[SQUEAK] [RUSTLING] [CLICKING]

**NORVIN RICHARDS:** Welcome back. Hope everybody had a restful break, spent lots of time doing syntax in their spare time. Let's do a little syntax now. I don't have any announcements. Are there any questions about the things that I'm not announcing, things that people are, like, wondering about, where we start?

OK. So I just wanted to start with some review, just to remind everybody where we were. We were drawing trees like this one. So here's a tree for "I will tickle the child with the feather." It's a tree that has various kinds of information in it about, well, various things, including substrings that we think are treated as constituents for various kinds of syntactic phenomena.

So this tree is meant to reflect the fact that this sentence, first of all, has a meaning in which I'm going to use a feather to tickle a child. That's the meaning that's been diagrammed here. And that if you perform certain operations that make it clear that this is the tree that you've got, like, topicalizing "the child," moving "the child" to the beginning of the sentence, "The child I will tickle with the feather," that's the only-- in fact, the only meaning that you can have is the meaning that goes with this tree.

So is this all sounds vaguely familiar? Are there questions about this tree? Is anybody looking at this tree and thinking, wait, which class am I in again? What is going on? Why? I'm going to talk about this tree in a little bit of detail today. But I just want to make sure there's nothing here that's shocking or distressing anybody.

So one of the things we've talked about is that some of the properties of that tree follow from selection. So we have this idea that there's a special kind of relation that can hold between heads, so the smallest things in the tree, the things that just have words under them, things like the verb, a relation that can hold between those heads and other kinds of phrases in the sentence. So we've said that the verb "tickle" selects the object noun phrase, "the child."

And what we mean by that is that the relation between the verb "tickle" and the object, "the child," is special in that not every verb can be followed by an object. So you can tickle a child. You can devour a child. You shouldn't. But it's grammatical. You can write a child.

But there are other verbs for which you just can't do this. You can't "thrive the child." That doesn't make any sense. So there are some verbs-- classic way to say this is there are some verbs that are transitive and others that are intransitive.

So in order to know whether you can have an object or not, whether there can be a noun phrase in that position or not, the sister of the verb, you've got to know what the verb is. The verb tells you whether it needs to have an object or not. So there's this relation of selection that holds between the verb and the object.

The idea is when we look up words like "tickle" and "devour" and "write" in our mental lexicon, we'll see various things about them, including how they're pronounced, but also whether they can have objects or not, whether they select for noun phrase sisters or not. So when we ask, going back to the tree, why is the sister of the verb, the noun phrase "the child," one way of interpreting that question, the answer is well, it's because the verb "tickle" selects for a noun phrase sister. And so you give it one. Now, that's why the tree has that bit of structure.

And we can tell that kind of story about a lot of parts of this tree. So similarly, we're going to want to say that the preposition "with" selects for a sister that's a noun phrase, "the feather." And for that matter, we'll probably want to say that the T, "will," is selecting for a verb phrase that's why the T has a verb phrase, it's its sister. So there are various places in this tree where a head has a particular sister. And it's because the head is selecting for that as its sister.

We also said that this relation of selection that is something that heads can do-- they can select for properties of their sister-- that sometimes, at least, they select more specifically than that. They select for sisters where the sister's head has a particular property. So I think the example I gave you last time was the verb depends-- where the verb depends needs a prepositional phrase sister, but it specifically needs a prepositional phrase sister in which the preposition is "on." So you have to depend on things. You can't depend from them or depend at them.

You can't just have any preposition there. It has to be "on." So there are verbs like "depend--" and there are many verbs like this-- that select for a particular prepositional phrase-- sisters, but in particular, prepositional phrase sisters that have a particular preposition. Sometimes it's less particular than that.

So I think in class I said-- (he said, vamping until he could get some chalk out)-- that the verb "put" seems to select for a noun phrase sister and prepositional phrase sister. So you put the book "on the table" or "in the refrigerator" or "under the car" or whatever, wherever it is you want to put the book. So the "put" has to have a noun phrase object, doesn't have to be the book. It can be any noun phrase.

And then there can be a prepositional phrase. "Put" is not like "depend." There are a variety of prepositions that can be here. But you can't just have any preposition here. So you can't say "Put the book during the party." That's not a possible sentence.

And we might hope to derive that from properties of the meaning of "put," right? So the prepositional phrase that goes with "put" needs to specify a location, right? And "During the party" doesn't specify a location unless we're thinking of time as space, which as long as syntax is not Doctor Who, I think we're OK. Yeah?

AUDIENCE:    So for clarity, because Merge only is binary--

NORVIN       Oh, dear. [LAUGHS]
RICHARDS:

AUDIENCE:    [INAUDIBLE]

NORVIN       Yeah. So Merge is only binary. And that means if we're going to have a tree for these kinds of sentences, we're
RICHARDS:    going to need to put the verb "put." And since we want the noun phrase to be next-- that's what this seems to tell
             us-- we'll have a noun phrase here. And then we'll have a prepositional phrase

             That's one possible answer to your question. If Merge is going to be binary-- if Merge is going to be binary, we're going to want to say, yeah, "put" is something that needs two things. We're going to have to give them to it one at a time. We can't give them both to it at once.

             Otherwise, if we wanted to do that, we would need to use ternary Merge, right? We'd need to merge three things at once. And so we'll merge them one at a time. We'll first give it the noun phrase. And then we'll give it the prepositional phrase.

Why do we first give it the noun phrase and then the prepositional phrase? Why don't we say, "Put on the table the book"? We might actually get to that. But we're not going to get to it today. So this is one possible answer to your question.

Another possible answer to your question, of course, would be to say, ah, we've discovered that we were wrong to say that there's binary Merge, right? That here's a place where we need there to be ternary merge. This is going to interact with things we're going to want to say about how selection works.

So I have now a couple of times said a thing gets to select for the properties of its sister, right? And here it's selecting for properties of its sister. But this is not its sister, right?

This is something else. It's-- never mind. I can't figure out the family relation between these two points on the tree. It's-- what is it? It's its aunt, yeah. The prepositional phrase is the aunt of the verb. That's not how actual syntacticians talk about this kind of thing.

So they're not sisters. So two kinds of things we can say. Oh, what we're discovering is that we need ternary Merge. We need these to both be sisters. Another would be to say, oh, we're discovering that selection isn't necessarily for properties of your sister. It's something more like you select things. The first things that you merge must be things that you select.

We're going to circle around and talk about that in a second. So to say something more elaborate about how you select. So that's a really good question. What we really need to do is develop tests that will tell us whether this is the right tree for something like this, or whether we would rather have something like this, where there's a verb and a noun phrase and prepositional phrase, and Merge doesn't have to be binary.

Just to cheat a little bit, what we would find out when we develop these kinds of tests is that this is not the kind of tree that we want. We want trees that are like this. But we're going to have to do some work to develop those tests. Raquel?

**AUDIENCE:** I have a scary thought.

**NORVIN RICHARDS:** Oh, no.

**AUDIENCE:** The thought is like-- so about selected--

**NORVIN RICHARDS:** Yeah.

**AUDIENCE:** I feel like there are some verbs, like, you say "board." Like you board a ship. You kind of have, like, a secret selection inside of it because you could think of "board" as like get on the ship.

**NORVIN RICHARDS:** Oh, I see.

**AUDIENCE:** And so you'd be like, ah, "get" is selecting for on the ship, a certain type of prepositional phrase.

**NORVIN RICHARDS:** Mm-hmm.

**AUDIENCE:** Or you could have just "board," which kind of includes it inside of it. Like, also in Spanish, if you have words like "buscar," which is, like, "to look for," and so it's, like, could you think of "put" as a verb that maybe-- like if English had been different, you could have a verb like "You put the refrigerator." Everyone knows that you mean "put in the refrigerator."

**NORVIN RICHARDS:** Yeah. I see what you mean. So you're pointing out something important, which is that-- here, let's do "look for." But in English, we're going to want to have a verb "look" that selects for a prepositional phrase, where the preposition is "for." But that there are other languages like Spanish in which there's a single verb that means "look for."

For that matter, in English, there's a verb "seek." So it's kind of dramatic. But if I go into a bookstore and say, "I'm looking for a book," that's the normal thing for me to say. I could also go into a bookstore and say "I am seeking a book." They would probably direct me to the fantasy, science fiction section if I did that. But those are both two ways to say the same thing.

So maybe the way to think about this is, yeah, Spanish doesn't have a verb that means "look for." It has a verb that means "seek." And-- there. Yeah. Or maybe another way to say this-- and this is going to be important as you guys are doing your work with the languages that you're working on-- is that you shouldn't necessarily expect the selectional properties of a verb to be the same from one language to the next. That if you are inclined to think of Spanish-- is it "buscar"?-- as the equivalent of "look for," that we want to think of that as-- as-- that English has a verb "look" that selects for a prepositional phrase. Spanish has a verb "buscar" that's like "seek." It selects for a noun phrase complement.

Yeah. So you want to be careful as you are going from language to language. You can't trust selectional restrictions. And indeed, so I've used "put" as the example of a verb that has two things that it seems to select. But there are probably examples of verbs that select two things, where the two things are, say, both noun phrases.

So take a verb like "give the children books." So here we want there to be two noun phrases coming together with "give." And "give" selects those. It's a property of "give" that it can have two noun phrases after it. And not every verb can do that. "Put," for example, can't.

So even verbs that are fairly similar in their meaning, like "donate"-- so you can't "donate the children books." You have to donate books to the children. So yes, as so often in this class, I'm showing you the easiest examples here. And as so often in this class, you guys are immediately saying, wait, wait, what about the complicated examples?

So, yes, there are more complicated examples. We'll try to get to them, cases where you're selecting more than one thing. We'll come back to that. We'll talk about it more now. Yes?

**AUDIENCE:** So for give the children books, how would you continue that? [INAUDIBLE]?

**NORVIN RICHARDS:** So if we use the technology that we have right now, we're kind of compelled to have a tree like this one. I wrote this as capital N because I knew I was about to write a noun phrase. "Give the children books." So where "give" needs to-- to combine with two noun phrases. And Merge is binary. And so we'll do binary merge twice. That's a kind of tree that we could draw with the techniques that we have right now.

I hope I hedged enough in there to make you feel emotionally grounded enough that if it turns out later that that's not the right tree, that you won't be too disappointed because we're going to talk more about this stuff. And our understanding will get more sophisticated. But given everything I'm telling you right now, that's the tree we expect. Yes?

**AUDIENCE:** Do these trees have to have the words in sentence?

**NORVIN RICHARDS:** I'm sorry. I missed the middle of that.

**AUDIENCE:** Do these trees have to have exactly each and every word in each sentence? Or could it fill in some words? For example, I learned in elementary school the subject of every command is "you."

**NORVIN RICHARDS:** Oh, mm-hmm.

**AUDIENCE:** Could you have "you" in parentheses in one of these trees?

**NORVIN RICHARDS:** Oh, I see.

**AUDIENCE:** "Give (to) the children books."

**NORVIN RICHARDS:** Yeah. Oh, I see. Oh. That's a really interesting and difficult question. The short answer is yes. There absolutely are places where we're going to want to say I'm showing you trees in which I'm not showing you trees anymore. I'm showing you a nebula. Give me just a second.

I'm showing you trees in which every terminal node, every head has one word under it. And you're wondering, could there be trees where there are nodes that don't have anything under them or don't have anything pronounced under them? And indeed the short answer is yes, there surely are going to be such trees. Your example is a good one.

Do I want to go off and talk about that? Yeah, let's talk about that for just a second. We talked a little bit before-- we're going to come back to this later. But we talked a little bit before about-- yeah, we can do this fast-- constraints on things that pronouns and names can refer to.

So for example, we talked about the fact that if you say, "She likes Sally," that's a perfectly fine sentence. But it can't mean that she and Sally are the same person, right? So "she" has to refer to somebody other than Sally. And we developed a rule that has that consequence. And I promised you that we would talk about that rule in more depth later on.

Here's another kind of case. If you say something like "Sally defended herself," there's this special expression "herself." And it has to refer to Sally, right? So "Sally defended herself" means Sally defended Sally. So "herself" refers back to whoever the subject is.

If this had been "Mary defended herself," well, it would have to be Mary defending Mary. If it had been, "I defended myself," well, then you have to use this special form of these words, these "-self" words. They're called reflexives. These reflexives have to refer back to something else in the sentence. In these examples, they always refer to the subject.

And they have to do that, right? So you can't say things like, "I defended herself" or "himself," right? These are out, yeah? So the reflexive that's at the end of these sentences has to refer back to the subject in these cases. And the form of the reflexive tells you something about what the subject is.

So you get, it's got-- so-- hmm. You get "herself" when the subject is feminine and third person. And you got "myself" when the subject is first person. And if it were "you defended," it would be "defended yourself," yeah? So this reflexive is telling you that it's referring back to "you," yeah? This means you defended you, yeah.

I'm telling you all this because your example from elementary school is a really good one. If I tell you, defend yourself, it's a command. Well, everything that we've now learned about these reflexes leads us to hope that there's a "you" in that sentence because, well, that's what reflexives seemed to do. They refer back to the subject.

And they have a form that tells you something about what the subject is. In this case, they tell you that the subject is "you," which is what you were taught in elementary school, yeah. So you say "Defend yourself!" And that's fine. And you cannot say "Defend himself!" or "Defend myself!"-- right? Just as you cannot say you defended-- you can say you defended yourself, but not "You defended myself" or "himself" or "herself," yeah?

So indeed, there are some good reasons to think that whoever told you that there's a "you" in this sentence was right. You can detect the "you" by using these reflexives, yeah. So there are, indeed, words that are not pronounced. And if we were going to draw a tree for defend yourself, we'd probably want to say, yeah, there's a "you" in subject position. And there would have to be a rule saying don't pronounce that particular "you."

So the short answer to your question is, yes, there are parts of trees that are not pronounced. And we may get a chance to talk more about. All right. That was a tangent. Any other questions? Take us back to this main line here.

Where are we? Yeah, so selection. Heads select for properties of their sisters, although several of you want to know what happens when they seem to have more than one thing that they select. And I'm trying to-- well, I'm not exactly ruthlessly suppressing that question. But I'm telling you what we currently seem to have to say about it and maybe flagging the possibility that we'll have to say different things later. So far so good?

So, yeah, right. And when selection is for something specific-- so this was the point I was trying to make with this slide. When a verb selects for something specific, a verb can, for example, say I need a prepositional phrase. And I need the preposition to be "on."

Or I need a prepositional phrase-- this is like "put." I need a prepositional phrase. And I need the preposition to be something locative. It needs to describe a location, yeah. So "depend" selects for a prepositional phrase with the head "on."

We're never going to find, for example, a verb that selects for a prepositional phrase-- and I don't care what the preposition is, but the object must be "tomatoes." We won't find anything like that. So verbs select for their sisters-- sisters in all the cases I'm going to show you.

They select for their sisters. But what they select specifically is sisters with a particular head. They don't say things like, I select for a sister whose complement must be this or which must contain a tomato or which must be modified by an adverb. Heads don't do things like that.

They select for properties of their sisters, specifically the heads of their sisters. And once we know that-- this is what I said in class last time-- we can use that fact about selection to detect other heads, so other kinds of things that seem to be in this selection relation with other words in the sentence, other heads in the sentence. So when we see other cases where there's a particular word in the sentence whose value seems to be determined by another word in the sentence, we get to think, oh, OK, maybe that's a selection relation.

This was the example I gave you last time. Verbs seem to be able to select for properties of the clause that follows them. So there are verbs like "think" that can be followed by a clause. Not every verb can be followed by a clause, right? So "I devoured the pizza." "Devour" can be followed by a noun phrase. But "I devoured that I have won the lottery" doesn't make sense. So this looks like a selection relation.

And specifically, it's a selection relation that's picky about these words that introduce the clause that come at the beginning of the clause, words like "that" and "whether." So "think" can be followed by a clause where the word that introduces the clauses is "that." You can say things like, "I think that I have won the lottery." "Wonder" can be followed by a clause where the word that introduces the following clause is "whether," as in, "I wonder whether I have won the lottery."

And these verbs can't be switched. So you can say "I think that I have won the lottery." You cannot say "I think whether I have won the lottery." You can say "I wonder whether I have won the lottery." You cannot say "I wonder that I have won the lottery."

And I was saying this looks kind of like "depend" and "on". "Think" needs a clause that starts with "that." "Wonder" needs a clause that starts with "whether." "Depend" needs a prepositional phrase that has "on" in it. And just like with "depend" and "on," we said, yeah, "depend" is selecting for a prepositional phrase with a particular head.

We get to say, oh, OK, apparently "that" and "whether" are the heads of the clause that's getting selected by the verb. So "think" and "wonder" are selecting for clauses that are headed by words like "that" and "whether." We have a word for words like "that" and "whether"-- we call them "complementizers."

I think I apologized for that word last time. I'll just apologize for it again because it's probably not the word you learned for those things in elementary school or high school. You might have heard them called conjunctions, so "subordinating conjunctions," lots of things people call them.

But in linguistics, we call them complementizers. So I'll have to ask you to join me in calling them that. So the abbreviation for complementizer is C. And the phrase is the sister of verbs like "think" and "wonder" is a complementizer phrase, a CP. It's a phrase that's headed by "that" or "whether," these complementizers.

So I'll review. Hopefully it sounds at least vaguely familiar. So now here we are back at the original tree. "I will tickle the child with the feather." We've talked a lot about selection relations. We've said that selection relations are relations between heads and phrases, many cases, the sister of the head. And in particular, selection relations seem to be picky about when there is pickiness about the head of the phrase that's getting selected.

So we've seen examples of that now with prepositional phrases and now with Complementizer Phrases, CPs, not clauses. But-- and this is near the end of what we did last time-- there is more to life than selection, not much more, but a little more. So we don't want to say that "tickle" or "child" is selecting "with a feather," right?

So when I told you that tickle is selecting the child, one of the ways I tried to convince you of that was to say, yeah, not every verb can be followed by an object. There are transitive verbs and intransitive verbs. That's the kind of thing that makes us think we're looking at a selection relation.

But any verb can be followed by "with the feather." You can do anything with a feather. You can tickle a child with a feather. Or you can devour a child with a feather. You can write a novel with a feather. Or you can thrive with a feather. Feathers, they're just very, very flexible tools. You can do anything with them.

Again, some of these things make more sense than others. So it's not clear what you mean when you say that you will thrive with a feather. Or for that matter-- well, it's actually fairly clear what you mean when you say you'll devour a child with a feather. It just doesn't bear thinking about too closely.

But basically you can do anything with a feather. There's nothing like verbs are transitive and intransitive. So this particular prepositional phrase, this sort of instrument, can go together with anything. And so we don't seem to want to say that there is a selection relation between this prepositional phrase and anything at all.

So there's a distinction that we draw between what are called arguments and what are called adjuncts. So arguments, like "the child" in "I will tickle the child with a feather," are things that are selected by something, in this case, the verb. And the adjuncts are just phrases that wandered in. They're not selected by anything. They're just there because they want to be.

They're not selected by anything. You get to put them in because you feel like it. They're often modifiers sort of like this one.

So there are arguments. And then there are adjuncts. How do you tell whether something is an argument or an adjunct? I think I warned you last time this is something that people often get confused by. And so I want to be clear about it.

Again, when we decided that "the child" is selected by "tickle," what we were doing was saying not every verb can be followed by an object. So if you're going to have a child right after the verb, you have to know what verb it is. There are transitive verbs and intransitive verbs. And some verbs are OK with the following object, and others or not.

That's the signature of a selection relation. So the arguments are picky about which heads they can combine with, and adjuncts are not. What people sometimes get confused about is thinking that it's the opposite, that the pickiness goes in the opposite direction.

So people think here's a verb that needs to have an object. And I've probably said things that led you down this garden path. So there are indeed verbs that are obligatorily transitive. I think the example I gave before was "devour." So "The dragon devoured pizza"--- because we've devoured enough children for one class, possibly too many--

"The dragon devoured the pizza." "Devour" actually has to combine with an object. Not only is this a selection relation because not just any verb can have an object, but actually, "devour" has to combine with an object. It's ungrammatical without the pizza. So if I take out the pizza, it becomes star, yeah? So "The dragon devoured," that's not a sentence.

So that's an argument, which is actually obligatory. "Devour" has to be transitive. But there are plenty of verbs that-- in fact, it's more common for verbs to be optionally transitive. So "devour" needs to have an object. But "eat," which means almost the same thing as "devour," the transitivity is optional. You can say "I ate an apple." But you can also say "I ate."

Obligatorily transitive verbs are actually kind of rare. And the best ones are kind of violent. They are things like "eviscerate" and "devour" and "mutilate." Those are the really clear transitive verbs. They're-- very handy in syntax classes. Yes?

AUDIENCE: So are we suggesting the fact that since [INAUDIBLE] property of a feather, or is that any adjunct can modify?

NORVIN RICHARDS: We're talking as though any adjunct can modify anything. And so this is another one of those places where we have to carefully distinguish between syntax and semantics. There are surely things that it's very difficult to imagine anybody doing with a feather, right?

But those kinds of cases-- so what's an example? "She proved Fermat's last theorem with a feather," right? I don't know how she would do that, right? But that's a math problem. That's not a syntax problem.

So the sentence is grammatical. We just can't figure out-- I wouldn't be able to draw a picture of it. Does that make sense? So, yeah, what we're saying is that that prepositional phrase can combine with anything in principle. Though there may be kinds of combinations that will give us meanings that are kind of hard to understand. Yeah, Joseph?

AUDIENCE: [INAUDIBLE] stylistically common that violent words--

NORVIN RICHARDS: --are the most transitive ones? I think it is, yeah. Yeah, there's something about violence and transitivity, yeah. Something to think about as you're working on your languages, if you want to.

So arguments are picky about what heads they combined with. But there are-- to look at things from the other perspective, if you're asking for a particular head, if you see a head and it's followed by a phrase, the question you ask yourself is not "Is that phrase optional?" People often ask that question. And it's a question that gets you in the wrong direction. There are plenty of examples of things that are, in fact, arguments, but they're optional.

And then I think this is the last thing we did last time. I was trying to illustrate arguments and adjuncts to you. And we were in the middle of deciding on the boat. So let's decide on the boat again, fairly quickly.

So what we decided was that the sentence "I decided on the boat" can mean at least two things. It can mean either I had some decision to make, and I made it while I was on the boat, right? Or it could mean I chose the boat, right? I was trying to choose between the boat and something else. And I chose the boat.

And what we said was, if we ask, "The prepositional phrase 'on the boat,' is that an argument or an adjunct?" the answer to that question is yes. It can be an adjunct. "I made my decision" when it has the-- when the sentence means "I made my decision while I was on the boat," then "on the boat" is an adjunct. You can kind of see why. Just like you can do anything with a feather, you can do anything on a boat, right? So any phrase you can modify it with "on the boat."

This particular prepositional phrase, then, is an adjunct in that reading, yeah? Have to be careful because, of course, if I say things like "It depends on the boat," or for that-- well, let's use that one, it depends on the boat. This is a case where there is a selection relation between "depend" and "on," right?

We've been talking about that before, that "depend" select for prepositional phrase for which the head is "on," yeah? So you can't just look at a prepositional-- if someone asks you out of the blue, is "on the boat" an argument or an adjunct-- in a way, that's the point of this slide too-- the answer is, wait, what's the rest of the sentence, right? Because you have to find out what the relationship is between that prepositional phrase and the other words that are around it.

So in the reading where "I decided on the boat" means "I made my decision while I was on the boat," "on the boat" is an adjunct. It's just describing the location where the rest of the sentence took place. And any sentence can take place on the boat, maybe.

As opposed to the reading where it means "I chose the boat," there it's an argument because, again, just the fact that "decide on" means choose is kind of an idiosyncratic property of the verb "decide" and the preposition "on." It's like if you look up "decide" in the lexicon, it's going to have there, we're going to have to list the information, that it can optionally select an argument that starts with "on" and that the result of that combination means "choose." If you think about other things that mean something pretty similar to "decide," like "make up your mind," so "I made up my mind on the boat" only means the first thing, I think, right?

"I made up my mind on the boat" means "I made my decision while I was on the boat." It doesn't mean "I chose the boat," right? I made a choice between the boat and something else. And I chose the boat, right? So it's not a property of expressions that mean "decide" that they always combined with "on" to mean this. It's a idiosyncratic property of "decide."

It's kind of like we have to list for particular verbs that they're transitive or that they're not. We have to list for the word "decide" that it combines with "on" to give you a meaning with something like choose. I'm sorry. I'm talking over you.

**AUDIENCE:** Is this the same effect as "look," where you "look up"?

**NORVIN RICHARDS:** Yes. Yeah, that's another good example. So you can "look up a reference." So you can "look up." And that "up" is probably an adjunct. You can do anything up. But to "look up a reference," the fact that that means "look through some stuff and find it," that's an idiosyncratic fact about looking up. That's another good example of an argument. Yeah, nice example. Yeah? OK.

And then-- I think this is where we stopped-- I asked you to think about sentences like "I decided on the boat on the plane." And I asked you to suppress your natural urge to make things more complicated and to think of alternatives.

So consider situations in which there's only one boat and only one plane and neither of them is on the other. There are two things that you could imagine this meaning. It could mean I chose the boat while I was on the plane. Or it could mean, in principle, I chose the plane while I was on the boat, if we've decided that "decide" and "on" can combine in these ways.

But I think the fact generally was that it only has one of those readings. Is that the reading that people have? I'll write the readings down. One is chose the boat while on the plane. And the other was chose the plane while I was on the boat. Yeah?

How many of you can get it to mean this first thing? How many of you can get it to mean the second thing? A few of you. The few of you who can get it to mean the second thing, please meet with your classmates after class and get them to convince you, or maybe you can convince them that they're wrong.

I think we talked about this a little bit in class, possibly, that, for me, at least-- and people should stop me if this is not true-- I can get it to mean the second thing, but I need an opera score. I have to say it in a particular way. I have to say something like "I decided, on the boat, on the plane." There have to be commas. And I have to kind of squash "on the boat" a little bit in order to get it to have this second meaning.

Those of you who were considering raising your hands the second time, is that true of you? Or are you people who can just say, "I decided on the boat on the plane," and mean this? Some of you are raising thumbs and nodding and things like that.

Is there anybody who-- that thing that I just said when I pronounced it in that particular way, is there anybody who did not think, oh, yeah, that's the way I was pronouncing it in my head when I said that I could have it be this way? Let me say it again. Is there anybody who, if you say, "I decided on the boat on the plane"-- saying it that way-- can it mean this, the second thing? Yes?

**AUDIENCE:** I feel like that way, the same sentence is more neutral than suggesting. I still have to say it in a different way to get the second meaning, but when I say like that, I don't immediately get the part [INAUDIBLE].

**NORVIN RICHARDS:** Oh. Oh, I see. How do you have to say it in order to get the second reading?

**AUDIENCE:** I absolutely didn't think about that.

**NORVIN RICHARDS:** Oh, OK. Fair enough. Fair enough. This is one of many places where I think I'm going to be content with the fact that all of you raised your hands when I asked whether it could mean this and only a few of you raised your hands when I asked whether it could mean this. I think maybe the ones of you who can get it to mean this are doing it by pronouncing it in a especially interesting way, which is itself an interesting fact.

There is-- I think I have alluded to this a couple of times-- a topic of study that people work on, trying to figure out what the rules are for how the pitch of your voice rises and falls as you speak and where you put in pauses and so on. It's the study of what's sometimes called prosody. It's very complicated and hard, but it's really interesting.

So maybe the short thing for me to say is, on the prosody where there's nothing special, where we're not doing any pausing or downgrading of anything, where we're just reading this straight through, I think everybody prefers this to this. Let me say that for the time being.

So "I decided on the boat on the plane." When you've got these two "on" phrases after "decide," the sort of tendency anyway, unless you do fancy prosodic things, is to have the first one be the argument and then the second one be the adjunct.

So what we're finding out, then, is that if you've got a head and it has both an argument and an adjunct, the argument is closer to the head. We're going to come back to that. But a way to think about it-- and we'll come back to it and say this more formally in a second-- it's as though-- I think I have a tree that I can make use of here. It's as though, if you're going to have a verb like "decide" that's going to have two prepositional phrases after it-- and forget what these are for now, and also we'll have "on the boat" and "on the plane."

So you've got "decide." And it's going to have two prepositional phrases after it. And "decide" optionally selects for a prepositional phrase with "on" as the head. And what we're seeing is it's as though-- if you pick the version of "decide" that's like-- if you decide to have "decide" select for something, it's as though, when you're merging these two prepositional phrases to projections of the verb, you need to merge the one that's selected first. There's some kind of urgency about this selection relation.

You don't just get to freely decide what order to merge these two prepositional phrases in, the argument and the adjunct. You need to hurry up and give it its selection requirements. Something like that. And we'll come back and talk more about that.

Incidentally-- well, who cares? Incidentally, that way of talking about things-- no, sorry. Let me wait until we get more formal about it to make the next point. The next point is that this may help us some with the kinds of cases that got me to write that tree in the first place, the kinds of cases where a head seems to select for more than one thing. So we'll come back to that.

So that's where we were last time, I think. [LAUGHS] Does anybody have any questions about any of that? This has been an attempt to review because I know you've had a week during which you might not have spent every waking moment thinking about syntax. I don't know why, but I guess young people today, they have their priorities.

Are there questions about this? Are there things that aren't clear? OK. Yeah?

**AUDIENCE:** I guess it seems to me that "decide" and "decide on" are almost like two different verbs.

**NORVIN RICHARDS:** Yeah.

**AUDIENCE:** So why couldn't you merge "decide" with "on" and have that be a verb phrase and the argument of that is [INAUDIBLE]?

**NORVIN RICHARDS:** Yeah. Yeah. Yeah. So you're wondering for "decide on the boat," why not do "decide on" and then combine that whole thing with a noun phrase, "the boat," something like that?

**AUDIENCE:** Yes.

**NORVIN RICHARDS:** Yeah. Notice that these are making different claims about whether "on the boat" is a constituent or not. And so, for example, one of the constituency tests that we fooled around with was the one where I'm amazed by something that you've said, and I repeat part of what you've said in amazement. So if you say, "I decided on the boat," one thing I can surely say is, "The boat?" But I think I can also say, "On the boat?"

**AUDIENCE:** Does that switch "up the reference"?

**NORVIN RICHARDS:** So I don't think so, right? "Up the reference"-- that's a good example. "Look up the reference." If I'm amazed when you say, "I looked up the reference," if I say, "Up the reference?" that's weird. I have a lifetime's experience being weird. And I think that's worse than "I decided on the boat," "On the boat?" I think. But, yeah, that's the claim.

Notice there's another difference between "look up the reference" and "decide on the boat." You can also say, "look the reference up." You cannot say "decide the boat on." So we probably don't want these to be the same. It's another reason to think that they're different.

If you're familiar with German, German has a zillion particles like this, where you're putting things between the verb and the separable prefix, they're called. Yeah? OK.

So now, hopefully I've got you willing to entertain, at least temporarily, the possibility that there are things that we can describe as arguments and adjuncts. Arguments are the things that are selected by other heads. Adjuncts are phrases that just wandered in by mistake. Nothing is selecting them. They're just here because they want to be. They're not here because they're satisfying any needs of anything at all. They're parasites, basically, is what they are. They end up in here inside the clause.

And I've shown you one kind of test for them, which is that if you have a head that is combining both with an argument and with an adjunct, it looks like there's at least a tendency for the argument to want to be closer to the head than the adjunct. So "decide on the boat on the plane," the argument-y reading, the choose reading, goes with the first one. That means chose the boat on the plane.

I want to show you another test for arguments versus adjuncts. Here's another sentence. "I decided on the boat, and Mary decided on the plane." That can mean at least two things, I think-- possibly four, but at least two.

One thing that it can mean is I chose the boat, and Mary chose the plane. Another thing it can mean is Mary and I both had decisions to make. We had to decide whether to major in linguistics or not. And I made my decision while I was in the boat, and she made hers while she was on the plane. So it could mean that, too.

I guess it could also mean I chose the boat, and Mary decided to become a linguistics major while she was on the plane? Maybe? I'm not so sure about that. But anyway, it can mean at least those two things.

Now consider this sentence. "I decided on the boat, and Mary did so on the plane." Does that mean two things? I don't think so. What does that one mean? Joseph?

**AUDIENCE:** That's the example. I decided to become a linguistics major while I was on the boat. And Mary chose not to, but she [INAUDIBLE].

**NORVIN RICHARDS:** Yeah, exactly. So I made the right decision on the boat, and Mary made the wrong decision on the plane. Yeah, it can mean that. Yes.

So there's a phenomenon called VP-pronominalization. That is you're taking the VP "decide," and you're replacing it with "do so," which is kind of like a pronoun. It's like a pronoun in that it's an expression that can stand in for lots of different kinds of verb phrases. So just like a pronoun like "she" can stand in for any female person, "do so" can stand in for lots of kinds of verb phrases.

And what we're learning is that if you do that, the phrase that's outside of "do so"-- "on the plane"-- can only be an adjunct. It can't be an argument.

And there are various ways we could think about this, but here's one. We could say, look, this is the argument. This is the adjunct. We said there's a special relation of selection between "decide" and the argument that doesn't hold between "decide" and the adjunct. The adjunct is just here because it wants to be. So there's a selection relation between these two things. And then the adjunct is just something you merge because, well, you've got it, and you can merge it. That's what we've been saying.

And maybe what we're learning here is that if you look up "decide" in the lexicon, you're going to see that it has the option of selecting for a prepositional phrase headed by "on." But if you look up "do so" in the lexicon, well, it doesn't select anything. There aren't any selectional relations with "do so."

So "do so" is kind of blank. It just means there's a verb phrase, and look around at the rest of the sentence to figure out what the verb phrase is. But there's a verb phrase. So it's not doing any selecting. So if you see a prepositional phrase after "do so," it's not an argument of anything. It had better be an adjunct. I guess that's what we're learning here.

As I told you, this is another test for arguments and adjuncts. If you do VP-pronominalization-- if you replace the verb phrase with "do so" and you have a phrase left over, then that thing had better not be an argument. It had better be an adjunct.

The action with arguments and adjuncts so far has been with prepositional phrases. We've talked as though direct objects, for example, are always arguments. And so what we expect is that a direct object will never be able to be left over like this. That is, you won't be able to say, "I chose the boat, and Mary did so the plane," because "do so" doesn't select for anything. Direct objects are always selected for. You get them just if the verb is a transitive verb. And "do so" isn't a transitive verb. It's almost not a verb at all.

Does that accord with people's intuitions, that you can't say that? Yeah. OK. In fact, I'm going to star it before anybody gets the wrong idea. Bad sentence. Bad sentence. No biscuit! Yeah? OK. All right, so-- yeah?

**AUDIENCE:** You could say, "I chose the boat and Mary the plane."

**NORVIN RICHARDS:** Yes, good example.

**AUDIENCE:** [INAUDIBLE]

**NORVIN RICHARDS:** Yeah. So, "I chose a boat and Mary a plane," or "I decided on a boat and Mary on a plane." Can you say that? "I live in Somerville and Mary in Allston." You can have prepositional phrases in this construction, but maybe not selected ones. Ugh. Because "I decided on the boat and Mary on the plane," that feels kind of adjunct-y to me. I don't know about guys.

| | |
|---|---|
| **AUDIENCE:** | It works, but it's still vague. |
| **NORVIN RICHARDS:** | Works but it's still vague? Is that what you said? |
| **AUDIENCE:** | [INAUDIBLE] |
| **NORVIN RICHARDS:** | It could mean either one? |
| **AUDIENCE:** | Either one. |
| **NORVIN RICHARDS:** | OK, good. I was sort of hoping that was true because I don't know any reason why it wouldn't be able to mean either one. |
| | This is a really interesting phenomenon. There's a lot of work on it. It's called gapping. And dissertations have been written. [LAUGHS] It's interesting stuff. Yeah? |
| **AUDIENCE:** | When you first read the sentence, I actually interpreted it as "I chose the boat and Mary did so on the plane." |
| **NORVIN RICHARDS:** | Oh, no. What did Mary do on the plane? |
| **AUDIENCE:** | She chose the boat. |
| **NORVIN RICHARDS:** | Oh, she chose the boat on the plane. Oh, yes. Well, that would be OK. [LAUGHS] Phew. I thought you meant that she chose the plane. Yes, no, that's-- no, that's absolutely right. OK, phew. |
| | Yeah, that's a nice example. "I decided on the boat." Oh, here-- we can use this tree. "I decided on the boat and Mary did so on the plane." I was taking that to mean "decide" in the first clause is taking an adjunct, "on the boat." And in the second clause, well, "do so" is just replacing "decide." And "on the plane" is another adjunct. |
| | You're saying, yeah, "on the plane" is an adjunct all right. But "do so" is replacing the entire verb phrase "decide on the boat," where "on the boat" is an argument. |
| | And yes, that's another reading that it ought to be able to have. I was just ignoring that reading. Thank you for pulling that reading out and making me pay attention to it. You're absolutely right. Yeah? Cool. All right. |
| | So arguments versus adjuncts-- "decide," "on the boat," "on the plane." "On the boat" is an argument. This means I chose the boat on the plane, at least on the most natural prosody. |
| | And we've now seen two ways of distinguishing arguments from adjuncts. One is if you have anything left over after VP-pronominalization-- anything that's outside, "do so." Anything that's still there had better be an adjunct and not an argument because "do so" doesn't select for things. And if you have both an argument and an adjunct, the argument tends to be closer to the verb than the adjunct. Those are the two tests that I've given you so far. |

And then here's a mini-constituency test that's meant to get you to take seriously the possibility that there is a constituent, "decide on the boat." Look, you can coordinate that constituent with another constituent of the same kind. You can say, "Mary will decide on the boat and read a novel on the plane." That's fine.

So, terminology break-- the lower thing is the complement. It's the sister of the head. So "complement" is a name that we use for sisters of heads which, as we've seen, is a position that's kind of privileged for arguments, for things that are selected. So if there's only going to be one thing that can be-- if there's a competition between an argument and an adjunct to be the complement, well, it's the argument that's the complement. That's the thing that gets to be the sister. That's what we're seeing.

So here's the principle that I introduced informally a second ago and I'll now say a little more formally. If you've got a head that's selecting for an argument, what we're seeing is you need to take care of the selection requirements of the head first before you do anything else. You must first eat your broccoli before you can have your dessert. You have to take your core classes before you can switch to taking all linguistics classes. That's the way life is.

So if you're going to read books quickly, "read" is a transitive verb. It can combine with a noun phrase. And so you're going to want to give it its noun phrase first. That's the first thing you'll merge with "read."

"Quickly" is an adjunct. You can do anything quickly. It's not getting selected by "read." We won't find verbs that can combine with "quickly" and verbs that can't. And so, yeah, you need to satisfy the needs of "read" first before you go merging "quickly," which is just kind of an optional thing.

And that's why the story is going to be-- we can say, "He read the book quickly," but not, "He read quickly the book," in English. Yeah?

AUDIENCE:    In languages that have flexible word order--

NORVIN       Yes. [LAUGHS] Let me sit down.
RICHARDS:

AUDIENCE:    How do these sentences-- the sentence trees work out if you can rearrange?

NORVIN       So you're pointing to the fact that there are many languages out there in which word order is a lot more flexible
RICHARDS:    than it is in English. And you know what? Even in English, it sometimes gets more complicated than this.

So let me show you the ways in which it gets more complicated in English. And when we get to that, we will have a tool that we can use to describe what's going on in the languages you have in mind. So let me just get you to hold off on your question for now.

Are there any other questions about this so far? OK. All right.

In fact, I think we might be about to do it right now. Yeah. So where are we? Trees are constructed by binary Merge. Merge is constrained by selection via this thing I just called the Projection Principle, which says, if a head selects for something, then that should be the first thing you merge.

Before, some of you were tormenting me with questions about heads that seem to be selecting more than one thing. And you can kind of interpret the Projection Principle in a way that's sympathetic to that. You get to say, yeah, if you have a head that selects for more than one thing, "give the children books" or "put the book on the table," it has two needs. And you had better satisfy those needs as fast as you can, modulo binary merge. So give it one of its arguments. And then it still has another argument it needs, so you better merge that one next.

The tools that we have right now make that a possible answer to those kinds of questions. Questions still floating around about whether those are the right trees, but those are the trees we expect right now. Yep. OK. All right. Yeah? Yes?

**AUDIENCE:** So for a verb like "give," and you are trying to make a construction like "give the children books," would it make sense to instead say that "books" as an argument is an argument for what you get after you merge "gives" with that first argument? It's kind of like--

**NORVIN RICHARDS:** Yeah, I see what you mean. Sorry. Go ahead.

**AUDIENCE:** Kind of like cutting in lambda calculus.

**NORVIN RICHARDS:** Yes. Yes, it is like that. That's a nice way to talk about it.

So I've been talking as though-- let's see if I can say it coherently. I've been talking as though when we look up "give," "give" is going to say, well, I need two noun phrases. Or at least there is a version of "give" that takes two noun phrases.

You're asking me, wait, couldn't-- first of all, don't we want to say something more complicated than that? And we saw this with "put" as well. It doesn't just want two noun phrases. It wants two noun phrases in a particular order. So you want to "give the children books." You don't want to "give the books children," meaning give children books.

So the first noun phrase in this list is the noun phrase that gets the books, gets the second noun phrase. It's not the other way around. And in "put the book on the table," "put" maybe selects for a noun phrase and a prepositional phrase, but we need to say something more structured than that because it has to be the noun phrase first and then the prepositional phrase. It can't be the other way around.

And you're wondering, can we say something like, "give" is a function that takes a noun phrase and gets converted into another function that also takes a noun phrase, something like that. That's sort of the equivalent of currying in or Schönfinkelization or whatever.

If you ever study semantics in my department, I have several German semantics colleagues, colleagues whose native language is German and they are semanticists. And there were two people who invented the kind of functions that he's talking about, where you have a function and it changes the function into another function that takes another kind of thing. One of them had the surname Curry, and the other had the surname Schönfinkel.

This guy was, I think, British. And this person was German. So most English speakers refer to this as currying in. But if you are German, you refer to it as Schönfinkelization.

[LAUGHTER]

And apparently Schönfinkel discovered it before Curry, so the Germans are annoyed by the fact that we call it currying. I'm not German, so I'm not annoyed by you calling it currying in.

Indeed, we clearly want something more structured than what I'm giving us. And I'm just going to leave your point right there. We need to do something more sophisticated than what I'm doing here.

I keep hinting at the fact that we're going to want to investigate these trees, the trees that I'm showing you, with other techniques to find out whether these are the right constituency structures. And when we do that, I think we'll have another reason to revise what I'm telling you now. So there are several reasons to be uneasy about what I'm telling you now.

I've shown you a theory which works fine as long as heads only have one argument. As soon as they have two arguments, these kinds of unsettling questions arise. And we're going to come back to them. OK? Good question.

Other questions about this? This is great. I feel like I'm in a graduate seminar. OK? All right.

So this is where we are then. Trees are constructed by binary Merge. We have the Projection Principle, which says, if there's a selection relation, you need to do that Merge relation first.

And that's going to get us contrasts like "Mary wrote the novel on a typewriter" versus "Mary wrote on a typewriter the novel," where the second one is no good because "write" has the option of being a transitive verb. And when it's a transitive verb, it selects for a direct object. And that's the novel.

"On a typewriter" is like "with a feather." You can do anything on a typewriter. You can combine with anything. So it's an adjunct. And so there's no hurry to merge it.

So we've worked our way to the conclusion that "write," when it's transitive, absolutely, absolutely has to select an object. And the object has to be the first thing you merge together with "write." So it has to be right after "write" in English. That's why you can say, "Mary wrote the novel on a typewriter." You cannot say "Mary wrote on a typewriter the novel." The novel, the thing that's getting written, it absolutely has to be right next to "write."

Darn! That last example looks problematic, right? If I ask you, "What did Mary write on a typewriter," we've just worked our way to the conclusion that "write," when it takes a direct object, the direct object has to be the first thing you Merge with "write." It has to be right next to "write." There can't be anything intervening between "write" and it's complement, the thing that's getting written.

What's the thing that's getting written in that example? What did Mary write on the typewriter? Joseph?

AUDIENCE: "What."

NORVIN
RICHARDS: "What." Yeah. This sounds like an Abbott and Costello routine. "What's getting written." Yes.

[LAUGHTER]

But that's not the sister of "write." That's nowhere near "write." It's way the heck at the beginning of the sentence. What the heck is going on?

Are you all emotionally distraught? That's what I'm trying to do. Yeah? OK, good.

So two possible responses-- oh, well, we didn't have time to get too attached to the Projection Principle anyway. It was just a couple of slides ago. So much for that idea. That's one possibility. So apparently heads can select for things, and they don't have to be anywhere near it. So, well.

But, look. Here's another possibility. We could say, no, the Projection Principle is right-- is correct. I should have picked a different verb. The Projection Principle is correct. It is true that a verb like "write" that selects for an object absolutely has to merge with the object first.

And so, really what you're doing when you start to ask a question like, "What did Mary write on a typewriter?" is you are merging "write" with "what." "What" is starting off as the sister of "write." So you start off with something more like "Mary wrote what on a typewriter."

And then, apparently, there is some operation that takes "what" and puts it somewhere else, at the beginning of the sentence. So-- this was a while ago-- Kateryna asked me, what about languages where word order is freer? And I said, things are about to get more complicated. Things have now gotten more complicated.

So, yeah, there's selection. Things select for things. And when x selects for y, then y needs to merge with x right away. And there are adjuncts that can merge wherever they want. And there are things like this-- movement operations.

I can spend some time trying to convince you that this is true. But right now let me just assert that it's true-- cases where, indeed, things do merge just the way we've convinced ourselves that they do. They merge where they should. They merge as sisters of verbs. But then something else happens, and they end up somewhere else. So there's this operation of movement where you take the word "what," and you move it to the beginning of the sentence in order to form questions like this one.

Notice that in English, and indeed in many languages-- most languages. Not all languages, but in many languages, if I'm amazed by something you've said-- if you say, "Mary wrote a proof of Fermat's Last Theorem on a typewriter," I can say, "Mary wrote what on the typewriter?" So it actually is possible to say these words in this order. I just have to be in a particular emotional state. I have to be astonished.

This is actually cross-linguistically extremely common for-- they're called echo questions, where, if I can't believe what you just said or if I couldn't quite hear what you just said-- if you're telling me on the T, and you say, "Mary wrote [GARGLING NOISE] on a typewriter," and there's lots of noise in the background, and I missed the crucial thing, I can say, "Mary wrote what on a typewriter?"

These are called echo questions, where I'm repeating most of what you just said and replacing part of it with a wh-word. And it's extremely common cross-linguistically for it to be possible to leave these question words like "what" in the positions where you would expect them to be in those kinds of questions, in the positions where they would be selected.

It's not universal, actually. There are languages that don't let you do that. If you're working on a language, it could be interesting to do some finding out about how it forms these kinds of questions.

OK, so lots of questions about what's going on in this last example. There are several reasons to think that "what" is ending up in CP. Remember CP? It was the thing that had heads like "whether" and "that." And we said verbs like "know" and "think"-- and "wonder" I think was the example I used before-- they select for clauses. And in particular, they select for properties of the head of the clause.

So "think" can select for a clause that's headed by "that." "That" is the complementizer. That's our word for it in syntax. "That" is the complementizer that introduces that embedded clause.

"I don't know whether he ate the ants." "Whether" is a complementizer that can be selected by "know." You can't "think whether he ate the ants." And actually there are verbs like "know" that can have either "whether" or "that."

With a verb like "know" that can have "whether," it can also have "what" immediately following it. So you can say, "I don't know what he ate."

And notice that if it has "what," it cannot have either "that" or "whether." So you can say, "I know that he ate the ants." You can say, "I know whether he ate the ants." And you can say, "I know what he ate." But you cannot say, "I know what that he ate," or "what whether he ate." So "that" and "whether" and "what"-- they all seem to be sort of in the same slot there. They're in the CP somehow.

We'll see they're not quite in the same slot. But the idea that "what" ends up somewhere in CP, that seems to be part of what's going on here.

And then, as I said, I promised you there will be various reasons to think that "what" starts off as the sister of "write" and moves into CP. But one of them is the one I just went through. Under certain circumstances, communicative circumstances, I can say, "Mary wrote what on a typewriter?" like if I couldn't quite hear you or if I don't believe what you just said.

So here's a tree that we're going to draw for "What will Mary write?" It's going to have "what" starting off as the sister of "write," right where the Projection Principle wants it to be. "Write" selects for a direct object, and it gets one. That's the sister of "write." And then it moves to the edge of the CP. And so that's the kind of tree that we're going to draw.

This phenomenon-- there's a name for it. It's called wh-movement. It's called wh-movement because these question words-- these words like "what" and "where" and "why" and "when"-- tend to start with the letters W and H in English. "Who" and "what" and "where" and "when" and "why"-- and "how," which doesn't start with the letters W and H, but it does contain the letters W and H, just not in the right order.

So these words are called wh-words. And they're called that. It's just a technical term in syntax. We call these words wh-words, regardless of the language we're working in. It's a sort of embarrassingly Anglocentric term. So they're called wh-words because in English they start with W and H.

The language that you're working on, they surely will not start with W and H. But we're still going to want to call them wh-words. And this phenomenon is called wh-movement. And it's a cross-linguistically very common phenomenon.

There's an English example of it there again. "What did you put on the table?" Here's the Tagalog for "What did you put on the table?" You can see the Tagalog word for "what" doesn't begin with W and H. Tagalog does have W and H, but words can't start with W and H.

And there's the Finnish for "where did I put my clothes." I should really learn how to say "what did you put on the table" in Finnish. I don't know why that's my Finnish example. So various unrelated languages that have wh-movement. It's a cross-linguistically very common phenomenon.

It's not universal. Some of you, in fact, are native speakers of languages in which wh-words don't move to the left edge of the clause. They just stay where they are.

So in Chinese, for example, if you want to say "What did Zhangsan buy," you don't say, "What did Zhangsan buy," or at least you don't have to. The standard thing to say is, literally, "Zhangsan bought what," which, as I said, you can say in English, but only under special circumstances. In Chinese, that's just the natural way to ask that question, is to leave [INAUDIBLE] right where it would be as the object of the verb.

And here are a couple more examples-- Bafut, which is a language of Cameroon, and Hopi, which is a language of the American Southwest.

So there's cross-linguistic variation in how you form wh-questions. There are languages, like English and Finnish and Tagalog and many other languages, where you take your wh-words and you move them to the left edge of CP. And then there are languages, like Chinese and Bafut and Hopi, where the wh-words just don't move. They just stay where they would normally go, wherever they would normally go in the sentence. There's no movement going on.

So in Chinese, if you wanted to say, "Zhangsan bought a book," instead of "what," you would just put the word for "book." Chinese normal word order is subject, verb, object, kind of like English. Same deal for Bafut. Hopi has the verb at the end of the sentence. So these wh-words, these words that mean things like "what" and "who," they're just going where the object would normally go in these wh-in-situ languages.

And those are almost the only two options. Take your wh-word and move it to the left edge of CP, or leave it where it would normally go. You can imagine others, right? So, for example, it's not clear that there are any languages in which you take the wh-word and you move it to the end of the clause. You could imagine a language like that, but it's not clear that there are any languages in which you say, "You put on the table what?"

I think my next slides make that observation more complicated. And I think I want to skip them, actually. So to make this fact more interesting, let me show you one other kind of cross-linguistic variation. I'm not going to do that. So let me do that fast. We'll come back to this because we're running low on time. And I want to show you one other quick thing.

In the remaining five minutes, I'm going to set up another thing. And then we'll come back, and we'll start here next time.

I've been concentrating on wh-questions where you're only asking about one thing. In many languages-- not all languages, but in many languages, it's possible to ask about more than one thing at the same time. So you can ask questions like, "What did you give to whom," where, if I ask you a question like that, what I want is a list of people and things such that person x got thing x and person y got thing y. That's what I'm asking you if I ask you that kind of question.

Again, there's some variation. So English, as I said, is a language with wh-movement. But it's specifically a language with wh-movement of one WH. So if you want to ask a multiple wh-question, you move one of your wh-words, but you leave the other ones where they are. So you say, "What did you give to whom?" or "What did you give to whom when, where, why, how?" So all your other wh-words just stay where they would normally go.

There are other languages in which all of the wh-words move in this big, moving herd to the beginning of the clause. So in Bulgarian, for example, you don't ask literally, "What did you give to whom?" You ask literally, "What to whom did he give?" So "what" and "to whom" are both at the beginning of the sentence.

There are bunch of languages like this. Mohawk is another one. Mohawk's a language spoken not too far from here, in parts of America and Canada. These are both languages in which the wh-words all have to move in a multiple wh-question.

And again, there's some variation between languages. There are languages that move one wh-word, like English. There are languages that move no wh-words, like Chinese. There are languages that move all the wh-words, like Bulgarian or Mohawk.

And again, it's not too hard to imagine other options. So for example, you could imagine a language that only moves two wh-words. That would be a language where you would say, "Who what gave to whom?" to mean who gave what to whom.

There aren't any languages like that. The only kinds of languages there are are the English kind-- so first, the Mandarin kind, the Chinese kind, where you don't move any of them; the English kind, where you move one, where you say, "Who gave what to whom?"; and the Bulgarian/Mohawk kind, where you move them all. You say, "Who what to whom gave?" There aren't any languages like this that just move two or move up to two. You can imagine a language like that, but there aren't any.

And let me just leave you with this last point, and we'll probably take it up here again next time. Logical problem of language acquisition-- here's a game we can play. Here's a function. It's a function that if you give it 1, the answer is 1. If you give it 2, the answer is 2. If you give it 3, the answer is 3. If you give it 4, the answer is 4. What do you think the answer is if you give it 5?

**AUDIENCE:** 5.

**NORVIN RICHARDS:** 5? Can anybody think of any other options? Ha! You've fallen into my trap. The function that I actually had in mind was this one.

[LAUGHTER]

Such that the answer is 29. In fact, the answer could be anything at all.

So this is the kind of question you sometimes get asked on standardized tests. And it's always unfair because the answer could be anything at all. That first thing which I carefully devised to be 0 as long as the thing I was giving the function was 1, 2, 3, or 4, you could multiply that by anything. And so 5 could be any number.

Life is like that a lot. There are lots of places where you go through life, and you get a certain number of finite observations of how life works. And then you have to make a decision about what the basic rule is.

So you're doing science, let's say. And you go out there. You see many white swans. At some point, you have to decide, have I seen enough white swans that I get to decide that swans are white? Have I seen enough black crows that I get to say that crows are black? You never know. Maybe the next one is going to be purple or green. It's just hard to know. And this function is sort of a dramatic example of that.

Imagine, just in the remaining seconds, that you are a Bulgarian child. Were any of you Bulgarian children? OK, so just imagine counterfactually that you were a Bulgarian child. Here you are, growing up, hearing your parents ask wh-questions.

And there's got to be some number, n, that is the largest number of wh-words you ever heard in a question. Maybe you heard your parents say two wh-words in a question. Maybe you heard them say three. It's kind of unlikely that you ever heard them say four or five. I mean, it depends, I guess, on what your parents' line of work was. But there's some number that's the largest number. And it's probably different from Bulgarian to Bulgarian.

So what we might expect-- so Bulgarians are sort of in the position you guys were in with that function. If you just hear this, let's say, "What to whom did he give?" you've got to ask yourself, is the rule move all the wh-phrases? Is it move two of the wh-phrases? Is it move maximally three, maximally four, whatever? There are literally infinitely many rules that are compatible with this data point.

And so you might have expected that Bulgarians, depending on how weird their parents were, would grow up with slightly different grammars, that when you took Bulgarians and you put them into a hyperbaric chamber and you gradually added wh-words to the questions, that they would diverge as the questions got more and more complicated, that there would be the two-wh Bulgarians and the three-wh Bulgarians and the four and the five, that you would find that out.

That's not what we find out. The experiment has been done. What you find out is the Bulgarians are all the same. They all move all their wh-phrases.

What we think is going on really is that being a human being means having the kind of mind that can put language together in some ways but not others. There was never any danger of the Bulgarian children entertaining the possibility that the grammar was move two wh-phrases. They knew that there aren't languages like that. Human languages don't work that way. This is what we mean when we talk about universal grammar.

We'll review this next time because we're out of time. But we'll talk more about this next time.