The Role of Syntactic Flexibility and Prosody in Marking Given / New Distinctions in Finnish[*]

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One of the most fascinating aspects of Finnish grammar is the number of different information structure marking devices speakers have at their disposal, using syntax, prosody and morphology. The present article empirically investigates the interplay of syntax and prosody by analysing semi-spontaneous speech with variable word order and comparing it to scripted speech. The main object of attention lies in a detailed analysis of the phonetic correlates of new and focused words obtained in an experiment eliciting localisation expressions. While speakers of the scripted data used standard SVO word order, participants in our study were free to choose the most suitable word order. Speakers made extensive use of syntactic marking of information structure when this option was available, while prosodic marking was more pervasive when syntactic variability was excluded. Based on this interplay, we suggest a link between discourse configurationality and prosodic phrasing, arguing that both conspire for an optimal marking of information structure.

Keywords: *Finnish, information structure, prosody, syntax*

1 Introduction

Finnish is well-known for being a discourse-configurational language. That is, while word order is basically free, variations express differences in information structure. According to Vilkuna (1989, 1995), sentences can thus be divided into K-position, T-position and V-field, as illustrated in Table 1.[1] While topical ele-

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[1]   Vilkuna (1995) provides both an LFG and a GB-account, which identifies the K-position as Spec,CP for nominals and C for finite verbs, while the T-position corresponds to Spec,IP and the V-field is identified with I'.

Table 1: Division of Finnish sentences into K-position, T-position and V-field (adapted from Vilkuna, 1995, 245).

K-position	T-position	V-field	
	Anna$_S$	sai$_V$	kukk-i-a$_O$.
	Anna.NOM	got	flower-PL-PRT
'Anna got flowers'.			
	Kukkia$_O$	sai$_V$	Anna$_S$.
'Anna got the flowers'.			
Kukkia$_O$	Anna$_S$	sai$_V$.	
'It is was flowers that Anna got'.			
Anna$_S$	kukkia$_O$	sai$_V$.	
'It is was Anna who got flowers'.			
Sai$_V$	Anna$_S$	kukkia$_O$.	
'Anna did get flowers'.			

ments are usually realised in the T-position, that is, directly preceding the finite verb, contrastive elements—both topics and foci—usually occupy the preceding K-position (also see Vallduví & Vilkuna, 1998). The default position for non-contrastive foci is sentence-final.

However, syntactic variation is by no means the only way of marking information structure in Finnish. Prosodic effects have also been reported, with research mostly concentrating on the notion of focus. Several studies detected an expansion of pitch range on narrowly focused words (Välimaa-Blum, 1988, 1993; Mixdorff et al., 2002; Vainio & Järvikivi, 2006, 2007), and effects on duration (Mixdorff et al., 2002; Suomi, 2007) and intensity (Vainio & Järvikivi, 2007) have also been described. Interestingly, Vainio & Järvikivi (2006, 2007) found that speakers compensated for information-structurally inappropriate word orders by using prosodic correlates and that listeners were sensitive to both prosody and word order in judging prominence of words in short sentences.

Finally, information structure also plays an important role in the meaning and use of certain clitics like *-kin* 'also', although it is often difficult to pinpoint their semantic and pragmatic meaning precisely (see Nevis, 1986, and the references therein).

(1) Jussi kävi-kin   kotona.
     Jussi went-also home

     'Jussi did too come home'. (from Nevis, 1986, 10)

The present article investigates the contribution of syntactic and prosodic

correlates of information structure and the interplay between them by analysing data from a semi-spontaneous production experiment. In this study, participants uttered descriptions which systematically induced information structural variations. Crucially, the experimental design enabled participants to choose freely between syntactic, prosodic and morphological means for marking information structure. The two following research points guided the analysis of the resulting data. First, the use of morpho-syntactic means, more specifically word order variation, and second, the comparison of prosodic information structure marking to findings from a previous study using scripted material with invariable canonical word order are investigated in detail (use of clitics was infrequent and is not discussed in the present article). The results confirmed the hypothesis that speakers make systematic use of syntactic variability when available. Additionally, they also employed prosodic markers, however less pervasively than in the absence of this option. On the basis of these results, we argue that syntax and prosody conspire towards an optimum of information structure marking, in which the new and focused constituent is final, both syntactically and prosodically.
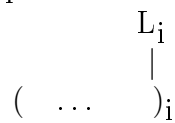
In analysing effects of information structure, we mainly concentrate on the distinction between new and given elements, i.e. those that are newly introduced into a discursive context and those that are previously mentioned in discourse (for a discussion of givenness, see e.g. Gundel et al., 1993; Krifka, 2008). Additionally, new material was generally focused, while given material was part of the background. Thus, two distinct levels of information structure—the divisions into given / new and focus / background—largely overlap in the reported data. However, the analysis primarily considers information status (given vs. new), since the experimental design directly manipulated this factor.

The following prosodic analysis is based on Arnhold (2013). It makes use of two levels of prosodic phrases, intonation phrases (i-phrases) and prosodic phrases (p-phrases), as shown in (2). The highest prosodic domain considered in this paper is the i-phrase which is frequently marked by final creaky or breathy voice and is the domain of pitch downtrend phenomena (e.g. Iivonen, 1998). In line with Välimaa-Blum (1993), we also tentatively assume that i-phrases have a final low boundary tone L_i. Furthermore, we describe Finnish as a phrase language in terms of the phrase-level prosodic typology suggested by Féry (2010), i.e. it shows little variation in the choice of phrasal tones, but instead makes prosodic distinctions through changes in phrasing. In line with this, we assume that what has traditionally been described as a rising-falling accent, appearing on most Finnish content words, is instead the results of two tones associated with the p-phrase, H_p and L_p (see the example Figure 1, analysed in (3)). Prosodic phrasing in Finnish, and in particular its correspondence with syntactic units, requires future research. In the present context, it is relevant to note that content words tend to form p-phrases of their own, although larger p-phrases spanning complete NPs or PPs also occur.

Finite verbs constitute an exception. They are traditionally described as accent-less unless in narrow focus (Välimaa-Blum, 1993; Iivonen, 1998) and mostly form a p-phrase together with their objects in broad focus SVO sentences as discussed in section 2. However, verbs phrasing together with the preceding subject, as in (3), are likewise frequent.
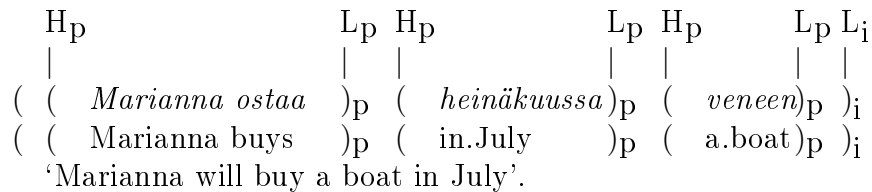
(2)   Prosodic phrases in Finnish

    a. i-phrase

$$L_i$$
$$|$$
$$(\quad \dots \quad)_i$$

    b. p-phrase

$$H_p \qquad L_p$$
$$|\qquad\qquad |$$
$$(\quad \dots \quad)_p$$
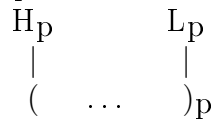
(3)   Prosodic phrasing in a short Finnish sentence

$$H_p \qquad\qquad\qquad L_p\; H_p \qquad\qquad L_p\; H_p \qquad\quad L_p\, L_i$$
$$|\qquad\qquad\qquad\qquad\; |\quad |\qquad\qquad\quad |\quad |\qquad\qquad |\quad |$$

((*Marianna ostaa*   )$_p$ (*heinäkuussa*)$_p$ (*veneen*)$_p$)$_i$
((Marianna buys   )$_p$ (in.July   )$_p$ (a.boat)$_p$)$_i$
'Marianna will buy a boat in July'.

The remainder of this article is structured as follows: Section 2 summarizes the effects of information structure on prosody in an experiment with simple short sentences in standard word order. It provides a background for the investigation of the use of prosody in the experiments . Section 3 introduces the materials analysed in the main body of the article, before section 4 lays out the hypotheses and section 5 the results. The syntactic analysis is reported in subsection 5.1. The following subsections analyse the prosodic measures that showed effects in fixed word-order materials to see whether they exhibited the same effects in in our study, where word order was free. Section 6 contains a discussion and conclusion.

2   Prosodic information structure marking with fixed standard word order

This section provides a background for the analysis of the materials. As a first step, it summarises the prosodic information structure marking observed in a scripted production experiment. In this experiment, participants uttered short sentences in fixed unmarked word order as answers to pre-recorded questions eliciting different
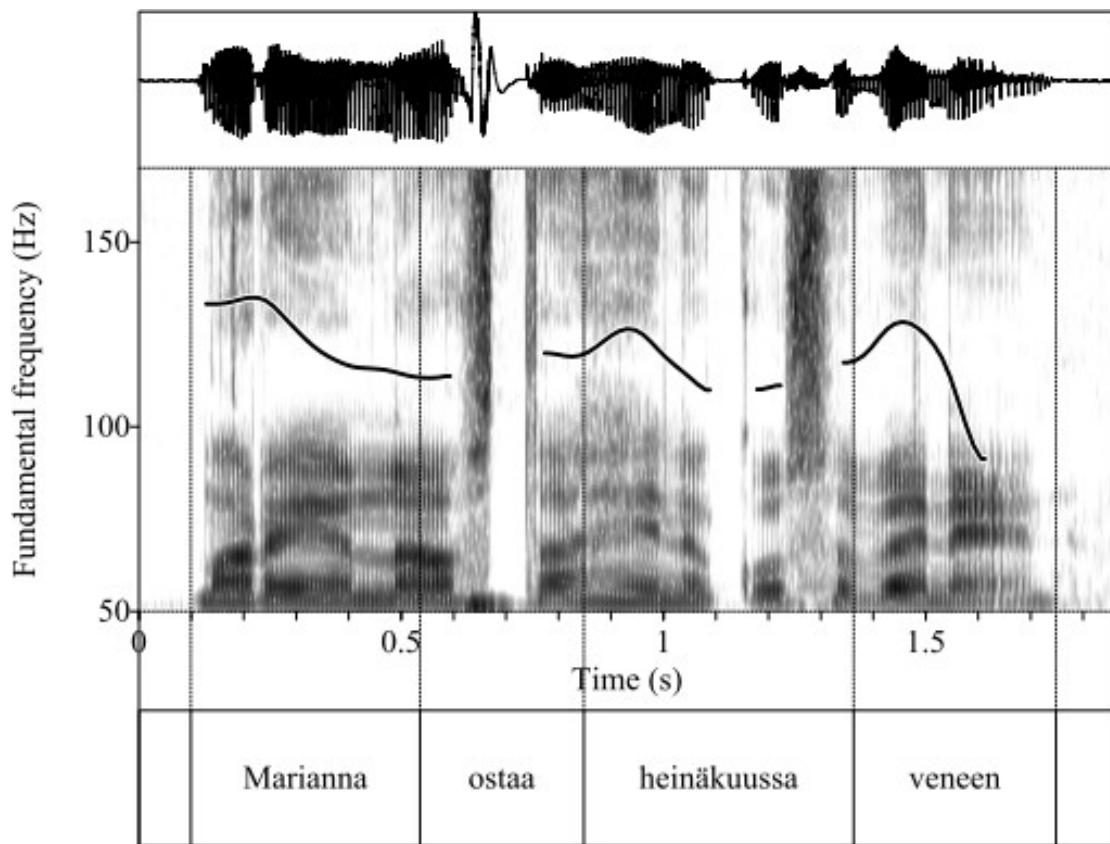
Figure 1: Realisation of the short Finnish sentence in (3).

information structures (described in more detail in Arnhold, 2013, a preliminary analysis was also reported in Arnhold, 2011).

The following summary is based on data from 17 speakers, who produced altogether 947 sentences containing 2841 words. Participants produced eight short SVO sentences with seven different information structures: one all-new sentence (e.g. *What happened first? — Jimi read the menu*), three versions with information focus on the subject, verb and object, respectively (e.g. answering *Who knitted a blanket? — Maini knitted a blanket* for subject focus) and three versions with narrow corrective focus on the subject, verb and object, respectively (e.g. *Does Niilo paint a house? — Niilo paints a cloth* for object focus). Narrowly focused elements were also always new in the context of the question-answer pair, while the other elements in the same sentence were mentioned in the question, and thus are considered given information according to the definition introduced above.

The data showed effects of information structure on four phonetic measures:[2] Pitch range, word duration, occurrence of pauses and non-modal voice quality (i.e. speech produced with distortions of the normal vocal fold vibrations, mostly creaky or breathy voice in our data, resulting from aperiodic vibration cycles and excessive air leakage, respectively, see Esling, 2006). New constituents showed higher values for pitch peaks and lower ones for following minima, as well as longer word durations. They were more often followed by pauses and they ended in non-modal voice more often than words in all-new sentences. By contrast, given words had smaller pitch ranges, shorter durations and they showed non-modal voice quality more frequently in post-focal position.

For an example exhibiting all these effects in parallel, consider the utterance *Jani töni lavaa* 'Jani pushed a platform' illustrated in Figure 2. The sentence-initial subject is narrowly focused. It is realised with larger pitch range and longer duration than if it were given (compare also with the following verb containing the same number of segments). It ends in non-modal voice quality and is followed by a pause. By contrast, pitch movements are strongly compressed on the verb and not measurable on the object due to creaky voice, with both words showing relatively short durations.

For the phonological analysis of these results, we follow the account suggested

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[2]   The original analyses additionally considered vowel quantity and position in the sentence. However, the analysis in Arnhold (2013) showed that all systematic effects of vowel quantity could be accounted for in terms of duration (e.g. the effect of narrow focus lowering the pitch of L_p was larger for words with long vowel quantity, which afforded more space for the pitch fall to this target). Position was correlated with grammatical function due to fixed SVO word order, so that effects were largely explained by verbs forming p-phrases with their objects as shown below. The only truly position effects, such as lower pitch maxima later in the sentences, were very straightforward and would only add unnecessary detail in the current context. These factors will therefore not be discussed in the following.
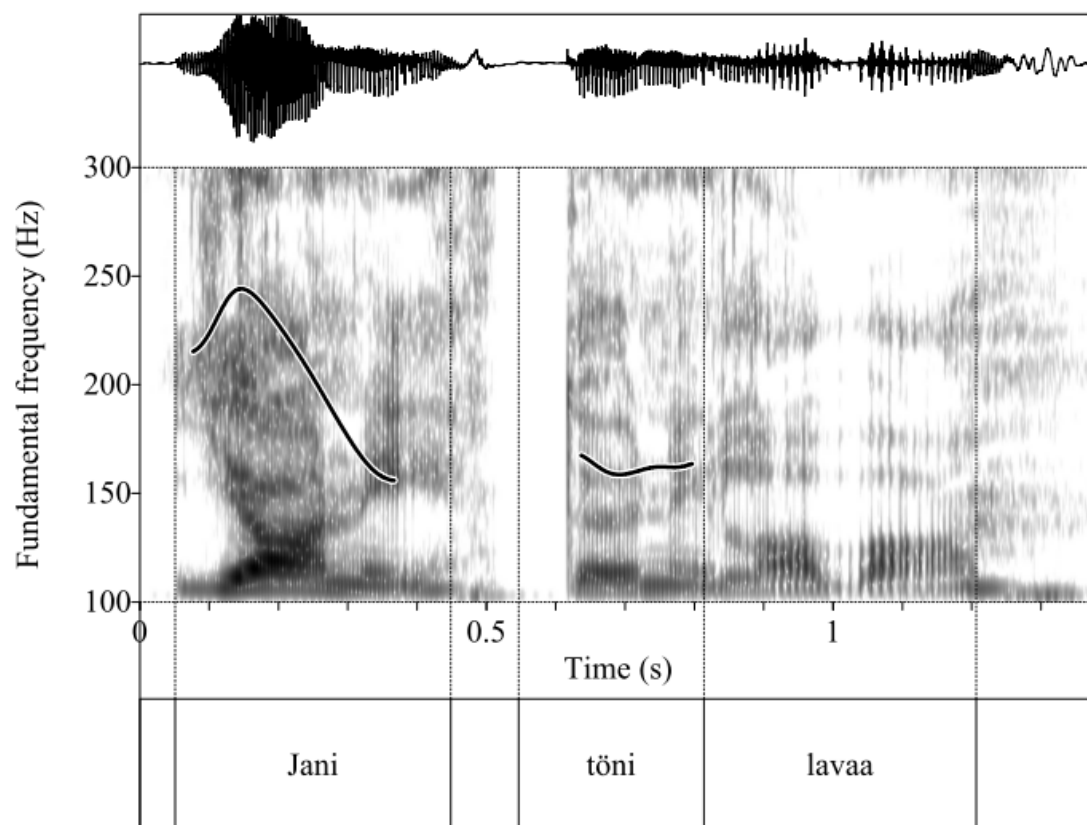
Figure 2: Prosodic marking of information structure in a sentence with fixed word order.

by Arnhold (2013). As summarised in (4), we assume two parallel strategies of focus marking, adjusting prosodic phrasing and prominence, respectively.

(4) Prosodic strategies for marking focus in Finnish
    a. Adjustment of phrasing:
       The end of a new focused constituent is aligned with the right edge of an i-phrase.
    b. Adjustment of prominence:
       Narrowly focused material is made more prominent, given material less prominent compared to an all-new context.

First, the right edge of a focused constituent is aligned with the right edge of a prosodic phrase, which we take to be the i-phrase (for an OT-constraint formalising this requirement see Selkirk, 2000, on English and Féry, 2013, for an account considering a wide range of languages). This is schematically illustrated in (5), where the subscript letters identify the boundaries of i-phrases and p-phrases, while boldface indicates narrowly focused constituents. Again, consider the example in Figure 2. The default phrasing of this sentence in an all-new context appears in (5a). While this phrasing already contains a p-phrase boundary between subject and VP, an additional i-phrase boundary is inserted in subject focus as realised in Figure 2, see (5b). For completeness, (5c) and (5d) show verb and object focus, respectively.

(5) Prototypical phrasing of SVO sentences in different information structures
    a. All-new sentence:

       $((\text{Jani})_p \ (\text{töni} \quad \text{lavaa})_p)_i$.
       Jani   pushed a.platform

       'Jani pushed a platform'.
    b. Narrowly focused subject: $((\mathbf{Jani})_p)_i \ ((\text{töni lavaa})_p)_i$.
    c. Narrowly focused verb: $((\text{Jani})_p \ (\mathbf{töni})_p)_i \ ((\text{lavaa})_p)_i$.
    d. Narrowly focused object: $((\text{Jani})_p \ (\text{töni } \mathbf{lavaa})_p)_i$.

The assumption that focus goes together with an inserted i-phrase boundary directly accounts for the increased occurrence of pauses after focused material. Likewise, longer durations and non-modal voice quality are plausibly explained as phrase-finality markers (on non-modal voice as a finality phenomenon see Iivonen, 1998; Nakai et al., 2009). Additionally, the adjustment of phrasing can at least partly explain the effect of information structure on pitch range: The insertion of an i-phrase boundary at the same time inserts a boundary at the p-phrase level, which is marked by H_p and L_p tones. Second, we understand the remaining prosodic effects—further differences in pitch range and duration—as adjustments

of prominence, scaling focused constituents up and given ones down in prosodic prominence.

3   Methods

As in the study summarised in the previous section, the material was elicited in systematically varied information structural contexts, but this time, the experimental design allowed variable word order instead of imposing fixed canonical SVO. The remainder of this paper presents data from an experiment eliciting semi-spontaneous speech. The data has previously been reported by Féry, Skopeteas & Hörnig (2010) in an overview comparing data from six languages, including Finnish. They argue for an overall similar account using the OT-constraint ALIGN-FOCUS-R to account for the right-edge alignment of focused constituents with an i-phrase (for a summary of the findings, see subsection 5.1). The current evaluation adds phonetic data to the prosodic analysis and provides a statistical assessment of significance for both prosodic and syntactic data. Differences in the results, e.g. in the count of word orders, are due to a re-evaluation of the data. A principled source of difference is that we decided to drop Féry et al.'s (2010) restriction against localisations like (6). To ensure comparability across the six languages in their data set, Féry et al. (2010) excluded all cases in which the speaker first introduced a referent (like the gorilla in (6)) before specifying its place in the localisation proper (marked with boldface in (6)).

(6)   Gorilla tuli   takasin ja   **se tuli   to-hon   karhu-n ete-en**.
      gorilla came back   and it came there-ILL bear-GEN front-ILL

      'The gorilla came back and it came there in front of the bear'.

3.1   Experimental Design

The participants' task consisted in the description of changing spatial layouts of plastic toy animals on a table in front of them. The participants addressed another native speaker, an acolyte, in such a way that he could reproduce the layouts with an identical set of toys. During the experiment, participants were seated at a table next to the experimenter (the first author), while the second native speaker sat at another table a few meters away with his back to them.

The spatial layouts are depicted in Figure 3. The experimenter first put two animals on the table next to each other, a crocodile and a gorilla. After the participant described this layout to the acolyte, the experimenter added a horse next to the gorilla, completing the first layout of three animals (L1). The participant described this layout. This procedure was repeated until the participant had

Figure 3: Layouts used in the experiment.

L1	Crocodile	Gorilla	**Horse**		
L2		Gorilla	Horse	**Tiger**	
L3		Gorilla	Horse	**Bear**	
L4		**Zebra**	Horse	Bear	
L5			Horse	Bear	**Dog**

L6	Horse	L7	Horse	L8	Horse
	<u>Bear</u>		Bear		Bear
			Gorilla		**Cow**

L9	*Tiger*	L10	**Pig**
	Horse		Tiger
	Bear		Horse

L11	<u>Tiger</u>	Horse

described all layouts. Each layout differed from the previous one by the manipulation of one animal, which was newly added or reintroduced to the layout or moved to a different location (displaced). Animals not currently placed on the table were hidden in a bag so that participants were unfamiliar with animals not part of a previous layout. With the exception of reintroduced animals, animals added to a layout were thus contextually new in the linguistic as well as the deictic / physical context of the description. In contrast, animals already part of the preceding layout were contextually given and had often been previously mentioned. In this way, the experimental design controlled for the information status of the referents used in the spatial localisations. The experiment systematically elicited three different information structural categories for the manipulated animals: new (marked in bold in Figure 3), reintroduced (marked in italics in Figure 3) and displaced given (underlined in Figure 3). Layouts L1 to L5 and L8 and L10 arose by adding a new animal to a constellation of two animals already standing on the table. New animals were added in one of three ways: by removing an animal and placing the new animal in the same position (L3, L4, L8), by adding the new animal at the place opposite to the place of the removed one (L2, L5, L10) or by simple addition without removing another animal (L1, L7). In layouts L7 and L9, the added animal had already figured in earlier layouts (L1 to L3 and L2, respectively) and was thus not completely new, but reintroduced. Lastly, for layouts L6 and L11, no animal was added, but an animal already standing on the table was moved to

a different position, i.e. displaced.

3.2   Participants

All participants were native speakers of Finnish and students at the University of Joensuu (now part of the University of Eastern Finland). Recordings were conducted with 32 participants at the laboratory of the Department of Linguistics at the University of Joensuu in November 2007. Data from 20 participants (19 female) was chosen for further analysis, discarding participants with a cold or with unnatural, bored or extremely slow speaking style and those who delivered incorrect descriptions. All speakers were reimbursed for their time.

3.3   Editing and analysis

The speakers produced descriptions of eleven layouts each, so that the analysis considers 220 descriptions altogether. For each of these localisations, the reference to the manipulated animal was annotated using Praat (Boersma & Weenink, 2013), measuring its duration, the use of non-modal voice quality, the occurrence of pauses and the time and f_0 of the p-phrase tones H_p and L_p associated with it.

Statistical analysis was done by fitting linear mixed-effects models as implemented in the software R (R Development Core Team, 2010; Baayen, 2008), then comparing different models with the ANOVA function. Factors not significantly improving the model fit according to these comparisons were removed, so that the reported models include only significant predictors. For binomial models analysing the binary responses presence vs. absence of pauses and presence vs. absence of non-modal voice quality, R's lmer function calculated p-values. For all other measures, significance of a factor was assumed when the t-value associated with it was larger than 2, which should be unproblematic for relatively large data sets (Baayen et al., 2008, 398, footnote 1). The following section only reports significant effects. For subset models, using linear mixed-effect models was not feasible due to the small corpus size. Therefore, t-tests were used for analysing numeric variables, and Fisher's exact test and loglinear modelling were employed for the analysis of binary variables.

4   Hypotheses

We expected participants to describe the position of the manipulated animal— whether newly added, reintroduced or displaced. In particular, we anticipated that manipulated animals would be localised relative to the animals already present on the table rather than localising the static animals relative to the manipulated one.

With respect to the main research question, the interaction of syntax and prosody in marking information structure, we tested the following hypotheses:

Hypothesis 1 When speakers are free to use word order variation to mark information structure, they do.

Hypothesis 2 Even with other options available, speakers will still employ prosodic means of marking information structure.

Elaborating on hypothesis 1, we expected that in semi-spontaneous speech, speakers would choose word orders in accordance with the information structural division described in the literature as summarised in section 1 (Vilkuna, 1989, 1995; Vallduví & Vilkuna, 1998). In particular, we hypothesised that they would place new material in the default position for new information focus, i.e. sentence-finally. In contrast, given material should appear earlier in the sentence, either in the T-position or pre-finally in the V-field.

Additionally, as laid out in hypothesis 2, prosody is probably active in marking information structure even though other means for marking information structure are available. To assess this claim, we compared our materials to the findings from the study with fixed word order summarised in section 2, analysing the four phonetic measures that showed effects of information structure for the fixed SVO materials. In accordance with hypothesis 2, the referents of new objects should be i-phrase final and overall prosodically more prominent, as was described for new and focused words in fixed SVO word order. That is, they should show a larger pitch range, longer duration, end more frequently in non-modal voice quality, and be more frequently followed by pauses than given (and potentially reintroduced) animals.

5   Results

As expected, participants described the locations of the manipulated—new, reintroduced or displaced given—animal, usually by relating it to a static or removed animal (see (7) and (8)). Following Féry et al. (2010), we refer to the animal whose position was described as the 'locatum' (or Loc)—marked by boldface in the examples—and to the part of the utterance that specifies their position as the locative expression (or Lx)—rendered in italics. For example in (7), the described layout L11 resulted from changing the position of a given animal, in this case a tiger. The speaker expressed this animal as the locatum, with the locative expression specifying its new position relative to a static given animal, the horse. Here and below, we identify examples by speaker number and layout number, i.e. 4.11 marks layout L11 as described by speaker 4.

(7) Nyt sika otettiin   pois ja **tiikeri** siirrettiin *hevose-n   vasemma-lle*
now pig was.taken away and tiger   was.moved horse-GEN left-ALL
puole-lle.
side-ALL

'Now the pig was taken away and the tiger was moved to the left side of the horse'. (4.11)

(8) Tiikeri lähti poikkeen ja *se-n   tila-lle*   tuli **karhu.**
tiger   left   away   and it-GEN place-ALL came bear

'The tiger went away and in its place came a bear'. (23.3)

The following sections analyse the syntactic and prosodic characteristics of locatum animals ('locata') with systematically varied givenness status (given, new, reintroduced).

5.1 Word order

In all localisations, locata either preceded the locative expressions (Loc≻Lx order, cf. (7)) or followed them (Lx≻Loc order, cf. (8)). Overall, Lx≻Loc order was more frequent, occurring in 69% of the localisations (152 cases). However, there were clear differences between given, new and reintroduced locata, as shown in Table 2. Strikingly, manipulations of given animals always resulted in descriptions with Loc≻Lx order. In contrast, localisations of new animals showed some variation, but overall there was a clear preference for Lx≻Loc order. Descriptions of reintroduced animals largely patterned with those of new ones, although the tendency towards Lx≻Loc order was slightly less strong. Fisher's exact test suggested that the distribution of Loc≻Lx and Lx≻Loc order did indeed differ significantly between utterances with given, new, and reintroduced locata. In other words, the givenness status of the locatum had a significant effect on the order of locatum and locative expression (two-tailed, $p < .001$). A loglinear model confirmed this result ($df = 216, \chi^2 = 119.92, p < .001$).

Table 2: Localisations with locatum preceding and following the locative expression by givenness status of the locatum.

	Loc≻Lx		Lx≻Loc	
Given	40	(100%)	0	(0%)
New	19	(14%)	121	(86%)
Reintroduced	9	(22%)	31	(78%)

Relating the data to Vilkuna's (1989; 1995) model shows that the relative order of locatum and locative expression was largely a matter of the occupation of the T-position and the sentence-final position (the K-position is expectedly less relevant in the current context, since the experiment was not designed to elicit contrastive foci or topics). Locata occupied the T-position in about 90% of the localisations with Loc≻Lx order (57 cases, see the example in (9)). In Lx≻Loc order, about 99% or 139 locata were realised in the default focus position, i.e. final in the V-field, as illustrated in (10).[3] Thus, relative order of locatum and locative expression was strongly indicative of word order.

(9)

K-position	T-position	V-field		
	karhu	siirty	*hevose-n*	*ete-en.*
	bear	moved	horse-GEN	front-ILL

'[...] the bear moved to the front of the horse'. (22.6)

(10)

K-position	T-position		V-field	
	Tiikeri-n	*tila-lle*	tuli	**karhu**.
	tiger-GEN	place-ALL	came	bear

'In the tiger's place came a bear'. (8.3)

It should be noted that syntactically, the sentences in the current study are systematically different from those of the study using scripted SVO sentences summarised in section 2, which describe events with a prototypical transitive encoding of agent vs. patient or theme role. This type of active transitive sentence was almost completely absent from our materials (an exception is given in (11)).

(11) Nyt hän otti krokotiili-n   pois ja   laitto *hevose-n*   *viere-en*
      Now (s)he took crocodile-ACC away and put   horse-GEN next.to-ILL
      tiikeri-n.
      tiger-ACC

      'Now she took the crocodile away and put a tiger next to the horse'. (26.2)

The majority of localisations in our data were either passive sentences, like (7) above, or, like (8) and (10), a type of intransitives traditionally called existential sentences. As one of the reviewers points out, intuitions about T-selection are much less clear for these types of sentences than in classical transitives (see also Vilkuna, 1989, esp. 49–50 on T-selection for passives and Vilkuna, 1989, 149–175; Karlsson, 2008, 104–105; Hakulinen & Karlsson, 1995, 95–96; Penttilä, 1957, 627–628 on T-selection and word order in existential sentences).

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[3]   These numbers exclude altogether 17 locata appearing in elliptical sentences (12 Lx≻Loc, 5 Loc≻Lx), where the discourse configurational division was difficult to determine.

Passive voice appeared in 22% of the localisations (48 sentences), describing the movement of the animal as a transitive event without specifying the person performing the movement (i.e. the experimenter),[4] whereas 73% or 161 localisations used active voice. Eleven elliptic descriptions without a verb could not be classified (about 5% of the data). Participants used passive formulations for 28% and 30% of localisations of given and reintroduced animals, respectively, but for only 20% of localisations of new locata (11, 11 and 26 cases, respectively). Interestingly, the choice of passive vs. active voice did not correlate with strong differences in word order: 67% of passives and 70% of active localisations had Lx≻Loc order, overwhelmingly placing the locatum in final position.

The occurrence of existential sentences is a bit more difficult to quantify, since they are less well-defined as a class. Hakulinen et al. (2004, § 893) list five criteria, given in (12), but state that they are not necessarily met in all cases (also see Hakulinen & Karlsson, 1995, 95–97; Vilkuna, 1989, 155–175). In addition to those formal characteristics, existential sentences generally share the function of introducing a new referent into the discourse (Penttilä, 1957, 627–628; Hakulinen & Karlsson, 1995, 95; Vilkuna, 1989, 165–169).

(12)   Characteristics of prototypical existential sentences, from Hakulinen et al. (2004, § 893)

   a. The verb is *olla* 'to be'.

   b. The T-position is filled by a locative expression and the subject follows the verb.

   c. The subject is divisible and bears partitive case.

   d. In a negated clause, the subject bears partitive case.

   e. The verb does not agree with the subject.

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[4]   Note that while this function of passive voice is the same in Finnish as in the Germanic languages, there are important differences and it has been questioned whether the Finnish passive is indeed a passive at all (see the discussion in Hakulinen et al., 2004, § 1331). In particular, patient referents are not turned into subjects in Finnish passive sentences, according to Vilkuna (1989, 50; also see Hakulinen & Karlsson, 1995, 174), and passive forms exist for both transitive and intransitive verbs, although the former are more frequent (Vilkuna, 1989, 253, footnote 16). In fact, passive forms together with the first person plural pronoun *me* 'we', e.g. *me menttiin* 'we went', are extremely frequent in casual spoken Finnish, as already observed by Penttilä (1957, 471–472), and have replaced the first person plural active forms, e.g. *(me) menimme* 'we went', in many dialects (Karlsson, 2008, 354). Also note that while passive constructions in Germanic languages usually have the function of topicalising or foregrounding the patient, this is frequently achieved by word order variation in Finnish, with an active OVS sentence corresponding most closely to an English passive, e.g. *Kallea löi Pekka* 'Kalle was hit by Pekka' (e.g. Hakulinen & Karlsson, 1995, p.255–256; also see Kaiser, 2000, on the discourse functions of OVS).

	K-position	T-position	V-field	
(13)	Tä-ssä	on	virhe-i-tä.	
	this-INE	is.3SG	mistake-PL-PRT	

'There are (some) mistakes here / in this'.
(adapted from Hakulinen et al., 2004, § 893)

Hakulinen et al.'s (2004) typical existential sentence fulfilling all these criteria appears in (13), while a representative example from the current data set is shown in (14). In our data, only seven localisations (3%) contained a form of the verb *olla* 'to be' in accordance with (12a), while by far the most frequent verb was *tulla* 'to come' (119 cases or 54%). Altogether 137 localisations (62%) fulfilled the word order criteria in (12b). However, localisations never included partitive subjects (12c). Consequently, the criterion in (12e) does not apply, since non-agreeing verb forms as in (13) default to the third person singular, which constitutes agreement with the nominative singular subjects referring to the manipulated animal. Lastly, participants did not use negation in the localisations, so that (12d) cannot be evaluated.

	K-position	T-position		V-field	
(14)		*tiikeri-n*	*taa-kse*	tule-e	**sika.**
		tiger-GEN	back-TRA	come-3SG	pig.NOM

'[...] behind the tiger comes a pig'. (28.10)

There is some disagreement as to which criteria are decisive (for an overview, see e.g. Hakulinen & Karlsson, 1995, 95–97), but it seems reasonable to classify localisations like (14), with the word order properties described in (12b) and a third person singular form of the verb *tulla* 'to come', as existential sentences. Overall 47% were of this type, with an additional 12% being in line with (12b), but containing passive verbs forms like *laitettiin* 'was put' (104 and 26 cases, respectively). Relating this to information structure, participants did not use existential sentences in localising displaced given animals at all, but *tulla*-existentials made up 59% of localisations for new animals and 52% for reintroduced ones (83 and 21 cases, respectively). Passive existentials appeared in 18 new animal localisations (13%) and in eight localisations of reintroduced animals (20%).

A more detailed syntactic analysis of the data was presented in Féry et al. (2010). The article presented a cross-linguistic study of semi-spontaneous data obtained from the same experiment as the one reported here conducted uniformly for six languages (Chinese, English, Finnish, French, Georgian and German). The well-known tendency for a given constituent to be uttered before a new constituent delivered the non-canonical marked word order (locative expression before locatum, Lx≻Loc). It was shown there that prosodic alignment is first of all a prosodic constraint that relates information structure to the edge of a prosodic domain. But

syntax provides some of the tools to fulfil this constraint. Thus, prosody and syntax are working together in satisfying information structural needs. In a subset of the studied languages (German, Georgian and Finnish), non-canonical orders were dominant in the critical context. At the other extreme, in French and English, non-canonical orders were always non-preferred, even though they occurred more frequently in the critical condition. The Chinese results were intermediate between the two classes of language. This difference was related to the fact that the syntactic operations involved in the derivation of non-canonical word orders differed in the two language types: the non-canonical word orders in German, Georgian and Finnish were analysed as the result of scrambling, while the non-canonical word orders in English, French and Chinese were understood as the results of movement to designated positions in the left periphery. In other words, it was shown that some languages, including Finnish, were much more responsive than others in their propensity for a non-canonical word order for the sake of information structure. This difference was attributed to the restricting role played by syntax and prosody in the languages considered.

5.2 Prosody

Prosodic marking of information structure was much weaker in the semi-spontaneous data than in the comparable study with fixed word order summarised in section 2. For most of the phonetic measures, effects were less clear in the data with variable word order and often not statistically significant. Before proceeding to the detailed analyses, consider example (15), a localisation of a new locatum (see Figure 4). The difference to the prosodic information structure marking exemplified in Figure 2 is striking. Whereas Figure 2 shows pitch range boosting for the new constituent and compression for the given parts, Figure 4 exhibits regular downstep of p-phrase tones throughout the sentence. This includes the pitch contour on the new locatum *hevonen* 'horse', which the speaker realised in final position, as is typical in our data. In accordance with its position, the locatum ends in creaky voice and is slightly elongated. It is, however, not especially prominent. Notice also the absence of non-modal voice quality or shortened durations during the rest of the sentence.

(15) Sitte *gorilla-n   oikea-lle   puole-lle* tul-i **hevonen.**
  then gorilla-GEN right-ALL side-ALL came horse

  'Then a horse came on the gorilla's right side'. (19.3)

The following subsections flesh out this finding in more detail with the support of statistical analyses. For all measures, we first present an analysis of the data set on a whole, using mixed-effect models. We then give the results of separate analyses for the subset of data in Loc≻Lx. This order occurs in all three
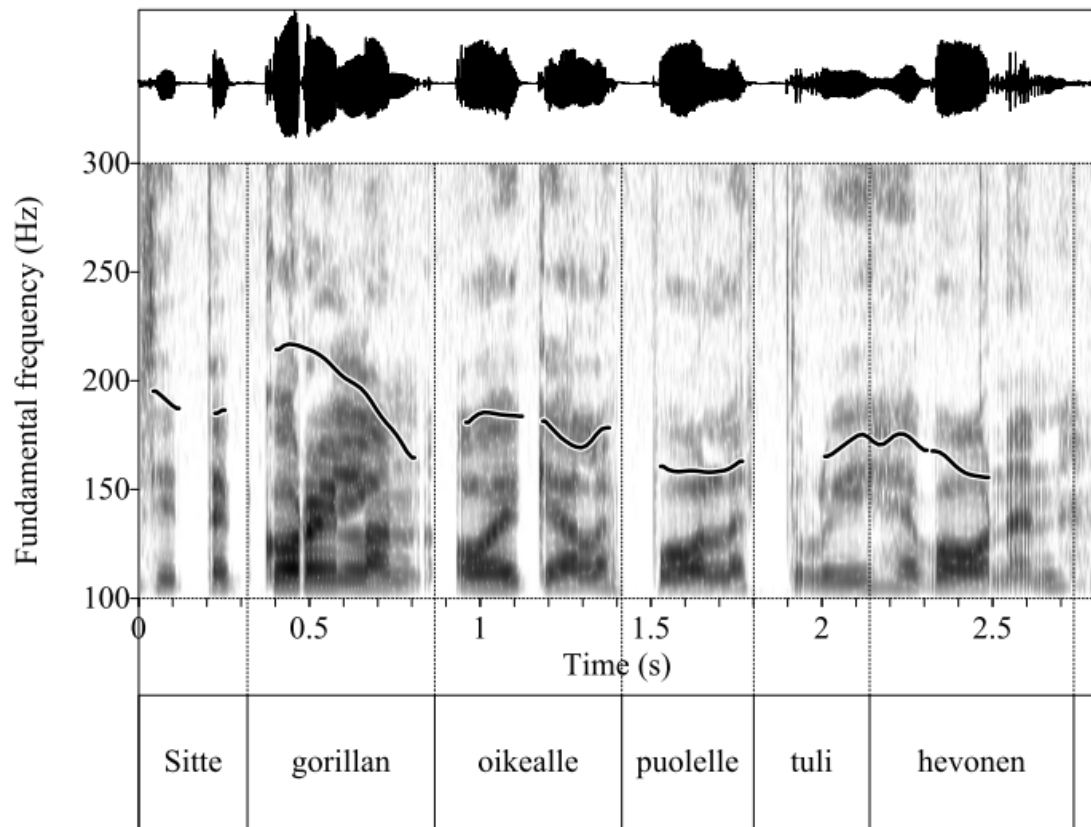
Figure 4: Localisation with new locatum.

information structural conditions, so that it is possible to test for the pure effect of givenness and exclude an effect of word order. The subset analyses used t-tests, since it contained a reduced number of data points. Frequently, these two evaluations give very different results. The overall analyses of the data set as a whole, which ignored differences in word order, sometimes yielded a rather counter-intuitive picture. Several apparent effects of givenness in the data set on a whole did not persist in the subset analyses. We assume that they can be explained as differences in relative order (see section 5.1), thus positional effects. However, it was not possible to directly test statistically for an interaction of givenness and word order in the current data set due to distributional gaps. That is, since Lx≻Loc order never occurred for localisations of given animals, the factors order and givenness status could not be crossed.

5.2.1 *Pitch range*

In the data set on a whole, new and reintroduced locata did not have a larger pitch range than given ones. The subset analysis indicated that this was likely a positional effect: While the relative order of locatum and locative expression varied for new and reintroduced animals, localisations of given ones exclusively used Loc≻Lx order. Thus, given animal referents always appeared relatively early in the utterance, while new and reintroduced ones frequently appeared towards the end, often in absolute final position (cf. section 5.1). Due to downstep / declination, pitch range tends to be larger at the beginning of the utterance, all else being equal (see, e.g. Prieto et al., 1996, for an investigation of downstep and declination in Spanish; declination in Finnish is mentioned by Välimaa-Blum, 1993, 83, and Iivonen, 1998, 317).

Across the data set as a whole, mean pitch range was smaller for new and reintroduced locatum animals (2.5 semitones (st) and 2.8 st, respectively, compared to 3.9 st for given ones). A linear mixed-effects model indicated that this difference was significant for reintroduced, and marginally significant for new locata (cf. Table 3).[5] It also included two other factors significantly affecting pitch range: number of segments and relative distance from utterance beginning. The effect of the first predictor indicates that words with more segments had larger ranges than shorter words. The second factor is a measure of the distance of the locatum from the beginning of the utterance relative to sentence duration. This measure had values ranging from 0 for sentence-initial locata to almost 1 for locata realised close to the end of the utterance. Its negative effect in Table 3 suggests that pitch

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[5]   The fact that, in spite of a higher mean value for new locata, a significant effect arose for reintroduced locata, but not for new ones, appears to have been caused by the difference in distributions for these two conditions. As visible from Figure 5, variance was much larger for new locata than for given and reintroduced ones.

range was overall smaller for locata realised later in the utterance, indicating a declination effect.

Table 3: Best model of locatum pitch range (in st), with random by-subject effects of givenness status (167 observations).

	Estimate	Std. Error	t value
(Intercept)	2.0943	0.8494	2.4657
New	−0.7756	0.4207	−1.8434
Reintroduced	−0.8426	0.4069	−2.0705
Number of segments	0.5151	0.1238	4.1612
Rel. distance to beg.	−2.3311	0.5037	−4.6277

For a finer-grained picture of the effect of givenness, consider Figure 5, showing boxplots of pitch range for given, new and reintroduced locata separately for both orders. It illustrates that locatum pitch range was overall larger in Loc≻Lx than in Loc≻Lx order, the mean range being 3.8 st and 2.3 st, respectively. That is, pitch range was smaller for locata appearing earlier in the utterance, which is a natural effect of downstep / declination. Since the distribution of word orders significantly differed between given, new and reintroduced locata (cf. section 5.1), we directly assessed the effect of givenness for the subset of locata in Loc≻Lx order. A paired by-participant t-test comparing the pitch range of given and non-given (new and reintroduced) locata did not indicate a significant difference, nor did one comparing only given and new locata ($t(10) = 0.37, p = 0.7$ and $t(8) = −0.34, p = 0.7$, respectively; note that corresponding by-item tests could not be conducted due to the experimental design).

5.2.2 Duration

New and reintroduced locata showed longer average durations for the data set as a whole. Again, this effect did not persist in the subset model, thus it might be a positional effect. New and reintroduced locata were more often realised in final position, which is affected by final lengthening (see Nakai et al., 2009).

On average across the whole data set, participants realised given locata with a duration of 461 milliseconds (ms), while new locata were 504 ms and reintroduced locata 494 ms long. However, the linear mixed-effects model in Table 4 suggests that reintroduced locata were significantly shorter than given ones, while the duration of new and given locata did not differ significantly. Instead, the model includes a significant effect of number of segments, with locata consisting of more segments being understandably longer in duration. Also, locata had longer durations when the locatum expression preceded or followed a pause.
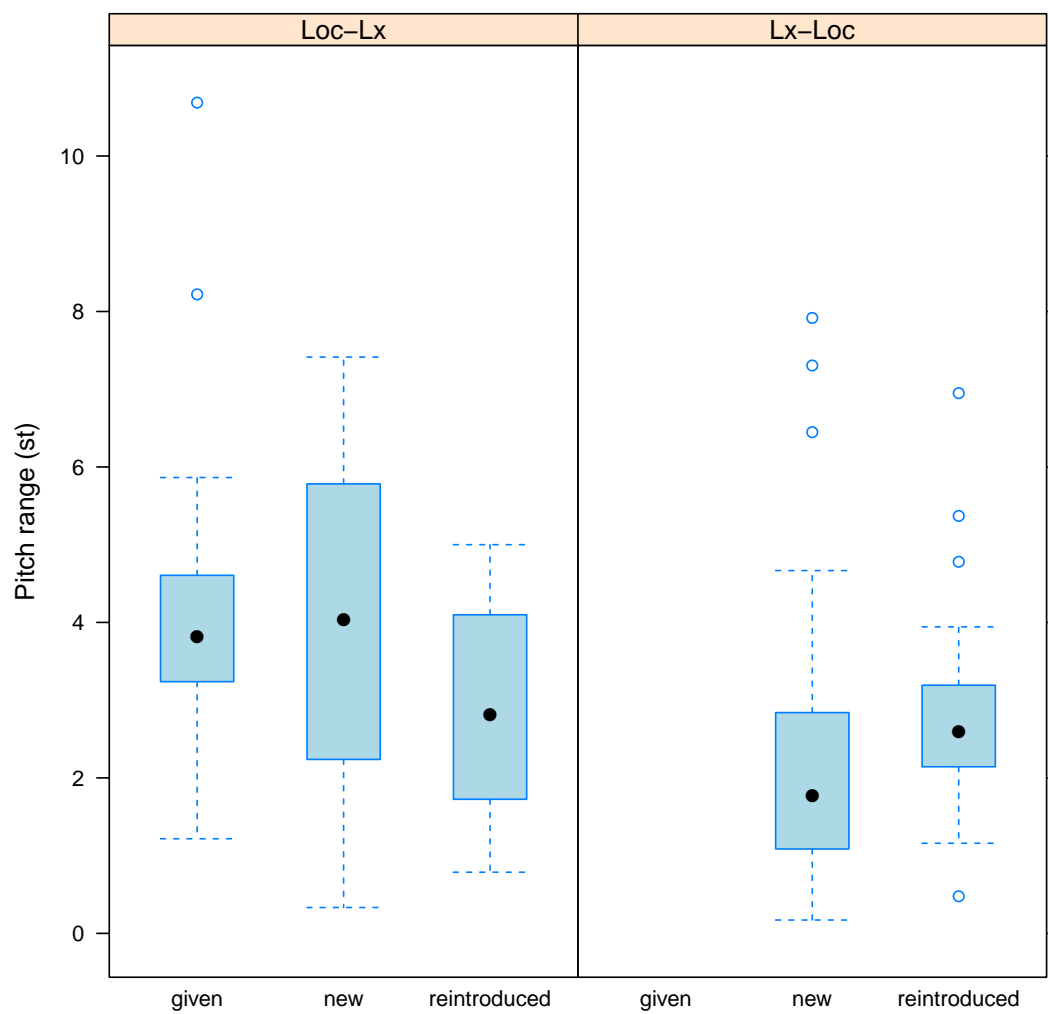
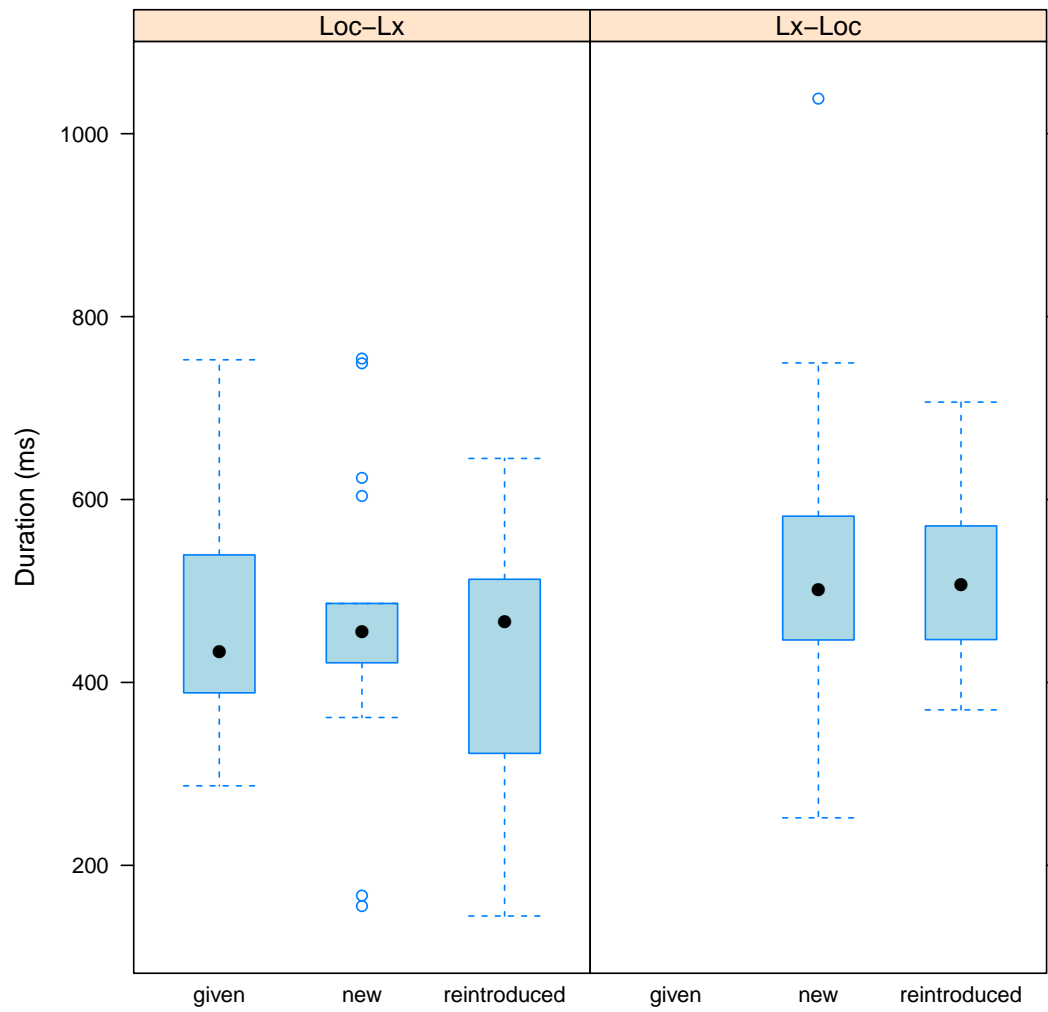*Figure 5: Pitch range of locatum animals in different conditions (in st).*

Figure 6: Duration of locatum animals in different conditions (in ms).

Table 4: Best model of locatum duration (in ms), with random effects of subject (219 observations).

	Estimate	Std. Error	t value
(Intercept)	102.9975	34.6730	2.9705
New	11.5650	17.4551	0.6626
Reintroduced	−32.4980	19.7665	−1.6441
Number of segments	57.1341	5.5468	10.3003
Following a pause	47.0956	11.8688	3.9680
Preceding a pause	93.2954	14.9131	6.2559

Figure 6 shows the distribution of duration measurements for given, new and reintroduced locata separately for the two word orders. Overall, locatum durations were shorter when the locatum preceded the locative expression than in the reverse order, which only occurred with new and reintroduced locata (mean 456 ms and 511 ms, respectively). This is expected since locata in Lx≻Loc order overwhelmingly occupied the utterance-final position (recall section 5.1), where they were affected by final lengthening. In Loc≻Lx order, paired by-participant t-tests did not find a significant difference between given and non-given or between given and new locata ($t(12) = 1.22, p = .2$ and $t(9) = 0.22, p = .8$, respectively).

5.2.3 Voice quality

Figure 7 depicts the percentage of (partly) non-modal realisations for first and second syllables of given, new, and reintroduced locata in Loc≻Lx and Lx≻Loc order, respectively. It shows that in Loc≻Lx order, non-modal realisations were infrequent for the first syllables of locata in all givenness conditions, whereas second syllables were more often non-modal for new and especially reintroduced locata compared to the given condition. When locata followed locative expressions, participants realised both their first and second syllables with non-modal voice quality in about 40%–60% of the (new and reintroduced) locata.

Binomial linear mixed-effects models estimated the differences between givenness conditions to be significant in the data set as a whole. The significant positive effects suggest that non-modal voice quality was more likely for the first syllables of new locata than for those of given ones (cf. Table 5), and more likely for the second syllables of both new and reintroduced locata than for the given intercept (cf. Table 6).

In addition to the effects of givenness, both models indicated that non-modal voice quality was significantly more likely later in the utterance, i.e. at a greater relative distance from its beginning. Also, participants used non-modal voice
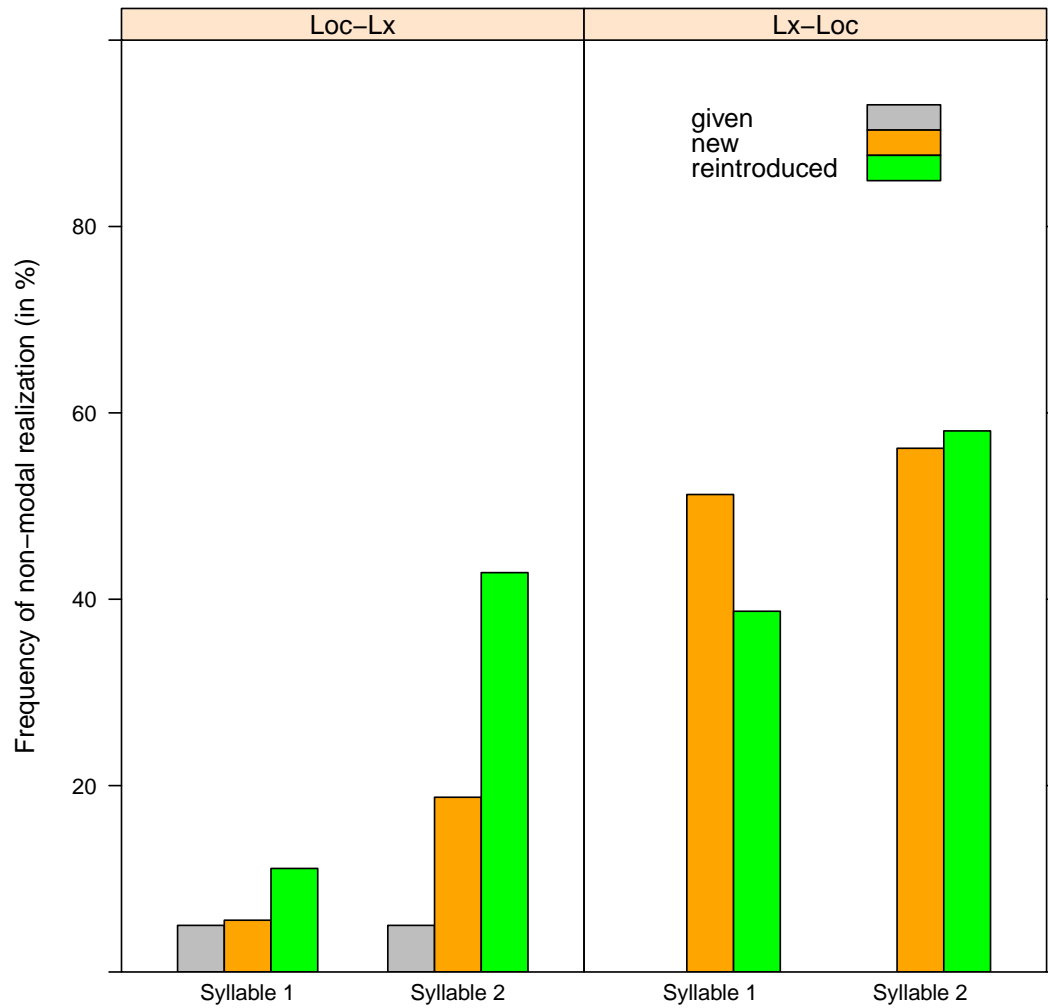
Figure 7: Percentages of syllables with (partly) non-modal voice quality in different conditions for first and second syllables of locata.

Table 5: *Best model of occurrence of non-modal voice quality in first syllables of locata, with random effects of subject (219 observations).*

	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	−3.2593	1.3503	−2.4137	0.0158
New	1.7549	0.8605	2.0394	0.0414
Reintroduced	1.4423	0.9179	1.5713	0.1161
Rel. distance to beg.	4.4855	1.0721	4.1839	0.0000
Number of segments	−0.3946	0.1762	−2.2390	0.0252

Table 6: *Best model of occurrence of non-modal voice quality in second syllables, with random effects of subject (215 observations).*

	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	−4.6747	0.8927	−5.2367	0.0000
New	2.4486	0.8277	2.9584	0.0031
Reintroduced	2.7289	0.8792	3.1038	0.0019
Rel. distance to beg.	3.1977	0.8422	3.7969	0.0001

significantly less frequently on first syllables of locata consisting of a larger number of segments according to the model in Table 5.

Analysing only the subset of locata in Loc≻Lx order, we found no significant effect of givenness on the voice quality of the first syllable (Fisher's exact test, two-sided: $p = .7$; loglinear model: $df = 64, \chi^2 = 0.42, p = .8$). In contrast, Fisher's exact test confirmed the significant effect of givenness on the voice quality of the second syllable when comparing given, new and reintroduced locata in Loc≻Lx order (two-sided, $p < 0.05$) and a loglinear model likewise found a significant effect ($df = 60, \chi^2 = 7.07, p < 0.05$). However, the effect disappeared when reintroduced items were excluded: When considering only given and new locata in Loc≻Lx order, we did not find a significant difference between them (Fisher's exact test, two-sided: $p = .1$; loglinear model: $df = 54, \chi^2 = 2.38, p = .1$).

5.2.4 Pauses

All in all, 159 locata, i.e. 74%, were followed by a pause—either utterance-internally or marking the end of the utterance. As indicated by the model in Table 7, the occurrence of a pause was significantly more frequent after new and reintroduced locata than after given ones, with 86% of new locata, 82% of reintroduced locata and 18% of given ones followed by a pause (119, 33 and 7 occurrences, respectively). However, recall that participants realised most new and reintroduced locata in Lx≻Loc order where they were almost always utterance final, and thus followed by a pause, whereas all given locata preceded the locative expressions. For the subset of locata realised in Loc≻Lx order, the effect of givenness was not significant (Fisher's exact test, two-sided: $p = .6$; loglinear model: $df = 64, \chi^2 = 0.78, p = .7$).

Table 7: *Best model of occurrence of pauses after locata, with random effects of subject (219 observations).*

	Estimate	Std. Error	z value	Pr($>$|z|)
(Intercept)	-7.5049	1.6255	-4.6170	0.0000
New	2.7439	0.5402	5.0798	0.0000
Reintroduced	2.5086	0.7048	3.5596	0.0004
Rel. distance to beg.	6.1096	1.0992	5.5583	0.0000
Number of segments	0.5402	0.2315	2.3336	0.0196

Finally, pauses were also significantly more frequent after locata appearing relatively late in the utterance and after those containing more segments (cf. Table 7 again). The former finding seems to be a statistical reflection of the fact that

locata late in the sentence were frequently utterance-final and thus by definition followed by a pause. The latter might be an effect of constraints on maximal phrase length, but this explanation would need to be backed up by further research.

6 Discussion and Conclusion

This article has investigated information structure marking in a semi-spontaneous experiment, in which participants were free to choose word order. In accordance with hypothesis 1 in section 4, word order showed a clear effect of the difference between given and new (and to a lesser extent reintroduced) referents, with new referents mostly occupying the sentence-final focus position and given ones overwhelmingly appearing in the earlier T-position. Related to this word order variation, we found that participants used existential sentences in the majority of localisations of new and reintroduced locata—but not for localising displaced given animals. This follows naturally from Vilkuna's (1989; 1995) model of discourse configurationality. Two of the most important characteristics of prototypical existential sentences are their function of introducing new referents into the discourse and their tendency for subjects to appear after the verb, frequently in final position (e.g. Vilkuna, 1989, and Karlsson, 2008, focus on word order, but cf. Penttilä, 1957, who discusses existentials primarily in relation to partitive subjects). The final position in the V-field is the default location of non-contrastively focused elements according to Vilkuna (1989, 1995). The use of existentials, characterised by late subjects, is thus a way of placing a new (subject) referent in the focus position. The two properties, late subjects and the function of introducing new referents, then, thus are two sides of the same coin, strongly connected to the fact that Lx≻Loc order dominated in localisations of new and reintroduced locata, while localisations of given locata exclusively used Loc≻Lx order.

In contrast with the pervasive syntactic effects of information structure, the prosodic effects usually did not reach significance. These results differed clearly from the results of a previous study with scripted data imposing unmarked SVO word order, summarised in section 2. Prosodic marking of information structure was ubiquitous in the study with fixed SVO order, but not in the present experiment (cf. the overview in Table 8). In accordance with hypothesis 2, new locata were expected to have a larger pitch range and longer duration, as well as to end in non-modal voice quality and to be followed by pauses more frequently than given locata, based on the SVO data. However, new locata did not exhibit larger pitch ranges or longer durations. While they ended in non-modal voice quality and were followed by pauses more frequently than given locata in the data set as a whole, only the effect of voice quality persisted in the subset analysis of localisations with Loc≻Lx order. Thus, prosodic marking of information structure was considerably

less in the variable word order than with fixed SVO word order.

Table 8: Comparing prosodic marking of information structure for fixed and variable word order: Effects of new/focused status.

Effect	Fixed SVO	Variable order	
		overall	Loc≻Lx
Larger pitch range	×		
Longer duration	×		
More final non-modal voice quality	×	×	×
More following pauses	×	×	

We argue here that the availability of word order variation in the localisation experiment was the crucial reason for the decreased use of prosodic information structure marking in the localisation experiment. Since syntax (and morphology) were fixed in the earlier study, prosodic devices carried the load of transmitting information structure on their own. By contrast, the participants of the localisation experiment were free to use syntactic devices to mark the manipulated variation in givenness and they consistently made use of this option. In fact, we go a step further and suggest that the participants of the localisation experiment used only one of the two prosodic strategies identified on the basis of previous research, the adjustment of phrasing. Notice that the prosodic effects that did reach significance were the use of non-modal voice quality and (partly) the occurrence of pauses, both known as finality markers. Also, the speakers clearly preferred to place new referents in final position syntactically, making them also prosodically final. Therefore, we assume that whereas speakers did not boost the prosodic prominence of new elements as much as for scripted SVO materials, the prosodic requirement that focused constituents be right-edge aligned with i-phrases was still active. While participants employed other grammatical means of information structure marking, they still additionally used some prosodic means, in line with our hypothesis 2. This prosodic constraint may be explicitly linked to the well-known fact that the default position for new information foci is sentence-final in Finnish. To achieve the alignment of i-phrase and focused constituent, placing the focused material in final position is maximally efficient. In this case, only one i-phrase is needed to accommodate both the focused constituent and the non-focal parts of the utterance, as illustrated schematically in (16a). When the option to re-order is not available, like in the study summarised in section 2, an additional i-phrase boundary has to be inserted, see (16b) and (16c).

	K-position	T-position		V-field
a.		$(\ldots$	$\ldots$	$[\ldots]_{FOC})_i$
b.		$([\ldots]_{FOC})_i$	$(\ldots$	$\ldots)_i$
c.		$(\ldots$	$[\ldots]_{FOC})_i$	$(\ldots)_i$

(16)

The structure in (16a) fulfils both the prosodic alignment constraint and adopts the syntactic default of placing the new / focused element in the final position, while at the same time reducing the number of i-phrases to a minimum. In contrast, (16b) and (16c) manage to align focus constituent and i-phrase boundary, but deviate from the standard Finnish discourse configuration and, in doing so, require one more i-phrase to accomodate the same material. Therefore, (16a) is optimal both from the syntactic and the prosodic point of view, while (16b) and (16c) are inferior in both respects. It is difficult to say whether prosodic phrasing is caused by syntactic regularities or whether it is the other way around. That is, it can also be the case that prosodic constraints create the syntactic patterns so frequently observed. Either way, our data show a close connection between the use of prosody and syntax in marking information structure.

References

Arnhold, Anja. 2011. Multiple prosodic parameters signaling information structure: Parallel focus marking in Finnish. In Wai-Sum Lee & Eric Zee (eds.), *Proceedings of the ICPhS XVII, 17-21 August 2011, Hong Kong*, 248–251.

Arnhold, Anja. 2013. *Finnish prosody: Studies in intonation and phrasing*: Goethe University Frankfurt am Main dissertation.

Baayen, R. Harald. 2008. *Analyzing linguistic data: A practical introduction to statistics using R.* Cambridge University Press.

Baayen, R. Harald, Douglas J. Davidson & Douglas M. Bates. 2008. Mixed-effects modeling with crossed random effects for subjects and items. *Journal of Memory and Language* 59(4). 390–412.

Boersma, Paul & David Weenink. 2013. Praat. Doing phonetics by Computer (version 5.3.45). Retrieved Apr 21, 2013. www.praat.org.

Esling, John H. 2006. States of the Glottis. In Keith Brown (ed.), *Encyclopedia of language & linguistics (second edition)*, 129–132. Oxford: Elsevier.

Féry, Caroline. 2010. Indian languages as intonational 'phrase languages'. In Imtiaz Hasnain & Shreesh Chaudhury (eds.), *Problematizing language studies. Festschrift for Rama Agnihotri*, 288–312. Delhi: Aakar Books.

Féry, Caroline. 2013. Focus as prosodic alignment. *Natural Language & Linguistic Theory* 31(3). 683–734.

Féry, Caroline, Stavros Skopeteas & Robin Hörnig. 2010. Cross-linguistic comparison of prosody, syntax and information structure in a production experiment on localising expressions. *Transactions of the Philological Society* 108(3). 329–351.

Gundel, J K, Nancy Hedberg & Ron Zacharski. 1993. Cognitive status and the form of referring expressions in discourse. *Language* 69(2). 274–307.

Hakulinen, Auli & Fred Karlsson. 1995. *Nykysuomen Lauseoppia*. Jyväskylä: Gummerus 3rd edn.

Hakulinen, Auli, Maria Vilkuna, Riitta Korhonen, Vesa Koivisto, Tarja Riitta Heinonen & Irja Alho. 2004. VISK (online version of *Iso suomen kielioppi*). Retrieved Jan 06, 2014. http://scripta.kotus.fi/visk.

Iivonen, Antti. 1998. Intonation in Finnish. In Daniel Hirst & Albert Di Cristo (eds.), *Intonation systems: A survey of twenty languages*, 311–327. Cambridge: Cambridge University Press.

Kaiser, Elsi. 2000. The discourse functions and syntax of OSV word order in Finnish. In Arika Okrent & John P. Boyle (eds.), *The proceedings from the main session of the Chicago linguistic society's thirty-sixth meeting, vol. 36.1*, 179–194. Chicago: Chicago Linguistic Society.

Karlsson, Fred. 2008. *Finnish. An essential grammar* Routledge essential grammars. Oxon: Routledge 2nd edn.

Krifka, Manfred. 2008. Basic notions of information structure. *Acta Linguistica Hungarica* 55. 243–276.

Mixdorff, Hansjörg, Martti Vainio, Stefan Werner & Juhani Järvikivi. 2002. The manifestation of linguistic information in prosodic features of Finnish. In *Proceedings of speech prosody 2002*, 511–514. Aix-en-Provence.

Nakai, Satsuki, Sari Kunnari, Alice Turk, Kari Suomi & Riikka Ylitalo. 2009. Utterance-final lengthening and quantity in Northern Finnish. *Journal of Phonetics* 37(1). 29–45. doi:10.1016/j.wocn.2008.08.002.

Nevis, Joel Ashmore. 1986. *Finnish particle clitics and general clitic theory* Ohio State University Working Papers in Linguistics 33. Columbus, Ohio: The Ohio State University, Department of Linguistics.

Penttilä, A. 1957. *Suomen kielioppi*. Porvoo/Helsinki: WSOY.

Prieto, Pilar, Chilin Shih & Holly Nibert. 1996. Pitch downtrend in Spanish. *Journal of Phonetics* 24(4). 445–473. doi:10.1006/jpho.1996.0024.

R Development Core Team. 2010. R: A Language and Environment for Statistical Computing (version 3.0.1). Retrieved Jul 15, 2013. http://www.r-project.org.

Selkirk, Elisabeth O. 2000. The interaction of constraints on prosodic phrasing. In Merle Horne (ed.), *Prosody: Theory and experiment. Studies presented to*

   Gösta Bruce, 231–261. Dordrecht, Boston and London: Kluwer.

Suomi, Kari. 2007. On the tonal and temporal domains of accent in Finnish. *Journal of Phonetics* 35. 40–55.

Vainio, Martti & Juhani Järvikivi. 2006. Tonal features, intensity, and word order in the perception of prominence. *Journal of Phonetics* 34. 319–342.

Vainio, Martti & Juhani Järvikivi. 2007. Focus in production: Tonal shape, intensity and word order. *The Journal of the Acoustical Society of America* 121(2). EL55–EL61.

Välimaa-Blum, Riita. 1988. *Finnish existential clauses - their syntax, pragmatics and intonation*: The Ohio State University dissertation.

Välimaa-Blum, Riita. 1993. A pitch accent analysis of intonation in Finnish. *Ural-Altaische Jahrbücher* 12. 82–94.

Vallduví, Enric & Maria Vilkuna. 1998. On rheme and kontrast. *Syntax and Semantics* 29. 79–108.

Vilkuna, Maria. 1989. *Free word order in Finnish: Its syntax and discourse functions*. Helsinki: Suomalaisen Kirjallisuuden Seuran Toimituksia.

Vilkuna, Maria. 1995. Discourse configurationality in Finnish. In Katalin É. Kiss (ed.), *Discourse configurational languages*, 244–268. New York/Oxford: Oxford University Press.

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