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Focus on scope: information structure and quantifier scope in Russian

This paper examines the scope readings of Russian double-quantifier sentences like (1) and (2), focusing on the relative contributions of word order, prosody, and information structure (IS). Corresponding English sentences are ambiguous between surface-scope and inverse-scope readings, which are commonly derived by covert QR of either the subject QP or the object QP to a higher position at LF (e.g., May 1977, Heim & Kratzer 1998). For Russian, there is disagreement about whether only surface scope is possible (Ionin 2003), vs. whether both surface and inverse scope are allowed (Antonyuk 2006). According to Ionin (2003), when prosody is neutral, the preverbal QP is in Topic position, and reconstruction of the topic is impossible due to IS considerations: the topic must be interpreted first. Ionin suggests that when the preverbal NP is not a topic, e.g., in a contrastive-focus configuration, inverse scope is possible. The link between contrastive focus and scope has been made for other languages. For German, it has been argued (e.g., Krifka 1998, Bobaljik & Wurmbrand 2012) that in a contrastive topic/focus configuration, marked by a rise-fall intonational contour, inverse scope becomes possible. This configuration has not previously been explored for Russian.

(1) Odna devochka pogladila kazhdogo kotenka. (one>every), ?(every>one)
    One girl-NOM stroked-Fem every kitten-ACC
    surface-scope reading, paraphrase: a specific girl stroked all the kittens
    inverse-scope reading, paraphrase: for every kitten, a (potentially different) girl stroked it

(2) Odnogo kotenka pogladila kazhdaja devochka. (one>every), ?(every>one)
    One kitten-ACC stroked-Fem every girl-Nom

To address the relationship between scope and focus, we conducted five experiments with 152 adult native Russian speakers (between 28 and 32 participants per experiment), all of which used a sentence-picture verification task. For each test item, participants viewed a picture, listened to a sentence, and stated whether the sentence matched the picture, by selecting YES or NO. Four sentence types were tested, with word order (WO) and quantifier configuration (QC: indefinite subject + universal object, vs. universal subject + indefinite object) varied, as shown in (3). The test picture for the sentences in (3) showed three different girls, each stroking a different kitten; this picture makes (3a,d) false on the surface-scope reading and true on the inverse-scope reading, with the reverse truth-values for (3b,c). Control pictures were also used for which, because of entailment, the sentence was true on both surface-scope and inverse-scope readings: e.g., for (3a-b), the control picture showed the same one girl stroking all three kittens, and for (3c-d), the control picture showed the same one kitten being stroked by all three girls. Two test lists were used, with counterbalancing of pictures and sentences across lists; there were 4 tokens for each picture/sentence-type combination in each list, plus fillers.

(3) *Target sentences, English gloss*
   a. $S_{one}VO_{every}$: One girl-NOM stroked-FEM every kitten-ACC. (= (1) above)
    b. $O_{every}VS_{one}$: Every kitten-ACC stroked-FEM one girl-NOM.
    c. $S_{every}VO_{one}$: Every girl-NOM stroked-FEM one kitten-ACC
    d. $O_{one}VS_{every}$: One kitten-ACC stroked-FEM every girl-NOM. (= (2) above)

In the **Baseline** experiment**,** the test sentences were presented with neutral intonation, in order to establish the baseline availability of inverse-scope readings. In the **Focus-one** experiment, the indefinite quantifier (a form of *odin* 'one') was given contrastive stress: the stressed element was thus preverbal in (3a,d) and postverbal in (3b,c). This experiment was designed to check whether contrastive focus facilitates inverse scope. The **At-least** experiment replaced *odin* 'one' with *po krajnej mere odin* 'at least one', in order to examine whether adding the focus particle *at least* has the same effect as contrastive stress. In the **Focus-every** experiment**,** the universal quantifier was given contrastive stress, so that the stressed element was now postverbal in (3a,d) and preverbal in (3b,c). In the **Rise-fall (RF)** experiment, a rise-fall contour marked each sentence, so that the preverbal element would be construed as topic, and the postverbal one as focus. (The Baseline and Focus-one experiments were previously reported in Authors (2014); the other three experiments are new.)

Performance with control pictures was near-ceiling in all conditions, indicating that participants were paying attention. Results with the test (distributive) picture are presented in Figure 1. The data were analyzed using a binary mixed effects logistic regression, with WO, QC, list and experiment as fixed effects, and participants and items as random effects. Both WO ($z=6.76$, $p<.001$) and QC ($z=6.84$, $p<.001$) had significant effects of the results, and interacted significantly with each other ($z=9.93$, $p<.001$). This was due to the rate of YES responses being significantly lower when the surface-scope reading was false (and inverse scope true), as in (3a,d), compared to when the surface-scope reading was true (3b,c), which indicates that surface scope is more accessible than inverse scope. There was no effect of list. WO and QC also interacted significantly with experiment when the Baseline experiment was compared to each of the Focus-one ($z=5.96$, $p<.001$), Focus-every ($z=3.39$, $p=.001$), and At-least ($z=2.84$, $p=.004$) experiments; however, there was no interaction between WO, QC and experiment when the Baseline and RF experiments were compared ($z=1.52$, $p=.128$): i.e., the performance patterns in these two experiments were the same.

Significant interactions were followed up with Bonferroni-corrected pairwise comparisons, which revealed the following. For the sentence type in (3d) (OVS with a preverbal indefinite), focusing the indefinite object (Focus-one experiment) or adding the focus marker *at least* (At-least experiment) significantly increased the rate of YES responses relative to the Baseline experiment: inverse scope became more accessible. For the other three sentence types (3a-c), the experimental manipulations did not have a significant effect, though placing focus on the preverbal universal QP in (3b,c), in the Focus-every experiment, marginally *decreased* the rate of YES responses relative to the Baseline experiment (i.e., once again, inverse scope became more accessible).

Figure 1: Study results: %YES responses with test picture
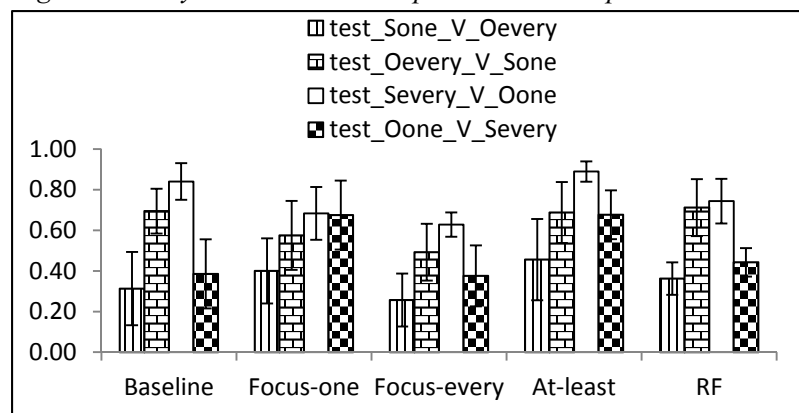
We conclude that, per Ionin (2003), IS is closely related to scope in Russian. When the preverbal QP is construed as the topic (either under neutral intonation, or under the rise-fall contour), surface scope is strongly preferred. However, inverse scope is still allowed about 20/30% of the time, which suggests that Russian scope is not frozen, and that surface scope is a preference rather than a requirement (for processing-based accounts of such preferences in English see, e.g., Anderson 2004). At the same time, placing the preverbal scrambled object in contrastive focus overrides this preference, and makes the inverse scope reading more readily available, indeed preferred; we analyze this effect as focus-driven reconstruction of the scrambled object to its base position (cf. Neeleman & Weerman 2009). The fact that prosodic prominence (the Focus-one experiment) has the same effect as presence of a focus marker (the At-least experiment) indicates that we are dealing with the syntactic category of Contrastive Focus, rather than with a prosodic effect. Furthermore, the lack of a difference between the Baseline and RF experiments indicates that that topics behave the same regardless of whether they are prosodically marked: when the rise-fall contour establishes the scrambled object as the topic, rather than the contrastive focus, the object does not reconstruct. Our findings suggest that Russian differs from German (Krifka 1998, Bobaljik & Wurmbrand 2012); we will discuss possible reasons for this difference.

Selected references: **Anderson 2004**, The structure and real-time comprehension of quantifier scope ambiguity, PhD thesis, Northwestern. **Antonyuk 2006**, The scope of quantifier phrases in Russian: A QR analysis, *Linguistics in the Big Apple*. **Bobaljik & Wurmbrand 2012**, Word order and scope: Transparent interfaces and the ¾ signature, *LI* 43. **Ionin 2003**, The one girl who was kissed by every boy: Scope, scrambling and discourse function in Russian, *Proceedings of ConSole X*. **Krifka 1998**, Scope inversion under the rise-fall contour in German, *LI* 29.