

Don't scope your universal quantifier over negation!

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There has been a lot of attention in the literature given to the factors which decide the relative scope of logical operators in the interpretation of sentences. One of the crucial factors was claimed to be information structure (Jackendoff 1972, Hajičová 1975, Büring 1997, a.o.). One of the most important cases discussed in the literature is the scopal interpretation of negative sentence containing universal quantifier which is assumed to be disambiguated by intonation pattern in English and German even by Kadmon (2001). We present an argument that the apparent wide scope of the universal quantifier over negation is a result of scope illusion as argued independently for definite NPs and negation in Beck (2001). This opens a possibility that the scope of universal quantifier is always below negation. The crucial evidence comes from an extensive corpus study of the interpretation of Czech universal quantifier *všechno* 'all' (2000 sentences from the SYN2010, representative corpus of contemporary Czech, was parsed; the relative scope of negation and \forall for each sentence was decided by paraphrasing the sentence meaning into the sentence with unambiguous scope and judging the plausibility of such paraphrase). We found that 89 % of negated sentences with unmodified subject NP containing *všechno* is interpreted with the relative scope $\neg > \forall$ (1). The remaining 11 % of unmodified subject NP is interpreted with the opposite scope. This holds irrespective of the linearization – both S neg-V and neg-V S linear order show nearly the same percentage of relative scopes (notice that Czech is a language with relative free word order, the changes in linearization were claimed to be linked to information structure by many, see Kučerová 2012 a.o.). But surprisingly the interpretation totally reverses when we consider modified universal subject NPs: 87 % of sentences is interpreted with the scope $\forall > \neg$ (2) and only 13 % has the interpretation with the opposite scope. We argue that the interpretation $\forall > \neg$ is just illusion of scope similar to apparent wide scope of conjunction over negation in languages like Hungarian (Szabolcsi & Haddican, 2004).

- (1) a. Myslím, že všechny mrtvolý se ještě neobjevily.
Think.1sg that all corpses SE still NEG-appear.3pl
'I think that all corpses didn't appear still.'
- b. Všichni pacienti si ale látky nevytvářejí.
All patients SI though matters NEG-develop.3pl
'All patients don't develop antibody.'
- (2) Všechny ty škody neměly jiný účel než nadělat co nejvíc
all the damages NEG-have.3pl other purpose than make as much
hluků.
noise
'The purpose of all the damages was to make as much noise as possible.'

Proposal: We argue that the fixed scope between universal quantifier and negation is the result of competition in grammar, namely reference set competition (Reinhart, 2006; Percus, 2006), see also blocking (Horn, 1989). The reason why the scope $\forall > \neg$ is never realized by the sequence *všechno . . . ne* is that there is a strictly simpler realization of the same semantic information, namely a single lexical item *žádný* 'no'. We argue that the existence of this lexical item blocks the scope reversal structure. We argue further, that the illusion of scope $\forall > \neg$ in examples like (2) arises as the result of negation applied to the definite (maximal) plurality, as introduced in Beck (2001), and called

homogeneity presupposition (3) by her. The core idea of the homogeneity presupposition is to distribute the pluralized property P to all atoms in the denotation of A; in case of negated sentences (3-b) this leads to apparent scope of A over negation. The homogeneity presupposition is used by Beck to explain the strong interpretation of sentences like *The children are not asleep* where negation and the definite NP appear and where the weak reading ($\neg > \delta(\text{CHILDREN})$) isn't grammatical. We follow Beck (2001) in this respect and argue that the apparent wide scope of universal quantifier over negation in examples like (2) is the result of the distribution of negative property to all atoms constituting the maximal plurality denoted by the universal NP, not a result of QR or any semantic transformation which would scope \forall over \neg .

- (3) *P(A)
- a. =1 iff $\forall x[x \in A \rightarrow P(x)]$
 - b. =0 iff $\forall x[x \in A \rightarrow \neg P(x)]$; undefined otherwise

Predictions: our proposal makes three following predictions. **First**, we predict that whenever the illusion of $\forall > \neg$ arises, the universal NP should be definite (in the sense of restriction of the quantificational domain by such means as relative clauses, presuppositional collective modifiers, demonstratives, ...). Our corpus study shows that this prediction is born out. **Second** prediction, because universal quantifier and conjunction are logically equivalent (in finite domains), we expect that the conjunction of two definite NPs in negated Czech sentences should produce apparent 'wide scope of conjunction' over negation reading. The second observation is demonstrated in (4) which (unlike its English translation) is interpreted only as conjunction of two negated statements ($\neg p \wedge \neg q$). This is not the case for indefinite NPs where both scopes are possible. **Third** prediction: we predict that change in the word order typically associated with a change in the information structure should have no effect on the scope of *all* and negation. Notice that in Czech negation is realized as a bound morpheme on the finite verb. We predict that both SV (i.e., *all* neg-V) and VS (i.e., neg-V *all*) orders should yield the same interpretation, namely, $\neg > \forall$. This is exactly what we found in the corpus. The decisive factor is the definite interpretation of universal NP as discussed above. The last prediction supports the traditional view of the architecture of language faculty (Chomsky, 1995) where the information structure doesn't intervene with the semantic part of the derivation.

- (4) Petr nepřečetl Meditace a Babičku.
 Petr NEG-read.3sg Meditations and Grandmother
 'Petr didn't read Meditations and The Grandmother.' $\neg p \vee \neg q$ in English

Selected references

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