One Reading for Every Word Order: Revisiting Russian Scope

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1. Introduction

1.1. Background: Russian quantifier scope

This paper examines whether double-quantifier sentences in Russian allow inverse scope, and how the factors of word order, prosody, and information structure contribute to the availability of inverse scope readings. Our focus is on sentences with one indefinite quantifier and one universal quantifier, as in (1), both SVO variants (1a,c) and OVS variants (1b,d). SVO is the basic word order in Russian, but scrambling is freely allowed (cf. Bailyn 1995). The surface-scope and inverse-scope readings of the sentences in (1) are spelled out in (2).

(1) a. Odna devočka pogladila každogo kotenka.
One-Nom girl-Nom stroked-Fem every-Acc kitten-Acc
"One girl stroked every kitten."

b. Každogo kotenka. pogladila odna devočka.
Every-Acc kitten-Acc stroked-Fem one-Nom girl-Nom
"Every kitten was stroked by one girl."

c. Každaja devočka pogladila odnogo kotenka.
Every-Nom girl-Nom stroked-Fem one-Acc kitten-Acc
"Every girl stroked one kitten."

d. Odnogo kotenka pogladila každaja devočka.
One-Acc kitten-Acc stroked-Fem every-Nom girl-Nom
"One kitten was stroked by every girl."

(2) a. paraphrase of surface-scope reading for (1a) = inverse-scope reading for (1b):
There exists one specific girl x, such that for every kitten y, x stroked y.

b. paraphrase of inverse-scope reading for (1a) = surface-scope reading for (1b):
For every kitten y, there exists one (potentially different) girl x, such that x stroked y.

c. paraphrase of surface-scope reading for (1c) = inverse-scope reading for (1d):
For every girl x, there exists one (potentially different) kitten y, such that x stroked y.

d. paraphrase of inverse-scope reading for (1c) = surface-scope reading for (1d):
There exists one specific kitten y, such that for every girl x, x stroked y.

There is disagreement in the literature about whether inverse-scope readings are available to sentences such as those in (1). Ionin (2003) argues that in emotively neutral sentences, with stress on the rightmost constituent (see Junghanns & Zybatow 1997), scope is frozen, so that only surface-scope readings are available for both SVO and OVS orders. Ionin explains frozen scope by appealing to information structure considerations. In emotively neutral sentences, the preverbal element is the topic

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(cf. King 1995), and Ionin argues that topics must be interpreted first: they cannot reconstruct, and no other element can undergo covert QR to a position above the topic. In SVO sentences (1a,c), the subject is the topic, while in OVS sentences (1b,d), the object is the topic. Ionin further suggests that inverse scope becomes available in the presence of contrastive focus (see also Neeleman & Titov 2009 on the relationship between contrastive focus and reconstruction in Russian).

Antonyuk (2006) disagrees with Ionin's judgments, and argues that inverse scope is freely available in Russian, just as in English, and is derived via covert QR (May 1997, Heim & Kratzer 1998). Neither Ionin nor Antonyuk assumes any differences between SVO and OVS orders in terms of inverse-scope availability. However, for other languages (German – e.g., Krifka 1998, and Japanese – e.g., Kuroda 1970), it has been argued that scope is frozen with canonical word order, but that both surface scope and inverse scope are available for scrambled word order (see also Bobaljik & Wurmbrand 2012).

1.2. Prior experimental investigations of quantifier scope in English and Russian

There has been much prior experimental work on quantifier scope in English (e.g., Ioup 1975, Kurtzman & MacDonald 1993, Tunstall 1998, Anderson 2004, among many others). In general, these studies have found that both surface-scope and inverse-scope readings are available, but the former are preferred, both offline and online. Anderson (2004) argues that the preference for surface scope is processing-based: inverse-scope readings involve longer-distance QR than surface-scope readings, and QR incurs a processing cost. In the case of Russian, our prior studies (Stoops & Ionin 2013; Ionin, Luchkina & Stoops 2014) have also found that that both surface-scope and inverse-scope readings are available, but surface-scope readings are preferred. This goes against Ionin's (2003) claim of frozen scope in Russian, and is consistent both with Antonyuk's (2006) claim that inverse scope is available in Russian, and with Anderson's (2004) claim that inverse scope incurs a processing cost, and is therefore dispreferred. In fact, in Ionin et al. (2014), we used the same experimental pictures to test scope readings in Russian and in English, and found very similar patterns of judgments in the two languages.[1]

However, a limitation of our prior studies is that the target sentences were presented in written form, and without any preceding context, so we had no control over either the prosody or the information-structure configuration that the research participants may have assigned to the sentences. According to Ionin (2003), scope is frozen only in sentences with a particular prosodic contour (emotively neutral, with no contrastive stress) and with a particular information-structure configuration (the preverbal element interpreted as a topic); in contrast, sentences in which one of the constituents is in contrastive focus are argued to allow inverse scope. The tie between prosody, information structure and scope is certainly not new: in the case of other languages, notably German and Japanese, researchers (e.g., Büring 1997, Krifka 1998, Bobaljik & Wurmbrand 2012, among others) have argued that a contrastive topic-focus configuration facilitates inverse scope. However, the effect of contrastive focus on Russian scope has not previously been investigated.

1.3. Research questions

We set out to investigate whether (and how) word order, prosody, and information structure affect the availability of inverse scope in Russian. We pose the research questions in (3).

(3) a. Is scope frozen in non-emotive sentences in Russian?
b. Is there any difference between SVO and OVS word orders in terms of (un)availability of inverse scope?
c. Does contrastive focus facilitate inverse scope?
d. Is a prosodic pattern consistent with contrastive focus *on its own* sufficient for facilitating inverse scope? Or does it facilitate inverse scope only in the appropriate information-structure configuration?

[1] See also Contras, Tsai, Mai & Polinsky (2014); in a study with auditory sentence presentation, Contras et al. found that native English speakers allow both surface-scope and inverse-scope readings, with a preference for the former, while native Mandarin Chinese speakers disallow inverse scope.

2. Methodology

We administered an auditory sentence-picture verification task (SPVT) to adult native Russian speakers. Each item in the SPVT consisted of a sentence (with or without preceding context) presented auditorily in the context of a picture. The sentences were read by a female native Russian speaker. Participants had to judge whether the sentence matched the picture by selecting either YES or NO. The SPVT was presented via the internet, using the survey gizmo tool. In designing the test materials, we crossed three within-subjects factors (word order, quantifier configuration, and picture type) with two between-subjects factors (prosody and presence/absence of context).

2.1. Within-subjects manipulations

The target sentences in the SPVT fell into four types, illustrated in (1) above. These four sentence types are a result of the crossing of two factors: word order (SVO, as in (1a,c) and OVS, as in (1b,d)) and quantifier configuration (indefinite subject with universal object, as in (1a,b), and universal subject with indefinite object, as in (1c,d)). Each sentence type was presented with two distinct picture types: the control picture, which (by entailment) made the sentence true on both surface-scope and inverse-scope readings; and the distributive test picture, which made the sentence true on one reading but not the other. The control picture for (1a,b) was a subject-oriented picture, in which a single girl strokes all the kittens (Figure 1). In the context of this picture, it is true that a single girl stroked all the kittens (surface-scope reading of (1a) and inverse-scope reading of (1b)) and, by entailment, it is also true that every kitten was stroked by a girl (inverse-scope reading of (1a) and surface-scope reading of (1b)). For (1c,d), the control picture was an object-oriented picture, in which a single kitten is stroked by all the girls (Figure 2); we leave verification of the truth-values as an exercise to the reader.

The same distributive test picture was used for all sentences in (1a-d); as shown in Figure 3, in the distributive picture, different girls are paired with different kittens. In the context of Figure 3, (1a) and (1d) are false on the surface-scope reading (it is false that a single girl strokes all the kittens, and it is false that a single kitten is stroked by all the girls) but true on the inverse-scope reading (it is true that every kitten is stroked by a girl, and it is true that every girl strokes a kitten). For (1b) and (1d), Figure 3 makes the sentences true on the surface-scope reading and false on the inverse-scope reading.

On the assumption that surface scope is always available, we expect to get acceptance of the sentence types in (1b,c) in the context of Figure 3. However, for (1a,d), acceptance in the context of Figure 3 would indicate availability of inverse scope, while rejection in the context of Figure 3 would indicate that inverse scope is either unavailable or strongly dispreferred.

Eight token sets were constructed; all items had the form in (1), with the numeral *odin* 'one' as the indefinite quantifier, and *každyj* 'every/each' as the universal quantifier. The lexical material was varied (girls stroking kittens, boys feeding birds, doctors treating patients, etc.). Two test lists were created, so that each sentence was presented only once within each list. For example, for the token set in (1), the sentences in (1a,c) were presented with control pictures in list1 and with the distributive picture in list2, while the opposite was the case for the sentences in (1b,d). Thus, each participant heard each sentence only once, with each sentence type represented by four tokens. Each list contained thus 32 target items (4 sentence types X 2 picture types X 4 tokens), as well as 32 fillers. The filler sentences contained either indefinite or universal quantifiers, but not both at once, and were not scopally ambiguous. The items within each list were blocked and randomized for order of presentation. Each list was preceded by two example items and two practice items.

2.2. Between-subjects manipulations

In order to test the effects of prosody and information structure, we created four distinct versions of the SPVT, each administered to a different group of participants. In the Baseline version, each sentence was presented in isolation, with neutral intonation (sentence stress on the rightmost constituent, and no contrastive stress). In the Emphasis version, each sentence was presented in isolation, with contrastive stress on the indefinite determiner (preverbal in (1a,d), postverbal in (1b,c)). In the Topic-context and the Focus-context versions, each sentence was preceded by a brief dialogue (recorded by two female

Russian speakers) that either established the preverbal element as the topic (in the Topic-context version), or established the indefinite as being in contrastive focus (in the Focus-context version). Participants were instructed that they were listening to a dialogue between two women, Anna and Vera, in which Anna is telling a story, and Vera is asking a question about the story. Sample stories are given in (4) and (5) below. In the Topic-context story in (4), Vera's question sets up a topic interpretation of *one girl* in Anna's response: the girls, rather than the kittens, are the subject of discussion. In the Focus-context in (5), Vera tries (unsuccessfully) to guess the outcome of the story; the contrastive-focus interpretation of *one girl* in Anna's response is ensured by a contrast with *all the girls* in Vera's question.

Figure 1: control subject-oriented picture for (1a,b)

Figure 2: control object-oriented picture for (1c,d)

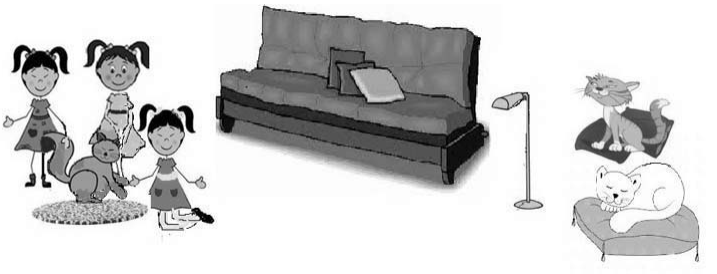
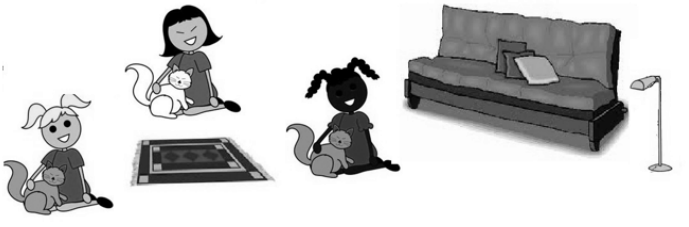


Figure 3: distributive test picture for (1a-d)



(4) Topic-context version:

Anna:	V	komnate	bylo	tri	kotenka.	Potom	zašli	tri	devočki.
	In	room	was	three	kittens	then	entered	three	girls
	"There were three kittens in the room. Then there entered three girls."								
Vera:	I	čto	že	èti	devočki	stali	delat'?		
	And	what	PART	these	girls	became	do-INF		
	And what did these girls do?"								
Anna:	Nu,	odna	devočka	pogladila	každogo	kotenka.			
	Well	one	girl	stroked	every	kitten			
	"Well, one girl stroked every kitten."								

(5) Focus-context version (capital letters indicate contrastive stress):

Anna:	V	komnate	bylo	tri	kotenka.	Potom	zašli	tri	devočki.
	In	room	was	three	kittens	then	entered	three	girls
	"There were three kittens in the room. Then there entered three girls."								

Vera: A dal'še? Navernoe, každogo kotenka pogladili VSE devočki?
And further probably every kitten stroked all girls
"And then? Probably, every kitten was stroked by ALL the girls?"
Anna: Net, chto ty, vsego ODNA devočka pogladila každogo kotenka.
No what you only one girl stroked every kitten
"Oh no, only ONE girl stroked every kitten."

The final sentence was recorded with maximally neutral intonation in (4) and with contrastive stress on *one* in (5). However, these sentences are not identical to the ones in the Baseline and Emphasis versions, which used sentences like (1a). In the Topic-context version, the target sentence from (1a) is preceded by *nu* 'well', which helps bring out the reading of the preverbal element as a topic. In the Focus-context version, *one* is modified by *vsego* 'only', to ensure a contrastive reading. We explore the possible effects of these additional words in Luchkina and Ionin (in prep.), where we also consider the exact prosodic contours of all sentences in more detail. In the present paper, we focus on the two manipulations of prosody (neutral in the Baseline and Topic-context versions, contrastive in the Emphasis and Focus-context versions) and context (absent in the Baseline and Emphasis versions, and present in the two context versions). We predict that if contrastive prosody facilitates inverse scope, we should get more YES responses to the sentence types in (1a,d) (which are false on the surface-scope and true on the inverse-scope reading) in the Emphasis and Focus-context surveys than in the other two surveys. We further expect that context may increase a preference for surface scope in the Topic-context survey (since the preverbal indefinite in (1a,d) is established as a topic), and facilitate inverse scope even more in the Focus-context survey (where context and prosody both point to a contrastive interpretation).

2.3. Participants

The participants in the study were adult native Russian speakers. Nearly all of the participants completed the study in Russia (or in one case, Belarus); some of the participants for the Baseline survey version were tested while traveling abroad, but Russia was still their permanent residence (several additional participants who had lived in the United States for several years were excluded from analysis, in case their Russian judgments were influenced by English). Three of the participants reported being born in Ukraine, one in Belarus, and one in Moldova, but all five reported Russian as their native language; the rest of the participants were born in Russia. Twenty-nine speakers completed the Baseline survey (13 for list1, 16 for list2), 30 completed the Emphasis version (15 per list), 28 completed the Topic-context version (14 per list), and 30 completed the Focus-context version (14 for list1, 16 for list2) (having an equal number of participants by version or list was not always feasible, due to the need to exclude some participants). Participants ranged in age from 18 to 54, with the mean age of 23. Participants were compensated monetarily for completing the surveys.

3. Results

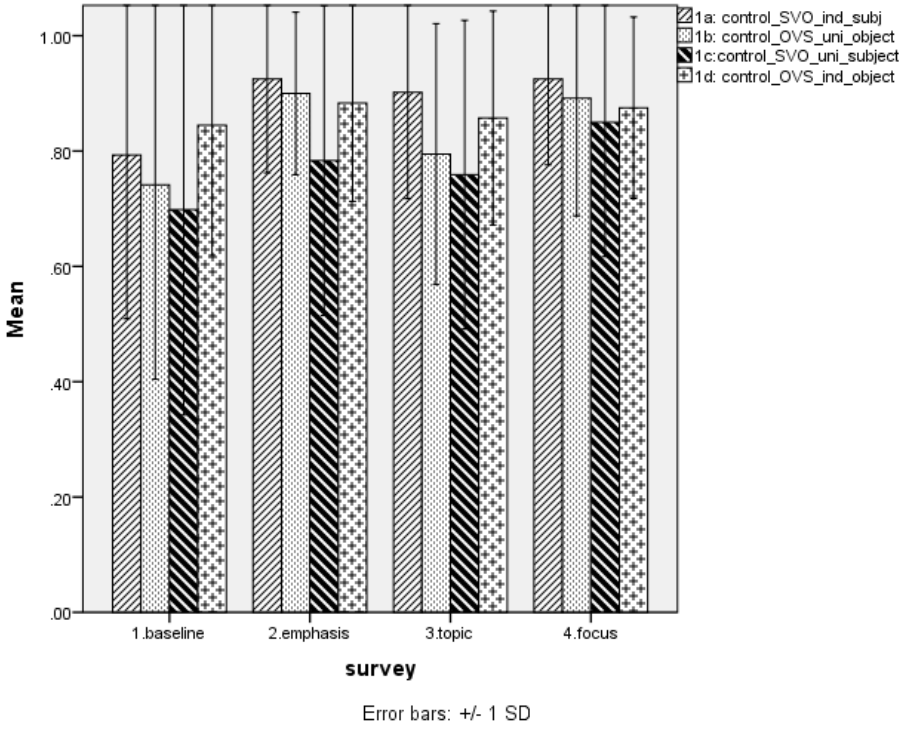
The results for the control pictures (Figures 1 and 2) are provided in Figure 4, for all four survey types. The results for the distributive test picture (Figure 3) are provided in Figure 5. Both figures report the percentage of YES responses; recall that YES and NO were the only response options.

As shown in Figure 4, the rate of YES responses with control pictures was quite high (around 80% of more) for all sentence types and in all four surveys, indicating that the participants were paying attention. The rates of YES responses are higher for sentence types that start with an indefinite (1a,d) than for those that start with a universal (1b,c); this is not surprising: when participants encounter a sentence starting with *každyj* 'every', they may prefer a distributive interpretation, on which every girl strokes a different kitten (1c) or every kitten is stroked by a different girl (1b). In contrast, for the sentences starting with an indefinite, the pictures with a specific girl doing the stroking (Figure 1) or a specific kitten being stroked (Figure 2) are a perfect match for (1b) and (1c), respectively.

We turn now to Figure 5, where several patterns are immediately clear. First, the rates of YES responses are much higher for the sentence types that, in the context of Figure 3, are true on the surface-scope reading (1b,c) than for those that are true on the inverse-scope reading but false on the surface-

scope reading (1a,d). Second, this difference is more pronounced in the surveys with neutral prosody (Baseline and Topic-context) than in those with contrastive prosody (Emphasis and Focus-context). Third, the effect of prosody on (1a,d) is much stronger for the OVS (1d) than for the SVO (1a) variant.

Figure 4: Performance in the control conditions (Figure 1 for (1a,b), Figure 2 for (1c,d)): %YES responses, by survey type



The data for the distributive condition were analyzed using a binary logistic regression. We introduced the following fixed effects: quantifier configuration (indefinite subject vs. universal subject), word order (SVO vs. OVS), prosody (neutral vs. contrastive), context (present, as in Topic-context and Focus-context surveys, or absent, as in the other two surveys) [2], and list (1 vs. 2). The following fixed effect combinations were introduced as interaction terms: *quantifier configuration * word order*, *quantifier configuration * prosody*, *word order * prosody*, and *word order * quantifier configuration * prosody*.[3] Participants (N=117), items (N=32) and survey versions (N=4) were introduced as random effects. The model was fit in the R software package (R Development Core Team 2012) using the *lmer()* function of the *lme4* package (Bates, Maechler & Dai 2008). The model output is provided in Table 1: as shown, word order, quantifier configuration, and prosody each had a significant effect on the results, but context and list did not.

As shown in Table 1, the strongest interaction effect came from the *quantifier configuration * word order* interaction, as expected given the relationship between scope readings and word order. As shown in Figure 5, YES responses were more frequent for SVO than for OVS word order when the universal is in subject position (in this configuration, SVO sentences are true on the surface-scope reading while OVS sentences are false (see (1c-d)), but more frequent for OVS than SVO word order when the

[2] Note that the context in the Topic-context and Focus surveys is not identical (see (4) vs. (5)). Therefore, two binary logit models were implemented, one with context (2 levels: present vs. absent) and the other with information structure (3 levels: topic vs. focus vs. undefined) as factors. The models were then tested in R for differences in their explanatory quality and fit to the data. This analysis revealed no significant difference between the two models (chi sq. =1.08, p>0.3). Therefore, we report the output of the model that has context as a factor.

[3] A separate regression model with the interaction terms *context * word order* and *context * prosody* was tested, but the interaction terms with context did not reach significance. Therefore, for the sake of parsimony, interactions featuring context were excluded from the final regression model.

indefinite is in subject position (in this configuration, SVO sentences are false on the surface-scope reading, while OVS sentences are true (see (1a-b)).

Figure 5: Performance in the distributive condition (Figure 3): %YES responses, by survey type

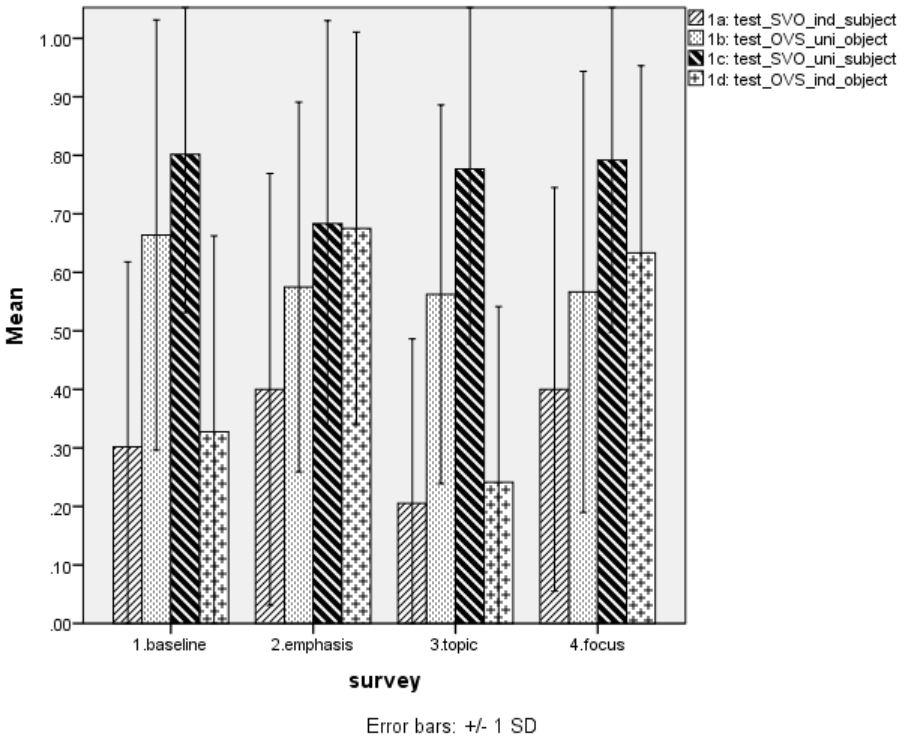


Table 1. Fixed effect estimates (top) and Variance Estimates (bottom) for Binary Logit Model of YES Responses (N=1872, log-likelihood: --991.1)[4]

Fixed Effects	**Coefficient**	**SE**	**Wald z**	**p-value**
intercept	-1.426	0.359	-3.977	<.001*
word order	2.135	0.274	7.789	<.001*
quantifier configuration	3.302	0.302	10.944	<.001*
prosody	0.894	0.365	2.447	0.014*
context	-0.236	0.304	-0.778	0.437
list	0.106	0.313	0.338	0.735
quantifier config.* word order	-5.226	0.421	-12.414	<.001*
quantifier config.* prosody	-1.270	0.362	-3.513	<.001*
word order * prosody	-1.155	0.330	-3.502	<.001*
quantifier config. * word order * prosody	3.692	0.499	7.394	<.001*
Random Effects	**Variance**	**SD**		
subject	2.258	1.503		
item	0.055	0.235		
survey version	0.000	0.007		

[4] In Tables 1 and 2, significant p-values (below the alpha level of .05) are marked by an asterisk.

We now consider the role of prosody. Prosody had a significant main effect (more YES were elicited in the two surveys with contrastive prosody than the two versions with neutral prosody), and also interacted significantly with both quantifier configuration and word order. In fact, the three-way *quantifier configuration * word order * prosody* interaction was the second strongest interaction effect in the model. In order to explore this interaction (and the *quantifier configuration * prosody*, and *word order * prosody* interactions), we examined the results of pairwise comparisons, reported in Table 2. Consider first rows 1 through 4, which examine the effect of prosody when both word order and quantifier configuration are held constant; we see that prosody affects only one of the four sentence types, the one in (1d) (row 4 of Table 2). When an OVS sentence is false on the surface-scope and true on the inverse-scope reading, contrastive prosody raises the proportion of YES responses significantly, i.e., it facilitates the inverse-scope reading. Interestingly, however, prosody has no such effect on SVO sentences that are false on the surface-scope reading ((1a), row 1 of Table 2), indicating that contrastive prosody does not facilitate inverse scope for SVO sentences. Not surprisingly, sentences that are true on the surface-scope reading are not affected by prosody (rows 2 and 3): the proportion of YES responses remains constant regardless of prosody, indicating that the surface-scope reading is always available.

Turning to the next four rows of Table 2, we examine the effects of word order when both quantifier configuration and prosody are held constant. We see that for sentences that have an indefinite in subject position (1a-b), word order has a significant effect both with neutral prosody (row 5) and contrastive prosody (row 6): OVS sentences (true on surface scope) are always accepted more than SVO sentences (false on surface scope), regardless of prosody. In contrast, for sentences with a universal in subject position (1c-d), word order has an effect with neutral prosody (row 7) but not with contrastive prosody (row 8): with contrastive prosody, OVS sentences (false on surface scope) are accepted just as much as SVO sentences (true on surface scope), once again indicating that contrastive focus facilitates inverse scope for OVS sentences.

Table 2. Results of pairwise comparisons for quantifier configuration * word order * prosody interaction

	pairwise comparison	coefficient	SE	Wald z	p-value
1	SVO, indefinite subject (1a), with neutral vs. contrastive prosody	-0.894	0.365	-2.447	0.219
2	OVS, universal object (1b), with neutral vs. contrastive prosody	0.261	0.357	0.732	0.996
3	SVO, universal subject (1c), with neutral vs. contrastive prosody	0.376	0.381	0.988	0.976
4	OVS, indefinite object (1d), with neutral vs. contrastive prosody	-2.161	0.367	-5.886	<.001*
5	indefinite in subject position: SVO vs. OVS, (1a) vs. (1b), neutral prosody	-2.135	0.274	-7.789	<.001*
6	indefinite in subject position: SVO vs. OVS, (1a) vs. (1b), contrastive prosody	-0.980	0.250	-3.921	0.002*
7	universal in subject position: SVO vs. OVS, (1c) vs. (1d), neutral prosody	3.091	0.297	10.411	<.001*
8	universal in subject position: SVO vs. OVS, (1c) vs. (1d), contrastive prosody	0.554	0.261	2.120	0.402
9	SVO: indefinite vs. universal as subject, (1a) vs. (1c), neutral prosody	-3.301	0.302	-10.944	<.001*
10	SVO: indefinite vs. universal as subject, (1a) vs. (1c), contrastive prosody	-2.031	0.266	-7.628	<.001*
11	OVS: indefinite vs. universal as subject, (1b) vs. (1d), neutral prosody	1.925	0.269	7.144	<.001*
12	OVS: indefinite vs. universal as subject,, (1b) vs. (1d), contrastive prosody	-0.498	0.251	-1.985	0.492

Finally, we turn to the last four rows of Table 2, which test the effect of quantifier configuration when both word order and prosody are kept constant. We see the same pattern as before: for SVO sentences, sentences that true on the surface-scope reading (1c) are accepted more than those that are false on the surface-scope reading (1a), regardless of prosody (rows 9 and 10). In contrast, for OVS sentences, sentences that are true on surface scope (1b) are accepted more than those that are false on surface scope (1d) only with neutral prosody (row 11), but this difference disappears with contrastive prosody (row 12).

To sum up, we find a strong, and statistically significant, preference for the surface-scope reading with neutral prosody, for both SVO and OVS word orders, in both quantifier configurations. Introduction of contrastive prosody on the indefinite determiner facilitates the inverse-scope reading of OVS sentences, but not of SVO sentences: numerically, we do see an effect of contrastive prosody for both word orders, but it reaches significance only for OVS order.

4. Discussion

We now revisit our research questions in (3). With regard to (3a), we do find evidence that in non-emotive sentences (sentences with neutral prosody), scope is frozen: sentences that are true on the surface-scope reading are accepted between 50% and 80% of the time, while sentences that are true on the inverse-scope but false on the surface-scope reading are accepted only 20-30% of the time (see Figure 2). It is possible that the 20-30% acceptance rate indicates that inverse scope is available, but strongly dispreferred for processing reasons (cf. Anderson 2004); alternatively, this acceptance rate may be noise. Our findings cannot disentangle these two possibilities. Our findings are consistent with Ionin's (2003) proposal that non-emotive sentences have the preverbal element in Topic position, and that this topic must be interpreted first (alternatively, there is a strong preference for interpreting the topic first). The fact that we find no difference between the Baseline and Topic-context surveys suggests that the preverbal element is considered a topic by default.

Turning to questions (3b) and (3c), we see that there is no difference between SVO and OVS word orders when prosody is neutral, but that contrastive prosody facilitates the inverse-scope reading only for OVS and not for SVO sentences. This is an interesting new finding, which suggests that contrastive prosody facilitates scope reconstruction of the scrambled object in OVS sentences, but not scope reconstruction of the preverbal subject in SVO sentences. It is not clear at present why this should be the case. An asymmetry between canonical and scrambled word orders has previously been noted for other languages, including Japanese and German (see Bobaljik & Wurmbrand 2012 for an overview of the facts). However, for these languages, it has been argued that scrambled word order allows inverse scope even with neutral intonation, whereas canonical word order requires a rise-fall intonational contour for inverse scope (Krifka 1998, among others). This is not what we find for Russian, and our findings do not fully align with Bobaljik and Wurmbrand's (2012) proposal.

Finally, with regard to the question in (3d), we see that context has no effect on the results: participants interpreted sentences with neutral prosody in the same manner regardless of whether they were presented in isolation (Baseline survey) or in a context that set up the preverbal NP as a topic (Topic-context survey). Sentences with contrastive prosody on the indefinite were interpreted the same regardless of whether they were presented in isolation (Emphasis survey) or in a context that placed the indefinite in focus (Focus-context survey). This suggests that speakers recover information structure from prosody: a sentence with neutral intonation is interpreted as having a sentence-initial topic, while contrastive stress on the indefinite automatically leads to a contrastive-focus interpretation. Methodologically, this means that it is not necessary to introduce context in order to test the effects of contrastive prosody.

5. Conclusion and plans for further research

The findings in this paper suggest that Russian speakers have a strong preference for surface-scope readings of non-emotive double-quantifier sentences, and that contrastive focus facilitates the inverse-scope reading of scrambled OVS sentences, but not of canonical SVO sentences. In future research, we

plan to examine whether contrastive focus facilitates inverse scope for other quantifiers, including universal quantifiers and higher numerals; it is important to show that our results are generalizable beyond the indefinite *odin* 'one', which has been argued to be a specificity marker in Russian (Haspelmath 1997, Ionin 2013). We are also examining whether introducing the focus particle *po krajnej mere* ('at least') has the same effect of facilitating inverse scope as contrastive prosody. In order to allow for a direct comparison between Russian and what has been previously claimed for German (e.g., Krifka 1998, Bobaljik & Wurmbrand 2012), we are also examining the effect of the rise-fall contour on scope interpretation in Russian. Finally, we are administering the Baseline and Emphasis surveys, with materials translated into English, to native English speakers, in order to allow for a cross-linguistic comparison on the relationship between scope and prosody. In the future, we hope to use the same materials with another language that allows scrambling, such as German.

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