[SQUEAKING]

[RUSTLING]

[CLICKING]

NORVIN RICHARDS: Last time I introduced you to something strange. This whole semester maybe has been kind of strange. But last time I tried to get you to take seriously the idea that in addition to the kind of movement that we were talking about at the beginning, the kind where you took some phrase and caused it to be pronounced in a place that wasn't the place that it started out, the way we were doing wh- movement, and NP movement, those kinds of movements where you can see why it's called movement. The result of movement is that the thing is no longer where it was before. That's kind of what you expect with movement.

Last time I was trying to get you to believe that there's another kind of movement which exists and moves things, but which does not change the order in which the words are pronounced. There are several examples of this kind of movement. But the one I was introducing you to last time is called QR, which is short for "quantifier raising."

So it was a proposal about how to get ambiguities-- like the ambiguity in "Everyone in this room speaks two languages," which we talked about. This could mean either everyone in the room is bilingual. Or there are two particular languages that everyone in this room has in common. And maybe some of them are bilingual, but maybe some of you speak three languages, or four, or five.

So on one reading, it means there are two languages that everyone speaks. Maybe we all speak English and French. And some of us all speak other languages. In the other reading it means, for everyone in this room, the following is true. They speak two languages. Maybe we have no languages in common. So one of us speaks Swahili and German. And the other one speaks Burmese and Quechua, and so on.

Yeah, so we all agreed that it had those two readings. And what I said was, there is a proposal, in fact, it's the default assumption in the literature, about how to deal with this kind of ambiguity, is to say, there is an optional operation that takes one of those quantifiers and moves it past the other one.

And the order in which you interpret the quantifiers is determined by the position that they're in after you do that movement. But in English, this movement is invisible. So you have the option of moving "two languages" to a position above "everyone in this room."

And if you do that, you only get the reading, there are two languages that everyone in this room speaks. And if you don't, then you only get the reading, it's true for everyone in this room that they speak two languages. So that string of words is ambiguous.

But that ambiguity is, in the end, a structural ambiguity, just like the ambiguity for "I shot an elephant in my pajamas," So in "I shot an elephant in my pajamas," we ended up deciding that's a structural ambiguity. That is, that string of words has two different trees that it can be associated with. Then the two different trees have different meanings. And that's-- and we saw lots of evidence for that.

The claim that's underlying quantifier raising is that this is also a structural ambiguity. That string of words has two trees that are associated with it. And the weird thing about QR is that one of the trees involves a movement operation that you can't see, that the claim is.

One of the interpretations is related to a tree that, if you pronounced the movement, would be "Two languages, everyone in this room speaks." And the claim was English, well, does its QR in a way that you can't see. I showed you Hungarian apparently does its QR in a way that you can see. You get to see these quantifiers moving back and forth.

And that's where we were. I'm sort of repeating that partly to make sure that nobody is thinking that there was something that they were supposed to understand that they didn't. This is supposed to seem creepy at this stage. Here I am saying that things are moving in an invisible way. You're not supposed to come out of that thinking, oh yeah, sure.

Are there questions about that? Are you all in the appropriate emotional state? Yes, I just said all that, thank you. So this is our first case of covert movement. And because it's late April, it's probably the only kind of covert movement that we'll have a chance to talk about. There are other kinds, but this is one of the big ones.

So I gave you some reasons last time to take seriously the idea that QR exists. And we even talked a little bit about some of the conditions on it. So, for example, we saw that QR cannot get out of a TP. So it can't get out of the clause that it's in. We saw some evidence for that.

What I want to do today is show you another condition on it. This is something that my colleague Danny Fox discovered. And it's I'm telling you about it because I think it's really cool. So here's a condition on QR, which is really interesting.

Here's another case of QR, so "Someone loves everyone." If you do QR, then this means no one is unloved. So everyone has this property, someone loves them. If you don't do QR, then it means there is a particular person, my grandma maybe, who loves everyone.

So there are these two quantifiers. And by doing QR, you change the relationship between them in a way that changes the meaning of the sentence. Looking at this, you might wonder, is QR just always optional? So suppose I am looking at "John loves everyone."

Well, here there's only one quantifier. So you might have thought that the simplest theory, the easiest theory would be one that said, whenever you have a quantifier, you can optionally do QR to it or not. And if you do QR to it, then if it goes past another quantifier, then congratulations.

You've changed the meaning. And if not, well, I hope you enjoyed doing QR, but it didn't do anything. You could imagine that it would work like that, that QR would just be something that you could always optionally do. My colleague Denny Fox has discovered that this is not how it works. So this is a case where QR wouldn't do anything.

And what Fox discovered is that when QR wouldn't do anything to the meaning, it's not possible. It's going to take a while to show you the evidence for that. We're going to have to develop another detector for QR. But we'll do that, and then we'll be in a position to demonstrate that this is true. So let me show you.

The detector is going to involve a phenomenon called VP ellipsis, which I think we've touched on every so often, but let's touch on it again. So sentence like "John bought a book and Mary did too," ellipsis refers to this kind of thing you can sometimes do where you leave out part of the sentence. You just don't pronounce part of the sentence in this case.

This is called VP ellipsis because there where I've got that underscore, there would have been a VP, but there isn't. Sentences like this, the missing verb phrase gets interpreted as being the same as some other verb phrase that's salient.

Often it's a verb phrase that someone has said. So "John bought a book and Mary did too," this has to mean something like John bought a book, and Mary bought a book too. So the missing verb phrase is understood as being the same as the other verb phrase that you can see. Yeah, is this clear enough?

Lots of interesting work on what exactly counts as the same. So there are some clear cases. If I say "John bought a book and Mary did too," Mary-- what Mary did was buy a book. You don't just get to randomly put in a verb phrase, your favorite verb phrase. It doesn't work that way.

There are places where there's more wiggle room and what counts is the same. So if I say "John dislikes his father and Bill does too," that can mean a couple of different things. What's one thing it can mean? [INAUDIBLE].

AUDIENCE: John and Bill know each other somehow. And John dislikes his father. And Bill hangs out at John's house too much and also dislikes John's father.

NORVIN RICHARDS: Yeah, so John dislikes John's father, and Bill also dislikes John's father. It is, indeed, one thing it can mean. What's another thing it can mean?

AUDIENCE: Bill dislikes his own father.

NORVIN RICHARDS: Yeah, John dislikes his own father. And Bill dislikes his own father. That's another thing it can mean. So the same, what counts is the same is an interesting question-- yeah.

AUDIENCE: Could it also, depending on context, be that they both dislike a third person's father?

NORVIN RICHARDS: I think it probably could, yeah, yeah, great. So Fred has a father that everyone dislikes. John dislikes his father and Bill does too-- yeah.

AUDIENCE: The first two [INAUDIBLE] brothers.

NORVIN RICHARDS: That's true, that's true. But if they're not, then they're not. Yes, no, you're absolutely right. Yeah, yeah, so when I say there's interesting stuff to talk about when we say that they have to be the same. So if John dislikes John's father and Bill dislikes Bill's father, are they doing the same thing? Maybe, kind of.

They're both engaged in dislike of one's own father. Maybe that's what makes it close enough. And so there's a big literature on figuring out how to define the same in the relevant sense, which we won't have to worry about too much. But it's worth bearing in mind that there's this requirement. In fact, this requirement is crucial for the argument I'm going to give you in a second.

So back to the guards. Remember this one, "A guard is standing in front of every building"? We said this has two readings, a normal reading where every building is guarded. And then you guys were very creative with coming up with other creative versions of this where a single guard is somehow guarding all the buildings at once.

Maybe there's one very wide guard. Maybe-- somebody was saying, yeah, maybe the buildings are all facing each other. And one guard is standing in the geometric center between all the buildings, yeah. Whatever, anyway, either there are as many guards as there are buildings, which is kind of the normal reading for this sentence, or there's one guard who is standing in front of every building, the kind of guard who, when he stands around the house, he stands around the house. So these are the two readings.

Now, let's think about a sentence like, "An American guard is standing in front of every building, and a Canadian guard is too." So the first half of that can presumably mean two things. Yeah, me neither. There's one American guard for each building, or there's one very wide American guard.

And the second half of that sentence can presumably also mean two things once you put in the ellipsis. So can the whole thing mean four things? I don't think so. In fact, it's not just me. People who know much more about semantics than I do don't think so either.

So the four imaginable readings, the easy ones are, each building has two guards, one American and one Canadian, or there are two very fat guards, one American and one Canadian. The other logical possibilities where each building has one normal American guard and there is one gigantic Canadian guard, or the other way around, I don't think it can mean those things. And some of you were shaking your heads in ways that suggested that you agree with me.

Is there anybody for whom the things I've crossed out they were like, yes, that's what it means. What is wrong with all of you people? So this looks like a place where the condition that's-- one way of interpreting this is to say, the condition that says when you do VP ellipses, the elided VP has to be the same as another VP is kind of constraining what we can do in a particular way.

So, again, the ambiguity in the first half of this sentence we decided had to do with whether you do QR or not. You can do QR of "every building" to a position above "an American guard." And then you get the normal reading, every building has an American guard in front of it. Or you cannot do that, in which case there has to be one American guard who's standing in front of every building.

And what we're learning is-- from crossing out the two readings that I've just crossed out, what we seem to be learning is if you do QR in the first half of this sentence, you have to also do it in the second half. And if you don't do it in the first half, you have to not do it in the second half.

Does that make sense? That is, you either get the reading where you did QR in both, each building has two guards, or the reading where you did QR neither. There are two gigantic guards. You don't get the mixed readings. And we can think of this as another instance of this requirement that if you're going to do VP ellipsis, you're elided VP has to be the same as your other VP.

So if you do QR in one, you have to do QR on the other-- yeah. OK, well this is kind of handy because what it means is-- so if parallelism extends to QR, if you do QR in one conjunct, you have to do it in both. What it means is, we now have another way of detecting QR.

That is, we have a way of finding out whether you're doing QR in one clause. And that goes beyond just sitting and thinking about what the sentence means. So if we set up this kind of context where we've got VP ellipses, we happen to know that you can only do QR in clause number one if you do it in clause number two.

And that means that if we have a way of determining whether QR is happening in clause number one, we'll know whether it's happening in clause number two, regardless of meaning. Does that make sense? This will be handy for answering the question that I posed earlier on.

So consider this sentence, "John is standing in front of every building." Well, it's an odd sentence, but it doesn't matter whether you do QR or not because "John" is not a quantifier. He's just some dude. So QRing "every building" past "John" won't change anything. This sentence is always just going to mean every building has this property.

If you look in front of it, there is John. That's the only thing this sentence can mean, doesn't matter whether QR happens or not. And so the question that I posed for you earlier was, if QR wouldn't change anything, can it still happen?

And is QR-- in a way, our lives might be easiest if the answer was yes. We would get to say, QR is something that just randomly happens. You just always get to take quantifiers and move them to higher positions just for fun. This is what they do. They move.

We're about to see, I think, I already spoiled this, that that's not how it works. Actually, you can only do QR if you have two quantifiers. And you want to get one of them to be higher than the other, and if QR is going to affect the meaning. And I'm about to show you the evidence for that-- yeah, Joseph.

AUDIENCE: What would be the set operation here, the building that John is standing in front of?

NORVIN   So, yeah right, so what are the sets? So "every" is relating the set of buildings, so the set of things that John is
RICHARDS: standing in front of. And it's saying every member of the set of buildings is a member of the set of things that
             John is standing in front of.

So if you look at every building in the set, you will see John standing in front of it. That's what it says. And it doesn't matter whether you do QR or not. Yep, so a question, can you do QR? Answer, no. And here's how we find out: "John is standing in front of every building, and a guard is too."

Now we have a way of finding out whether you can do QR in the first conjunct because in the first half of this sentence, John is standing in front of every building. We can find out whether QR is happening there because we know that in this kind of sentence you can only do QR in the first half if you do QR in the second half and vise versa.

And although it doesn't matter whether you do QR or not in the first half, it does matter in the second half. In the second half, a guard is standing in front of every building. That's our core QR sentence. We know that whether you do QR or not changes the meaning of the sentence.

If it were possible to do QR in the first clause, then the second clause would be able to have a reading with QR. It would be possible for the second clause to mean every building has a guard in front of it, maybe different guards. Is that a reading it can have?

So I think if I say-- you're shaking your heads appropriately, I think-- if I say "John is standing in front of every building and a guard is too," that can only mean that John and the guard are both very large, or both standing in the geometric center between the buildings that are around [INAUDIBLE]. It means one of those things.

It doesn't mean, for example, there's one gigantic guard-- sorry, doesn't mean there's John, who is gigantic, and every building has a guard-- thank goodness because John-- somebody should keep an eye on John, clearly.

It can't mean that, which is kind of striking because that's the normal meaning for a guard to standing in front of every building. I mean, we're only entertaining the reading with the gigantic guard because, well, we're doing intro to linguistics. And this requires us to think about peculiar things.

But that meaning goes away in this sentence. The normal meaning goes away. This sentence is odd-- odd not just in the first conjunct, but in the second conjunct. And this requirement of parallelism, this requirement that when you do VP ellipsis you can only do QR in one half of this clause if you are doing it also in the second half, this is, as I said before, giving us a new detector for QR.

So we now-- in order to know whether we can do QR in "John is standing in front of every building," we don't have to-- we already know that it doesn't do any good to sit and stare at that sentence and try to think about what it would mean if you did QR or if you didn't. It doesn't change the meaning.

But now we have a new detector for QR besides staring at meanings. We get to look at these parallelism examples. And what these teach us is, yeah, you can, in fact, do QR. And John is standing in front of every building. So cool fact, QR only happens if it changes the meaning, only happens if it's going to invert the scope of two quantifiers.

OK, that's it for that bit about QR. New bit about QR, and then we're just about done with QR I think, which is also about VP ellipsis. I want to show you one other bit of an argument that QR exists, that it is a thing, that quantifiers actually are moving. There's a phrase which is moving, just in a way that you can't hear.

So there's a movement operation that doesn't change the order of the words. I want to show you a new bit of evidence for that. This bit of evidence also involves VP ellipsis. So just again, to remind you, VP ellipses, these are cases like this, the ones we've been talking about, where you've got a verb phrase that's missing. And it's interpreted as being the same as another verb phrase.

So "John bought a book and Mary did too" means John bought a book and Mary bought a book too. And then there's this identity condition that says that your elided VP has to be the same as another VP. So in this case, it has to be "buy a book."

There's interesting work on this actually because there are contexts where you can elide a verb phrase even though no one has uttered another verb phrase. So there's-- apparently there were a pair of linguists who used to demonstrate this at conferences.

They gave a famous talk in which one of them advanced on the other one with a meat cleaver. And the other, his coauthor, would say "Don't, don't!" which involves VP ellipses. And no one has uttered the VP which he is trying to convey. It's just clear from context that what he means is "Don't hit me with a meat cleaver."

But anyway, in these kinds of sentences where there is another verb phrase, the identity condition shows up. The two verb phrases have to be the same. Now, let me introduce you to an interesting kind of example. This is called antecedent-contained deletion.

So let's think about sentences like "John will visit every city that Mary did." So there's VP ellipsis here. You can see after "did," there's this gap. What verb phrase are we going to fill in for that? Let's think about that. I think I next show you a tree.

So here's a tree. "John will visit every city that Mary did." There's a little blank there. So that blank needs to be the same as a verb phrase. So we could fill in that verb phrase. But if we fill in that verb phrase, what we'll end up with is, "John will visit every city that Mary-- visited every city that Mary-- visited every city that Mary--" we will never stop interpreting this verb phrase.

Do people see that? That's why it's called antecedent-contained deletion. There's an elided verb phrase that's contained in a verb phrase that you appear to have to copy into the verb phrase that's missing. And it's unclear why you can never stop thinking about these sentences. Yeah, you ought to be stuck.

And yet we don't have the sense that we are stuck when we hear this sentence. "John will visit every city that Mary did." You're like, yeah, I know what that means. So it's possible that you're wrong. You don't know what it means. But that doesn't seem right. Our intuition is that, yeah, it's not hard to interpret.

If we believe in QR-- yeah, this way lies madness. Yeah, so we can't interpret the sentence this way. Is this clear what the problem is? If there is such a thing as QR, so we'll do quantifier raising, we'll move that noun phrase out of there.

Well, now there is a verb phrase, "every city"-- so "Every city that Mary did, John will visit." Now there's a verb phrase, visit, that we're going to put there. So it'll mean, Every city that Mary visited, John will visit. And that seems to be what it means. So it means John will visit every city that Mary visited.

So here's another reason to take seriously the existence of something like QR, that is the idea that there is an operation that moves quantifiers out of the position where they were and moves them to some higher position, in this case moves a quantifier, like "Every city that Mary did" at least out of the verb phrase.

I attached it to the TP, doesn't matter-- moves it out of the verb phrase. It's what makes it possible to interpret things like antecedent-contained deletion, which seemed to exist. And so we want an account of why it can exist-- yeah.

AUDIENCE: Are we allowing for [INAUDIBLE]?

NORVIN RICHARDS: I should have drawn this tree differently. One of the problems with QR being invisible is that it's kind of hard to say what it looks like after you did the move. I'll try to fix this before I put the slide up. It would have worked just as well for me to create a new TP binary TP node on top of a earlier TP node. So don't allow yourselves to be distracted by the ternary branching in this slide. I'll try to fix that. Any other questions about this? This is another argument for this.

At this point, all I hope to have done is to have gotten you to be willing to entertain the possibility that you would not have to be crazy to believe in the kind of movement that you cannot see--

[SNEEZE]

Bless you. There is a lot of work--

[SNEEZE]

--bless you-- on covert movement, so movements that you cannot see, developing tests for where it goes, and where it lands, and what drives it, and why you don't get to see it. It's one of the big areas of linguistics, trying to understand what this is.

And if this is a topic that interests you, I encourage you to take more linguistics classes. This is a major topic, something we work on. So that's it for QR. I'm not going to raise any more quantifiers. I'm going to show you something else. This will also be about quantifiers, but they will not be raising. We'll be able to interpret them right where they are.

Let's consider some properties of quantifiers. Some proper-- some quantifiers have a property which is of interest. They are what's called downward entailing. What does that mean? It's a fact about these sentences, so "No American smokes" and "No American smokes cigars"-- first of all, they're both false.

But if we think about the entitlement relations between them, remember that we've said what quantifiers do is relate two sets to each other. In this case, "No American smokes" relates the set of Americans to the set of things that smoke. And it says the intersection of those is empty.

And the second sentence relates the set of Americans to the set of things that smoke cigars. And it says the intersection of those things is empty. And here's the thing, the set of things that smoke cigars is a subset of the things that smokes. If you smoke cigars, then you smoke. If you smoke, you don't necessarily smoke cigars. You might smoke something else, cigarettes, say.

I feel weird talking to undergrads about this because this is all antiquated technology presumably. I assume none of you smoke anything. But, anyway, back in the day, people smoked various things. So now observation, there's an entitlement relation between these two sentences. Which one entails the other? Yes.

AUDIENCE: The first entails the second.

NORVIN RICHARDS: Yeah, the first entails the second. If it's true that no American smokes, then it's true that no Americans smoke cigars. If it's true that no Americans smoke cigars, is it true that no American smokes? Maybe not. Maybe they all smoke cigarettes.

OK, cool. So this is a quantifier that's what's called downward entailing. That is if you take the second set and you make it smaller, you switch to a subset, then you get an entailment relation. So the second set, the set of smokers, if we switch from the set of smokers to the set of smokers of cigars, then we get an entailment relation between the two sentences.

If the first sentence is true, the second sentence has to be true. That's a property of the quantifier "no," that it's downward entailing. I just said all that, thank you. So first sentence entails the second, and the second sentence does not entail the first.

Or to put it another way, if we look at one of these Venn diagrams, we've got the set of Americans and the set of smokers. And "No American smokes" says that the intersection of those is empty. There's the set of cigar smokers. And "No American smokes cigars" says that the intersection of those is empty.

And if the first of those is true, the second has to be true. And you can see by looking at all the circles-- yeah, that's a Venn diagram. So "no" is downward entailing. That is, if it's true that no A are B, and if C is a subset of B, then it is also true that no A are C.

Yes, yes, yes-- is "every" downward entailing? So is it the case that if every American smokes, does it follow that every American smokes cigars? No. so not all quantifiers are downward entailing. "No" is downward entailing, but "every" is not.

In fact, is "every" upward entailing? That is, if it's true that every American smokes-- sorry, if it's true that every American smokes cigars, is it true that every American smokes? Yeah. So there are downward-entailing quantifiers and there are upward-entailing quantifiers.

Now, why am I telling you all this? Partly just because it's entertaining, but also consider sentences like "No one lifted a finger to help," or "No one contributed a red cent," or "No one saw anything." These first two sentences in particular have literal meanings. So the first sentence can mean no one did this, and had that somehow help. It could mean that.

But it also has an idiomatic meaning. It's something like, nobody did anything at all to help. Nobody made the least effort to help. Similarly, the second sentence-- do people still use this expression?-- It's an expression people have heard, no one contributed a red cent.

So it can mean literally, nobody put in a red penny, a penny that had been painted red. But it can also mean no one contributed anything at all. No one contributed any money. And no one saw anything. It means no one saw anything, OK, cool.

Now, interesting fact about these kinds of expressions, they're picky about where they can show up. So you can say "No one lifted a finger to help," or "No one contributed a red cent," or "No one saw anything." But you cannot say "Everyone lifted a finger to help" unless you mean the literal meaning.

So can mean everyone in unison like this helpfully, it can mean that. But it can't have the idiomatic meaning. It can't mean no one did anything. Ditto for the second sentence, "Everyone contributed a red cent"-- OK, maybe you ended up with a pile of pennies that were painted red, but it can't have the idiomatic meaning.

So these kinds of expressions, "lift a finger," and "a red cent," and "anything," have these funny constraints on their distribution. And so far, so we've said that "no" is downward entailing and that "every" is upward entailing. And so we could imagine various ways of accounting for the fact so far.

We could say, for example, that these are expressions that need to be near a quantifier which is downward entailing, or that they need to not be near a quantifier which is upward entailing. So given the data that we have so far, "everything"-- both of those would be stories we could tell. Yes.

I'm sorry, I can tell we're in the part of the semester where everyone is tired. And I've just assigned you lots of things. And also, I am talking too much. So I should do more standing here, like allowing you to put these things in. So here, let me try to fix that with this next slide.

Here are some quantifiers. Here are some quantifiers. "No," "every," "few," "a few," "more than ten," "less than ten," and "exactly ten." This is chalk. I can tell that if I use this piece of chalk, I would be scratching the board, which will not be fun for anybody.

So we're going to figure out which of these are downward entailing. And then we've got "no" and "every," where we know that "no" is downward entailing and "every" is not downward entailing. I put this in the same order-- then we've got "few," and "a few," and "more than ten," and "less than ten," and "exactly ten."

OK, cool-- now let us consult our intuitions about this. Is "few" downward entailing? So what we're asking is, so for to say that "no" is downward entailing is to say that "No Americans smoke" entails "No Americans smoke cigars."

Let me just pause to allow you to be thankful for the fact that we live in the age of slides as opposed to the age-- which wasn't so long ago-- where my job would be to write everything on the board. And then your job would be to write down the things that I wrote. Your lives are better than they would have been not so long ago. Maybe my handwriting was better back then, who knows.

So "no" is downward entailing because it's true that if no Americans smoke, it must also be true that no American smoke cigars. How about "few"? So what's the relationship there? If I say few Americans smoke, does it follow that few Americans smoke cigars? I think it does.

So "few"-- there's a reason that when we were talking about sets, I was careful to show you quantifiers like "no," and "every," and "some." "Few" is a little harder to describe in terms of sets. It's something like "The intersection of these sets has a small number of things in it," something like that.

How about "a few"? So if a few Americans smoke, does it have to be true that a few Americans smoke cigars? No. Maybe there are a few Americans who smoke. And all of them smoke hookahs or whatever-- yeah.

AUDIENCE: Would that not also be true for "few"?

NORVIN RICHARDS: A few.

AUDIENCE: That few Americans smoke, that all the ones that do smoke cigarettes.

NORVIN RICHARDS: What do people think? If I say "Few Americans smoke," do we get to conclude that few Americans smoke cigars, or is it possible that all of the few Americans who smoke, smoke something else? Hmm, I'm going to put a question mark next to "few" because I think that's a good question.

For "a few," I think it's pretty clear that the answer, the answer is no. This relation does not hold. OK, how about "more than ten"? So more than ten Americans smoke. Would it follow that more than ten Americans smoke cigars? No. Was that a question-- just stretching, OK.

If less than ten Americans smoke, do less than ten Americans smoke cigars? Yes. And if exactly ten Americans smoke, do exactly ten Americans smoke cigars? No, cool. All right, good. Let's see what the slide says. Yeah, OK.

So for the slide, I ended up claiming that "few" is downward entailing. It's interesting to think about the case that you're raising. Trying to figure out what we think. Doo, doo, doo, doo, doo-- now, oh yes, so now having done that, let's think about these expressions.

So we've already said, it's OK to say "No"-- let's see, "No American did anything." But expressions like "anything," which are weirdly sensitive to the properties of the quantifiers that are around them, they want to be near a downward entailing-- maybe that's one theory that we could fool with-- they want to be near something that's downward entailing. So I'll put a column here for "anything."

And we've said that "anything" is OK with "no," and it's bad with "every." So "Every American did anything," that's not possible. How about "Few Americans did anything"? It's fine. How about "A few Americans did anything"? No. How about "More than 10 Americans did anything"? "More than 10 Americans did anything"? No.

And then "Less than 10 Americans did anything"? I think, yep. "Exactly 10 Americans did anything." Some of you are shaking your head, and some of you are nodding. "Exactly 10 Americans did anything about the problem." You're all wiggling at me. [LAUGHS]

OK, so-- when I once taught in a summer school in India, there WAS a wonderful summer school. There all these brilliant students. It was really great. We were in the foothills of the Himalayas. It was this gorgeous spot.

And I had a great time teaching in the class for all of these reasons. Also, the food was wonderful. Although whenever I said that to the Indian students, they would look at me and smile because clearly I had no idea what good Indian food was supposed to taste like.

But one of the fun things, many fun things about teaching there was that, as I said to them at one point, I come from a place where we have several things we do with our heads. We can say, do "yes" with them, and we can do "no." And they did those things in India. But they also did this. And I could never figure out what they meant.

[LAUGHTER]

Sometimes they just meant, wait, we will think about that some more. It seemed to be the equivalent of "Hmm." Anyway, OK, so these columns, even taking my bad handwriting into account, these columns kind of resemble each other We have checks and X's in more or less the same places.

The one place where there might be a difference has to do with "Exactly ten." So this was the place where you were wiggling it at me. "Exactly ten students did anything about the problem." "Exactly 10 students lifted a finger to help." What's another example like this?

Oh, "ever." Yeah, so "No one has ever eaten nattoo with avocados." It's not true. This is fine. But "Everyone has ever eaten nattoo with avocados" is bad. "Few people have ever eaten"-- blah, blah, blah-- is fine. "A few people"-- no. How about "Exactly ten people have ever eaten nattoo with avocados"? I think that's OK.

It's interesting that our intuitions about this are kind of shaky, caused us to wiggle. Notice that this is the place where these two quantifiers, or these two columns stop resembling each other quite so closely. Up until that last line, you could get away with thinking these expressions, things like "ever," and "anything," and "lift a finger," they are things that want to be around something that's downward entailing.

And those of you who were shaking your heads when I asked about "Exactly ten Americans did anything about this," you should be proud of yourselves, because your lives are easy lives. So that's bad. This is bad. Everything is good. On the other hand, if it's true that it's possible to say things like "Exactly ten people have ever eaten nattoo with avocados," then yeah, there's something else going on here.

If we do the same exercise for upward entailing-- I won't make you do it-- what you can see is that the upward-entailing column is almost the mirror image of the downward-entailing column, but not quite. So "Exactly ten" is the one where they split. So upward entailing, again, what we're asking is-- if I say-- so we can do it first with "no": "No American smokes cigars." Would it follow from that that no American smokes?

For "no," the answer is no. So no, it is not upward entailing. "Every" is upward entailing because if every American smokes cigars, it's also true that every American smokes. If exactly ten Americans smoke cigars, does it follow that exactly ten Americans smoke?

No. So there could be a few more that smoke other things. So "exactly ten" is unlike all the other quantifiers in this list, in that it is neither downward entailing nor upward entailing. And if we ask, does it license an NPI, the answer is kind of wiggly.

So this is a place where we might wonder whether license-- I think I led us into this when I first introduced you to these expressions-- sorry, NPI is short for negative polarity item. These are these expressions, like "anything," or "ever," or "lift a finger," which are sensitive to the nature of the quantifiers that are around them.

And tables like this are the kind of thing people construct when they're trying to figure out exactly what is it that they're sensitive to. Do the want to be near something downward entailing, that's one popular theory, or is it maybe they want to avoid being near something which is upward entailing?

And those are almost the same thing, as you can see in those first two columns, but not quite. Quantifiers like "exactly ten" are helpful. Janice, Janice has worked on this.

AUDIENCE: [INAUDIBLE]. There was an observation that I wanted to make about the "exactly ten."

NORVIN   Yeah.
RICHARDS:

AUDIENCE: But it seems to me that if you created a context where you said, when you put out a call for 100 people, volunteers, and exactly ten [INAUDIBLE], something like that, versus put out a call for ten volunteers, it seems like that works better. But if you say, you put out a call for ten volunteers, exactly ten did anything, then it seems like it doesn't-- it gets worse.

NORVIN   I think I get that. Does everybody get that? So those are-- that's a nice example, thanks. So what you're pointing
RICHARDS: out is that it's helpful for the exactly ten to be explicitly a subset of another set that we've got hanging around or something like that. It's a partitive expression of some kind maybe, cool, cool-- yeah.

AUDIENCE: So in that case, could we say that "exactly ten" only behaves in that way when exactly could be replaced with only?

NORVIN RICHARDS: Ah, well, let's see. That's a nice way to think about it. So the point about "exactly ten," isn't it, is that in those kinds of contexts is that this was true of ten of them, but not of the others, something like that, yeah. And so maybe that is the way to think about it. "Only" is another interesting expression to think about here, maybe, but let's not, yeah.

Cool, so especially if we take Janice's suggestion and securely think of "exactly ten" as being OK with anything, being the thing which stands out here in this last row, then maybe we want to think of these expressions as expressions that want to be in a context that's not upward entailing. That's a move people make.

I can tell you that as you go through life, if you interact with linguists and they are not semanticists, they will often tell you that these are expressions, things like "lift a finger," and "a red cent," and "anything," and "ever," that these are expressions that need to be in a downward-entailing context, because it's almost true, and it's shorter than a non-upward-entailing context.

But it's arguably not quite true. This is maybe closer to what these things mean. OK, how about these expressions? So if I say "John saw anything," or "John contributed a red cent," or "John lifted a finger to help," these are all bad. And maybe that's not so surprising. John isn't a quantifier at all.

And in particular, if we ask, if we pretended that John was a quantifier, I guess, if we ask is "John" upward entailing, I guess there's a sense in which he is, if "John smokes cigars" entails that John smokes.

But consider sentences like the first ones. "John didn't lift a finger to help." Or "John didn't contribute a red cent." Or "John didn't see anything." What we're seeing here is that it's possible to license those expressions not necessarily with the quantifier, but with this negation.

The negation is another kind of thing that makes these OK. That's the reason that they are called negative polarity items. It's because this is-- the first observation about them, that they were things that were OK in negative sentences but usually bad in positive sentences. Then people were like, wait, there are some quantifiers that can license them too. People were [INAUDIBLE].

Yes, great, so if John smokes cigars, that does entail that John smokes. But if John doesn't smoke cigars, that no longer entails that John doesn't smoke. If John doesn't smoke cigars, it's possible that he does smoke, just not cigars. So what negation does is create a non-upward-entailing context, which is what these quantifiers want.

So these expressions are what are called negative polarity items. They need to be in a non-upward-entailing context. And this has just been another example of the kind of thing that people work on. If you are looking around for things to work on for your final paper, for your field work paper, this is the kind of thing you can go look for.

Most languages have NPIs. So you could spend some time asking about how to say things like "He didn't do anything," and finding out what kinds of expressions you use. So that's the kind of thing you could do. Questions about any of this? Yes.

AUDIENCE: So [INAUDIBLE]. About "less than ten," so "less than ten people [INAUDIBLE]."

NORVIN RICHARDS: I'm sorry, say it again.

AUDIENCE: So "less than ten people did anything [INAUDIBLE]." But what about "less than 10 billion people did anything?"

NORVIN RICHARDS: "Less than ren billion people did anything."

[SNEEZE]

Bless you. Maybe-- so I don't know, what do the rest of you think about that? Is that a-- is that an odd sentence? Joseph.

AUDIENCE: I think if we are able to imagine a world where there's trillions of people and you colonize the entire galaxy, and then some massive disaster happens, and one little planet of ten billion people signs up to help, then maybe that's [INAUDIBLE].

NORVIN RICHARDS: Yeah, so I wonder whether this has to do with the conditions under which it makes sense to use an expression like "less than ten billion people." So the way things are right now, "less than ten billion people" would be, well, all the people that there are.

And so this is connected to other questions about pragmatics, which we have skipped and will continue to skip, about which quantifiers you will use under which kinds of circumstances. So there's work on the fact, for example, that if I say something like "Mary ate some of the cookies," that you are inclined to interpret that as meaning that she ate some of them, but not all of them.

So if I say "Mary ate some of the cookies," and then you go over and discover that the plate of cookies is empty, you have a tendency to be discouraged. But if "some" just means the set of, "Mary ate some of the cookies." If "some" just establishes a relation between the cookies and the things that Mary ate and says, the set of cookies and the set of things that Mary ate has a nonempty intersection, if that's all it means, then if Mary ate all of the cookies, then this should be true.

And there are two things we could do about that. One would be to say, well, we need a different definition of "some" then, because that's not our reaction if it turns out she ate all of the cookies. But there's another move that people standardly make, which is to say, if "I say Mary ate some of the cookies," what you do is you listen to me say that,

and you mentally bear in mind the fact that I said "some," and I didn't say "all." And you're thinking about other kinds of things I could have said. And if I had said "all," I would have been, in a sense, more informative. I would have been telling you that there are no cookies left.

Yeah, so on that approach, we're OK. Our existing definition of "some" is OK. We get to just say, yeah, "some" just means there's a nonempty intersection. And then there's this tendency that you have to listen to a quantifier and think about other quantifier that you could have said.

And I think there's something similar going on-- I'm sorry, this is taking a long time-- I think there's something similar going on with your example. But if you say "less than ten billion people," I'm invited to wonder why you are describing all existing people that way. Why aren't you just saying "everyone"? And I think there's something similar, some way of relating that fact to this fact I think-- yeah.

AUDIENCE: So you say there is a principle that we assume that when we have conversations that the other person [INAUDIBLE].

NORVIN RICHARDS: Yes, yes, and then there's a really interesting question about what I mean when I say informative. We have to try to figure that out. That idea is an idea by a guy named Grice. His idea was that when you hear people speak, you make assumptions about the conversational moves that they will make. You assume that they will be honest and that they will tell you everything. They will be maximally informative, and so on.

And some of the interesting kinds of inferences that we make about things that people say come from cases where we're following these assumptions about what people will be doing-- [COUGHS] excuse me. And one of the other things that he's interested in showing is he'll-- so we will do things which obviously violate Grice's-- they're called maxims, Grice's maxims.

And then you get to draw conclusions when I do those kinds of things. So there's a classic example. If somebody asks me, "How did the students do on the test? and I say, "Well, *Mary* passed."

[LAUGHTER]

That tells you that Mary passed. And the fact that I didn't completely answer your question leads you to make conclusions about why. You get to ask yourself, so why didn't he tell me about any of the other students? Oh dear. And the answer-- there could be various answers.

Maybe the answer is everyone else failed. Maybe the answer is I happen to believe for some reason that you're entitled to know how Mary did, but not about anybody else. Maybe you're Mary's dad or something. There are various ways that-- conclusions you could draw, depending on the circumstances. But that's another kind of example of Grice's maxims in action.

This is a domain of linguistics, which I'm not planning to talk about at all, and yet here I am. It's called pragmatics. And I'm not planning to talk about it because, I think I've said this before, when you're teaching intro classes in anything-- this is probably true of your other professors and your other intro classes-- the professor presumably has a specialty, something that they mainly work on.

And for the rest of the class they're doing their best to make everything look reasonably plausible. And I think I told you, the part where I have a specialty, that was syntax. So everything else-- I haven't been making it up. I've been doing my best to show you things that were really true.

But I'm not a semanticist. And I so I'm a syntactician. I'm not a semanticist. And I am really, really not a pragmaticist. And there are people who work on that, and I'm just not one of them. So I I've already told you more about pragmatics than I know.

[LAUGHTER]

Well, I won't try to tell you anything else. Your TAs, for example, might be able to undo some of the damage tomorrow.

AUDIENCE: So by communicating [INAUDIBLE]--

NORVIN RICHARDS: You're going to ask me about pragmatics, aren't you. [LAUGHS] Go ahead. It's all right.

AUDIENCE: I'm trying to understand what you said about Grice. So if you say, "I go to school," and when someone asks where you go to school, you say "North of Boston," which is true. Then if I went to school in, like, Greenland, it's north of Boston. But if that person found out that I do actually go to school in Greenland, they'd think that I was being dishonest.

NORVIN RICHARDS: Yeah, they would feel that-- yes, exactly. Yeah, that's a good example, particularly if-- there was some reason to think that when you said "North of Boston," you were leaving open the possibility that you were going to school in various fine educational institutions north of Boston. I probably shouldn't try to name any in particular.

And then if it turns out that, in fact, you were in someplace in Greenland that's not all that famous, they might think, ah, I've been tricked. Yes, right. You're absolutely right. They get to ask why you did that. Why were you vague when you could have been specific? Yeah, anything else I can make up about pragmatics? Yes, Raquel?

AUDIENCE: I was thinking about the-- and I don't know if this is iconic or not. But there's this one scene in *Pink Panther* where he says, "Does your dog bite"? And then the guy's like, "Nope." And the dog bites. And he's like, I/" thought you said your dog didn't bite." And the guy's like, "That's not my dog."

[LAUGHTER]

NORVIN RICHARDS: "That is not my dog." It's a classic. Yeah, so a lot of comedy is built on failing to obey Gricean maxims. Yeah, that's exactly right Yeah, so in this case, the maxim of relevance-- so when he asks, "Does your dog bite," the guy is supposed to think, "Why is he asking me this? Oh, he must be assuming that this is my dog. That must be what he wants to know about."

So this is a kind of navigation of people's expectations in conversation, that people always have to do. That's right-- unless you're Inspector Clouseau. Yeah, OK, good. Let's end a little bit early today then. And have a good weekend. And I will see you next week.