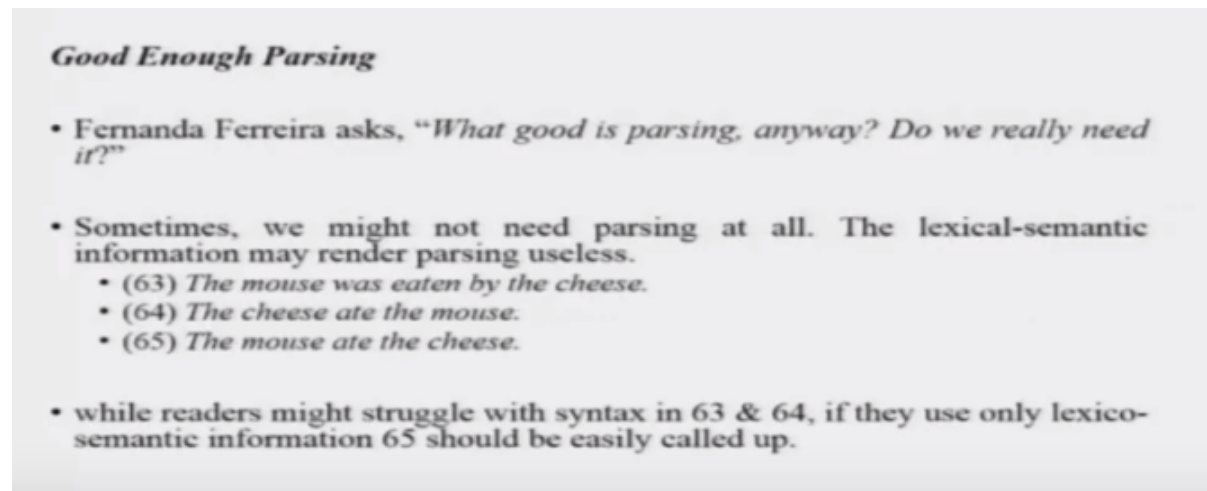
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- Consider,

  (61) *I read the bodyguard of the governor retiring after the troubles is very rich.*
  (62) *I read quite recently that the governor retiring after the troubles I very rich.*

- In 61, both possible attachments, "*retiring after the troubles*" can be valid 50 % of the time. In 62, only one possibility is valid.

- If syntactic structures are activated in parallel, and if they compete; 61 should be difficult.

- However, eye-movement studies showed 61 was just as easy as 62; hence no competition.

Now moving on let's look at some other sentences. I read The Bodyguard of the governor retiring after two troubles is in very rich. I read quite recently that the governor residing are retiring after troubles is

very rich. So, two sentences. In (61) both possible attachments retiring after the Troubles. Bodyguard could also be retiring, or the governor could also be retiring. Both can be valid 50% of the time. In (62) only one possibility is one is valid, that is the governor retiring after troubles is very rich. Now if the syntactic structures were to be activated in parallel, and if they compete (61) should be difficult. Because it's 50/50.However eye moment studies showed that (61) was just as easy as (62), and hence there was no real competition here. Okay? So, again evidence is kind of a little bit of you know here and there with respect to all of these accounts.

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Good Enough Parsing

- Fernanda Ferreira asks, *"What good is parsing, anyway? Do we really need it?"*

- Sometimes, we might not need parsing at all. The lexical-semantic information may render parsing useless.
  - (63) *The mouse was eaten by the cheese.*
  - (64) *The cheese ate the mouse.*
  - (65) *The mouse ate the cheese.*

- while readers might struggle with syntax in 63 & 64, if they use only lexico-semantic information 65 should be easily called up.

Now let's look at an even more different account of parsing. So, this is called good enough parsing. Kind of is put forward by Fernanda Ferreira, one of the leading researchers in psycho linguistics understanding sentence combinations, and stuff and he asks what good is parsing anyway. Do we really need parsing at all? Do we really do parsing? You know? So, the idea is what they're trying to say is sometimes we might not need parsing at all. Sometimes we might not really be doing a lot of parsing knowingly. Okay? So, sometimes you might not need passing at all. The lexical semantics information that is the understanding of the words, that are in the sentence, might already be sufficient. So, that we don't really need to do any parsing anyways .Let us look at the example the mouse was eaten by the cheese ,the cheese ate the mouse ,the mouse ate the cheese .You see these three sentences (63), (64), (65) .The mouse was eaten by the cheese. The cheese ate the mouse. The mouse ate the cheese. Three sentences. Now while readers might struggle with the syntax in (63) and (64). If they only use lexical semantics in from. You know? While the readers might struggle with the syntax in (63) and (64). Well the syntax kind of can lead them all right. However, if they only use lexical semantic information (65) should be, easily called you know (65) is something that you know each of the correct sentence, the mouse can eat the cheese the cheese cannot eat the mouse Okay? So, that kind of argument, we might so the argument here is that as long as, you are

understanding the meaning of the words involved in the sentence you do not really need to do parsing, you do not really need to struggle with multiple syntactic structures and their competition and their structural possibilities and so on and so forth, as long as you're understanding what each of the words are meaning in these sentences that should be enough that could that will do the job that we complete the efficient communication and you do not really need parsing per se. Okay? That is the whole point of this good enough parsing thing.

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- This suggests that people may not always compute syntactic relations between words in sentences or that, when the syntax and the lexical level disagree, people prefer to base their interpretation on default lexical–semantic associations.

- Either outcome would go against standard assumptions about how sentences are interpreted—that people look up words in the mental lexicon, structure the input, and use semantic rules to assign a standard meaning to the structured input.

Now this suggests that people may not always compute syntactic relations between so, the the last three sentences it says, that people may not always compute syntactic relations between words and sentences, or that when syntax and lexical levels disagree people prefer to base their interpretation on default lexical semantic relations. So, more often not people will go with the meaning parts of it, rather than the syntactic grammatical choices Okay? So, this is a very interesting outcome after we've kind of you know read so, much about parsing.

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Now either outcome would go against standard assumptions about how sentences are interpreted that people look upwards in the mental lexicon structure the input, use semantic rules to assign a standard meaning to this interacting. So, this is kind of you know it this kind of approach does not fit in with any of the other parsing accounts that we have talked about.

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- Further, evidence that people fail to construct the correct structure for some sentences comes from sentences like :

  - (66) *While the hunter was stalking the deer drank from the puddle.*

- If participants parse this sentence correctly, they sentence should not mean that, *the hunter was stalking the deer*. However, it does.

- But when participants were asked directly after reading the sentence, "Was the hunter stalking the deer?", they would very likely answer "yes."

- That is the result that one would expect if readers left *the deer* attached as the direct object of *was stalking*, but that structure is not licensed by the grammar.

Okay? Further there is, evidence that people fail to constrain people fail to construct correct structures for some sentences, and that could come from sentences like, while the hunter was talking the deer drank from the puddle. Now, this is the whole sentence I, have not given any parse or anything but just look at this if participants parse this sentence correctly the sentence should not mean the hunter was talking to

deer Okay? If, they kind of go completely by grammatical relation so, while the hunter was talking the deer drank from the puddle. So, it kind of does not connect the deer and talking in one phrase but when participants were asked directly after reading the sentence was the hunters talking the deer they would most likely say yes, even though if you do a syntactic analysis of the sentence on the multiple structural possibilities and so on, you will not be able to link stalking with the deer. However, if you ask people, they will say yes, yes, yes the hunter was talking that here they are kind of just you know understanding the meaning of whatever is in all there is hunter there's a deer obviously the hunter is talking the deer, that kind of thing.

Now, that is the result you know hunters of and people saying yes that is the result that one would expect if readers left the deer attached as the direct object of was talking but that structure is not licensed by the grammar that structure is not plausible within how you know, the grammatical structure building exercise would permit. So, it basically tells us that as long as the lexico semantics understanding is there as long as people are understanding the meanings of the words involved, they are not really going to bother with the syntactic representations being created.
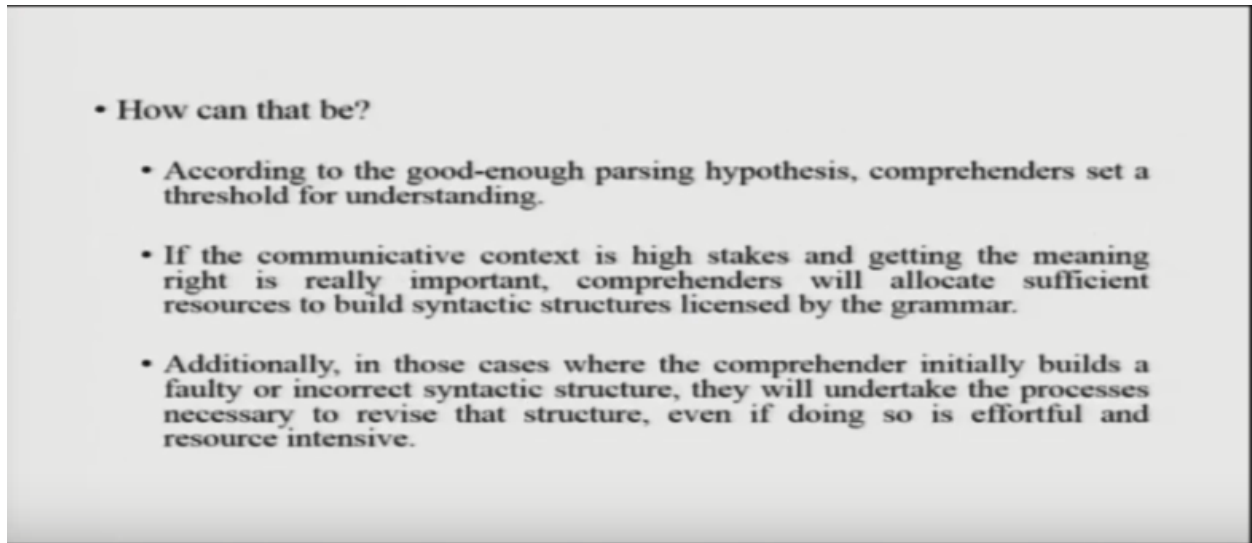
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- Another,

    (67) *While the hunter was stalking the deer in the zoo drank from the puddle.*

- Because it is very highly unlikely that a hunter would stalk an animal in a zoo, the correct syntactic structure should lead participants to an interpretation where the hunter is stalking something besides a deer.

- Nevertheless, when participants in this study were asked the same question, "Was the hunter stalking the deer?", they were likely to respond "Yes."

Let us take another example, actually see (67) while the hunter was talking the deer in the zoo drank, while the hunter was talking the deer in the zoo drank from the puddle this is even more unlikely so, because it is very highly unlikely that the hunter would stalk an animal in a zoo the correct syntactic structure should lead parts to an interpretation where the hunter is talking something besides the deer. Okay? Let me show you by way of pause how that is, while the hunter was talking the deer in the zoo drank from the puddle so, now it does not make sense now you will not be able to say that the hunter is

talking the deer because already this in semantic information is there that this is a zoo scenario obviously hunters don't stock deer in the zoo it's prohibited it's illegal so, then the interpretation of what the hunter was talking will be something else than the deer as permitted by syntax. So, nevertheless when the participants in this study were asked the same question, here they still answered you know was that under something they still they were likely to respond 'yes'.

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- **How can that be?**

  - **According to the good-enough parsing hypothesis, comprehenders set a threshold for understanding.**

  - **If the communicative context is high stakes and getting the meaning right is really important, comprehenders will allocate sufficient resources to build syntactic structures licensed by the grammar.**

  - **Additionally, in those cases where the comprehender initially builds a faulty or incorrect syntactic structure, they will undertake the processes necessary to revise that structure, even if doing so is effortful and resource intensive.**

Now, how is that happening according to the good enough parsing hypothesis comprehend as set a threshold for understanding the kind of set Okay? This is how, far I will understand if the community if the communicative context is high-stakes and getting the meaning right is really important comprehend will allocate sufficient resources to building syntactic structures licensed by the grammar did you get it so, if the community con communicative context is high stakes you are having a formal conversation you are in an interview you are reading for an exam there is where you kind of you know try and go by the rule try and go by the book generate as many you know syntactic structures that are needed and kind of go with that. However, in those cases also additionally where the component that initially builds a fact a faulty or an incorrect syntactic structure, they will undertake the process is necessary to revise that structure and they'll do all of that as necessary.

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- However, in most experimental contexts, the stakes are very low (for the participants, anyway), there are no consequences for failing to interpret, and the sentences tend to be tricky and abstract, and refer to little or any real-world content.

- Under those conditions, participants will do just enough syntactic processing to come up with some meaning.

- If the syntax is tricky, as it is in sentences like (66) and (67), and participants' thresholds for feeling like they understand is low, they may not recognize that there is a problem with the syntax—either because they are not actually parsing the input or because they are satisfied with a structure that is not licensed according to the standard grammar.

However in most experimental context, the stakes are very low you're not losing anything nobody is going to find you or penalize your punished if you don't understand the correct sentences so, what happens there is there are no consequences for failing to interpret, correctly Okay? and the sentence is obviously also tend to be quite tricky and abstract, and refer to little or you know very little really little world like things. So, under those conditions what might be happening is people just do enough syntactic processing to come up with some meaning and they'll throw that me and let go with that meaning. Okay? So, if the syntax is tricky in sentences like (66) and (67), in the hundred you know and the dear sentences and the participants' threshold for feeling is like they understand is low, then they may not recognize that there is a problem with the syntax either because they are not actually parsing the input which is alright or because they are satisfied with whatever they have gotten out of it.

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- How can that be?

  - According to the good-enough parsing hypothesis, comprehenders set a threshold for understanding.

  - If the communicative context is high stakes and getting the meaning right is really important, comprehenders will allocate sufficient resources to build syntactic structures licensed by the grammar.

  - Additionally, in those cases where the comprehender initially builds a faulty or incorrect syntactic structure, they will undertake the processes necessary to revise that structure, even if doing so is effortful and resource intensive.

So, in sentence number (67) this one,

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- Another,

  (67) *While the hunter was stalking the deer in the zoo drank from the puddle.*

- Because it is very highly unlikely that a hunter would stalk an animal in a zoo, the correct syntactic structure should lead participants to an interpretation where the hunter is stalking something besides a deer.

- Nevertheless, when participants in this study were asked the same question, "Was the hunter stalking the deer?", they were likely to respond "Yes."
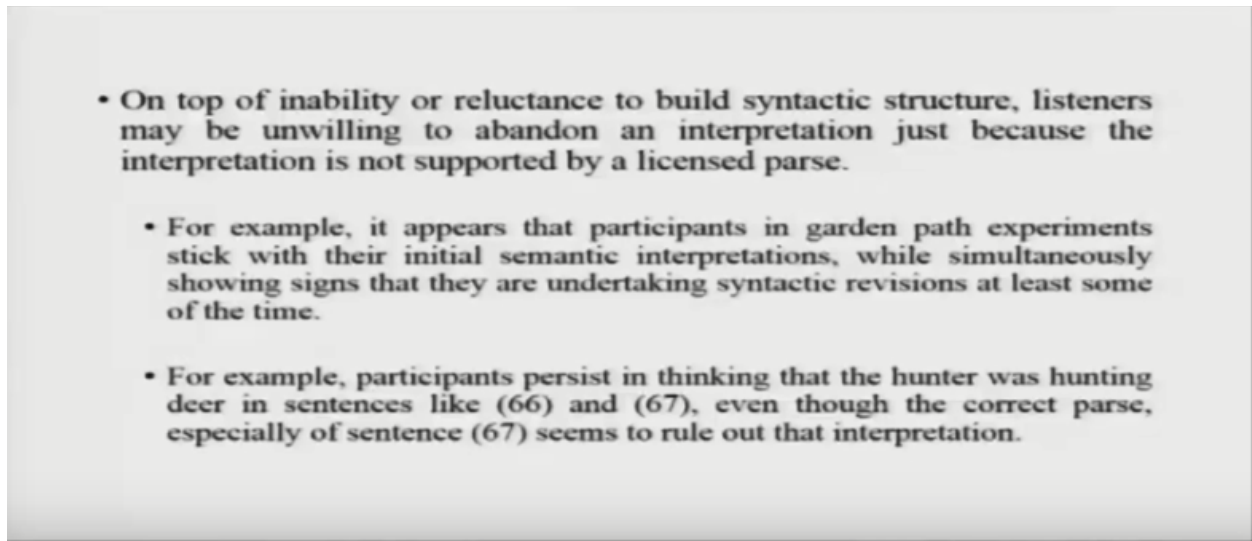
while the hunter was talking the deer in the zoo drank from the puddle even though kind of you know the syntax does not permit it and there is enough semantic evidence that you know the hunter could not be talking stalking the deer in the zoo they don't really you know pay a lot of attention to this, what they basically do, is you know they kind of go ahead with

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- However, in most experimental contexts, the stakes are very low (for the participants, anyway), there are no consequences for failing to interpret, and the sentences tend to be tricky and abstract, and refer to little or any real-world content.

- Under those conditions, participants will do just enough syntactic processing to come up with some meaning.

- If the syntax is tricky, as it is in sentences like (66) and (67), and participants' thresholds for feeling like they understand is low, they may not recognize that there is a problem with the syntax—either because they are not actually parsing the input or because they are satisfied with a structure that is not licensed according to the standard grammar.

just getting a rough sense of meaning and answering, Okay? Hunter a deer Hey obviously the hunter must be stalking the deer irrespective of whether it is a zoo or a forest. Okay? That that kind of thing, or so that is that is something further on.

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- On top of inability or reluctance to build syntactic structure, listeners may be unwilling to abandon an interpretation just because the interpretation is not supported by a licensed parse.

  - For example, it appears that participants in garden path experiments stick with their initial semantic interpretations, while simultaneously showing signs that they are undertaking syntactic revisions at least some of the time.

  - For example, participants persist in thinking that the hunter was hunting deer in sentences like (66) and (67), even though the correct parse, especially of sentence (67) seems to rule out that interpretation.

On top of the inability to or reluctance to build the syntactic structures, listeners may be sometimes unwilling to abandon an interpretation just because the interpretation is not supported by a license parse.

So, you kind of make up your mind this is how I, understand the sentence grammatical not grammatical does not matter so, shows reluctance to abandon a particular structure as they have understood it and that can be actually seen. For example, when participants you know it appears that in the that part smells in the garden, but experiments stick with their initial semantic representations, while simultaneously showing signs that they are undertaking syntactic revisions at least some of the time.

So, even though they are doing the semantic revisions and everything even though they are doing their own semantic interpretations and everything they kind of still stick to their initial semantic representation even though they are evaluating these multiple syntactic structures, more often than not these participants stick with their initial semantic representations.

Now for example, the parchments did persist in thinking that the hunter was talking the deer in both sentences (66) and (67), in the zoo or in the forest even though the correct, correct pass especially overtly send a (67) would have ruled out that kind of interpretation.
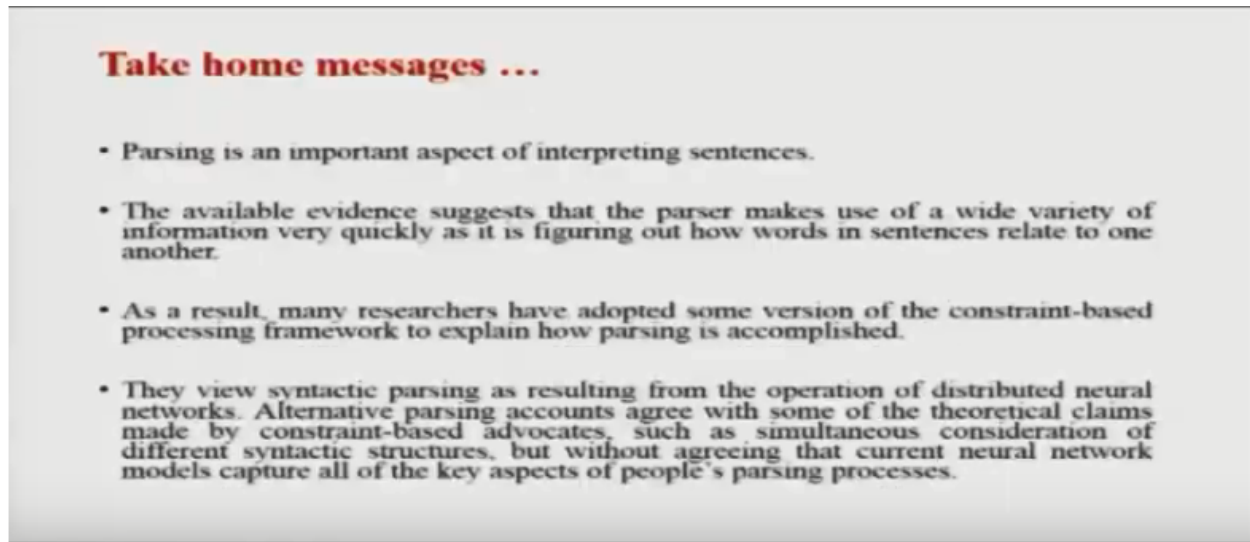
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- experimental evidence also suggests that comprehenders are less likely to successfully revise an initial interpretation when a change in syntactic structure entails a change in meaning (van Gompel, Pickering, Pearson, & Jacob, 2006).

- So, participants appear to maintain initial syntactic commitments when changing a syntactic structure involves changes in semantic interpretation as well.

- One problem in distinguishing between the good-enough parsing account and alternative accounts is that we need to have a way to tell the difference between an error and a good- enough parse.
  - If someone reads a sentence and comes up with the wrong meaning, is this because the system is designed to mis-parse the sentence (as assumed under the good- enough parsing account)? Or did they just make an error?

Okay? So, that is that is slightly interesting about how parsing seems to be you know working out here. Now, experimental evidence also suggests that comprehenders are less likely to success fully revised an initial interpretation with a change in syntactic structure you know that, entails a changing meaning. So, it has also been shown experimental evidence also suggests that comprehenders are less likely to successfully revise an initial interpretation when a change in the syntactic structure you know forints a change in meaning they still wouldn't do that. So, partisans usually they will appear to maintain the initial syntactic commitments when challenging a syntactic structure would involve changes in this way so, for example I, generated this structure let me just simplify what I am saying here if I, generate if I am reading a sentence I generated an initial syntactic structure they're sort of made sense to me now if, somebody is presenting me more information to change this and in changing this I, will have to change the meaning as well and my understanding of the sentence as well I will be reluctant to do so, I will stick with my initial syntactic commitments and I will go with that in spite of whatever evidence is kind of coming up because I don't want to change this so that my understanding you know should not change. So, I'm kind of resisting change in syntactic structures so as to resist, resist change in you know my understanding of this that is what is being said here.

Now, one problem in this kind of an account or one problem in distinguishing the good enough parsing account and other alternative accounts is that we need to find a way to tell the difference between an error and a good enough parts, you know this is wrong, and this is a good enough parse. The good enough parse is basically Okay? I, just pass to a point that I, can understand the meaning to my satisfaction Okay? or I'm making this erroneous parse so I, need to know as a comprehenders or speakers that Okay? Whether I'm going right or I'm going wrong do I care about this enough so you need something like that if

someone reads a sentence and comes up with the wrong meaning is this because the system is designed to miss pass the sentence or do they have they just make made an error so, this is something we need to ask.

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Take home messages ...

- Parsing is an important aspect of interpreting sentences.

- The available evidence suggests that the parser makes use of a wide variety of information very quickly as it is figuring out how words in sentences relate to one another.

- As a result, many researchers have adopted some version of the constraint-based processing framework to explain how parsing is accomplished.

- They view syntactic parsing as resulting from the operation of distributed neural networks. Alternative parsing accounts agree with some of the theoretical claims made by constraint-based advocates, such as simultaneous consideration of different syntactic structures, but without agreeing that current neural network models capture all of the key aspects of people's parsing processes.
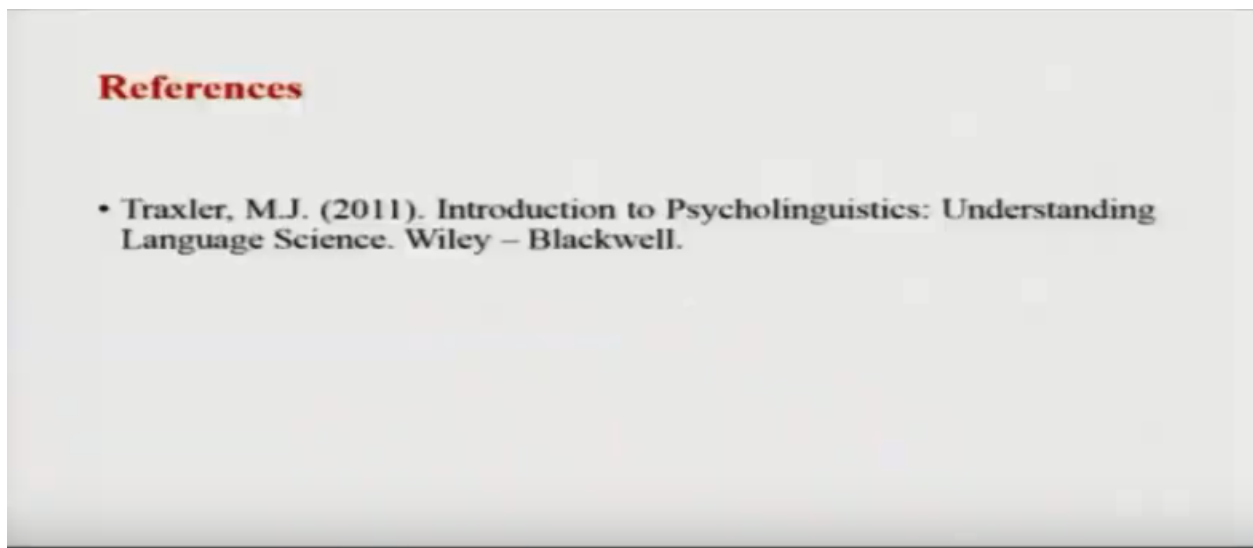
Okay? That that is not really very well specified within the good enough parsing thing so, we'll kind of you know leave this discussion and that maybe we'll kind of pick it up at a later point.

This brings me to the end of this chapter on sentence parsing let us talk a little bit about some of the take-home messages what did we learn we learned that a sentence is a meaningful organization of words that kind of you know is done according to certain rules to give a certain meaning, what did we learn mostly is that there is something called parsing it's a very strenuous mental activity but we kind of do it and it is a most important aspect of understanding sentences. So, to speak Okay? The available evidence suggests that the parser or this mechanism that is helping us organize the structure of the sentence makes use of a variety of wide variety of information very quickly as it is figuring out how words in the sentence relate from each other obviously we saw visual context for sorry, sentence context, verb subcategory information cross linguistic influence structural frequency everything, all of that is being used and that is being used on the fly simultaneously in parallel in order to get us to the correct interpretation. Okay? As a result, many struck researchers have adopted some version of the CBP processing framework to explain how parsing seems to be done so, there is a lot of a kind of a wide variety of notions about here some of the researchers.

View syntactic parsing as a result of from the as a result of the operation of distributed neural networks alternative passing accounts agree that some of the theoretical claims made by the constraint base activates advocates such as simultaneous consideration of multiple structures could be correct but they do

not agree on the fact that current neural network models will be able to capture all of these kind of parsing mechanisms. But that's that's a different that's a question for a different day basically what we kind of want to understand is that yes it is important to understand how words are organized within a sentence there's a process called parsing, that helps us do it that process either kind of operates very simply in the GPD kind of account, or it kind of takes in a lot of variety of information as in the CBP model or the conscious may consumer based model or RBP model or, we can kind of go there with a very you know different attitude and say that no, no parsing is not really very, very important more often than not we kind of go with the lexical semantics relations obviously sometimes when the stakes are high and so on we might do a little bit of parsing and creating multiple structures and evaluating them there is all about sentence processing that I have to say

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References

- Traxler, M.J. (2011). Introduction to Psycholinguistics: Understanding Language Science. Wiley – Blackwell.

Thank you so much. We'll meet in the next week to talk about reading. Thank you.