Relative Scope and Givenness of Focused Arguments in a Free Word Order Language*

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1. Introduction

It is well known that constituent order and prosody are important factors in determining scope-type relationships cross-linguistically. This paper reports on an experiment designed with the goal of investigating the relationship among (i) free constituent order, (ii) Givenness, and (iii) domain-restriction relationships in Serbian.

The major hypothesis to be tested is that the relationship between Serbian “free” constituent order and scope-type relationships resulting from it are mediated by the Quantification structure (see e.g. Heim 1982, Diesing 1992), as put forward for Serbian in Predolac (forthcoming). In particular, the set of principles that drive Serbian surface constituent fronting is claimed to be related to the notion of domain restriction (in the sense of von Fintel 1994 and Roberts 1995, among others). In the absence of a better term, the term domain-restriction relative scope (DR relative scope) is used hereafter to refer to the structural relationships among distinct partitions of the following version of the Quantification structure:

\[
\text{Operator} | [\text{restriction clause (recursive)}] […] […] | \text{nuclear scope}.
\]

The study concentrates on the F-marked arguments (subjects and objects) of simple transitive sentences, in which S, V and O occur in each of the six possible orders.

An additional question of the study is whether the relationships observed when both arguments are F-marked (in the sense of Selkirk 1995) would change due to one of these arguments being GIVEN (as defined in Schwarzschild 1999). Namely, while GIVENNESS is known to affect semantic relative scope relationships, Predolac (forthcoming) argues that the effects of constituent order variation, such as the established domain restriction patterns, are still preserved independently of changes in GIVENNESS. The existing studies of Serbian “free” constituent order and its relationship with information structure either do not address these issues systematically (Godjevac 2000, 2006), or are concerned exclusively with quantifier scope (Godjevac 2003).

Two cases are thus addressed in the study: (i) the case where both arguments (S, O) are F-marked, that is, where neither argument is GIVEN; and (ii) the case where one of the arguments is GIVEN, and the other argument is not GIVEN.

The experiment reveals the effects of Serbian word order variation without relying on truth-conditional differences and truth-value judgments. Rather, it relies on felicity judgments for simple transitive target sentences (whose word order varies), when these sentences are used as continuations (1b,c) within contexts (1a), as in the example below:

(1) a. While in Europe almost every man knows several top soccer players, in America…

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1 The symbol “|” stands for a boundary between partitions in the Quantification Structure. Note that the assumed Quantification Structure may contain a recursive restriction clause, which then consists of multiple partitions (as in Diesing 1992, for example).
b. ...čak i najveći ljubitelji sporta znaju samo Bekama. SVO
   even part. biggest fans of-sports know only Beckham

c. #...samo Bekama znaju | čak i najveći ljubitelji sporta. OVS
   only Beckham know even part. biggest fans of-sports
   intended: “…even the biggest fans of sports know only about Beckham.”

While the restriction clause of (1b) is suitable within the context of (1a), the restriction clause of (1c) is not, as reflected in different felicity judgments.

2. Hypothesis

The main hypothesis to be tested experimentally is that the linear precedence corresponds to wider DR relative scope among F-marked arguments in the Quantification Structure, all else being equal, as formulated in (2). Again, note that the relevant notion of DR relative scope is related to domain restriction, and does not necessarily correlate with the notion of semantic relative scope:

(2) \([\text{arg}_i^F]\) takes wider DR scope over \([\text{arg}_j^F]\) \(\rightarrow\) \([\text{arg}_i^F]\) precedes \([\text{arg}_j^F]\)

The main goal is thus to answer the question of whether the assumed relationship between the restriction clause and the nuclear scope in the Quantification Structure, on the one hand, as well as the relationship among different partitions within the restriction clause on the other hand, are reflected in the pragmatics of Serbian constituent order data or not. For example, the assumed version of the Quantification Structure predicts that constituent orders \([\text{arg}_i^V || \text{arg}_j]\) and \([\text{arg}_j^V || \text{arg}_i]\) would be compatible with different types of contexts, since the distribution of arguments \((\text{arg}_i\) and \(\text{arg}_j)\) within the restriction clause and the nuclear scope is not identical. Moreover, constituent orders \([\text{arg}_i, \text{arg}_j || V] \) and \([\text{arg}_j, \text{arg}_i || V]\) are also predicted to be pragmatically distinct from one another, since the arguments in the restriction clause are not organized in the same way. In the former case, \(\text{arg}_j\) further restricts the domain of the common ground already restricted by \(\text{arg}_i\); in the latter case, it is the other way around. It is exactly this type of relationships that the term DR relative scope in the hypothesis refers to.

As already said, an additional question is whether GIVENNESS could somehow affect the hypothesized relationship from (2). One experimental case was constructed so as to make one of the arguments of the target sentence GIVEN, by minimally modifying the contexts.\(^2\)

Importantly, note that the hypothesis does not refer to presuppositionality of elements. The reason for this is that all elements (S, V, O) in the experimental data were used in their non-existential readings, and the pragmatic effects of relative scope were expected to show independently. If an argument is sentence initial (e.g. O in OVS and OSV), it is predicted to be in the restriction clause of the Quantification Structure (i.e. \(OV||S\) and \(OS||V\)). If an argument is post-verbal (e.g. O in SVO and VSO), it is predicted to be in the nuclear scope of the Quantification Structure. If both arguments are preverbal (as in SOV and OSV), the prediction is that they would both be in the restriction clause, but that at the same time, their different relative order in the restriction clause (i.e. \(S||O||V\) and \(O||S||V\)) would have result in pragmatic differences. In V-initial cases (VSO and VOS), only the final argument is predicted to be in the nuclear scope, while the other argument could be either in the restriction clause or in the nuclear scope.

3. Methodology

3.1. Participants

The participants were 240 adult speakers of Standard Serbian, of whom 220 were randomly selected undergraduate students at two Serbian universities (University of Belgrade and University of Novi Sad), and the rest (20) were randomly selected adult speakers outside of academia.

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\(^2\) Only the wide-scope argument was varied with respect to its GIVENNESS status in this way.
3.2. Materials

The experiment was based on Serbian simple transitive sentences, in which S (=subject), V (=verb) and O (=object) occurred in all six possible orders (i.e. SVO, SOV, VSO, VOS, OVS, OSV). The two arguments of such sentences (S, O) were used with “focusing” adverbs čak i and samo, which only roughly correspond to English even and only, respectively. This was done to ensure the F-marking on the relevant NPs in the default case, i.e. the case where neither argument is GIVEN. The verb is always kept GIVEN in the target sentences across all stimuli.

Target sentences always occurred as an utterance within a brief context. A combination of a particular context and a particular target sentence represented a single stimulus. The participants were asked to evaluate the acceptability of the target (=underlined) sentence relative to its context on a scale from 1 to 5:

(3) A sample stimulus

Context: "Among land animals, elephants are extraordinary in how much load they can carry.”

Target sentence: Samo slonovi čak i velika stabla.
only elephants carry even part. big logs
“Even big logs, elephants can carry; it is only elephants that can do it (among animals).”

There were 1440 stimuli in total. These were created out of 120 randomly selected unrelated scenarios on which contexts were based. First, two minimally different contexts were derived from each scenario in order to vary GIVENNESS of one of the arguments in the target sentence. The total number of contexts was thus 240. Next, each of the 240 contexts (such as the one given in 3) was “run through” all six word-order variants of their corresponding target sentence (i.e. SVO, SOV, VSO, VOS, OVS, OSV).

3.3. Experimental design

The experimental design was a repeated-measures ANOVA, done in two separate analyses:

i. Analysis by participants
ii. Analysis by stimuli

The following table provides an overview of the experimental variables:

(4)

<table>
<thead>
<tr>
<th>Dependent variable: Acceptability ratings</th>
<th>Independent variable 1: DR relative scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>- values: numbers between 1 and 5</td>
<td>- values: S &gt; O and O &gt; S</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent variable 2: GIVENNESS of the wide-scope argument</th>
<th>Independent variable 3: Word order</th>
</tr>
</thead>
<tbody>
<tr>
<td>- grouping variable across participants, but repeated across stimuli;</td>
<td>- repeated variable in both analyses;</td>
</tr>
<tr>
<td>- values: DG (=GIVEN) and DNG (=not-GIVEN)</td>
<td>- values: SVO, SOV, VSO, VOS, OVS, OSV</td>
</tr>
</tbody>
</table>

Random variables: Participants and Stimuli

Dependent variable: Acceptability ratings

The participants’ evaluations on the scale from 1 to 5 (more precisely, averages across them) served as the dependent variable.

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3 Note that Serbian čak i is not the exact equivalent of English even, since Serbian čak i corresponds only to the so-called ordinary even of English. Namely, Serbian čak i does not have the negative polarity usage that English even has (see Rullmann 1997).

4 As done, for example, in Wagner (2008).
Independent variable 1: DR relative scope

The scenarios were set as to force a particular DR relative scope between these arguments: either S > O, or O > S, which were the two levels of the DR relative scope variable. In other words, there was only one pragmatically felicitous way for participants to set the DR relative scope between the two arguments in the target sentence in a given context. For an illustration, for the already seen sample stimulus in (3), there is exactly one felicitous way to set the relative scope between “(only) elephants” and “(even) big logs” in the target sentence with respect to the given context, and it is the one where the former takes scope over the latter (S > O; 5a). The meaning of the other DR scope possibility (O > S) for the target sentence is paraphrased in (5b), and this one is incompatible with the given context in (3):

(5) a. Only for elephants (we can say that), they carry even the big logs.
   b. Even for big logs (we can say that), only elephants carry them.

Paraphrases (5a) and (5b) differ with respect to what is taken to be in the restriction clause, and what is in the nuclear scope. Scenarios were chosen in such a way that only some types of domain restriction patterns were natural for target sentence continuations. The speakers were thus guided toward a particular DR scope relationship between the two arguments in each of the contexts.

As already mentioned, all contexts were based on 120 unrelated scenarios. These scenarios were divided into 4 groups, as shown in (6):

(6)    S > O            O > S
       ┌───────────────┐     ┌───────────────┐
       │ Sčak-i/Osamo  │ Sčak-i/Osamo  │ O > S
       └───────────────┘     └───────────────┘

Group 1 (30)                                                    Group 2 (30)

As can be seen in (6), the main division among scenarios was made across two levels of the DR relative scope variable (S > O and O > S). Each group contained 60 scenarios. In order to create scenarios as natural as possible, two distinct focusing adverbs (i.e. čak i ="even" and samo ="only") were used. Consequently, it was necessary to control for a potential unwanted effect that the usage of two distinct focusing adverbs could cause. A further division was thus made within each of these two groups, and it was based on which of the two focus operators (i.e. čak i ="even" or samo ="only") was used with a particular argument (S or O): Sčak-i/Osamo or Ssamo/Očak-i.

Independent variable 2: GIVENNESS of the wide-scope argument

Givenness of one of the arguments (=the wide-scope argument) was included in the design as an independent variable. The variable had two levels: Wide-scope-argument-GIVEN (=DG) and wide-scope-argument-not-GIVEN (=DNG). At the same time, the verb was invariably GIVEN in the previous context, while the narrow-scope argument was kept as non-GIVEN (i.e. it was F-marked).

While GIVENNESS of the wide-scope argument was a repeated variable across stimuli, it was a grouping (=non-repeated) variable across participants. Each participant saw only contexts with a single value of the GIVENNESS of wide-scope argument variable (=either DG or DNG), in addition to only a single value of the scope variable (=either S > O or O > S).

Independent variable 3: Word order

As already mentioned, the target sentences were simple transitive sentences in each of the six possible word orders: SVO, SOV, VSO, VOS, OVS, OSV. Each of the 240 contexts was “run through” all six word-order variants of its corresponding target sentence. I give the final chart with the distribution of stimuli in (7):

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5 Making “GIVENNESS of the wide-scope argument” a repeated variable across participants would require 240 unrelated scenarios (twice as many), which would have made the already challenging task of context creation practically unmanageable for a single researcher.
Word order was a repeated measure both in the analysis across stimuli (i.e. each context appeared with all six possible word orders in the target sentence), as well as in the analysis across participants (since each participant saw all six word orders). Nevertheless, the experiment was designed in such a way that no participant saw the same scenario twice. Moreover, whenever two different participant subgroups saw the same context, they saw it together with target sentences whose word orders were different. In other words, no stimulus was repeated across participant subgroups. This was achieved by the usage of a 6x6 Latin square in the experimental design ([6 word orders] x [6 participant subgroups]). There was 24 participant subgroups (i.e. 1A, 1B,…2A, 2B,…4E, 4F), where each subgroup consisted of 10 participants:

3.4. Procedure

At 10 experimental sessions, which lasted up to 30 minutes, participants were given questionnaires. Each questionnaire consisted of 60 stimuli, i.e. context + target sentence combinations. The questionnaires were made with two different random orders among contexts for each of the participant subgroups (i.e. 1A.order1, 1A.order2, 1B.order1, 1B.order2,…4F.order1, 4F.order2). Participants were asked to read each short excerpt of text carefully and evaluate the acceptability of the underlined target sentence that occurred at the end of each excerpt. A scale from 1 to 5 (where “5” = ”perfectly natural/acceptable”) was used, and the participant was asked to circle a number on it for each stimulus.
4. Results

4.1. Analysis by participants

i. SO*WO: The two-way interaction between DR relative scope (=SO) and word order (=WO) was significant: F(5, 1180) = 88.44, p<0.05.

ii. SO*GivennessD: The two-way interaction between DR relative scope (=SO) and GIVENNESS of the wide-scope argument was not significant: F(1, 236) = 0.05, p>0.05.

iii. GivennessD*WO: The two-way interaction between GIVENNESS of the wide-scope argument and word order was marginally significant: F(5, 1180) = 2.23, p=0.0496 < 0.05.

iv. SO*GivennessD*WO: The three-way interaction between DR relative scope, GIVENNESS of the wide-scope argument and word order was significant: F(5, 1180) = 4.44, p < 0.05. The relevant charts are given in (9a,b):

(9) SO*GivennessD*WO charts by participants:

a. 

b. 

v. Tukey post-hoc comparisons by participants (selection):

For S > O and DNG:
- SVO and SOV not significantly different (p>0.05);
- OVS and OSV not significantly different (p>0.05);
- SVO, SOV each significantly better than OVS, OSV, VSO, VOS (p<0.05).

For O > S and DNG:
- SVO and SOV not significantly different (p>0.05);
- OVS and OSV not significantly different (p>0.05);
- OVS, OSV each significantly better than SVO, SOV, VSO, VOS (p<0.05).

For S > O and DG:
- SVO significantly better than SOV (p<0.05);
- OVS and OSV not significantly different (p>0.05);
- SVO significantly better than both OVS and OSV (p<0.05);

For O > S and DG:
- SVO, OVS and OSV not significantly different (p>0.05);
- SVO, OVS and OSV each significantly better than SOV, VSO, VOS (p<0.05).
4.2. Analysis by stimuli

i. SO*WO: The two-way interaction between DR relative scope (=SO) and word order (=WO) was significant: F(5, 590) = 66.395, p<0.05.

ii. SO*GivennessD: The two-way interaction between DR relative scope (=SO) and GIVENNESS of the wide-scope argument was not significant: F(1, 236) = 0.05, p>0.05.

iii. GivennessD*WO: The two-way interaction between GIVENNESS of the wide-scope argument and Word order was significant: F(5, 590) = 2.823, p=0.0157 < 0.05.

iv. SO*GivennessD*WO: The three-way interaction between DR relative scope, GIVENNESS of the wide-scope argument and word order was significant: F(5, 590) = 5.871, p < 0.05.

v. Tukey post-hoc comparisons by stimuli: identical to (v) in the analysis by participants.

5. Discussion

The main experimental result is that there is a significant three-way interaction among DR relative scope, GIVENNESS of the wide-scope argument, and Word order (compare the charts for SO*GivennessD*WO given in 9a-b). This means that the effect of each of these three factors on the acceptability of target sentences is dependable on the values of the other two factors.

The major case that the experiment tested was the one that involved two F-marked (=not GIVEN) arguments. This corresponds to the case when the wide-scope argument was not GIVEN (=DNG). I discuss the results for the DNG and DG cases below separately, starting with the DNG case.

5.1. Interaction SO*WO, where DNG

Let us briefly recall our predictions. If an argument was sentence initial, we predicted that it would be in the restriction clause of the Quantification structure. If an argument was post-verbal in our examples, we predicted that it would be in the nuclear scope of the Quantification structure. If both arguments were preverbal, we predicted that they would both be in the restriction clause, but at the same time, that their different relative order in the restriction clause would have different pragmatic effects.

These predictions are borne out by the experimental results. The main charts from both analyses are provided in (10a-b) below:

(10) Results (neither of the two arguments is GIVEN)

a. Analysis by participants

b. Analysis by stimuli
As can be seen in (10a-b), the two DR relative scope (SO) lines are mirror images of one another. Crucially, when the DR relative scope value was $S > O$, the subject-initial word orders (SVO, SOV) were rated as significantly more acceptable by participants than non-subject-initial word orders (VSO, VOS, OVS, OSV). On the other hand, when the DR relative scope value was $O > S$, the object-initial word orders (OVS, OSV) were rated as significantly more acceptable by participants than non-object-initial word orders.

However, the findings also suggest that what matters for felicity of our target sentences was not merely the relative ordering (=precedence) between the two arguments, but rather whether the wide-scope argument was sentence-initial or not. Namely, V-initial sentences were consistently judged as significantly less acceptable by participants than the sentences in which the wide-scope argument was initial, regardless of what the relative ordering between the two arguments was. Moreover, there was no statistically significant difference in acceptability between the two V-initial orders (VSO and VOS) for either value of the DR relative scope variable. What such a finding with respect to V-initial word orders suggests is that these orders have a special information structure. It is quite reasonable to assume that V-initial orders require specific contexts, different from the ones used in the experiment, as claimed in Predolac (forthcoming). Note that the verb was always GIVEN, and easy to accommodate as presuppositional. Its fronting in the given contexts nevertheless resulted in infelicity.

Crucially, a sentence with the initial wide-scope argument is significantly more acceptable to speakers of standard Serbian than the corresponding sentence in which the wide-scope argument is not sentence-initial. I conclude that this is an effect that is predicted by the Quantification Structure. Namely, neglecting V-initial cases, given how we linked the constituent orders of Serbian monotransitive sentences with the Quantification Structure, the two arguments were always in two distinct partitions of the Quantification Structure. If arg$_i$ was initial, then arg$_i$ was in the restriction clause, and the argument arg$_j$ was necessarily in a structurally lower partition than arg$_i$. Whether argument arg$_j$ was also in the restriction clause or not, arg$_j$ had a narrow DR relative scope with respect to the arg$_i$. This DR relative scope distinction in the Quantification Structure had consistent pragmatic effects.

5.2. Interaction SO*WO, where DG

Does making the wide-scope argument GIVEN (=DG) affect the observed relationship between DR relative scope and word order? The answer is yes, but the exact way in which GIVENNESS of arguments matters for the relevant relationship cannot be determined based on our, in this respect, insufficient experimental data.6

Two main differences in the results, compared to the DNG case are summarized in (12a,b), and the relevant diagrams are provided in (13a,b):

\[
(12) \quad \begin{align*}
\text{a. In } O > S \text{ case, O-GIVEN, the acceptability of the SVO order is not significantly different from those of O-initial orders, Namely, it seems that suddenly not two, but as many as three orders (OVS, OSV, SVO!) become more acceptable than the rest (SOV, VSO, VOS).} \\
\text{b. In } S > O \text{ case, S-GIVEN, OVS and OSV are significantly less acceptable than the S-initial orders.}
\end{align*}
\]

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6 Recall that GIVENNESS was of secondary importance in our experiment. Due to technical constraints, the experiment did not include the cases where the narrow-scope argument is GIVEN. This is thus left for future investigation.
(13) *Results (the wide-scope argument is GIVEN)*

a. Analysis by participants

The difference in (12a) is puzzling. It suggests that the GIVEN object (O) can apparently be understood as participating in the domain restriction, taking the wide DR scope from its base position with respect to the non-GIVEN subject (S). However, (12b) suggests that a similar result is not obtained with the GIVEN final subject argument (in OVS) that is GIVEN, in which case the subject does not seem to be able to participate in domain restriction and "outscope" the object. This is a less surprising finding, since the final subject (whether GIVEN or not) is not in the restriction clause of the Quantification Structure, and it thus does not play a role in domain restriction. Due to insufficient data, I leave the exact interpretation of the results in (12a,b) for future research.

6. Conclusion

The experimental results in the case of F-marked arguments confirm that the pragmatic effects of constituent order variation in Serbian can be explained by the notion of DR relative scope, as defined on the Quantification Structure. DR relative scope can thus be understood as a predictor of constituent order for a given sentence. This is compatible with our hypothesis that the Quantification Structure drives the constituent order variation in Serbian by being the mediator between domain restriction and constituent order.

Furthermore, the experimental results suggest that the verb-initial orders are pragmatically special when compared to non-V-initial orders.

Finally, as expected, GIVENNESS of the wide-scope subjects that follow objects, as in OVS, does not affect felicity of OVS orders. This might suggest that GIVENNESS does not change anything in the established regular all-F-marked DR relative scope patterns. However, the experimental findings are different for SVO cases, since it turned out that making the wide-scope object GIVEN can improve felicity judgments for the SVO order from dispreferred (when the object is F-marked) to more acceptable (when the object is GIVEN). We thus have to remain cautious with respect to whether GIVENNESS of an argument (in the sense of Schwarzschild 1999) can have an effect on the observed relationship between the Quantification Structure and constituent order, or not. Due to the lack of the whole paradigm (in which we would have a possibility of having the narrow scope arguments as GIVEN as well), resolving of this issue experimentally is left for further research.
References