Q05 Scope relations

Course in Semantics · Ling 531 / 731

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1 What is scope?

The scope of an operator is the domain over which it affects the meaning of things.

(1) *Every dog scratched itself on the neck.*

(2) *It scratched every dog on the neck.*

In (1), the pronoun *itself* can be tied to *every dog*, so that each dog scratched its own neck. (The use of the reflexive *itself* rather than *it* drives this link home, but is an accidental fact of English grammar).

In (2), however, the pronoun *it* cannot be tied to *every dog* in the same way.

The reason is that in (1), the pronoun is in the scope of *every dog*, while in (2), it is not. Let's imagine the LF representation of our sentences to see. The scope of *every dog* is bracketed off in both cases

(1′) Every dog_1 [scratched x_1 on the neck]

(2′) x_1 [scratched every dog_{*1} on the neck]

Scope also appears prominently when there are multiple quantified expressions. Note how the truth-conditions change with word order (and that includes falsehood conditions!)[1]

(3) *Every student read one book.*
   1. TRUE if every student read the same book
   2. TRUE if every student read a different book
   3. FALSE if there are students who read no books

(4) *One book was read by every student.*
   1. TRUE if every student read the same book
   2. **FALSE** if every student read a different book
   3. FALSE if there are students who read no books

What is the difference? Syntactically, the quantifiers have a different dominance relation. (specifically, c-command). Semantically, the difference is scope. We can get a sense of the scope by bracketing off its scope, or by following a quantified DP with a "is such that" phrase.

[1] The difference is more stark if we say *exactly one book*, and another difference appears— In (4), some students may have read more than one book, but not in (3).

(5) *Every student read one book.*
Every student is such that they read one book.
Every student [read one book]
→ We check **each student** to see how many books they read. We have to check all of them.

(6) *One book was read by every student.*
One book is such that every student read it.
One book [was read by every student]
→ We check **each book** to see how many students read it. We don't necessarily have to check them all, though.

(Acquisition studies find that children mess this up, and processing studies find that adults sometimes do, too.)

2 How can we tell if something has scope?

Not every expression has scope. Definite descriptions don't. We can tell because we don't change the meaning like we did with quantified expressions. Recall that you can test for scope by changing the c-command relation between the DPs, while controlling for other changes in meaning. If the truth-conditions change (as above), then what you changed has scope. If not, then not. The following have the same truth conditions, so *Tom Sawyer* does not have scope.

(7) a. *Every student read Tom Sawyer.*
b. *Tom Sawyer was read by every student.*

We changed the c-command relation between the DPs by switching the sentence to the passive. This preserves the argument structure (who's doing what), so that the meaning does not change in that regard.

3 Wide scope, narrow scope

We use the terms **wide** and **narrow** to express a scope relation between two expressions. We say an expression has wide scope if it takes the other in its scope, narrow if it's in the scope of the other.

Wide scope
Expression α has wide scope with respect to expression β if and only if β is in the scope of α.

Narrow scope
Expression α has narrow scope with respect to expression β if and only if α is in the scope of β.

So in (3), *every student* has wide scope with respect to *one dog*, while in (4), it has narrow scope with respect to *one dog*.

Conversely, in (3), *one dog* has narrow scope with respect to *every student*, while in (4), it has wide scope with respect to *every student*.

Generally, you would choose which term to use based on what you're talking about. So if you're focused on *every student*, you'd say that (3) has a 'wide scope reading', while (4) has a 'narrow scope' reading.

Terminology: If α takes wide scope with respect to β, we can express this in a number of ways (this list is not inclusive)

- α takes scope over β
- $\alpha > \beta$
- $\alpha \gg \beta$
- α scopes over β
- α has scope over β
- β scopes under α

4 Scope ambiguity

Sometimes, a sentence is ambiguous because it can lead to different scope relations. This is known as a scope ambiguity.

(8) *Five boys got into two cars.*
   a. Context 1: You have a room with five boys. They have to leave. They couldn't all fit into one car, though, so they took two.
   b. Context: You have building full of boys who all had to leave. There were enough cars for everyone, if four people got into a car. But there were two cars that five boys managed to fit into.

(9) Scope wise:
   a. Context 1: Five boys [(they) got into two cars]
   b. Context 2: Two cars [five boys got into (them)]

5 Surface and inverse scope

When a sentence is ambiguous with respect to scope, we say that it has **surface scope** when the dominance relation of scope matches that of the overt syntax.

In (8), context 1 has surface scope. *Five boys* c-commands *two cars* in the syntax as well as in the scope relation.

surface scope : five boys > two cars

inverse scope : two cars > five boys

If the scope relation is flipped, we say it exhibits **inverse scope**. In (8), Context 2 has inverse scope.

6 Scope rigidity

We can flip scope relations by placing scope-bearing items in different syntactic positions. In English, the passive is one way to do this. But English grammar does not allow us to simply flip subject and object DPs to get the scope to match the syntax.

However, many languages can do this, or even must.

In Turkish, for instance, the expressed equivalent of (8) is not ambiguous. It only has the surface scope reading where five boys takes scope over two cars.

(10) *Beş çocuk iki araba-ya girdi.*
five child two car-DAT entered
'Five boys got into two cars' (five boys $>$ two cars)

If you want the other reading, you have to actually move the object so that it syntactically dominates the subject.

(11) *İki araba-ya beş çocuk girdi.*
two car-DAT five child entered
'Five boys got into two cars' (two cars $>$ five boys $\rightarrow$ ten boys in all)

It seems that no other reason for the movement exists except to build the right scope relation.[2]

This phenomenon is known as **scope rigidity**, and languages like Turkish are called **scope-rigid** languages. As more people do semantic fieldwork, we find more and more scope rigidity cross-linguistically.

[2]Some recent theories of syntax posit that all movement is driven by syntactic features, but this kind of movement is a problem, because it is purely semantic in nature and it isn't clear what feature would trigger it.