

## Prosodic marking of givenness in Czech

### 1 Outline

- (1) a. *What happened?*  
 Marie viděla Pavla.  
 Mary saw Pavel.acc
- b. *What about Pavel?*  
 Pavla viděla Marie.  
 Pavel.acc saw Mary

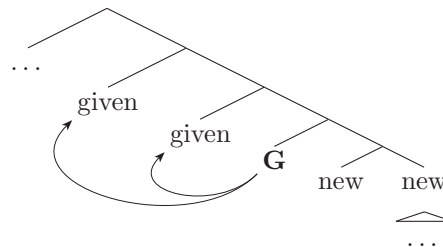
It is a common observation that different word order options in Czech are influenced by information structure (IS). The question we want to answer is how exactly word order in Czech is linked to IS. We will argue that the crucial constraint concerns how IS is mapped to prosody: given elements must not carry sentence stress.

### 2 Previous approaches

**Word order and IS interact directly:** word order ↔ IS

In the Czech linguistic (functionalist) tradition, it has been proposed that “communicative dynamism” (Firbas 1957, 1992) governs word order, in that less dynamic (familiar, discourse old, functional) expressions tend to precede more dynamic (new, contrastive, lexically rich) expressions, see also e.g. Mathesius (1939); Sgall et al. (1980); Hajičová et al. (1998).

More recently, Kučerová (2007, 2012) formalized the idea of a given-new-partition in Czech within a modern generative framework. She argued for a “G-operator” that marks elements in its scope as given (by adding a presupposition to it) and thus divides the structure into a given and a new part.



Under this view, scrambling is a result of this partitioning requirement: If new elements end up in the scope of the G-operator, this leads to a presupposition failure, and given elements outside the scope of the G-operator lead to a violation of the Maximize-Presupposition constraint (in context  $C$ , use the most informative presupposition satisfied in  $C$ ; Heim 1991).

For a different formalization of an IS-related partition of Czech utterances within the minimalist framework, see Biskup (2006, 2011), who proposes that backgrounded specific elements are to be interpreted and spelled outside the vP; we will not discuss this approach in detail here.

**Word order and IS interact indirectly:** word order ↔ prosody ↔ IS

For apparent interaction phenomena between word order and IS in other languages, a different approach has been proposed, according to which prosody should be taken into account as a crucial factor.

For example, Zubizarreta (1998) has proposed for Spanish that a clash between principles of prosody-IS-mapping and prosody-word-order-mapping causes word order variation:

- Rule 1: Put sentence stress on the focus.
  - Rule 2: Put sentence stress on the rightmost element.
- Results in a conflict if the focus is not rightmost.
- Solution: Move the focused element to the right periphery.

Further examples of prosodic approaches include the following:

Szendrői (2001, 2003) for Hungarian:

- Rule 1: Put sentence stress on the focus.
- Rule 2: Put sentence stress on the leftmost element.

→ Foci move to the left periphery.

Neeleman and Reinhart (1998) for Dutch:

- Rule 1: Do not put sentence stress on given elements.
- Rule 2: Put sentence stress on the rightmost element.

→ Given elements are scrambled away from the rightmost position.

### 3 Adopting the prosodic approach for Czech

Potentially conflicting rules concerning prosody and information structure are found in the literature:

- Given elements are deaccented in Czech: “*Constituents which are known, repeated, self-evident, or functional, are typically unaccented, whereas constituents which are important, new (i.e. not repeated) have accent, in which they can be told apart from known constituents.*” (Petřík 1938:132–33)
- Sentence stress is rightward-oriented in Czech: On the level of the phonological phrase and the intonational phrase, stress is assigned to the right (see Daneš 1957:63):

	(		*	)	IP		
	(	*	)	(	*	)	pP
Naštvaní učitelé stávkovali před budovou parlamentu.							

If this conflict is the motivation for scrambling in Czech, the following general predictions result:

#### **Predictions of the partition approach:**

The presence of a given-new-partition is the crucial requirement for acceptability: an utterance should not be acceptable unless all given elements appear to the left of all new elements.

#### **Predictions of the prosodic approach:**

Deaccentuation of given elements is the crucial requirement for acceptability: an utterance should not be acceptable if main stress falls on a given element.

## 4 Experiments

We ran a series of experiments to test several specific predictions:

- **Experiment 1:** This experiment served to establish something like a baseline: What happens in an all-new context, where no influence of givenness is expected?
- **Experiment 2:** Which positions are acceptable for a given object?  
The partition approach predicts that only positions preceding all new elements should be acceptable. The prosodic approach predicts that any position except the rightmost one carrying sentence stress should be acceptable.
- **Experiment 3:** Is shifting the stress away from the given element an alternative to scrambling?  
If the partition approach is correct, given elements must always scramble above new ones, irrespective of prosodic properties.  
Under the prosodic approach, this is an expected alternative way of avoiding stress on a given element.

General remarks:

- Each item consisted of a context utterance and the target utterance, forming a short dialog.
- Participants rated the acceptability of the target utterance in relation to the context on a 1–9 scale.
- Each participant saw each item in only one condition.
- Given constituents (determined by context) are marked in boldface, elements carrying sentence stress are underlined.
- In experiment 1 and 3, we also manipulated the definiteness of the object in order to test if the results are influenced by which concept of “givenness” is employed (discourse-salience as proposed by Wagner 2012, or existential presupposition, as suggested by Sauerland 2005 and adopted by Kučerová 2012). We will not discuss this issue in this talk, and we will only present a part of the results that is uncontroversial under both views. The full range of conditions can be found in the appendix.

### Experiment 1 — What happens in an all-new context?

- 2 x 4 design; factor 1 (between items): definiteness of the object (definite vs. indefinite); factor 2 (within items): position of the object (see below).
- 32 items, 44 participants.
- We only present a subpart of the results, namely the 16 items containing an indefinite object—here it is less controversial that they are not given in any sense. For the complete set of results, see the appendix.

(2) (C) Co ses dočetl v novinách?

*‘What did you read in the newspaper?’*

(a) V Praze prý starší pár útočník napadl kvůli penězům.  
 in Prague allegedly older couple.acc offender.nom attacked because.of money  
*‘In Prague some criminal allegedly attacked an older couple because of money.’*

(b) V Praze prý útočník starší pár napadl kvůli penězům.

(c) V Praze prý útočník napadl starší pár kvůli penězům.

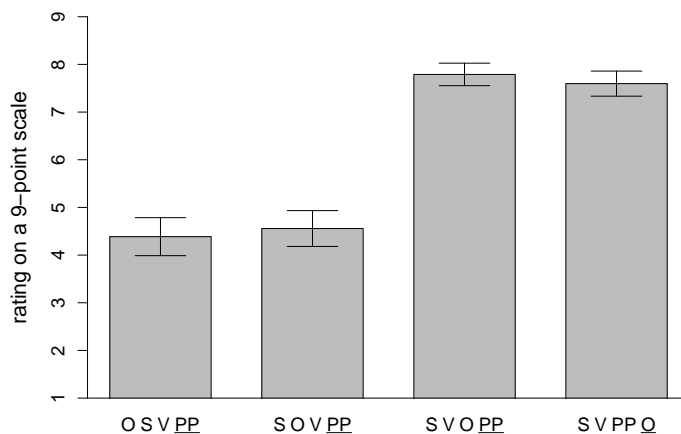
(d) V Praze prý útočník napadl kvůli penězům starší pár.

O S V PP

S O V PP

S V O PP

S V PP Q



Exp 1: mean ratings with 95% confidence intervals

Statistical analysis:

An ANOVA revealed a significant main effect of the object position (by subjects:  $F_1(1,43) = 169$ ,  $p < 0.001$ ; by items:  $F_2(1,15) = 37$ ,  $p < 0.001$ ). Post-hoc t-tests showed significant differences for all pairwise comparisons except for (a) vs. (b), and (c) vs. (d).

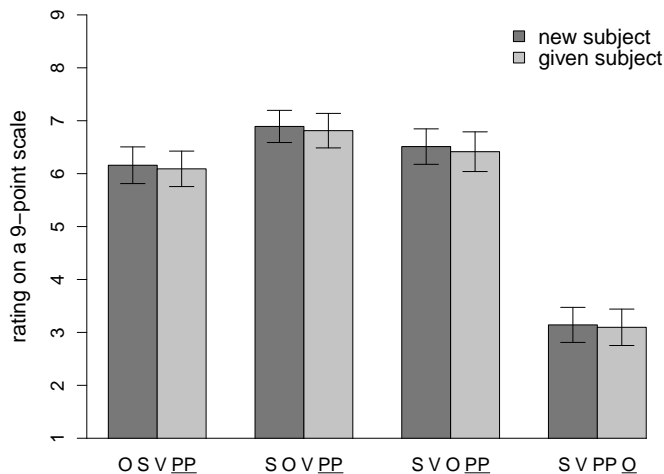
→ We conclude that both S V O PP and S V PP Q are possible orders in a context where no givenness-related movement is assumed to happen.

## Experiment 2 — Where can a given object scramble to?

- 2 x 4 design; factor 1: givenness of the subject (given vs. new); factor 2: position of the object.
- 32 items, 44 participants.

- (3) (C) Zjistil jsi, proč dnes sekretářka tak nadávala?  
*‘Did you find out why our secretary was so angry today?’*
- (a) Protože prý **sekretářku** Karel poslal do obchodu.  
*‘Because Karel allegedly sent the secretary to the store.’* O S V PP
- (b) Protože prý Karel **sekretářku** poslal do obchodu. S O V PP
- (c) Protože prý Karel poslal **sekretářku** do obchodu. S V O PP
- (d) Protože prý Karel poslal do obchodu **sekretářku**. S V PP O
- (4) (C) Zjistil jsi, proč dnes sekretářka nadávala na Karla?  
*‘Did you find out why our secretary was so angry with Karel today?’*
- (a) Protože prý **sekretářku** **Karel** poslal do obchodu.  
*‘Because Karel allegedly sent the secretary to the store.’* O S V PP
- (b) Protože prý **Karel** **sekretářku** poslal do obchodu. S O V PP
- (c) Protože prý **Karel** poslal **sekretářku** do obchodu. S V O PP
- (d) Protože prý **Karel** poslal do obchodu **sekretářku**. S V PP O

		given object & new subject		given object & given subject	
		partition approach	prosodic approach	partition approach	prosodic approach
(a)	O S V <u>PP</u>	✓	✓	✓	✓
(b)	S O V <u>PP</u>	✗	✓	✓	✓
(c)	S V O <u>PP</u>	✗	✓	✗	✓
(d)	S V PP <u>O</u>	✗	✗	✗	✗



Exp 2: mean ratings with 95% confidence intervals

### Statistical analysis:

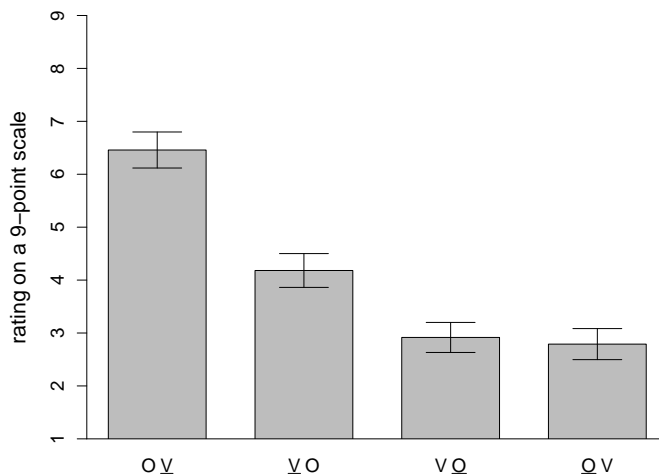
We found a main effect of position (ANOVA by subjects:  $F_1(1,43) = 132$ ,  $p < 0.001$ ; by items:  $F_2(1,15) = 152$ ,  $p < 0.001$ ), but no interaction with subject givenness (all  $F_s < 1$ ). Post-hoc t-tests showed that S V PP Q differed significantly from all other word orders, and in addition O S V PP was significantly different from S O V PP.

→ The results clearly differ from experiment 1, which shows that givenness really does have an influence on word order options in Czech. The predictions of the prosodic approach are borne out: All three conditions without sentence stress on the given object are acceptable, and the givenness status of the subject does not have any influence.

### Experiment 3 — Is stress shift an option?

- 2 x 2 x 2 design; factor 1: definiteness of the object (definite vs. indefinite); factor 2: word order (VO vs. OV); factor 3: sentence stress (on O vs. on V).
  - 40 items, 41 participants.
  - We only present the results for the four out of eight conditions involving a definite object, because these are uncontroversially given.
- (5) (C) Nevím, jak dlouho to ještě budeme snášet. Musíme se toho potkana ve sklepě co nejdřív zbavit.  
*‘I don’t know how long we will tolerate this. We have to get rid of that rat in the cellar.’*
- (a) No, volal mi Jirka, že prý právě potkana objevil.  
 well called me J. that allegedly just rat found  
*‘Well, Jirka called that he has just found the rat.’* O V
- (b) No, volal mi Jirka, že prý právě objevil potkana. V O
- (c) No, volal mi Jirka, že prý právě objevil potkana. V O
- (d) No, volal mi Jirka, že prý právě potkana objevil. O V

		partition approach	prosodic approach
(a)	scrambling: O <u>V</u>	✓	✓
(b)	stress shift: <u>V</u> O	✗	✓
(c)	nothing: V <u>O</u>	✗	✗
(d)	both: <u>O</u> V	✓?	✗



Exp 3: mean ratings with 95% confidence intervals

Statistical analysis:

Both factors had a main effect (word order:  $F_1(1,40) = 67$ ,  $F_2(1,39) = 31$ ; stress:  $F_1 = 139$ ,  $F_2 = 166$ ), and the interaction was significant ( $F_1 = 46$ ,  $F_2 = 62$ ; all  $p$ s < 0.001). All pairwise comparisons revealed significant differences, except for VO vs OV.

→ The results show intermediate acceptability for utterances with shifted sentence stress: It is better than the clearly ungrammatical options, but not as acceptable as the scrambled variant.

## 5 Analysis

We propose to model the observations within the OT-framework, adopting the following constraints:

- DESTRESS-GIVEN: A given phrase is prosodically nonprominent (Féry and Samek-Lodovici 2006), more precisely for Czech: it does not receive the strongest stress in the intonation phrase.
- NSR-I: The strongest stress in the IP falls on the rightmost phrasal stress (Truckenbrodt 2013).
- Ranking: DESTRESS-GIVEN >> NSR-I

	D-G	NSR-I
S V PP <u>O</u>	*!	
☞ S V O <u>PP</u>		
☞ S O V <u>PP</u>		
☞ O S V <u>PP</u>		

Tableau for new S, V, PP and given O

	D-G	NSR-I
☞ scrambling: <u>O</u> <u>V</u>		
stress shift: <u>V</u> <u>O</u>		*!
nothing: V <u>O</u>	*!	
both: <u>O</u> V	*!	*

Tableau for new V, given O

### Issues

- Graded acceptability: The standard OT framework is designed to determine the optimal one among a set of candidates. In its basic form, it does not provide a graded ranking of the other candidates for modeling intermediate acceptability.
- Potential solution 1: restricting the reference set. If the reference set is restricted to VO word order, stress shift is the optimal candidate, but excluding scrambled orders from the reference set is suboptimal in itself.

	D-G	NSR-I
☞ stress shift: <u>V</u> <u>O</u>		*
nothing: V <u>O</u>	*!	*

- Potential solution 2: weighted constraints. In Linear Optimality Theory (Keller 2000), constraints are associated with weights, and violations are cumulative. More fine-grained acceptability predictions emerge (we provide a very simple illustration below):

	D-G weight = 4	NSR-I weight = 2	score
scrambling: <u>O</u> <u>V</u>			0
stress shift: <u>V</u> <u>O</u>		*	-2
nothing: V <u>O</u>	*		-4
both: <u>O</u> V	*	*	-6

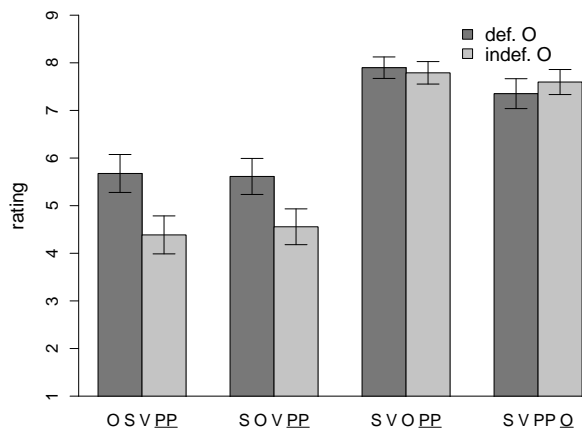
- What about economy? It is a common and often crucial assumption that optional syntactic operations should only be allowed if it is necessary for fulfilling an interface requirement. If this assumption is used to explain why scrambling is blocked in an all-new-context, a contradiction with the results for scrambling of a given object arises: there, structures involving a scrambled object are as acceptable as those where the object stays in situ. For now, we assume that scrambling in Czech is not restricted by an economy condition and that acceptability differences in the all-new context result from independent factors (see the appendix for the influence of definiteness).

## 6 Conclusion

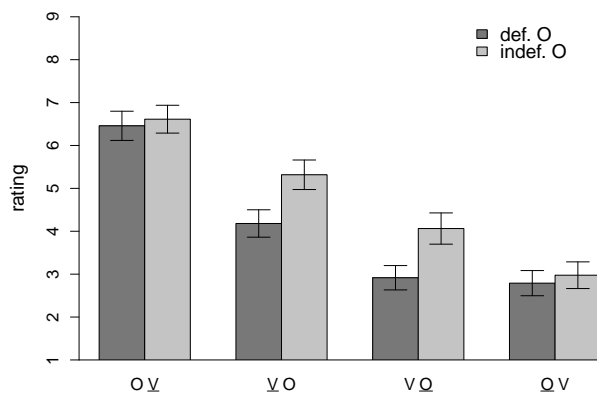
- Our results confirm that givenness does in fact influence word order in Czech.
- Experiment 2 showed that all tested word orders in which no given elements bears sentence stress were acceptable, as predicted by the prosodic approach. A given-new-partition is not necessary, so the partition approach undergenerates.
- Experiment 3 showed that shifting the sentence stress away from a given element in rightmost position raises acceptability significantly, but it is not as good as scrambling.
- We have proposed an OT analysis to model the observations.
- This solution does not involve a direct interaction between word order and information structure. A connection is established indirectly with prosody as a mediating component.

## Appendix

In experiment 1 and 3, we also manipulated the definiteness of the object, and this factor did have a significant effect. The generalization seems to be that definiteness does not have an influence on the acceptability of the optimal variants, but being definite facilitates scrambling in cases where scrambling is generally dispreferred (exp 1), and being indefinite facilitates staying in situ where that is dispreferred (exp 3).



Exp 1: Results including the definiteness factor



Exp 3: Results including the definiteness factor

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