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The syntax and prosody of the post-verbal domain in Hungarian

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Abstract

The present study investigates the syntactic and prosodic realisation of focus and givenness in the post-verbal domain of Hungarian. Two series of experiments were run, the first tested subjects' word order preferences of given and focused constituents, while the second set examined the prosodic realisation of these items. As opposed to the pre-verbal domain, word order in the post-verbal domain is relatively free. While the pre-verbal domain has been highly studied the post-verbal domain remains relatively under studied, non-the-less, due to the freedom of word order it provides and ideal place to investigate the interaction of word order, prosody and information structure.

The word order experiments consisted of three types of focus constructions: (i) simple post-verbal focus, (ii) post-verbal focus marked with the particle *is* 'also' and (iii) double focus constructions. In terms of givenness there were also three types, (i) simple textual givenness, (ii) items that were both textually given and marked as topics, and (iii) items that were textually given as well as forming the background of a pre-verbal focus. All experiments in the first set were conducted using the two-way forced choice paradigm, with 16 target sentences and a total of 362 participants. The results indicate that participants preferred to place focused constituents in the immediately post-verbal position as opposed to the clause final position in the case of all three post-verbal foci. In the case of givenness, simple textual givenness did not have an effect on word order, while constituents that were both given and marked as topics, or given and formed the background of a pre-verbal focus were preferred in the immediately post-verbal position, as opposed to the clause-final position, just like focused items. While the tendencies observed were clear it is obvious that word order choices reflected preferences, and not strict, grammatical differences as in the pre-verbal domain.

The second set of experiments were run to gain an understanding of the prosodic realisation of post-verbal foci and given constituents, there were again three types of foci, and two types of givenness: simple and backgrounded. There were 4 target sentences in three repetitions, and a total of 42 participants. The parameters considered were f0 maxima, minima and range, as well as the placement of f0 maxima within accented syllables, duration and intensity. The results indicate that there was no effect of givenness in either of its forms tested on the acoustic realisation of constituents. In terms of post-verbal foci however, there were significant differences: if a focused item occurred in the clause final position it was marked by parameters (f0 maxima, duration), than if it occurred in the immediately post-verbal position as compared to the baseline neutral controls. In terms of phrasing: boundaries between the two post-verbal constituents were present both if the immediately post-verbal constituent was in focus, and

when the clause-final constituent was in focus.

It is proposed that these findings are best accounted for by a system which accounts for the word order phenomena as driven by prosody. It is suggested that Intonational Phrases in Hungarian have a structurally (but not acoustically) prominent position on their right edges, in line with Varga (1981, 1988, 2002). In this framework given items of type (ii) and (iii) are dispreferred in the clause final position due to the fact that it is more prominent, and therefore occur in the immediately post-verbal position. Wile post-verbal foci, that occur in this position are followed by an IP boundary, in this way they occur at the right edge of an IP, but are more saliently marked than if they were to appear at an IP boundary which is also the final boundary of an utterance.

Contents

Chapter 1

Introduction

This study is concerned with the interaction of syntax, prosody and information structure in the post-verbal domain of Hungarian. Information structure has been likend with both syntactic phenomena, such as displacement or specific constructions and prosodic phenomena such as deaccentuation and restructuring. Hungarian is notable for the fact the pre-verbally it reflects information structure related roles by way of word order. Post-verbally however, its syntactic structure is much different. Here there seems to be a domain of relatively free word order with syntactic relations exhibiting both structural symmetries and asymmetries. While information structural categories and their syntactic and prosodic realisations in the pre-verbal domain have featured prominently in the literature, notably less attention has been given to these categories in the post-verbal domain. The importance of a study focused at the question of the interaction of syntax, prosody and information structure in this domain is not only important because it will expanding the literature on an understudied area, but because the notably different structural composition of the post-verbal domain in terms of syntax and possibly also prosody provides an interesting environment to examine the interaction of these three components of language.

The thesis will first examine the basic notions and background relevant to formulating research questions regard the topic of its inquiry in Chapter 2. This will include examining the information structural categories of focus and givenness. Followed by an examination of the syntactic and prosodic realisation of these categories. In the case of syntax this means that in many languages there are marked constructions such that for example a constituent in narrow focus is required to be in a specific position within the sentence, or that contextually given material precedes contextually new material. These phenomena has lead to numerous theories which are based in varying assumptions about the interaction of information structure and syntax, such as the cartographic approach (Rizzi, 1997) which sees information structural cat-

1

egories like topic and focus as being associated with various functional projections by way of features interpretable to syntax. Other theories argue in favor of so called interface approaches (Zubizarreta, 1998), where syntactic movement is motivated by the prosodic needs of particular constituents.

In terms of prosodic realisation this means that information structural categories are associated with cues reflecting varying degrees of prominence. An important aspect of prosodic prominence marking is the prosodic structure of a language itself, which may limit the ways in which prominence may be realised. Importantly it is also prosodic structure which interacts with syntax, therefore the realisation of information structural categories may best be understood as a complex interaction of these three domains.

Chapter 2 will also examine the relevant background on Hungarian. The difference between the pre- and post-verbal domain will be highlighted to point out the distinct syntactic properties of these two areas. Importantly it will be shown that the word order of constituents in the post-verbal domain shows a high degree of freedom, which means that varying word order relation are easily realised with out any economic constraints being violated. Hungarian prosody will also be examined, focusing on the question of the structural properties of the intonational phrase (IP), namely whether or not it has any default prominent positions which may interact with focus realisation. One prominent view is that IPs in Hungarian are left-headed (Szendrői, 2001) and this left-headedness is what creates a prominent position in the pre-verbal domain, which motivates movement to the canonical pre-verbal focus position. Crucially, the thesis will present the distinction between identificational and informational focus as proposed by É. Kiss (1998a). Based on this distinction it will be argued that there is a possibility to have foci in the post-verbal domain of Hungarian. Three such possibilities will be described: (i) simple unmarked post-verbal informational focus, (ii) informational focus marked with the focus sensitive particle *is* and (iii) identificational focus that is the post-verbal member of a double focus construction where the pre-verbal focus position is also filled.

The presence of post-verbal focus as well as contextually given material combined with the free word order possibilites of post-verbal syntax as well as the possible left-headedness of the Hungarian intonational phrase presents and interesting line of inquiry. How are post-verbal givenness and focus realised? This study will break down this overall question into two areas that will be independently examined by way of perception and production experiments.

Chapter 3 will present a series of forced choice experiments to ascertain the effects on word order of focus and givenness. The structures that were examined were such that the focused/given target item was placed in either the immediately post-verban (IPV) or the clause-

final (CF) position, and participants had to choose which word order variant they preferred as shown in (1).

(1)   a.   Verb XP_{focus} YP

        b.   Verb XP YP_{focus}

        c.   Verb XP_{given} YP

        d.   Verb XP YP_{given}

This experiment examined all three instances of post-verbal focus described above, as well as three different types of givenness: simple textual givenness, where the target item was lexically present in the context question; textual givenness + topical givenness, where the target item was not only present in the context question, but was also marked as its topic; and textual givenness + backgrounding, where the target item was present in the context question but also formed the background of the pre-verbal focus in the sentence where it occurred.

The results of these series of experiments indicate a clear preference for the focused item to be placed in the IPV position following the verb in all three focus types. In the case of givenness there was a distinction between simple textual givenness and the other two types. While only textually given items were not associated with any preferences, topical and backgrounded give items were preferred in the IPV position, just like foci. The nature of word order effects is also important to note. They do not seem to reflect categorical differences as it might be expected in the pre-verbal domain, rather they appear to reflect preferences. For example, the placement of focus in the CF position is possible it is just not preferred. This type of data poses a considerable problem for theories which view information structure related movement as driven by syntactic features. Therefore, it is argued that post-verbal information structure related phenomena is best explained by an interface theory which relies on the interaction of prosodic and syntactic structure.

The second group of experiments presented in Chapter 4 were concerned with the prosodic production of post-verbal foci in the two position (IPV, CF). While givenness was not independently examined in this experiment, it was considered beside focus, such that in certain conditions the focused constituent had a given, while in other a new clause mate. These experiments also examined all three types of post-verbal foci presented above.

It was found that there is a difference in prosodic realisation between foci in the IPV and CF positions. Both showed an association with higher f0 maxima values in their accented syllables. But, only the accented syllables of foci in the CF position were also consistently associated with higher f0 minima values as well as an increase in intensity. In terms of prosodic phrasing

as shown primarily by the presence of pre-final lengthening, there are also considerable differences between foci in the two positions. There do not seem to be any pre-focal boundaries before foci in the IPV position, while there is limited evidence for the presence of a boundary before foci in the CF position. However, there is considerable evidence for the presence of a boundary following the focus in the IPV position. While there are some notable differences between focus types the overall trends are present clearly present.

If a prosody driven theory of movement is to explain the combined results of the two experiments it will need to do the following: on the one hand create a prosodically prominent position immediately following the verb, in order to explain why focus is preferred in that positon; on the other, it must allow for this position to be prosodically non-prominent to explain the preference of given material in this position. Further more, it must be flexible enough to allow for the preferential nature of word order related to focus and givenness. Chapter 5 will examine the dominant interface theory for Hungarian as developed by Szendrői (2001, 2003); Hamlaoui & Szendrői (2015); Szendrői (2017). It will be shown that this theory is not sufficient in explaining the results, mostly because it is difficult for this theory to create a position of prominence in the post-verbal domain for the syntactic structures tested in this study.

It will be argued that by assuming that the prosodic marking of focus is associated not with the head (ie most prominent position) of an intonational phase, but primarily with its edge, a system of constraints may be created that derive the word order variations and prosodic marking observed in the two groups of experiments.

Chapter 2

Background

2.1 Information Structure: Focus and Givenness

Information Structure (IS) has been examined from many different angles with varying theoretical assumptions. Since the present study does not aim to make any claims regarding the nature of IS it will adopt a commonly held definition of this term as a framework, going back to Chafe (1974). IS in the terms of Chafe (1974) consists of the packaging of information conveyed in an utterance, pertaining to the temporary state of the adresse's mind. This packaging works by marking certain elements in the utterance as having specific functions with respect to the Common Ground (as originally formulated by Stalnaker (1974); Karttunen (1974); Lewis (1979), for example by marking a certain element as being the entity present in the common ground about which the utterance makes a predication, that is as being the topic of the sentence. This brief definition highlights the fact that IS is directly associated with many linguistic domains, it encodes information necessary for the computation of a specific meaning (semantics), based on a specific discourse context (pragmatics) and encoded by specific morphosyntactic and/or phonological forms. It is on this latter aspect that this study will concentrate by mapping the interaction of IS, syntax and prosody in the post-verbal domain of Hungarian, concentrating on focus and givenness. As will be shown below in Sections 2.3 and 2.5, Hungarian pre-verbal focus is associated with a specific syntactic and prosodic realisation. Post-verbally, however, these phenomena are somewhat understudied, and based on the fact that Hungarian post-verbal and pre-verbal syntax are fundamentally different its stands to reason that the realisation of information structural phenomena may also be fundamentally different. Therefore it is necessary to cross-linguistically survey these phenomena in order to understand alternate realisations and how they might be applicable to Hungarian. Section 2.1.1 will review the relevant background for focus and Sections 2.1.2 for givenness.

6 CHAPTER. BACKGROUND

2.1.1   Focus

There are many ways in which the notion of focus can be defined, or characterised. One possible understanding of focus is to look at it as having a quality of "newness", or a way of highlighting the most important information in an utterance. A proposal along these lines is described by Jackendoff (1972). Jackendoff's "new information focus" can be defined as information which is not shared by the speaker and the addressee. However, while the item in focus is usually new in terms of context, it has been suggested that this quality alone is neither sufficient nor necessary to define it, since focus need not be contextually new, as represented in the discourse bellow (Krifka, 2008).

(1)   A: Who stole the cookie, John or Mary?

        B: JOHN stole the cookie.

Krifka (2008), based on work in Alternative Semantics (Rooth, 1985, 1992) outlines focus as indicating the presence of alternatives that are relevant for the interpretation of linguistic expressions. Furthermore, he notes that the feature that is relevant to focus is the contrast that arises between an item and its alternatives. For example in the dialogue in (1) there are several responses which might be appropriate for the question, each with a different possible person as an alternative answer, the existence of this set of alternatives is what gives the special interpretation to the constituent JOHN.

The notion of focus can be interpreted and classified from many angles. For example one of these is by its use, which can be either semantic (affecting truth conditions) or pragmatic (common communicative goals of the participants) (Krifka, 2008), another is the distinction between information and identification focus (É. Kiss, 1998a) which will be presented in further detail in Section 2.3.3.1. Alternatively, categorisation can be based on the properties of the focused item in terms of the domain over which the focus marking extends. In this way distinction can be drawn between *broad* and *narrow* foci Ladd (1980). The difference between the two is shown in the question-answer pairs below. The statement in (2-b) is in broad focus, since the entire sentence is in a set of alternative sentences, all of which are possible answers to the question. While in (3-b) only the subject of the sentence is in focus, since the set of alternatives is such that it is made up of people who could have possibly put the dishes in the dishwasher.

(2)   Broad focus:

        a.   What happened after lunch?

        b.   [Steve put the dishes in the dishwasher]$_{foc}$.

(3)   Narrow focus:

    a.   Who put the dishes in the dishwasher?

    b.   [Steve]$_{foc}$ put the dishes in the dishwasher.

As is apparent from the examples above, focus in an expression can be elicited by a question in the context. While these questions are often actually uttered in the discorse they need not be. The notion of question-answer congruence (Paul, 1880; Roberts, 1996; Schwarzschild, 1999; Rochemont, 2012) holds that *wh*-constituent in the question corresponds to the constituent which is in focus, thereby it is the type of question which is responsible for marking out the domain of focus. Conversely, the marking of focus in an utterance that is not a response to a question leads to the assumption of a question which then becomes part of the Common Ground. The utterances of the type shown in (2-b) will be paired with questions whose domain extends over the entire utterance, while utterances such as the one shown in (3-b) are paired with questions where the the *wh*-word is one of the constituen, in this case the subject. The notion of question-answer congruence will be exploited in the experiments presented in this study, where questions will be used to present the appropriate contexts and to control the domain of focus in the target sentences.

2.1.2   Givenness

The notion of givenness has many uses and formal definitions, behind which the basic idea is that an item is given if it is somehow linked to another previously mentioned item or information that is shared by the interlocutors in a particular discourse. This property is linguistically relevant since it influences the way in which such an item is manifested in a sentence. This introduction explore on some of the concepts behind how givenness is defined, and it will present arguments to support an understanding of givenness that sees this category as gradient in the sense that some items may be more given than others. We will explore ways in which this gradience can be manifested, namely by considering the effects of topicality and backgrounding.

Givenness can be defined in a number of ways, which vary in how one assumes that an expression or its denotation are already present in discourse (Rochemont, 2016). For example, Chafe (1974) frames givenness in terms of cognitive activation, Prince (1981) in terms of familiarity and Ariel (1990) in terms of accessibility. On another dimension, Ladd (1980) identifies referential and textual senses of givenness, and while these notions may overlap, something that is textually given may also be referential, they do not necessarily need to: something that

is textually given may not necessarily be referential, and vice versa. An example for this distinction is given here from Büring (2007).

(4)   A: Did you see Dr Cremer to get your root canal?

       B: Don't remind me. I'd like to strangle *the butcher*

(5)   A: Why do you study Italian?

       B: I am married to *an Italian*.

Both items in italics are given but *the butcher* in (4) is given because it is coreferential with *Dr Cremer*, while *an Italian* is not coreferential with anything in the question, but it is lexically present.

It can be assumed, that different combinations of these (and other) more basic notions will lead to different degrees of givenness. This assumption is supported by a number of models that have been set up to capture the gradual or scalar nature of givenness (Chafe (1974); Prince (1981, 1992); Ariel (1990); Gundel et al. (1993); Arnold (1998); Kaiser (2011) among others). These authors propose models where the level of givenness of a particular item can be placed on a scale or hierarchy of givenness. For example, the position of an item on Ariel's (1990) accessibility scale is defined in terms of four primitives: i) The distance between antecedent and anaphoric expression, ii) competition between possible alternate antecedents, iii) salience of the referent in terms of topicality, and iv) unity of the frame/scenario between the anaphor and its antecedent. While some of these models assume that the different levels are mutually exclusive Prince (1981, 1992), others (Gundel et al., 1993) take them to be in a downward entailment relation. Krifka's (2008) distinction of common ground content, and common ground management is important for this study, not only because, like the models mentioned above, it allows for different degrees of givenness, but also a link between these degrees of givenness and the linguistic phenomena associated with them. Therefore, Krifka's (2008:262) definition of givenness features will be adopted in this thesis.

(6)   A feature X of an expression α is a givenness feature iff X indicates whether the denotation of α is present in the common ground or not, and/or indicates the degree to which it is present in the immediate common ground.

This study therefore will strive not only to examine givenness as it effects word order and prosody in Hungarian, but also to possibly identify different degrees of givenness and distinguish between their effects. This line of inquiry will form part of the first set of experiments

presented in Chapter 3

In terms of the relation between focus and givenness one proposal (Schwarzschild, 1999; Wagner, 2012) is that these two notions are best understood at each others' counterpoints, such that they can define one-another: what ever is not in focus is given. While this proposal is appealing from a theoretical point of view it has received some criticism (Büring, 2008; Stevens, 2014), for example Selkirk (2008) proposes a three way distinction which differentiates focus and givenness from discourse-newness. For the time being, this study will not adopt a point of view on this question, but it will consider newness along with givenness and focus in all of the empirical work.

2.2 Information Structure and Syntax

The nature of information structure is such that its categories may be expressed in a number of different ways in different languages. One such possible way is through word order variation where focused or given constituents are associated with a specific structural position or word order relation with other constituents. This section will review the major syntactic effects of focus in Section 2.2.1 and givenness in Section 2.2.2 as well as the theoretical approaches that these phenomena have prompted.

2.2.1 The syntax of focus

If a constituent in focus appears in a non-canonical position in a language, then that language marks focus through word order variation. Cross-linguistically two main types of focus related word order re-structuring have been identified among languages which somehow reflect a constituent's status as being in narrow focus through word order. Some languages languages move focus into a position where it is adjacent to the verb, while others place focus at the (left or right) edge of of a sentences. The two strategies can of corse overlap, as a verb adjacent position may also be at the edge of a clause (Surányi, 2016).

Basque is a language where an item in focus occurs left adjacent to the verb, consider the following examples from Arregi (2001).

(7)   a.   Jonek   Miren   ikusi rau.
           Jon.erg Miren.acc seen has
           'Jon saw Miren', 'Jon saw MIREN'

      b.   Miren   Jonek   ikusi rau.
           Miren.acc Jon.erg seen has.
           'JON saw Miren'

Both of the examples in (7) are grammatically acceptable, but they differ in terms of which constituent is marked as focus. The basic word order in Basque is SOV, as shown in (7-a). This version of the sentence is compatible with a broad focus interpretation, or one in which the object *Miren* is in narrow focus. If the context was such that the subject was required to be marked for narrow focus, only the constituent order in (7-b) would be able to provide that interpretation. The reson for this is the that in order for a constituent to be marked for focus it needs to appear immediately left of the verb. This position therefore can be thought of as syntactic marker of narrow focus. While left adjacency of the focus to the verb applies in a number of languages, among them Hungarian, as will be shown below, it is by no means exclusive. Some Bantu and Chadic languages (Watters, 1979; Tuller, 1992) for example, place focus constituent in a right adjacent position to the verb.

The other strategy of placing constituents in narrow focus at the edges of the sentence is also widely attested cross-linguistically. In Italian for example, a constituent in (non-corrective) narrow focus occurs in the clause-final position, as shown in the responses to the question in (8) (Samek-Lodovici, 2005).

(8)   Who won the race?

    a.   L'ha   vinta Gianni
        it-has won John
        'John wont the race'

    b.   *Gianni l'ha   vinta.
        John   it-has won
        'John won it'

The question in (8) requires an answer with a constituent in narrow focus corresponding to the *wh*-word in it. The felicitous answer is that in (8-a) since it not only contains the required constituent, but it also has that constituent appear in the clause final focus position. A languages that behaves similarly to Italian in this respect is Spanish (Zubizarreta, 1998), while languages that place focus in the left-periphery include Greek (Skopeteas, 2016) and Finnish (Vilkuna, 1995). Somali (Lecarme, 1999) is and interesting case from this respect, as normally focus is left-peripheral, but may also be right peripheral if the default focus position is occupied by a focus expletive.

As we have seen the presence of focus in a sentence is often associated with a non-canonical focus construction, which may vary from language to language. This has lead to a number of theoretical proposals about the underlying operations which achieve these word order variations. Of these, two main groups can be distinguished, on the one hand are those that see

these variations as primarily having to do with operations within the the syntactic component of language. While the other group of theories gives more importance to the fact that IS categories like focus are associated with specific prosodic cues as well, these theories place much of the motivation for varied word orders as the effort of the linguistic system to associate the constituent in a given IS category with its required phonetic/phonological realisation, whether that entails an increase in prominence or deaccentuation. This latter group of theories, commonly known as *interface theories* will be examined in Section 2.4.3, while the following will give a brief overview of 'syntactic' approaches.

Most of the 'syntactic' approaches to IS related word order phenomena operate is by taking IS categories to be associated with features that play a role in syntactic operations, as for example the [Focus] feature proposed by Jackendoff (1972). An influential proposal along these lines in that by Rizzi (1997) formulated within the so called cartographic approach. This approach assumes that the left-periphery of clauses contains a fine grained structure of functional projections that correspond to operators and other functional categories, among them information structural ones like topic and focus.

Rizzi's (1997) argument is that surface word orders reflect a complex and rigid structure associated with functional projections. Some of the evidence for this comes from Italian sentences like the one in (9).

(9)   Credo   [$_{Top}$ a Gianni], [$_{Foc}$ QUESTO], [$_{Top}$ domani], gli   dovremmo dire.
       believe.1sg   to John   this   tomorrow to.him should.3pl say
       'I believe that to Gianni, THIS tomorrow we should say'

(10)   [ForceP [Topic [Focus [Topic [FinP [TP]]]]]]

Rizzi (1997) proposes that the sentence in (9) is best captured by the structure in (10) where a segment of the hierarchical structure of the left-periphery is devoted to a rigid sequence of topics and foci. Since Rizzi's proposal the cartographic framework for accounting for IS related word order variation has been widely used cross-linguistically, where other supporting evidence has been found for a syntactic feature driven account of IS related movement. For example, Gungbe (Kwa family) does not only use word order to mark the topic and focus in the sentence, but also employs markers Aboh (2016). These markers are well analysable if one assumes that they are surface manifestations of underlying structural projections which exist in some languages, but not in others.

While the cartographic approach to IS related word order phenomena has been widely used it has not been without criticism. For example, Fanselow (2006) argues that incorporating

information structural concepts within the syntactic domain violates theoretical assumptions that syntactic operations are context-independent, they are triggered based on the lexical specifications of elements or because of grammatical relations between elements in the sentence. Fanselow argues further, based on Zubizarreta (1998), that categories like focus and topic are not encoded at a lexical level (inclusiveness condition), and further that they do not act like syntactic categories in terms of projection either: if the phrase *a small yellow book* is in focus, none of its parts are focused, only the phrase as a whole is focused. In a more empirical grain, Fanselow (2006) based on an original observation by Kenesei (1998) points out that sentences such as (11), where the direct object has been fronted are compatible with contexts that place a narrow focus reading on the object and also ones that have a VP focus, such as *"what have you done this morning?"*.

(11)   Ein Buch hab   ich gelesen.
        a   book have I   read
        'I have read a book'

This is problematic from the viewpoint of a cartographic theory, which can easily explain the movement of the object in narrow focus, but not the fact that it moved in the VP focus context, when it was not itself in narrow focus.

While Fanselow (2006); Fanselow & Lanertová (2011) argue for a stress based interface account for IS related movement, other syntactic, but non-carthographic accounts also exist. One of these suggests that IS related word order variation is a way to achieve an optimal transfer to the semantic/interpretational component (LF) of language, not through a specific structural position but instead a position relative to other material in the sentence (Müller, 1998; Haider & Rosengren, 2003; Neeleman & van de Koot, 2008).These theories postulate that instead of feature driven movement operations, word order variations are achieved by either base generation or through optional movement. Neeleman & van de Koot (2008) proposes a theory in which movement is not governed by functional projections, but rather by mapping rules between syntactic to information structural representations. The role of scrambling is to achieve a syntactic representation on which the mapping rule can operate. Neeleman and van de Koot argue that these representations consist of structures where the topic has been separated from the comment and the focus has been separated from its background, this way the structure in (38-a) becomes the structure in (38-b)

(12)   a.   [YP$_{background}$ [XP$_{focus}$ [ZP$_{background}$]]]

        b.   [XP$_{focus}$ [YP$_{background}$ [t$_{focus}$ [ZP$_{background}$]]]]

In Neeleman and van de Koot's model, categories like focus and topic do not play a role in motivating movement, instead movement is proposed to be freely available in syntax, the output of which is must meet rules which govern optimal interpretability at the semantic/pragmatic interface. This way it removes discourse related features from syntactic operations, relying instead on interace filters.

A point of difficulty for syntactic theories of focus are cases where focus movement seems to be optional, as in the example below from Bianchi & Bocci (2012).

(13)   a.   So   che Gianni ha invitato   Lucia ...
             I know that John   has invited.3sg Lucy ...

       b.   No, ha invitato   MARINA
             No   has invited.3sg Marina

       c.   No, MARINA ha   invitato
             no   Marina   has invited.3sg
             'No, he invited MARINA'

According to Bianchi & Bocci (2012), both sentences in (13-b) and (13-c) are acceptable in the context of (13-a). This would indicate that at least in some cases the movement of constituent in narrow focus is optional. Such cases are problematic for approaches, like the cartographic approach, which view focus as elicited by features within syntax, since leaving the focus in-situ would mean a violation of an obligatory movement trigger, which would lead to ungrammaticality. The solution, form a cartographic perspective, is to argue, as do Bianchi & Bocci (2012), that the two foci are somehow different in interpretation, and that the one in situ is not licensed to undergo focus movement to the left-periphery. In this case Bianchi & Bocci (2012) bring experimental evidence to show that while both sentences in (13-b) and (13-c) are grammatical and both contain a focused constituent, only the one in (13-c) has a corrective import, which licences it to move. The model by Neeleman & van de Koot (2008) would have a considerably easier task in this case, since both (13-b) and (13-c) meet the interface requirement of having a continous background.

This brief overview of the word order effects of focus and summary of selected approach was meant to show that languages that use word order to mark focus use different strategies to achieve this, but that these differences still abide by the main trends of placing focus either adjacent to the verb or the edge of a domain. Further more, that different types of theories have been developed to account for these phenomena from a syntactic point of view, with some attributing movement to syntactic features while others arguing for approaches that see these phenomena as a result of interface conditions. The next section will examine word order effect

associated with givenness.

2.2.2 The syntax of givenness

Like focus, givenness has been associated with word order phenomena, which can be described by the generalisation in (14) as taken from Neeleman & van de Koot (2016) but also supported by numerous other works (Clark & Clark (1977); Clark & Haviland (1977); Gundel (1988); Kučerová (2007); Skopeteas & Fanselow (2009) among others).

(14)   *Given-before-New Generalisation*

      If a language uses word order alternations to mark givenness, then in the marked order the given material precedes the new material.

One of the languages where this generalisation has been observed (Kučerová, 2007, 2012) is Czech. In Czech, as the generalisation states, constituents that are given in discourse appear before those that are discourse new, as shown in example (15).

(15)   a.   Chlapec našel lízátko
             boy.nom found lillipop.acc
             'The boy found a lollipop' 'A boy found a lollipop' 'The boy found the lollipop'

    b.   Lízátko   našel chlapec
             lollipop.acc found boy.nom
             'A boy found the lollipop'

Since Czech does not have a definite article, it makes use of givenness associated word order variation to elicit definiteness readings, since definite items must have a given status in discourse. The example in (15-a) can be associated with readings where the subject, *the boy*, is definite or indefinite and also where the object, *the lollipop* is definite or indefinite, however the object can only be associated with a definite reading if the subject is also definite. In a situation where the object is definite, and the subject is indefinite, the word order in (15-b) must be used, where the object precedes the subject.

Kučerová observes however, that the word order effect shown above is not associated with every item which is contextually salient. She observes that word order does not arrise for constituents that are merely discourse salient (a property that would lead to deaccentuation in a language like English), but they also need to be presupposed, that is, to be either definite or specific. This may be taken as an indication that Czech differentiates between the realisation of given items based on a scale where items which are higher in a givenness hierarchy elicit

effects that lower down items do not. Kučerová proposes to capture the givenness associated movement effects by way of Givenness operator, which would move every constituent that is given above it, in effect splitting the sentence into a given and a new segment.

Skopeteas & Fanselow (2009) experimentally survey a number of languages (Georgian, Prinmi, American English, Dutch, Yucatec Maya, German, Czech, Hungarian and Greek among others), for the effect of givenness related to word order variation. The task involved participants describing pictures presented to them, which showed scenes describable by simpe transitive sentences. The conditions varied according to which constituent, the agent or the patient was given. The study confirmed the overwhelming tendency for the generalisation in (14), and it also found that there were two types of strategies used by the participants to derive marked word orders, where the patient, the constituent which would normally occur later in the sentence, was given. These were: object fronting (argument reordering) and passivisation.

Skopeteas & Fanselow (2009) claim that movement associated with givenness is only optional, further more, that types of movement operations suggest that givenness does not induce A'-movement, that is movement to an operator position, just A-movement. The claim for optionality comes form the fact that in all languages surveyed subjects didn't exclusively produce sentences where given patients preceded contextually new agents, therefore both word orders shown in (16) were acceptable, with proportions of preference varying from language to language.

(16)   a.   Agent$_{new}$ Verb Patient$_{given}$
        b.   Patient$_{given}$ Verb Agent$_{new}$

Based on these findings, Skopeteas & Fanselow (2009) argue that givenness driven movement is best captured by an account of scrambling that is non-syntactically driven, such as the one put forth by Haider & Rosengren (2003).

The two studies presented above on givenness related word order phenomena show on the one hand the robustness of the Given-before-New generalisation in (14). On the other hand it points out the need for an approach to givenness that properly identifies the level on the givenness hierarchy where a constituent stands. While Kučerová (2007, 2012) claims that givenness related movement is obligatory in the case of Czech, she does make the point that this is true for a specific type of givenness (given + presupposed). This may explain the difference in results form Skopeteas & Fanselow (2009), who, in their survey of Czech found that participants produced sentences where given constituents followed contextually new constituents (as in example (16-b)) in 57% of cases, suggesting perhaps that the type of givenness tested in their

experiment was lower on the hierarchy and therefore it did not elicit movement. Further evidence for this is provided by the the study of Cowles & Ferreira (2011) for English, who found that if a constituent is given it is produced earlier in a sentences, but if these constituents were also marked as topics in context they were produced even earlier.

The variability in how different degrees of givenness may affect word order phenomena will be tested in the frist experiment to be presented in this study.

2.3   Background on Hungarian Syntax

Hungarian is characterised by a (pre-verbal) constituent order which reflects not primarily grammatical roles, but discourse functions, it is because of this that Hungarian is often referred to as a *discourse configurational* language following É. Kiss (1994, 1995).

The simple Hungarian clause can be divided into two distinct domains which show different syntactic behaviours. The pre-verbal domain is characterise by strict word order which reflects a hierarchical syntactic structure. The post-verbal domain on the other hand may best be characterised as having "free word order", where both structural symmetries and asymmetries may be found between constituents. The basic facts and the concerning these two domains and the major theoretical approaches that have been developed will be review in Sections 2.3.1 and 2.3.2 below. The extensive literature of Hungarian syntax and the restrictions of this study do not permit a full review, the following instead will concentrate on aspects which will play an important role in this work.

2.3.1   Pre-verbal structure

Pre-verbally, Hungarian has dedicated discourse functional positions, these are the topic and the focus positions as shown in (17). The topic is the left-edge of the entire sentence although it can be preceded by certain adverbial, while the focus occupies a specific position before the verb. Between them quantifiers may be inserted, however as those do not play a role in this study they will not be discussed in much detail, their relevance here is to point out that their scope is reflected by their hierarchical organisation. It is customary to divide the clause between the topic and the comment/predicate. The topic position contains the topic, while the predicate is made up of the post-verbal domain, the verb and the pre-verbal focus.

(17)   Topic > Focus > Verb > Post-verbal domain.

Broad-focus and narrow focus sentences are distinct syntactically as shown in (18). In broad

focus sentences, as there is no constituent which is in narrow focus, there is no constituent occupying the pre-verbal focus position as shown in (18-a) where *J'anos* is the topic of the sentence. In this case the pre-verbal position is unfilled, alternatively if the verb is such that it has a particle or there is a verbal modifier present, these occupy the immediately per-verbal position, as shown in (18-b).

(18) a. János aludt   az előadáson.
          John slept.3sg the lecture.on
          'John was sleeping during the lecture'

      b. János elaludt   az előadáson
          John prt.slept.3sg the lecture.on
          'John fell asleep during the lecture'

      c. János az előadáson aludt   el.
          John the lecture.on slept.3sg prt.
          'It was during the lecture that John fel alseep'

In narrow focus constructions there is an item in narrow focus, which is situated immediately preceding the verb (18-c). In this case, if there is a verbal particle, or verbal modifier, it occurs in the post-verbal domain, usually, but not necessarily in the immediately post-verbal position.

There have been a number of theories developed to account for the focus position and how an item in narrow focus gets there. Bródy (1990, 1995) argues that above the verb there is a functional focus projection (FP), to which a focus marked constituent is attracted by way of checking its [+Focus] feature. This theory explains well how the verbal modifier ends up behind the verb in the case of narrow focus: it is stranded after head-movement of the V to the head of the FP projection, as shown in (19). It also highlights why movement of an item in narrow focus is obligatory to this position: with out checking the the [+Focus] feature, the construction would be ungrammatical.

(19) $[_{FocP}$ Focus Verb [verbal modifier t_{verb} $[_{VP}$ t$focus$]]]

More recently Horváth (1997, 2000, 2005, 2007) has also worked with a functional projection dedicated to a focus operator, however, she has argued against the use of a focus feature to motivate this movement. According to her, the focus position is in fact not associated with focus, but one very specific aspect of pre-verbal foci, namely their exhaustive interpretation[1].

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[1]The exhaustive property of the pre-verbal focus has been widely accepted in the literature, however, more recently it has come under empirical investigation. Onea (2009), for example claims that exhaustiveness is not part of the truth conditional content of sentences with pre-verbal focus. None-the-less, he draws the conclusion, that Hungarian pre-verbal focus is still more exhaustive, than what he calls *prosodic* focus in other languages like German. See also: Onea & Beaver (2009); Gerőcs et al. (2014) In this thesis, the majority view, holding that pre-verbal

Example (20) taken from Horváth (2005), shows this using a test for exhaustivity developed by Szabolcsi (1981). The negation of the focus in the first part of the sentence is true, since it did not exhaustively identify all relevant members of the set in question.

(20)   Nem JÁNOST hívták   meg, hanem JÁNOST ÉS MARIT (hívták meg)
         not   John.acc invited.3pl prt   but   John.acc   and   Mary.acc

         (invited.3pl prt)
         'It's not John that they invited, it's John and Mary (that they invited)'

Further more, she points to evidence from constructions where she claims that focus does not occur in the pre-verbal position, yet is clearly interpreted as focus, by citing the different behaviours of constituents with the particles *csak* 'only' and *még ... is* 'even ... also' (Horváth, 2007).

(21)   a.   Mari csak a   FOGADÁSRÓL késett   el.
              Mary only the reception.from late.was prt
              'Mary was late only for the reception'

         b.   *Mari csak a   FOGADÁSRÓL elkésett.
              Mary only the reception.from prt.late.was

(22)   a.   *Mari még az ESKÜVŐJÉRŐL   is   késett el.
              Mary even the wedding.her.from also late.was prt

         b.   Mari még az ESKÜVŐJÉRŐL   is   elkésett.
              Mary even the wedding.her.from also prt.late.was
              'Mary was late even for her wedding.'

Horváth makes the argument that while both *csak* and *még ... is* are associated with focus, the difference in their distribution as shown in above is unexpected if one assumes that it is focus which is responsible for focus movement. She argues that the difference can be best captured by their different interpretations. Since *csak* exhaustively identifies all relevant entities that are in focus it can only occur it the pre-verbal postion as shown in (21), conversely *még ... is* only partially identifies the relevant entities, it cannot occur in the pre-verbal position as shown in (22), but must occur somewhere else. (More will be said about this latter type of focus in Section 2.3.3). Based on the this specific interpretation, which is unique to the pre-verbal focus position, Horváth (1997, 2000) proposes the existence of an *exhaustivity operator*, that she identifies as responsible (through formal feature checking) for triggering focus movement to the pre-verbal position. Further arguments in favor of the exhaustivity of pre-verbal foci are presented in É. Kiss (1998a)

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focus is exhaustive will be adopted.

This brief review of the literature of pre-verbal focus is only meant to serve as an indication for one possible way of treating focus related movement in Hungarian, namely within syntax. As the most prominent phenomena associated with IS categories in Hungarian is related to word order variation, it makes sense that this variation be attributed to syntactic mechanisms. Under this view, focus is primarily, marked by syntax, with prosodic marking being secondary. This does not mean that prosody driven accounts have not been proposed, those will be presented in Section 2.5.

2.3.2 post-verbal structure

As noted earlier, post-verbally Hungarian exhibits a high degree of flexibility. All of the sentences shown in (23) are grammatical, and there is little identifiable difference between their meanings. It is evident that difference between the argument structural roles does not seem to have a great effect on word order, none-the-less some word orders may be more preferred than others.

(23)   a. A bulin   bemutatta   Péter   Istvánnak Dórát.
          The party.on prt.introduced Peter.nom Steven.dat Dora.acc

      b. A bulin   bemutatta   Istvánnak Dórát   Péter.
          The party.on prt.introduced Steven.dat Dora.acc Peter.nom

      c. A bulin   bemutatta   Dórát   Péter   Istvánnak.
          The party.on prt.introduced Dora.acc Peter.nom Steven.dat
          'At the party Peter introduced Dora to Steven.'

There have been attempts at establishing the syntactic structure of this domain (É. Kiss, 1987, 1994, 2002; Surányi, 2006a,b; É. Kiss, 2008), these attempts have primarily focused on discovering differences between subjects and objects by way of using tests that have been proven to show hierarchical differences, and thus syntactic structure in other languages. These tests however yield varied results, with some supporting a symmetrical and others and an asymmetrical structural analysis. Some of this evidence will be presented here, but for a more detailed discussion the reader is directed to Surányi (2006b); É. Kiss (2008). It is worth pointing out that these theories, since they deal primarily with subject-object relations make suggestions for the internal structure of the Verb Phrase (VP), a syntactic unit which often overlaps entirely with the post-verbal domain in the surface representation, however syntactically it only makes up a part of it. Structural positions which occur in the post-verbal domain may be occupied by categories like adjuncts that are adjoined at a fairly high point in the derivation, but get lin-

earised post-verbally (high right adjunction on É. Kiss's (2008) account), or possible functional projections which are situated above the VP initially but end up in a position under the verb at the final point in the derivation, when the finite verb is moved to a higher position, such as the stranded verbal particle in narrow focus constructions (É. Kiss, 2002). A tree depicting the this structure in presented in (24)[2].

(24)

Focus

    Verb

        Particle

            t_{verb}

                VP

        t_{verb} post-verbal material
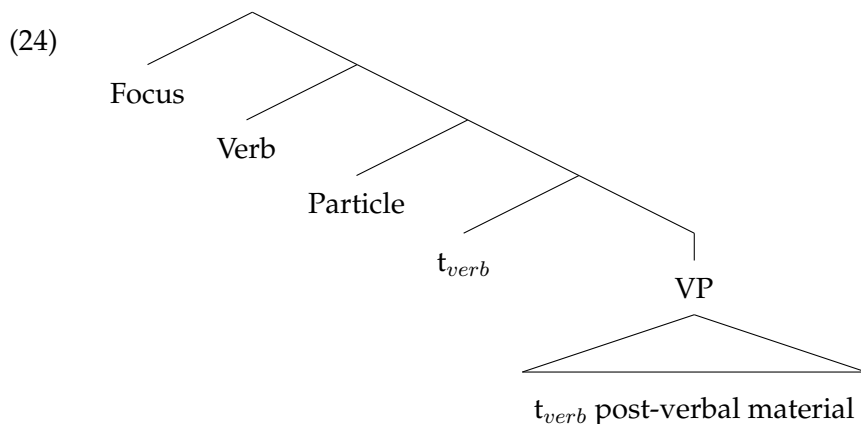
Some of the evidence supporting a symmetrical structure comes from the fact that there is a lack of weak crossover and superiority effects, the presence of violations of Binding Condition C and free constituent order as well as compositional theta-role assignment. The evidence from Condition C violations are presented below. These violations arise when a referential expression is c-commanded by another expression that is co-referential to it (Chomsky, 1981). In English, where subjects c-command objects these violations arise only when a pronoun in the subject c-commands a referential expression in the object, compare (25-a) and (25-b). In Hungarian both versions are ungrammatical or at least marked, shown in (26-a) and (26-b). Examples and judgements taken from É. Kiss (2008). The reason for this markedness/ungrammaticality has been argued to be the fact that the the structural relation between the subject and the object inside the verb phrase, before either of them is moved to a pre-verbal position, is symmetrical.

(25)   a.   John's$_i$ mother loves him$_i$.

        b.   *He$_i$ loves John's$_i$ mother.

(26)   a. ??János$_i$ anyja   szereti őt$_i$
             John   mother.his.acc loves   him
             'John's mother loves him'

        b.   *(Ő$_i$) szereti János$_i$ anyját.
             He   loves   John   mother.his.acc
             Intended: 'John loves John's mother.'

---

[2]For evidence that the verb movement likely happens this way see É. Kiss (2002); Surányi (2009)

Evidence for an asymmetrical structure relation between the subject and the object is supported by evidence from Anaphora binding, the fact that movement out of subjects but not out of objects is restricted, the observation scope taking abilities of non-increasing quantifiers is restricted when they are in objects but not when they are in subjects, and the fact that bare nominals can incorporate with verbs only if they are objects and not subjects (external arguments). As above, a token example of this evidence is presented, in this case from Anaphora binding. Anaphora binding violations arise when an anaphora is not properly c-commanded by its antecedent. In English, this arrises when an anaphor is in the subject position, but its antecedent is in the object position, as shown in (27). In Hungarian we find a similar effect. The sentence in (28-a) is grammatical, because the anaphor in the object position is properly c-commanded, however the sentence in (28-b) is ungrammatical, supposedly because the anaphor in the subject position is not properly c-commanded by the antecedent in the object position. Hungarian sentences and judgements were taken from Surányi (2006b).

(27)   *Each other saw John and Mary.

(28)   a.   Gyakran elemzik   a   pszichológusok egymást.
              often   analyse.3pl the psychologists   each   other.acc
              'Psychologists often analyse each other'

         b.   *Gyakran elemzi(k)   egymás   a   pszichológusokat.
              often   analyse.3sg(3pl) each other the psychologists.acc
              Intended: 'Psychologists often analyse each other'

This type of contradictory evidence has lead to two main theories being developed regarding the structure of the Hungarian VP. É. Kiss argues in a number of works (É. Kiss, 1987, 1994, 2002), for a symmetrical, flat structure, where arguments are in a mutually c-commanding relationship, while Surányi (2006a,b) makes a case for a hierarchical structure with the availability of a scrambling operation to achieve free word order and account for other phenomena which may indicate a symmetrical structure. More recently É. Kiss (2008) has adopted a theory, relying on the notion of phases – as having chunks of structure that are closed for further syntactic operations – as developed by for example Chomsky (2005), to suggest a model, where up until a point in the derivation of the sentence the structure is hierarchical. It is before this point that Condition C and other asymmetries obtain. After this point, É. Kiss argues, that the post-verbal domain, which makes up a closed portion of a phase is transfered to the phonological component of grammar, where it may be freely linearised and spelled out with a word order which may be influenced by a number of factors.

Szalontai (2012) represents an effort to gather experimental evidence to differentiate be-

tween the two main approaches (flat vs hierarchical) to the structure of the VP. That study investigates a number of the phenomena listed above using a native speaker acceptability judgment task. While its results could not overwhelmingly confirm the validity of one of the theories above the other, it did show that the evidence gathered from the post-verbal domain is best characterized as being gradient in nature. This observation supports a view that aspects of the post-verbal domain, such as word order preferences are the result of an interaction of multiple factors. Further more, that studies of this domain will have to account for these aspects of the post-verbal domain systematically.

The basis for such an account has been laid out in work by both Surányi and É. Kiss cited above. In the case of Surányi's hierarchical approach it is the inclusion of scrambling as a relatively free mechanism that may achieve word order variation which may possibly reflect a number of factors. In the case of É. Kiss, different proposals have been made, the underlying idea behind them is that since the post-verbal structure is flat free linearisation is available. This linearisation is then determined by factors associated with the constituents themselves. É. Kiss (2002) suggests that linearisation reflects hierarchies of aspects of the constituents, for example specific constituents will precede non-specific ones, or constituents which have human reference will precede inanimate ones. É. Kiss (2008) suggests that the primari influencing factor is Behaghel's law of growing constituents, a rule formulated by Behaghel (1932) which states that larger constituents, a property which É. Kiss (2008) characterises as "phonological weight" will follow shorter constituents.

In the literature little has been said of the effect of information structural categories in the post-verbal domain. While the specifics of post-verbal foci will be investigated in the following sections, it is worth noting here the proposal by É. Kiss (1996, 1998a), which suggested that functional projectons for focus and topic may exist in the post-verbal domain. However, she suggests that these projections only occur when there is a pre-verbal focus, as shown in the structure in (29), with a sentence in (30) providing a concrete example.

(29)   [Topic [Focus [Verb [Topic [Focus [$t_{argument1}$ $t_{argument2}$]]]]]]

(30)   Csak két lány olvasott el   a   vizsgára csak két könyvet.
         only two girls read   prt the exam.for only two books.acc
         'There were only two girls who only read two books for the exam'

Under this view the post-verbal focus position is situated higher than the argument positions. É. Kiss (1996) argues that while the order of the post-verbal arguments in their argument positions is free, the order of constituents in the post-verbal focus position is not. More specifically

she suggests that above the post-verbal focus position, like above the pre-verbal focus position there is a topic position, which may only be filled by [+specific] or [+referential] constituents as in the case of pre-verbal topics. She gives the examples in (31), which in her judgement highligt the degradation of placing a non-topic like constituent between the verb and the post-verbal focus.

(31)   a.   Melyik tesztben követett el   [csak János]$_{foc}$ három hibát?
             which exam.on made   prt only John   three   mistakes

        b. ??Melyik tesztben követett el   három hibát   [csak János]$_{foc}$?
             Which exam.on made   prt three   mistakes only John
             'Which test was it where only John made three mistakes?'

Since givenness and topichood overlap to a significant degree, this proposal would predict that at least some post-verbal given constituents, namely those bearing a topic role, would end up between the verb and the post-verbal focus.

2.3.3   post-verbal focus types

While the pre-verbal focus has been extensively examined in the literature, post-verbal fous has received considerably less attention. As it is one of the phenomena which plays a crucial role in this study this section will examine the types of foci which may occur in the post-verbal domain. First a typological difference suggested between pre- and post-verbal foci will be examined in Section 2.3.3.1, following this, Section 2.3.3.2 will consider the behaviour of foci marked with the focus sensitive partile *is* 'also', and the this discussion will be concluded by the examination of double focus constructions in Section 2.3.3.3.

2.3.3.1   Post-verbal simple focus

An influential proposal concerning the difference between pre-verbal and post-verbal foci is by É. Kiss (1998a), who suggests that it is possible to have post-verbal foci, however foci in the pre-verbal focus position are distinct from foci which can occur in the post-verbal domain. Therefore, É. Kiss (1998a) proposes a terminological distinction to capture this difference. She suggests the term *identificational focus*, and the term *information focus*. Identificational focus is the one which is associated with the pre-verbal focus position, as presented above in Section 2.3.1. This focus is characterized by the fact that it exhaustively identifies all relevant entities, while information focus does not.

    É. Kiss argues that the function of identificational focus is to "represent a subset of the set of contextually or situationally given elements for which the predicate phrase can poten-

tially hold: it is identified as the exhaustive subset of this set for which the predicate phrase actually holds" (É. Kiss, 1998b:249). By contrast, information focus is said to only mark the non-presupposed nature of a constituent. Not only does this type of focus not exhaustively identify a referent, it does not represent this referent as a member of a set of alternatives. The difference idenfiticatonal and information focus is shown by the examples in (32).

(32)   a.   Mari EGY KALAPOT nézett ki magának.
            Mary a   hat.acc   picket prt herself.for
            'It was a hat that Mary picket out for herself'

        b.   Mari kinézett   magának EGY KALAPOT.
            Mary prt.picket herself.for a   hat.
            'Mary picket for herslef a hat'

The sentence in (32-a) contains a pre-verbal focused constituent, and it is applicable in a context where out of the possible things that Mary could have picked out for herself she picked out a hat. É. Kiss suggests that (33-b) on the other hand is felicitous in a context where the verb may or may not be inferred from the discourse context and the DP introduces new, non-presupposed information. A possible context for (33-b) is suggested by É. Kiss as being the following, where the focused constituent in the second sentence, *egy kalapot* represents new, non-presupposed information.

(33)   a.   János és   Mari vásárolnak.
            John and Mary shop.3pl
            'John and Mary are shopping'

        b.   Mari kinézett   magának EGY KALAPOT.
            Mary prt.picket herself.for a   hat.
            'Mary picket for herself a hat'

É. Kiss argues that information focus represents not only new information, but is indeed a focus, because it can be associated with a set of alternatives, as an answer to a *wh*-question. To prove this É. Kiss brings the example shown here in (34).

(34)   a.   Hol jártál   a   nyáron?
            where went.2sg the summer.in
            'Where have you been during the summer?'

        b.   Jártam   OLASZORSZÁGBAN
            went.1sg Italy.to
            'I have been to Italy (among other places)'

In the small dialogue above, *Olaszországban* in the answer corresponds to the *wh*-word in the question. In this respect it behaves like the pre-verbal focus does, in a sense that it does not

merely represent contextually new information, but is a genuine new information focus. This observation means that post-verbal foci may be clearly separated from merely contextually new entities given the proper context. While the focus status of these items is not undisputed, see for example a critique of this position in Szendrői (2001), presented below in 2.5.1, for the purposes of this study they will be treated as foci, and the present study will rely on their property to be associated with *wh*-words in its experimental design.

As far as the distribution of simple post-verbal foci is concerned, É. Kiss (1998a) simply states that this type of focus is restricted to the post-verbal domain where it occurs in situ, that is at the structural position where the given constituent was first merged into the structure of the clause. The suggestion for a post-verbal focus projection by É. Kiss (1996) as outlined above pertains to post-verbal identificational foci, not the information foci discussed here. This view, taken together with what we know about the structure of the VP as shown in Section 2.3.2 predicts that post-verbal simple foci can occur in any of the post-verbal positions, as shown in (35).

(35) a. Mari kinézett   magának EGY KALAPOT.
          Mary prt.picked herself.for a   hat

      b. Mari kinézett   EGY KALAPOT magának.
          Mary prt.picked a   hat   herself.for
          'Mary picked herself a hat'

While my native speaker intuition is that both sentences in (35) are grammatical, there are subtle information structural differences between the two. Answering this question is one of the goals of this study. For the purposes of this study this type of focus will be referred to as simple post-verbal focus, to distinguish it from the other two categories of focus to be discussed below.

2.3.3.2 *is*-marked focus

The behaviour of the focus sensitive partiles *csak* 'only' and *is* 'also' have been briefly touched on in Section 2.3.1, where it was pointed out that constituents marked with the two particles differ in their distribution, such that pre-verbal constituents with the particle *csak* can only occur in the focus position, and constituents marked with the particle *is* cannot occur in that position, as shown here in example (36).

(36) a. Hova utaztál   el a nyáron?
          where traveled.2sg prt the summer.on
          'Where have you taveled to during the summer?'

      b.   Olaszországba utaztam   el.
              Italy.to   traveled.1sg prt.

      c.   *Olaszországba is   utaztam   el.
              Italy.to   also traveled.1sg prt

      d.   Olaszországba is   elutaztam.
              Italy.to   also prt.traveled.1sg

      e.   Elutaztam   Olaszországba is.
              prt.travelled.1sg Italy.to   also
              'I have also travled to Italy.'

The examples in (36-b) and (36-c) both contain an item in their pre-verbal focus position, while the sentence in (36-b) is a grammatical answer to the question in (36-a), the sentence in (36-c) is ungrammatical. The reason is, according to É. Kiss (1998a); Horváth (2005) that there is an incompatibility between the inherent non-exhaustive reading of the particle *is* and the exhaustive interpretation associated with the pre-verbal focus position. The constituent marked with *is* can occur either in the pre-verbal domain as in (36-d) or the post-verbal domain as in (36-e), where its occurrence should be relatively unrestricted.

(37)   a.   Mari kinézett   magának   EGY KALAPOT is.
              Mary prt.picked herself.for a   hat   also

      b.   Mari kinézett   EGY KALAPOT is   magának.
              Mary prt.picket a   hat   also herself.for
              'Mary has also picked a hat for herself.'

When comparing the sentences in (37) with those in (35), it is difficult to say if the presence of the particle creates a difference in the perception of the two variants to a different degree than one may find in the sentence pair with out a particle in (35). None-the-less, a potential effect cannot be ruled out, since for example, the particle licenses the occurrence of this type of focus in the pre-verbal domain, where simple information focus cannot occure. Therefore, this type of focus will also be investigated in this study.

2.3.3.3   Double focus

The third way in which a focus can occur in the post-verbal field is if it is part of a double focus construction. In such constructions the pre-verbal focus position is filled by one of the constituents in focus. Since this is a singular position, if there is another constituent in narrow focus in the clause, then it must occur in the post-verbal domain. There are two basic types of this focus construction, the double focus construction, and the pair focus (or complex focus) construction. What differentiates between these two is that semantically in the pair focus con-

struction there is only one entity in focus formed by the pair of entities represented by the two constituents, while in the simple double focus construction the post-verbal focus is independent in this respect from the pre-verbal focus.

(38) a. Ki   mutatta   be   kinek Julit?
          who introduced.3sg who.to prt   Juli.acc
          'Who introduced Juli to whom?'

     b. PETI mutatta   be GÁBORNAK Julit.
          Peter introduced.3sg prt Gábor.dat   Juli.acc
          'Juli was introduced to Gábor by Peter.'

In the dialogue above, the question contains two *wh*-words, it is felicitous therefore to have two foci in the answer to it. In (38-b) the pre-verbal focus position is filled by one of the foci, and the other *Gábornak* occurs in the post-verbal domain.

The post-verbal member of the double focus constructions is different from the simple focus and the *is*-marked focus discussed above in the sense that while those are considered to be information foci in the sense of É. Kiss (1998a), both focused constituents in the double focus construction are identificational foci. Therefore, in any syntactic framework which sees the identificational focus as being attracted to the specifier of a functional position, be it through a focus feature (Bródy, 1995), or an exhaustivity operator (Horváth, 2005) must also assume that the post-verbal foci are also associated with such a functional projection.

É. Kiss (1996, 1998b) suggests a structure where the syntactic derivation builds up iterated focus projections, with a narrow focused constituent occurring in the specifier of each, and the verb moving through their heads to yield a structure as shown in (39).

(39) FocP2
   Focus2   Foc
          Verb   FocP1
               Focus1   Foc
                      t_v VP
                            $\ldots t_v \ldots t_{foc1} \ldots t_{foc2} \ldots$
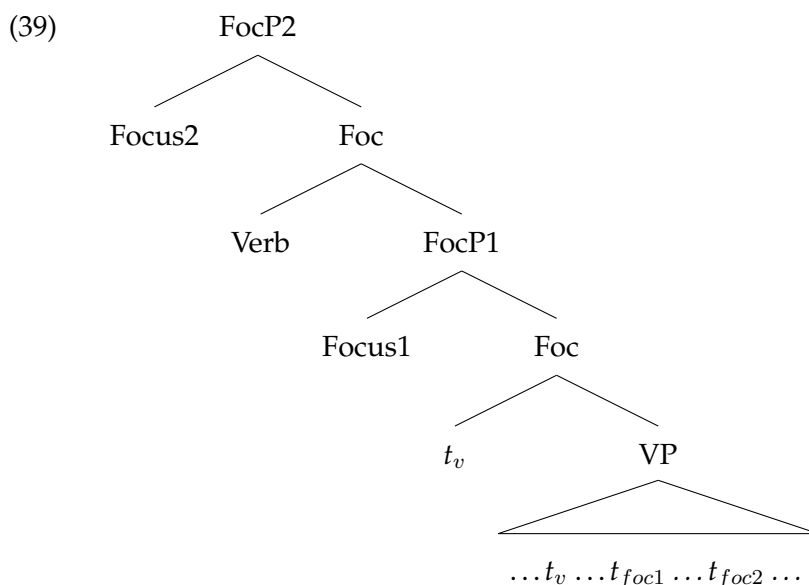
It is argued (Bródy, 1990, 1995; É. Kiss, 2002) that a structure like this is superior to one where the post-verbal focus is left in-situ based on examples like (40). In these sentences, the two focused constituents are also in a scope relationship, with the higher one taking scope over the lower one. If the post-verbal focus were left in situ, it would need to move to the specifier of the singular focus projection at the point of semantic interpretation, at which point the asymmetries needed to achieve the proper scope readings would be lost.

(40)   CSAK MARI kapott CSAK KÉT TÁRGYBÓL jelest.

       only Mary received only two subject.from A+

       'It was only Mary who got and A+ in only two subjects'

Alberti & Medve (2000) propose a different analysis, in their terms this type of focus is deemed *mirror focus*, and it is associated with a secondary exhaustivity operator. The structure they propose would mark out the secondary focus position to be at the right edge of the VP.

In the case of double focus construction therefore, there are theoretical proposals for associated structure. These proposals in turn make predictions about the likely position in which post-verbal foci might occur.

Since the type of focus in double focus constructions which occurs in the post-verbal domain is in its type, like the pre-verbal focus, theoretical accounts have been proposed concerning its positional distribution.

The iterated focus account would predict suc foci to occur following the verb, since that would be the position of the specifier of the first FP, which, at the end of the derivation is located in the post-verbal domain, as shown in (39). While these accounts permit the placement of items between the focus and the verb, those items are predicted to be associated with projections that are higher than the post-verbal focus, and should be the same ones (topic, adverbial, quantifier) seen in the pre-verbal domain. The mirror focus approach would predict that the post-verbal focus occurs at the other edge of the VP, and any non-focused VP internal material would appear between them, with out regard to its type.

2.3.4   Givenness in Hungarian

The fact that there exists abundant literature on the syntax of focus in Hungarian as opposed to givenness, is due to the fact that syntactic studies have primarily focused on the pre-verbal domain, where clear distinctions may be made between constituents in different syntactic positions. These positions are clearly identified with specific roles, but givenness, and the interpretations associated with it, do not play a part in this domain, except perhaps for the observation

that most constituents which appear in the topic position must be [+referntial] and [+specific] (É. Kiss, 2002).

One exception is the study by Skopeteas & Fanselow (2009), who among a number of other languages experimentally tested the effects of givenness on word order in Hungarian. Their study consisted of a picture description task, where participants were shown two images, one setting up the context and another which had to be described, the images showed two participants of an action, one the patient (the grammatical object) and the other the agent (the grammatical subject), one of which was given and the other new based on the context image in the target conditions. Participants who had to produce a sentence containing the two entities, the study observed the word order in which the two entities appeared[3].

The results for Hungarian indicated that if the subject was given it always appeared before the verb as shown in (41), one of the sentences from Skopeteas & Fanselow (2009), from a condition where *férfi* 'man' was given. While it is not clear from this sentence if the subject is in focus or topic position, given the setup of the experiment it is highly likely that it is a topic.

(41)   A férfi rángat   egy nőt.
        the man pull.3sg one woman.acc
        'The man is pulling a woman'

(42)   A hordót most felemeli   egy nő.
        the barrel now prt.lift.3sg one woman
        'A woman is now lifting the barrel'

However if the object was given and the subject was new, then sentences like the one in (42) were also produced, but not obligatorily. Skopeteas & Fanselow (2009) found that in these cases 54.5% of sentences contained fronted object, while 45.5% maintained the word order shown in (41). Hungarian poses a problem for Skopeteas & Fanselow (2009) who argue that givenness related word order variation only tarets A-positions, while the pre-verbal constituent in the examples above is in the preverbal topic field, which is typically considered an A-bar position. Skopeteas & Fanselow (2009) rely on É. Kiss (2003) who claims that constituents which appear in the topic position need not be operators. It is worth noting that **??** also seem to have controlled for animacy, but the effects of which are not reported among their findings.

It seems therefore that the Given-before-New generalisation shown in (14) also applies to Hungarian, however from the study by Skopeteas & Fanselow (2009) it is not entirely clear if this givenness effect is independent from topichood. This study will thus consider the effects of givenness on word order in the post-verbal domain, where these two factors may be teased

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[3]Skopeteas & Fanselow (2009) used thematic roles instead of grammatical ones to produce a design that was applicable to a wider set of languages with different base word orders

appart.

2.4   Information Structure and Prosody

The previous sections have primarily dealt with information structural phenomena as manifested in word order variation, and thus the relation between information structure and syntax. In the following, the relation between information structure and prosody will be addressed generally in this Section and more specifically regarding Hungarian in Section 2.5.

It is widely accepted that information structural categories correlate with the prosodic realisation of sentences (Bolinger, 1958; Chomsky, 1971; Jackendoff, 1972; Chafe, 1974; Pierrehumbert, 1980; Gussenhoven, 1984; Selkirk, 1984; Ladd, 2008). More specifically focus has been shown to have a near universal associated with prosodic prominence (Truckenbordt, 1995; Büring, 2010) while givenness often licences deaccentuation (Ladd, 1980). While these observations are robust cross linguistically, their implementation may vary from language to language, depending on how a given language realises prosodic prominence, a process determined by that language's prosodic structure and its relation to syntax.

In previous sections much has been said of syntactic word order variation effects associated with focus and givenness, however not all languages make use of word order to reflect a constituent's IS status. In such languages this task falls primarily on prosodic cues. This observation is reflected in Vallduví's (1991) notion of prosodic *plasticity*, a property along which he divides languages into two groups: prosodically plastic languages (like English) have the ability to vary their prosodic patterns relatively freely and thus shift prominence between constituents in a syntactic structure with out the need to modify that syntactic structure. While prosodically non-plastic languages (like Catalan) lack this ability, and will need to make modifications in their syntactic structure to be able to associate prosodic prominence with a a particular constituent. As will be shown in Section 2.5, Hungarian falls into this latter category, based on, among other things the word ordre associated with pre-verbal focus. One of the issues addressed by this study is the question of whether Hungarian introduces an element of plasticity in its prosody to associated post-verbal foci with the prominence that they require.

2.4.1   Acoustic realisation of information structure

While there are a large number of acoustic features present in speech, it is fundamental frequency (f0)[4], duration and intensity (loudness) which are primarily used for the expression of linguistically relevant information (Cruttenden, 1997). These tree features have formed the

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[4]f0 is the acoustic correlate of pitch, the perceptional feature associated with intonation.

basis of most research into the acoustic realisation of prominence (Breen et al., 2010), with supporting evidence for the importance of all three and their various combinations, for example: duration (Eady & Cooper, 1986), intensity and duration (Fry, 1958; Lieberman, 1960), f0 (Rietveld & Gussenhoven, 1985; Gussenhoven et al., 1997; Terken, 1991), intensity (Beckman, 1986; Kochanski et al., 2005).

More recently Breen et al. (2010) reported on a series of experiments meant to test the acoustic realisation of focus in English. They found that the primary marked of focus was f0 where focused material had higher f0 means and maxima, however participants were also consistent in marking focus with longer duration and greater intensity. Further more Breen et al. (2010) found that words preceding and following the focus were less prominent in terms of f0, duration and intensity. Other studies have also confirmed the importance of f0, both in terms of height (maximum, mean) and in terms of f0 excursion on focused material as being critical in focus realisation and robust cross-linguistically, some of these include Swerts et al. (2002); Hanssen et al. (2008) for Dutch, Baumann et al. (2006); Féry & Kugler (2008) for German, Ots (2017) for Estonian, and Chen & Braun (2006) for Chinese.

If prominence is associated with an increase in duration, higher f0 values and larger f0 range and greater intensity, then givenness, since, as it is commonly associated with a decrease of prominence can be assumed to be associated with an inverse of these values. Indeed, for many languages this is the case, but there is evidence to suggest that the realisation of givenness may not be cross-linguistically uniform. For example Swerts et al. (2002) found that Dutch and Italian differ in this respect, while Dutch marked contextually given items with decreased prosodic prominence, Italian did not, a finding that was confirmed by Avesani & Vayra (2005); Harris (2014). English in this respect behaves similarly to Dutch, where given material has been found to be associated with shorter durations Fowler & Housum (1987).

As will be shown below, prominence may not only be associated with varied realisation of individual item, and the accented syllables associated with them, but it may also be reflected in prosodic phrasing. Prosodic phrasing itself is associated with a number of cues, the most important of which is pre-final lengthening which has been shown to correlate well with prosodic boundaries (Lehiste, 1973; Klatt, 1975; Shattuck-Hufnagel & Turk, 1996, among otherse). This phenomenon occurs on the syllables preceding a prosodic boundary, but may also extend to syllables preceding the final syllable as well (Berkovits, 1994). Pauses have also been show to be indicators of phrasing. They have also been shown to correlate well with pre-boundary lengthening suggesting that the two form parts of a complex cue indicating prosodic boundaries Wagner & Watson (2010).

2.4.2   Prosodic structure and prominence

Besides being associated with the semantic/pragmatic features of a an utterance, prosody also reflects its syntactic constituent structure. Consequently theories have been developed which model the mapping of syntactic structure onto prosodic structure (among others: Selkirk (1984, 1986); Nespor & Vogel (1986); Truckenbordt (1995)). These theories usually assume a hierarchy of prosodic structure, where at the lowest level lexical items are mapped onto *prosodic words* (PW) at the highest level, sentences (utterances) are mapped onto *intonational phrases* (IP). Intermediary levels have also been proposed, such a the *prosodic phrase*, *minor* and *major phrases*, as well as the accentual phrase AP among others. The use of these intermediary levels vary between languages and authors. One influential view (for example Selkirk (1984)) is that prosodic units have a default prominent position, a head, which receives the most prominent stress of the strongest accent (the *Nuclear Stress* in the case of IPs as proposed by Chomsky & Halle (1968)). In this respect then, prosodic prominence is not only reflected in the acoustic cues surveyed above, but it is also associated with the prosodic structure of a given language.

As Jun (2005, 2014) points out, prosodic prominence may be realised in two ways from the point of view of prosodic structure: culminatively, by marking the head of a prosodic unit (*head-prominence*), and demarcatively by markig the edge of a prosodic unit (*edge-prominence*). While these possibilities seem fairly distinct, there may be overlap. While certain head-prominent languages may vary the position of the head of a phrase within that phrase depending on which constituent is in focus, other languages display strict headedness, where the head of a prosodic phrase is closely associated with the right or left edge of that phrase, making it difficult to distinguish head or edge prominence in such cases, since the two structural markers do not act independently of one another. Such languages, like Hungarian (Mády et al., 2016), can be categorised as edge/head-prominent (Jun, 2014).

Jun's classification suggests that that languages vary on how they mark prominence related to information structure based on which type (head, edge, edge/head) they belong to. Indeed, Féry & Ishihara (2010) found that German and Japanese do not make use of prosodic phrasing (the mapping of prosodic domains onto syntactic ones) to reflect information structural categories, as these are marked by the raising (focus) or lowering (givenness) of the f0 register of an item within a domain with out modifying phrasing. Similar findings were reported for Italian (Grice et al., 2005), Romanian (Manolescu et al., 2009) and European Protuguese (Frota, 2002), all head-prominence languages. Similarly many head/edge-prominence languages make use of prosodic boundaries to mark focus, as has been found for Northern Bizkaian Basque (Elordieta, 2007), Japanese (Venditti et al. (2008) contra Féry & Ishihara (2010)), and

Korean (Jun, 2005). Further more, Burdin et al. (2015) in a comparative study of typologically different languages (American English, Paraguayan Guarani, Moroccan Arabic and K'iche') found that the strategies used in the prosodic marking of focus only partially correlated with the head- vs head/edge-prominence distinction, for example both English (head-prominence) and Moroccan Arabic (head/edge-prominence) used phrasing as well as durational cues that are independent of phrasing to mark focus.

2.4.3 Theoretical approaches to information structure and prosody

As shown above, a prevalent view regarding focus is that it is associated with prosodic prominence, in fact, the dominant view is that focus is associated with the highest level of prominence in the intonational phrase (Chomsky, 1971; Jackendoff, 1972; Selkirk, 1984; Truckenbordt, 1995; Reinhart, 1995, 2006; Zubizarreta, 1998). For example Reinhart (1995) defines this relation as shown in (43).

(43)   *Stress-focus correspondance principle*
         The focus of a clause is a(ny) constituent containing the main stress of the intonational phrase, as determined by the stress rule.

Several theories have been developed which, unlike those reviewed in Section 2.2.1 see the need of the focus to be aligned with the main stress of an intonational phrase as the primary motivation of focus related word order phenomena. Zubizarreta (1998) for Spanish, Szendrői (2001, 2003) for Hungarian (this proposal will be explored further in Section 2.5.1), İşsever (2002) for Turkish and Samek-Lodovici (2005) for Italian, as well as other works.

These proposals differ in many aspects, for example Zubizarreta (1998) assumes the syntactic encoding of focus by way of [+Focus] feature as well as a syntactic focus position, while in Szendrői's (2001) model focus is not encoded syntactically all. None-the-less, they propose that the placement of nuclear stress is highly important in accounting for word order variation related to focus, as the application of the principle in (43) would mean that at least in some languages, which are categories as non-plastic by Vallduví (1991), the correspondance between focus and stress would be achieved by changes in word order.

A stress based approach to movement can not only apply to phenomena associated with focus, but also givenness. Recall from Section 2.4.1 that givenness is often associated with a decrease in prominence. One proposal which seeks to capture this is the DESTRESSGIVEN constraint of Féry & Samek-Lodovici (2006) formulated within their optimality theoretic framework as the counterpart to the STRESSFOCUS constraint. The STRESSFOCUS constraint is an al-

ternative way to grasp the focus prominence than how it is presented in (43) above. Reinhart's formulation makes reference to a specific prosodic unit, while these constraints talk about the focus domain, which is the constituent in focus combined with its background.

(44)   a.   STRESSFOCUS: A focused phrase has the highest prosodic prominence in its focus domain.

       b.   DESTRESSGIVEN: A given phrase is prosodically non-prominent.

One implementation of the DESTRESSGIVEN constraint is by Šimík et al. (2014); Šimík & Wierzba (2015) for Czech. Recall from Section 2.2.2, that Czech adheres to the Given-before-New generalisation in its word order, and that this has been analysed (Kučerová, 2007) as an instance of syntactic movement of the given elements. Šimík et al. (2014); Šimík & Wierzba (2015) argue that instead of the operator movement as proposed by Kučerová (2007), the factor responsible for this word order variation is the requirement in Czech that given elements avoid the main accent of the sentence. They suggest that in Czech Prosodic Phrases (phrases at an intermediary level) bear their accents on their right edge, and the right most Prosodic Phrase in the sentence projects its accent to become the highest level accent in the sentence, as shown in (45) taken from Šimík & Wierzba (2015).

(45)   ((Všecky TRAKTORY) (rychle VYJELY) (do družstevních POLÍ))
       all   tractors.nom quickly went.out into cooperative   fields.gen
       'All tractors quickly went out into the cooperative fields.'

Therefore, when a sentence is mapped onto an IP the right edge of the sentence will be associated with the highest level accent. Further more, they suggest that given elements have to adhere to a version of the DESTRESSGIVEN constraint shown in (44-b). Consequently given items are licensed to be scrambled away from the final position in the clause.

In the case of a language that does not realise givenness prosodically as for example Italian (see Section 2.4.1), Féry & Samek-Lodovici (2006) propose that the DESTRESSGIVEN constraint is not relevant in determining the prosodic realisation of utterances.

The theories reviewed above, which see information structure related word order variation as a result of a need to meet needs/constraints imposed by prosody provide a solution for explaining these variations with out resorting to incorporate information structural notions into syntax. This position is also argued for by Fanselow (2006), who points out that relying on scrambling, a form of syntactic dislocation that is (usually) not obligatory, in combination with a prosody driven word ordering, accounts for the optionality of moving focused/given

items that has been observed in a number of languages (e.g. German, Sinhala, Turkish) in an a more straight forward way, than trying to incorporate this optionality into a purely syntactic account.

2.5   Hungarian Prosody

Hungarian is an intonation language with post-lexical pitch accents located on the major constituents of the clause (Varga, 2002). These accents are aligned with the stressed, initial syllable of content words. A typical example of this pattern is shown in (46). Note that accents are present at the initial syllables of all major constituents: the topic (*tegnap*) the verb (*elmentünk*), and both post-verbal constituents (*a nővéremmel* and *az állatkerbe*). Note also that in this construction the verb itself (*mentünk*) does not receive an accent, instead the accent is located on the verbal particle (*el-*) which is in the immediately pre-verbal position. Further more, that the accents are realised on the first content word of of each constituent, thus the definite articles in the post-verbal domain remain unaccented.

(46)   'Tegnap 'elmentünk a 'nővéremmel az 'állatkerbe.
         yesterday prt.went.3pl the sister.mine.with the zoo.into
         'Yesterday we went to the zoo with my sister'

If a sentence includes a pre-verbal narrow focus, the accent pattern has been claimed to change as shown in (47). The pre-vebal narrow focus (*a nővéremmel*) receives an accent, but the verb following it is unaccented as is the verbal particle after the verb. This claim is widely attested in the literature Kálmán & Nádasdy (1994); Varga (2002); Szendrői (2001); É. Kiss (2002) and has also been shown experimentally Surányi et al. (2012); Szalontai et al. (2016). Although I have indicated that there is an accent on the topic, it has been suggested by Kálmán & Nádasdy (1994) that this accent is optional, an observation that has been experimentally examined by a number of recent studies (Genzel et al., 2015; Mády, 2015).

(47)   'Tegnap a 'nővéremmel mentünk el az ?állatkerbe.
         yesterday the sister.mine.with went.3pl prt the zoo.into
         'It was with my sister with whom I went to the zoo.'

Note that the accent on the post-verbal constituent has been marked with a question mark. This is meant to indicate that there is disagreement in the literature regarding the nature of these accents, some suggest that constituents following focus are deaccented (Kálmán & Nádasdy,

1994), while others argue that these accents if present are at a different hierarchical level than pre-verbal accents, a suggestion that applies in (47) as well as in (46), meanwhile recent experimental evidence seems to suggest that decantation post-focally is an optional tendency rather than a strict rule based operation (Genzel et al., 2015; Mády, 2015).

The goal of the following sections is to give an overview of proposals in literature that have been made regarding the prosodic structure of Hungarian sentences, both in broad focus and narrow focus constructions as presented above. This overview will highlight different possibilities for the prosodic realisation of foci in the post-verbal domain, even though this question has not been extensively considered by most authors. Further more, recent experimental evidence will be considered regarding the prosodic realisation of focus in Hungarian, in order to gain a better understanding of the phonetic cues that the language makes use of. While the prosody of givenness has not been as thoroughly investigate as that of of focus, some proposals have been formulated. These will also be considered.

2.5.1   Approaches to Hungarian prosody.

In terms of prosodic structure the existence of prosodic words, at the lowest level of the hierarchy and intonational phrases (IP) at the highest level of the hierarchy is relatively uncontested. Most authors also assume the existence of at leas one intermediary level, although there is no clear consensus what category is.

Prosodic words are widely assumed to be left-headed, with word level stress falling on word initial syllables (Varga, 2002; Olaszy, 2010)[5]. Prosodic words are usually mapped over content words, but they can also cover a morpho-syntactically created unit, most importantly, the verbal particle - verb compound. Above prosodic words most authors propose some intermediary levels like prosodic phrases (PP) (Vogel & Kenesei, 1987; Szendrői, 2001). The assumption take in this study is that the only intermediate level in Hungarian is the accentual phrase (AP) as argued for by Mády et al. (2013). The AP is characteries by one accent on the left-most syllable of its first content word with a falling contour and a tail that continues until the end of the AP. The AP is about the size of a constituent in a sentence. Above the AP is the intonational phrase (IP). This means that the sentence in (46) would have the structure in (48)

(48)   ((('Tegnap)$_{AP}$ ('elmentünk a)$_{AP}$ ('nővéremmel   az)$_{AP}$ ('állatkerbe.)$_{AP}$)$_{IP}$
         yesterday   prt.went.3pl the   sister.mine.with the   zoo.into
         'Yesterday we went to the zoo with my sister'

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[5]While this is widely accepted, it is sometimes the case that accents are not realised on the initial syllable but shits, or spreads to the second syllable as well (**?**)olaszy2016).

At the level of intonational phrases there are a few important points of disagreement in the literature. On the one hand there is no accord as to how exactly IPs matched with sentences, with the contested question being what syntactic units should be mapped onto an IP, whether or not a simple declarative sentence is made up of one or more IPs. On the other hand, there is no agreement as to the structural prominence relation within the IP. Authors disagree on wether or not the IP has a structural head position – a position with default phonological or phonetic prominence – and if it does, where exactly this head position is. These questions will be examined below in more detail.

Vogel & Kenesei (1987) and Kenesei & Vogel (1989), asume a completely flat structure of the Hungarian sentence, and argue that in broad focus constructions the topic, the verbal particle and verb complex and each post-verbal constituent form an IP, as shown in (49), further more, that in such a construction each IP is equivalent to a prosodic phrase.

(49)   [Topic] [Prt-Verb] [XP] [YP]

Their argument was bassed on the domain of applicability of stress reduction, and l-palatalisation, arguing that the domain for these phenomena is the IP. In subsequent work, Kenesei & Vogel (1998), they specifically analyse the prosodic phenomena associated with focus constructions. In this study they suggest that while the IP is still the highest level of prosodic structure, focus is associated with the prosodic phrase. When a sentence has a pre-verbal focus a process of prosodic restructuring ensures that the focus and following items are in the same prosodic phrase, where each post-verbal item itself a prosodic phrase.

(50)   a.   [A téren]$_{IP}$ [Pál]$_{IP}$ [játszik]$_{IP}$ [az angol   [játékkal]$_{PPH}$]$_{IP}$
              the square.on Paul   plays   the English toy.with
              'Paul plays with the English toy in the square'

        b.   [A téren]$_{IP}$ [[Pál játszik [az angol]$_{PPH}$ [játékkal]$_{PPH}$]]$_{PPH/IP}$
              the square.on Paul plays   the English   toy.with
              'It is Paul, who is playing with the English toy in the square'

The prosodic restructuring rule proposed by Kenesei & Vogel (1998) takes the structure assigned to the broad focus sentence in (50-a) and modifies it in such a way that when there is a pre-verbal narrow focus as in (50-b) the focus is in the same prosodic phrase as the word following it (the verb) and the post-verbal constituents, which form prosodic phrases of their own, also form part of the same prosodic phrase, where stress reduction can occur. While Ke-

nesei and Vogel do not deal specifically with headedness in their works cited above, Kenesei & Vogel (1998) does formulate the prosodic restructuring rule such that when narrow focus is present the left-edge of a PP is inserted before it (Kenesei & Vogel, 1998:107). While this does not amount to an explicit analysis of marking focus with edge prominence it is compatible with it. In the view developed by Vogel & Kenesei (1987); Kenesei & Vogel (1989, 1998) the prosodic structuring is triggered primarily by the syntactic structure, with some influences from semantics.

A highly detailed theory of Hungarian intonation has been developed by László Varga in a number of studies (Varga, 1981, 1983, 2002, 2016) (among others). Varga applies a contour based approach, where the contours are constituents within an intonational phrase, that have a characteristic internal structure. While an IP may contain several contours the most important is the final *terminal contour*, which begins on the final accented syllable and lasts until the end of the IP. While the termina contour/accent is in a way more significant than other contours in the IP Varga doesn't characterise it as the head of the IP, in the sense that it is in some way more salient than other accents within the IP. None-the-less, it does have the effect of keeping deaccented material away from the final position within an IP (Varga, 1981, p.c.), a point which will become relevant in connection to givenness. As far as the syntax-prosody mapping is concerned Varga (2016) notes that in the case of simple declarative sentences, the terminal contour is followed by an IP boundary, but the preceding contours, which are associated with the major syntactic constituents of sentence do not initiate IP boundaries after them, therefore, the entire sentence, including the topic, is mapped onto one IP.

Varga (2016) also consideres the post-verbal domain, for which he developed two rules that can overwrite the basic mapping rule outlined above. These rules are optional, and allow for a differentiated realisation of post-verbal intonational structure. The *upstep rule* allows for an optional avoidance of the downward movement of subsequent contours within the clause for the final constituent only if it has more than one accent. The RISING RULE allows for the insertion of a rising accent on the second accent of the first post-verbal constituent, this in effect will insert an IP boundary between the two post-verbal constituents (Varga, 2016:60-61). As we can see therefore the model developed by Varga allows for some modification of the IP structure, but only under very specific conditions. Varga (2002, 2016) does not assume a specific prosodic structure associated with pre-verbal focus, other than the observation that the verb following focus must be obligatorily deaccented, which is characterised as an instance of syntactic deaccentuation (Varga, 2002:143).

In terms of post-verbal foci, Varga does not class these separately from contextually new

post-verbal elements. However his model allows for a way to increase the prominence of any post-verbal syntactic constituent, by avoiding the downward drift within the IP and placing the accented syllable of the constituent noticeably higher (Varga, p.c.), this does not introduce a new IP.

It is important to not here that Varga's approach, namely the fact the he assumes that the final accent contour in a clause is the only obligatory one make some suggestions regarding the possibile occurrences of given constituent in the post-verbal domain. Because of this, Varga (1981) suggest that items which are contextually given may not appear in the clause final position.

(51)   Mit   csinált a   konyhában?
         what did.3sg the kitchen.in
         'What did he do in the kitchen?'

     a. Begyújtott a   konyhában a   fiának.
         fire lit.3sg the kitchen.in   the son.his.for
         'He lit a fire in the kitchen for his son.'

     b. *Begyújtott a   fiának   a   konyhában.
         fire lit.3sg the son.his.for the kitchen.in
         'He lit a fire for his son in the kitchen.'

For example, Varga (1981) deems (51-b) not acceptable, because as a contextually given item *a konyhában* should be deaccented, and, when a deaccented item co-occurs with an accented item in the post-verbal domain, he argues that the accent must occur in the clause-final position. In this respect Varga's (1981) proposal bears some resemblance to that made by Šimík et al. (2014); Šimík & Wierzba (2015) for Czech.

Another influential analysis of Hungarian intonation is that of Kálmán & Nádasdy (1994). Kálmán & Nádasdy do use the notion of intonational phrase in their analysis, and like Varga, they assume that each main accent – accents which correspond to major syntactic constituents – is on equal footing, including the post-verbal constituents. They do suggest that in sentence with a pre-verbal narrow focus a special type of accent is realised on the focused constituent, which they call eradicative accent. This accent is realised on the pre-verbal focus, and its effect is that all constituents in the post-verbal domain become deaccented. This is illustrated in and example taken from them presented in (52), with accents marked by underlining.

(52)   a. <u>M</u>arci az <u>á</u>gyba   dugta a   <u>t</u>örpét.
             Marci the bed.into hid   the smurf
             'Marci hid the smurf in the bed'

      b.   <u>Marci</u> az [<u>á</u>gyba   dugta a   törpét].
            Marci the bed.into hid   the smurf
            'It was in the bed where Marci hid the smurf.'

Kálmán & Nádasdy explicitly argue that not even the focus accent on *ágyba* is stronger than normal main accents. They claim instead that its increased prominence is due to the fact that the accents following it have been removed through deaccentuation. Further evidence for the assumption that the eradicative accent is not at a higher level than regular main accents is supported by Kálmán and Nádasdy's (1994:411) claim that short utterances in borad focus (53-a) and narrow focus (53-b) contexts are realised identically.

(53)   a.   Mit   csinált? – <u>Ké</u>miát   tanult.
            what did.3sg   Chemistry.acc learn.3sg
            'What was he doing? He was studying chemistry'

       b.   Mit   tanult?   – <u>Ké</u>miát   tanult.
            what learned.3sg   Chemistry.acc learned.3sg
            'What was he studying? He was studying chemistry'

       c.   Mit   csinált? – *<u>Ké</u>miát   tanul   a   buszon.
            what did.3sg   Chemistry.acc learned.3sg the bus.on

       d.   Mit   csinált? – <u>Ké</u>miát   tanul   a <u>bu</u>szon.
            what did.3sg   Chemistry.acc learned.3sg the bus.on
            'What was he doing? He was studying chemistry on the bus.'

Infact, they claim that the difference between the eradicative and normal main accent only becomes apparent when further post-verbal constituents are added. If these lack a main stress as in (53-c) they are infelicitous in broad focus contexts, as the absence of the accent signals the eradicative nature of the accent and the focus status of the pre-verbal constituent.

It is not explicitly stated that the eradicative accent is not linked to a specific structural position, the fact that it is associated with focus means that its most natural occurrence is the immediately pre-verbal position, but this association is not the result of a syntax-to-prosody mapping rule, but is an integral property of focus. Therefore technically the eradicative accent may be free to be placed anywhere where focus can occur, a logical conclusion not developed by Kálmán & Nádasdy, who do not consider post-verbal foci in their account.

A theory of Hungarian focus movement is also presented by Szendrői (2001, 2003). The main point of this theory is that the movement of items in narrow focus to the immediately pre-verbal position is motivated by its prosodic needs. Namely, Szendrői adopts the *Stress-focus correspondance principle* of Reinhart (1995) in arguing that the constituent in narrow focus must receive the main stress (nuclear stress) of a sentence. Szendrői thus relies on the prosodic

structure of Hungarian in order to explain focus movement, this fact makes it clear that her theory must be much more specific regarding prosodic structure and associated prominence that those developed by Vogel & Kenesei, Varga and Kálmán & Nádasdy presented above.

She, like **??** assumes that the comment portion of the Hungarian clause is mapped onto an IP, further more, she follows É. Kiss (1987, 1994, 2002) in assuming that there is a unique structural position associated with the nuclear stress on an IP, and that this position is on the left-edge of that IP. This results in the creation of a structural nuclear stress position at the left-edge of the comment, the position occupied by the verbal particle/modifier in sentences with broad focus contexts, and the narrow focus, if there is one, as shown in (54) with the asterisk representing the nuclear stress position.

(54)   [Prt-/Focus Verb (Prt) XP1 XP2]$_{comment}$
         (*   )$_{IP}$

This account explains well the need for focus to occur in the immediately pre-verbal position, but it also makes it difficult for foci to occur elsewhere, as Szendrői's (2001,2003). The other consequence of the model is that pre-verbal foci will be unmarked prosodically, both in terms of the prominence of the accent which falls on them, and in terms of the mapping of the prosodic structure associated with the given sentence (Szendrői, 2017).

Recall that according to the suggestion of É. Kiss (1998), foci can occur in the post-vebal position, if they are non-exhaustive, a type of foci É. Kiss calls *informational*. Szendrői (2003) argues that these foci are not in fact foci, and that therefore, the accents they receive are not the most prominent in the sentence. Szendrői supports this claim by on the one hand arguing that sentences where items in focus occurs post-verbally are not felicitous or not as felicitous answers to questions with a *wh*-item as those where this same constituent occurs in the pre-verbal focus positon. And, further more, she argues that even if post-verbal material is accented, this can only happen if the verb itself also bears and accent. Szendrői argues that this means that post-vebal constituents do not receive nuclear accents associated with IPs but only accents associated with the heads of phonological phrases.

In summarising the review of the literature above, it can be stated that there are several proposals both in terms of syntax-prosody mapping and the structure of prosodic phrases. In terms of mapping the major divide is between those who see the simple sentence mapped onto one (Szendrői, Varga, Kálmán & Nádasdy maybe interpreted in this way) or more (Vogel & Kenesei) IPs. In terms of structure, the divide is between those who see prosodic structure as left-headed (Vogel & Kenesei, Szendrői) or without a position of default prominence (Varga, Kálmán & Nádasdy). In terms of focus realisation there are some who argue that this

results in prosodic restructuring (Vogel & Kenesei), while others maintain that it does not effect prosodic structure (Varga, Szendrői, while Kálmán & Nádasdy propose a specific accent for focus, prosodic structure for them is irrelevant).

This study, will be looking only at the level of intonational phrases, since the informal, working definition adopted by it is that an intonational phrase is the relevant domain for the prosodic marking of focus. Therefore the internal structure of APs and levels below that are not of major interest to the topics considered here. Besides phrases, the other major prosodic component of prosodic structure to play a role in this study are accents. For the purposes of this study, accents are defined as the prosodic prominence associated with the initial syllable of each major syntactic constituent (i.e. the heads of each AP within an IP).

2.5.2   Prosodic prominence marking in Hungarian

This section will investigate the marking of IS categories in Hungarian by prosodic means, by reporting on the prosodic marking of focus through the results of a number of recent experimental studies. For the most part these studies investigated two aspects of prosodic marking of focus, on the one hand they considered the types of pitch accents which were realised on the topic and focus constituents, and on the other they collected data on parametric measures of intonation primarily associated with f0 contours and segment duration. The end of the section will consider the results of a study which attempted to isolate prosodic prominence marking from other linguistic factors like syntax or information structure.

Mády (2015) investigated the role of prosodic cues in marking pre-verbal foci in Hungarian. For this she used string identical sentences, as shown in (55-a), schematised in (55-b) that contained a verbal modifier (underlined in the example) which could be in focus or not.

(55)   a.   A   lányom   Németországba ment munkát   kereseni.
              The daughter.mine Germany.to   went work.acc search
              'My daughter went to Germany to look for work'

        b.   Topic – Verbal Modifier – Verb – post-verbal material.

In her experiments participants read the target sentences which were presented as responses to context questions which elicited neutral, focused and contrastively focused readings. Her results showed that topics were deaccented in the majority of cases (71%), however deaccentuation of the topic was not affected by the presence or absence of a following focus. Foci were accented in almost all cases, and carried a falling accent (which she annotated as H+L* or H*+L). The type of accent was also not affected by the focus conditions. The verb was also shown to

be deaccented in the majority of cases. With regards to the post-verbal elements, there was a difference between neutral sentences and those with a pre-verbal focus: post-focally there was a higher degree of deaccentuation of constituents, about 50% as compared to the 32% in neutral sentences. From this Mády (2015) concludes that post-focal accent deletion, as proposed by Kálmán & Nádasdy (1994) can best be characterised as a tendency and not a rule.

In terms of parametric cues associated with the accented syllables Mády (2015) did not find an overwhelming amount of evidence to suggest that pre-verbal focus is differentiated prosodically from a non-focused item in the same position. What she did find however was that contrastive focus did differ from non-contrastive and non-focused items, namely in two parameters: contrastive foci were preceded by topics whose accents had earlier f0 maxima peaks and latter f0 minima as well as having longer durations in their accented syllables. Further more, the accented syllables of the foci themselves showed a later alignement of f0 maxima, resulting in a latter realisation of the fall of the pitch contour. Besides this difference, Mády (2015) did not find any other cues that would differentiate between (non-contrastive) foci and non-focused items.

Mády (2015) also reported the results of a perception experiment where the effects of f0 maxima height and alignment as well as duration of the accented syllables of focused items were investigated in terms of naturalness judgments with broad focused, narrow focused and contrastive focused target sentences. In these experiments two values for each parameter were used: f0 maxima had a difference of 20Hz, alignement differed by 20 ms and duration of the accented vowel by 40ms. It was found that the judgements of participants were not influenced by any of the factors in the case of broad focused sentences, however participants did show preferences for accents that had higher f0 maxima in the non-contrastively focused conditions. Further more, a preference for higher f0 maxima was observed in the contrastively focused condition, but only when this was coupled with longer syllable durations.

These results confirm an earlier analysis of the same production data by Mády (2012). In that study the results of the production experiment were compared with data gathered from a spontaneous speech corpus. It was found that in spontaneous speech contrastive and non-contrastive foci can be differentiated by the values of the f0 maxima and minima as well as the f0 range of the accented syllable as well as the position of the f0 maxima within the accented vowel. However there were no reliable cues that could distinguish non-contrastive foci from their non-focused counterparts. Therefore, both Mády (2012) and (2015) suggest that the accented syllables of pre-verbal items are only marginally different if they are focused or not, and perhaps the best cue to differentiate between them is the placement of the f0 maxima within

the accented vowel. Mády (2012) suggest that the reason for this might be that a later realised f0 maxima would provide a longer duration of relatively higher f0 on the accented vowel, thus increasing its prominence.

Another recent study, Genzel et al. (2015) also investigated the prosodic realisation of pre-verbal foci. This study also considered two focus types: contrastive and non-contrastive, further more, it also investigated the role of the background of the pre-verbal narrow focus, which was alternated between given and contextually new. The target sentences used in the study had a structure similar to that use by Mády (2015), as shown in (55-b) in that the item that was in narrow focus was a pre-verbal verbal modifier, which could also appear in its per-verbal position in broad focused sentences. The target sentences were presented as answers to context questions in small dialogues which participants were asked to read aloud. The study considered both categorical markers in the form of contour types and parametric indicators.

In terms of contour types Genzel et al. (2015) found that the verbal modifier was overwhelmingly characterised as having a falling or a high (H*) contour. In terms of parametric cues, the study found that if the verbal modifier was in narrow focus it was realised higher by about 1.4 semitones in the case of non-contrastive focus and by about 2.5 semitones in the case of contrastive focus. Further more, it was found that the fall of the f0 contour over the verbal modifier was steeper in the case of narrow focus, by about 10 semitones/second in non-contrastive focus and about 13 semitones/second in contrastive focus. They also found that there is an interaction between the type of accent on the topic preceding the verbal modifier and the realisation of the focus on the verbal modifier.

One of the starting hypotheses of Genzel et al. (2015) was that foci could not only be marked by the accents realised on them, but also by the prosodic realisation of their background. However, their study did not find strong evidence that narrow focus would be marked by deaccentuation in the post-verbal domain.

Some of the results of Mády (2012, 2015) and Genzel et al. (2015) seem to be in contradiction. While Mády (2012, 2015) did not find a significant increase in f0 maxima on the accented syllable of the narrow focused item Genzel et al. (2015) did. This conflict is surprising given the similar stimuli and experimental methodology used by the studies, however it might just point to the high degree of variation in the exact prosodic realisations of focus. Further more, while the production experiment reported in Mády (2012, 2015) did not produce higher f0 maxima, the perception experiment reported in Mády (2015) did show a preference of participants for higher f0 maxima in focused conditions. Besides this, the two studies did show findings that can be interpreted as being congruent. Mády (2015) showed that focus was associated with a

later alignment of f0 maxima in the accented vowel, and Genzel et al. (2015) showed that focus was associated with a steeper fall in the f0 contour. While Mády (2015) did not report on the steepness of the f0 slope, Genzel et al. (2015) did report that according to their data peak alignent was not significantly affected by the presence of narrow focus. Taken together, these two results: latter f0 maxima and steeper fall, are at least not contradictory, as a later peak would logically result in a steeper f0 movement to reach a prosodic target following it. It cannot be ruled out hat the fact that Genzel et al. (2015) did not find late alignement may be due again to the highly variable nature of the prosodic data. The two studies are in accord however, in showing that post-focally deaccentuation is not obligatory, but merely a tendency. Further more, both found an overwhelming tendency of falling accents on focused items. While these two studies are not in complete accord in their findings, they are at least not contradictory in the tendencies that they show for the prosodic realisation of focus. The important conclusion to draw from their comparison is that a high degree of variation is to be expected in the prosodic realisation of pre-verbal foci. It might be the case that this is due to the fact that pre-verbal foci are usually clearly marked syntactically, therefore the prosodic realisation is not crucial in its marking.

Genzel et al. (2015) is also the only recent experimental investigation of the prosodic realisation of givenness in Hungarian, although it consideres it only as interms of the background of focus and not in its own right. The study found that givenness has an independent effect on the the realisation of the background. Topics that form part of the background were found to be more often realised with a rising accent as opposed to a falling one. The rising accent is usually associated with contrastiveness Gyuris & Mády (2014), however as Mády (2015) points out, the rising accents noted by Genzel et al. (2015) may be analysed as instances of deaccenting. In the post-verbal domain, Genzel et al. (2015) find that givenness of the background leads to more frequent deaccenting. These results show that givenness does play a role in the prosodic realisation of items, however the fact that givenness was only investigated in connection with focus leaves open the question of how much givenness may influence prosody by itself.

The study reported by Mády et al. (2016) represents an attempt to investigate the prosodic marking of prominence by removing linguistic cues from the the data being investigated. This was accomplished by having participants utter sequences of fruit names which were presented to them as images. Prominence was elicited by modifying the size of fruits, and asking participants to reflect this change in their realisation of the fruit sequences (i.e. placing more emphasis on larger fruits). The primary interest of the study was to identify if prosodic phrasing plays a role in prominence marking in Hungarian. The results showed that significantly more pauses

occurred before prominent items than non-prominent items. While the number of pauses after prominent items did not differ significantly from the number found after non-prominent items, it was found that the former were significantly longer. In terms of pre-final lengthening at two positions: on the syllable preceding the boundary before the target item, and on the final syllable of the target item. It was found that there was significant lengthening in both positions.

The presence of pauses and pre-final lengthening before prominence is compatible with the view, that Hungarian prosodic units have a structurally prominent position on their left-edge. Since, as Mády et al. (2016) argue the insertion of a pause and pre-final lengthening may emphasise the presence of a prosodic boundary before the prominent item. However, they also point out that it is not clear if these cues signals the presence of an IP as opposed to an AP boundary. The study also reported the results of methodologically identical experiment on German which found that in that language lower level boundaries are not used to mark prominence.

In summary it can noted that to mark focus, Hungarian has been documented to uses pitch, by possibly increasing the height of the f0 maxima on the accented syllable of the focused constituent, or by modifying the placement of the f0 maxima within the accented syllable, and by creating a steeper fall of the f0 after the maximum. It is questionable, however, to what extent these cues are consistent. The fact that the two recent studies (Mády, 2015; Genzel et al., 2015) outlined above had somewhat different findings, points to the possibility that the application of prosodic marking of focus is highly varied and may depend on a number of factors. Further more, as the results from Mády et al. (2016) indicate prosodic boundaries may also play a role in prominence marking.

2.6   The scope of the study

This summary of the information structural categories of focus and givenness as well as their interaction with syntax and prosody in general and in Hungarian in particular has served to put the goals of this study into perspective, so that its primary research questions can now be formulated.

It has been shown that focus and givenness may interact with both syntax and prosody in order to be realised with the appropriate prominence (or lack there of) associated with them. It has further been shown that Hungarian syntax is sensitive to information structural roles in its pre-verbal domain, which might be due primarily to its prosodic structure and the interaction between prosody and syntax as suggested by Szendrői (2001). It has also been shown that post-verbally Hungarian syntax is different, it is much less restricted than pre-verbally. As

syntactic versus prosodic plasticity (in terms of Vallduví (1991)) seems to play an important role in the realisation of focus and possibly other information structural categories, the post-verbal domain of Hungarian provides and ideal experimenting ground for the exploration of the relation between syntax, prosody and information structure. Based on this the following primary research questions may be formulated:

1. Does the presence of post-verbal focus effect the word order within the post-verbal domain?

2. Does the presence of givenness effect the word order within the post-verbal domain?

3. Is the (prosodic) realisation of focus effected by its position in the post-verbal domain? prosodyQuestion)

4. What prosodic cues are used to mark post-verbal focus?

It is the aim of this study to answer these questions by conducting a series of experiments. The first group of experiments will investigate the word order preferences associated with post-verbal information structure. The second group of experiments will investigate the prosodic realisation of focus in the post-verbal domain. While prosodic realisation of post-verbal given constituents is also a highly relevant research topic, it will not be investigated in this study. This was primarily due to the technical limitations involving the participant pool available for production experiments and the time each participant could be reasonably expected to take to perform the experimental task.

In order to investigate word order preferences, sentences where foci as well as contextually given and new elements appear in the post-verbal domain will need to be tested. The schematic version of this basic construction is given in (56) below.

(56)   [Verb [Constituent 1] [Constituent 2]]

The primary approach of the research method used in this study is to modify the information structural status of the post-verbal constituents in such a way that all possible combinations of focused, given and contextually new word orders are represented. These possible realisations will be then used to elicit judgement and production data. This methodology will allow for the gathering of data that has the widest possible coverage to asses the information structural effects considered. Another possible method would have been to draw up hypotheses from the literature and test those specifically. However, while some hypotheses may be formulated based on the previous literature (as will be discussed below), no highly detailed predictions

may be made regarding the research questions presented above. Collecting data in this way may lead to an incomplete, or misleading picture of the phenomena. It is then better therefore, to cast a wider net and evaluate those hypotheses which may be made in light of the information so gathered.

Since the post-verbal word order is free, and having made no initial theoretic assumption regarding the potential effects of focus and givenness on it, a number of logical possibilities may be formulated for these effects. If these effects are considered independently, then (I): focus/givenness may influence word order in such a way that the focused/given item will occur in the immediately post-verbal (IPV) position (as shown in (57-a) and (57-c)). (II): focus/givenness may influence word order in such a way that the focused/given constituent will occur in the clause final (CF) position (as shown in (57-b) and (57-d)). (III) focus/givenness will not have a discernible effect on word order and the focused/given constituents may occur in any post-verbal position.

(57)   a.   Verb Focus New

        b.   Verb New Focus

        c.   Verb Given New

        d.   Verb New Given

        e.   Verb Focus Given

        f.   Verb Given Focus

If focus and givenness are considered in situations where they occur together and have the same independent effect the following possibilites may arrise: (IV) the effect of focus will be stronger than the effect of givenness ((57-e) **or** (57-f)), (V) the effect of givenness will be stronger than the effect of focus ((57-e) **or** (57-f)), (VI) the effects of focus and givenness will be of equal strength resulting in an apparent optionality of word order ((57-e) **and** (57-f)). If the effects of focus and givenness do not have the same effect (for example: (I) is true for focus and (II) is true for givenness), then, when they are both present, a highly stable word order will arrise ((57-e) **or** (57-f)).

In terms of prosodic realisation, a similar set of predictions may be made. The variables to be considered involve the interaction of prosodic prominence associated with focus and the possibilities for prosodic prominence realisation in Hungarian. If at present no assumptions are made about Hungarian prosodic structure (i.e. its status as an edge/head-prominence language) a two main logically possible outcomes may be formulated for research question 3 above: (VII) foci occurring in different post-verbal positions are not realised differently. An

outcome of this nature could entail that prominence marking in the post-verbal domain does not alter the prosodic structure of the sentence, while allowing prominence to be realised in either the IPV or the CF position. If this is not the case then it must be that (VIII) the prosodic realisation of focus is different if the constituent in focus is in the IPV or the CF position. This latter prediction may be further divided according the actual prosodic cues associated with focus marking. It may be the case (VIIIa) that the accent of constituents in focus are affected by their syntactic position. It might also be the case that (VIIIb) the prosodic structure of the sentence is affected. Alternately, any combination of (VIIIa) and (VIIIb) is also feasible.

This introductory chapter has presented a number of theories of information structure in Hungarian. This section will now provide a brief overview of the possible predictions they may make with regard to research questions posed above. Recall that for pre-verbal focus movement two main types of theories have been developed. The first group of theories consideres focus related movement to be realised by syntactic mechanisms (see Section 2.3.1 for further details on these theories). In this group are theories developed by Bródy (1990, 1995), Horváth (2000, 2005 a.o.) and É. Kiss (1998a, 1998b a.o.). The primary concern of these theories is with pre-verbal focus, therefore, they do not make any predictions about the word order associated with post-verbal foci, unless it is part of a double focus construction. In this case the prediction is that post-verbal (exhaustive) foci will tend to occur in the IPV position since the focus structure is built up in an iterated fashion. Indeed most of these theories do not deal with the question of post-verbal (non-exhaustive foci). The notable exception is ?ekiss1998b), who claims that post-verbal information focus is not associate with a specific position in that domain. This claim makes the prediction that the presence of a constituent in focus will not influence the word order of post-verbal constituents, therefore if it is right, then prediction (III) will be borne out, at least for focus. No theory developed for Hungarian was found which makes any prediction of the behaviour of post-verbal contextually given constituents on purely syntactic grounds.

The second group of theories sees information structure related word order variation as the result of the interaction of Hungarian syntactic and prosodic structure (see Section 2.5.1). In terms of focus, the theory developed by Szendrői (2001, 2003) holds that movement to the pre-verbal focus position occurs due to the need for focus to be associated with the prosodic prominence inherent in that position. Therefore, according to her assumptions, foci in the post-verbal domain cannot occur, since it would then not be associated with the prosodic prominence that it requires. In her framework, constituents which É. Kiss (1998a) analyses as information focus are not assumed to have focus qualities. As a consequence her theory does not make any pre-

dictions regarding the positon or prosodic realisation of post-verbal foci, on the grounds that they not exist.

In terms of givenness, the observations made by Varga (1981) hold that contextually given constituents do not occur in the clause final position due to their need to be deaccented as Varga associates the clause final position with the mandatory presence of an accent (see Section 2.5.1). If this is indeed the case then it will be predicted that any given material will tend to occur in the IPV position rather the the CF position in structures such as (56), meaning that prediction (I) will hold true for givenness.

As stated above, the goal of this study is to explore these possibilities in order to gain an understanding of the interaction of information structure, syntax and prosody of the post-verbal domain of Hungarian. First a series of forced choice judgement tasks will be used to investigate the effects on word order of focus and givenness, these experiments and their results are presented in Chapter 3. Chapter 4 presents the results of prosodic production experiments designed to investigate the production of post-verbal focus.

Chapter 3

Forced Choice Experiment on Word Order

The first aim of the study was to establish the effects on post-verbal word order of focus and givenness. As outlined in the introduction, the general claim in the literature regarding constituent order in the post-verbal domain was that it is free. This could be because of the flat nature of the VP (É. Kiss 2002 a.o.) or because there is some sort of mechanism that allows for a reordering of the constituents after they have been merged into a hierarchical structure (Surányi 2006a, 2006b; É. Kiss 2008). What is not known at this point is whether or not givenness or the type of focus (non-exhaustive 'informational' focus) is associated with word order variations in this domain, and if so how do these factors interact with each other. The first series of experiments were designed to test for these effects.

In terms of focus all three types of possible post-verbal foci presented in Section 2.3.3 will be examined. Experiment 1 will look at post-verbal simle focus, while Experiments 2 and 3 will consider foci marked with the particle *is* and post-verbal members of double focus constructions respectively.

In Section 2.1.2 it was noted that givenness may best understood on a scale where items with different degrees of givenness have potentially different effects on realisation. Keeping this in mind the experiments were designed to for different types of givenness. Specifically Experiment 1 uses simple textual givenness, where given items are given verbatim in the discourse contexts, but are otherwise unmarked information structurally. Experiment 2 tests the effects of items that are textually given, but are also marked as topics in the discourse, while Experiment 3 considers given items that also form the part of the background of a pre-verbal

focus.

In the following, Section 3.1 will present a general methodology used in all three experiments using materials from Experiment 1 as examples. A less detailed description of the materials is given for Experiment 2 and Experiment 3 in their respective sections, with a focus on how they differ from those used in Experiment 1.

3.1   General Methodology

When choosing the appropriate paradigm to test the effects of givenness and focus on word order, it was assumed, that owing to the "free word order" nature of the post-verbal domain, if there are preferences for different word orders of focus placement, the differences between these would be harder to detect than those in the pre-verbal domain. Consequently, a simple acceptability judgement task would likely not be able to determine these preferences. Therefore, a two alternative forced choice task was employed in this study, a design that is much more capable of detecting smaller differences between preferences (Schütze & Sprouse, 2014).

The target sentences for the simple focus experiment were designed with the structure below. The constituent order was that of a neutral, broad focus sentence, with the verbal particle, if there was one, in the immediately pre-verbal position as well as a topic in the canonical topic position.

(1)   [Topic [$_{VerbalPredicate}$ V XP$_1$ XP$_2$]]

The topic in all but one case was a given name[1], with respect to syllable size, there were 11 two syllable, 4 three syllable and 1 four syllable topics. The verb in all cases was intransitive, in 11 cases the verb was a particle-verb complex, and in 5 cases it was a particle-less verb. With respect to syllable counts there were 2 two syllable, 8 three syllable, 5 four syllable and 1 five syllable verbs (including the verbal modifier where present). XP$_1$ and XP$_2$ were the target constituents bearing different IS markings in the different experimental conditions, their preferred word order was the dependent variable of the experiment. They were selected in such a way as to minimise effects inherent to them which could influence word order preferences outside of the independent variables. They were both circumstantial adjuncts, they had the same syntactic structure: either both were bare oblique nominals, or both were a noun preceded by a definite article. They were both inanimate, and each pair of adjuncts was composed of the same number of syllables, there were 7 three syllable pairs and 9 four syllable pairs (not

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[1]One of the topics was the expression *Az unokám* 'My grandchild'.

counting the determiner).

The independent variables of the experiment were focus and givenness, the baseline marking was contextual newness[2]. These variables created conditions such that one XP was either new or focus, while its clausemate[3] XP was new or given. These factors resulted in 3 treatment conditions (NEW-GIVEN, FOCUS-NEW, and FOCUS-GIVEN). Along these a (BASELINE) condition was also included, in which both post-verbal constituents were context new, and the sentence was in broad focus. In the study the term *focus conditions* will be used to identify all conditions that had focus, and to distinguish them from the BASELINE condition.

Condition	XP$_1$ (target)	XP$_2$ (clausemate)	Focus
BASELINE	new	new	broad
NEW-GIVEN	new	given	broad
FOCUS-NEW	focused	new	narrow
FOCUS-GIVEN	focused	given	narrow

Table 3.1: Conditions with associated discourse marking on post-verbal constituents.

The conditions were created by context questions preceding the target sentences. The task of the participants was to decide which target sentence was a more natural answer to the context question. A set of target sentences is illustrated in (2).

(2)   a.   Noémi kísérletezik   a   vegyszerekkel a   laborjában.
          Noémi experiment.3sg the chemicals.with the laboratory.poss.3sg.in
          'Noémi is experimenting with the chemicals in her lab.'

      b.   Noémi kísérletezik   a   laborjában   a   vegyszerekkel.
          Noémi experiment.3sg the laboratory.poss.3sg.in the chemicals.with
          'Noémi is experimenting with the chemicals in her lab.'

Example (3) illustrates a BASELINE condition question. It is a question which requires a broad focus answer, that is a sentence, where all elements, except for the topic, convey contextually new information. The associated target sentences (the possible answers) are shown in (2). Since the two post-verbal constituents, *a laborjában* and *a vegyszerekkel* are balanced for animacy, syllable number and adjuncthood, it is hypothesised that subjects' preferences for ei-

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[2]A potential, but somewhat unavoidable problem with conditions where givenness is not tested is caused by the fact that the constituents in the target sentences were always definite noun phrases. Wile this made the creation of focused given conditions relatively easy, it causes a problem when these constituents are asked to be interpreted as contextually new as in the BASELINE NEW-GIVEN and FOCUS-NEW conditions. The participants must accomodate their referents which casts doubt on their nature as truly contextually new. While this is a problem it effect all such conditions, therefore there is at leas consistency between conditions and contexts in this regard. I am indebted to Kriszta Szendrői for drawing my attention to this problem.

[3]In this study the term *clausemate* is used to refer to two adjuncts of the same verbal predicate

ther of the two word orders will be at chance level. The BASELINE condition can thus act as a reference point to measure deviation from by the responses given for the conditions involving givenness and focus.

(3)   Mivel foglalkozik a   barátnőd?   BASELINE
       what do.3sg   the girlfriend.poss.2sg
       'What is your girlfriend's job?'

The NEW-GIVEN condition was created in order to measure the effect that givenness has on constituent order in broad focus contexts. Context questions were created which required a broad focus answer, but they also included one of the post-verbal constituents in order to mark it as contextually given. An example is shown below. The context question thus modifies the information structure of the sentence that is its answer by marking one of the post-verbal constituents as contextually given, as shown in example (5). It is then up to the participants to decide which of the two word orders shown in (5) they find better answers the question in (4).

(4)   Mit csinál a barátnőd   a laborjában?   NEW-GIVEN
       what does the girlfriend.your the lab.her.in
       'What does your girlfriend do in her lab?'

(5)   a.   Noémi kísérletezik   a vegyszerekkel [a laborjában]$_{given}$.
            Noémi experiment.3sg the chemicals.with the laboratory.poss.3sg.in
            'Noémi is experimenting with the chemicals in her lab.'

       b.   Noémi kísérletezik   [a laborjában]$_{given}$ a vegyszerekkel.
            Noémi experiment.3sg the laboratory.poss.3sg.in the chemicals.with
            'Noémi is experimenting with the chemicals in her lab.'

The two final conditions were those where the context question was such that it required an item in narrow focus in the clause. The difference between the two was that while the question in the FOCUS-NEW condition, as shown in example (6), did not include the clausemate of the target item, the question in condition FOCUS-GIVEN did, as show in example (8). This was meant to modify the information structure of the target sentences such that in the FOCUS-NEW condition one of the post-verbal constituents was in narrow focus while the other was contextually new, as shown in the sentences in (7). While in the FOCUS-GIVEN condition, one of the constituents was in narrow focus as before, but the other was contextually given as

shown in (9). As before the task of the participant was to chose which sentence in (7) and (9) is a better answer to the question in (6) and (8) respectively. These two conditions allow for the investigation of the effects of focus on word order when compared with the neutral baseline condition on the one hand, and the interaction of the effects of givenness and focus on the other.

(6)   Mivel   kísérletezik   a   barátnőd?   FOCUS-NEW
        What.with experimenting the girlfriend.yours
        'What is your girlfriend experimenting with?'

(7)   a.   Noémi kísérletezik   [a vegyszerekkel]$_{focus}$ [a laborjában]$_{new}$.
             Noémi experiment.3sg the chemicals.with   the laboratory.poss.3sg.in
             'Noémi is experimenting with the chemicals in her lab.'

        b.   Noémi kísérletezik   [a laborjában]$_{new}$ [a vegyszerekkel]$_{focus}$.
             Noémi experiment.3sg the laboratory.poss.3sg.in the chemicals.with
             'Noémi is experimenting with the chemicals in her lab.'

(8)   Mivel   kísérletezik   a   barátnőd   a   laborjában?   FOCUS-GIVEN
        What.with experimenting the girlfriend.yours the lab.her.in
        'What is your girlfriend experimenting with in her lab?'

(9)   a.   Noémi kísérletezik   [a vegyszerekkel]$_{focus}$ [a laborjában]$_{given}$.
             Noémi experiment.3sg the chemicals.with   the laboratory.poss.3sg.in
             'Noémi is experimenting with the chemicals in her lab.'

        b.   Noémi kísérletezik   [a laborjában]$_{given}$ [a vegyszerekkel]$_{focus}$.
             Noémi experiment.3sg the laboratory.poss.3sg.in the chemicals.with
             'Noémi is experimenting with the chemicals in her lab.'

In order to control for the effects that individual items might have on word order preferences, the experiments were made up of two sub-experiments running parallel to each other. The sub-experiment for Group 1 was made up of the context questions and target sentences as presented above, while the other contained the same targets sentences, but with context questions that switched the marking of focus and givenness on the constituents: XP$_1$ of Group 1 became XP$_2$ of Group 2 and vice versa. The BASELINE condition was the same for both groups, as there was no difference in the information structural status of the post-verbal constituents, therefore the experiments in Group 2 used the same context questions that are shown in (3)

above. The context questions used in the Group 2 sub-experiment are shown below in (10),
(12) and (14), with the associated information structural effects on the target sentences. As be-
fore, the task of the participant was to choose which word order was a better answer to the
question.

(10)   Mit csinál a barátnőd   a   vegyszerekkel?   NEW-GIVEN Group 2
        what does the girlfriend.your the chemicals.with
        'What does your girlfriend do in her lab?'

(11)   a. Noémi kísérletezik   [a vegyszerekkel]$_{given}$ a   laborjában.
            Noémi experiment.3sg the chemicals.with   the laboratory.poss.3sg.in
            'Noémi is experimenting with the chemicals in her lab.'

        b. Noémi kísérletezik   a   laborjában   [a vegyszerekkel]$_{given}$.
            Noémi experiment.3sg the laboratory.poss.3sg.in the chemicals.with
            'Noémi is experimenting with the chemicals in her lab.'

(12)   Hol   kíséreletezik a   barátnőd?   FOCUS-NEW Group 2
        Where experimenting the girlfriend.yours
        'Where is your girlfriend doing her experiments?'

(13)   a. Noémi kísérletezik   [a vegyszerekkel]$_{new}$ [a laborjában]$_{focus}$.
            Noémi experiment.3sg the chemicals.with   the laboratory.poss.3sg.in
            'Noémi is experimenting with the chemicals in her lab.'

        b. Noémi kísérletezik   [a laborjában]$_{focus}$ [a vegyszerekkel]$_{new}$.
            Noémi experiment.3sg the laboratory.poss.3sg.in the chemicals.with
            'Noémi is experimenting with the chemicals in her lab.'

(14)   Hol   kíséreletezik a   barátnőd   a   vegyszerekkel? FOCUS-GIVEN Group 2
        Where experimenting the girlfriend.yours the chemicals.with
        'Where is your girlfriend experimenting with the chemicals?'

(15)   a. Noémi kísérletezik   [a vegyszerekkel]$_{given}$ [a laborjában]$_{focus}$.
            Noémi experiment.3sg the chemicals.with   the laboratory.poss.3sg.in
            'Noémi is experimenting with the chemicals in her lab.'

        b. Noémi kísérletezik   [a laborjában]$_{focus}$ [a vegyszerekkel]$_{given}$.
            Noémi experiment.3sg the laboratory.poss.3sg.in the chemicals.with

'Noémi is experimenting with the chemicals in her lab.'

Through out this study the term *target item* will be used to refer to the constituent that is the constituent in narrow focus in the FOCUS-NEW and FOCUS-GIVEN conditions, even if in a certain condition this constituent is not in narrow focus, as in the BASELINE or NEW-FOCUS conditions. Therefore the *target item* for Group 1 is XP_1 and for Group 2 it is XP_2. This notation is necessary in order to refer to the constituent of interest in the conditions where they are not in narrow focus. All of the target sentences along with their associated context questions are provided in Appendix A.

There were 16 lexicalisations of the target sentence structure in total, presented in a latin square design. To prevent the repeated exposure of target sentences in multiple conditions from influencing the judgements of the participants, each pair of target sentences was presented to each participant in only one of the five conditions. While each participant was presented with 4 lexicalisations for each condition. Additionally, there were 32 fillers.

The experiments were conducted over the internet. Participants were gathered through paid advertisements posted on the social networking site Facebook, which directed them to the experimental site. The advertisements were aimed at people above the age of 18, who lived in Hungary, before taking the experiment they were asked if their native language was Hungarian. The experiments were run on the IBEX platform Drummond (2013), a software which was specifically designed to obtain speaker judgements for linguistic experiments over the internet. Participants were first informed that they are about to take part in an experiment, the task to be performed in the experiment was explained, namely that they have to choose one of two sentences which better answers a question. Participants were prompted to give their sex and age. There was no personal information or identifier gathered from the subjects thus, the experiments were anonimous. After the introduction, subjects were presented with a practice session. This was followed by the experimental block. The context question and the associated target sentences were presented at the same time on one 'slide'. The context question appeared on top of the slide, while the two target sentences appeared near the centre of the slide, one on top of the other. The order of the target sentences on each slide was randomised. The order of the presentation of the slides was also randomised.

The three experiments described below involved a total of 362 participants. When a participant started the experiment they were assigned a number in the order they commenced the experiment. Participants with an odd number were assigned to Group 1, while participants with an even number were assigned to Group 2. The data collected from each experiment was

saved on the IBEXFARM server. If a participant did not complete the test their results were automatically discarded.

3.1.1 Statistical Analysis

The resulting data – the value of the dependent variable of the experiment – was composed of binary values of the placement of the target item: either in the immediately post-verbal position, or in the clause final position. First the the results for each condition were checked against chance levels with one-sample t-tests as an indication of the effect of the independent variables, or in the case of BASELINE the presence of any unforeseen factor that might skew the results.

After this step, logistic mixed effets models were fitted to ascertain the effects of information structural (IS) features present in each condition. Note, that the independent variable was the condition itself, and not the individual IS features since these were often not reducible to basic categories. The reason for this will be further examined in the description of the specific experiments. The random factors were, in all models, subjects and items (target sentences). The models were fitted using the glmer function of the lme4 package (Bates et al., 2015) of the statistical software R (version 3.3.0, R Core Team (2013)).

The fitting of the logistic mixed effects models was carried out following the methodology suggested by Matuschek et al. (2017) in order to achieve higher power with out inflating Type I error rate. In the first step, the maximal model was calculated including all random intercepts and slopes. Next the minimal model was calculated wich resulted in a global intercept, the intercepts for random effects and a single global estimate for the effect of the fixed effect. These two models were compared using the `anova()` function of R. If they were not shown to make different predictions, the results indicated by the minimal model were used. If they were shown to make different predictions, the next more complicated model was fitted, and it was compared to the maximal model in the same way. This process was repeated until there was a model which was less complicated than the maximal model, but was shown not to make the same predictions as the maximal model by an `anova()` function, the results of this model were used to asses the findings of the study. If all models were different from the maximal model, then output of the maximal model was used. In some cases different analises than the ones described above were also carried out, the methodology for these is presented in detail where applicable. While the results of the lme4 package do not report p-values (Bates et al., 2015), further more, in some cases it was necessary to compare means between focus conditions, not just between individual focus conditions and the baseline. To get p-values and to be able to

compare multiple means the lsmeans package was used (Lenth, 2016).

3.2 Experiment 1: Simple Focus

3.2.1 Materials

Experiment 1 investigated the word order preferences associated with simple focus (Section 2.3.3.1), the design and materials were those discussed in Section 3.1 above. There were a total of 101 participants (80 female, 21 male), with each subject giving 4 judgements for each of the 4 conditions there were a total of 1616 observations (816 for Group 1 and 800 for Group 2). The target sentences were those presented in the the previous section.

3.2.2 Results

The results for the effects of focus and givenness on the word order preferences as ascertained by the forced choice experiment are given in the barplots in Figure 3.1 below. The figure shows two barplots, one for each group. The bars represent the placement of the target item for each condition. The dark bars represent placement of the target item in the clause-final position (CF), while the light bars the placement of the target item in the immediately post-verbal position (PV)[4]. The results are given as percentages of all judgements for each condition. It is important to keep in mind that the plots for the two groups report information pertaining to two different constituents. The plot for Group 1 shows preferences for the placement of XP_1 while the plot for Group 2 shows preferences for the placement of XP_2. If there are inherent biases in the target sentences these would appear in the bars for the BASELINE condition, resulting in mirror images in the plots of the two Groups. This would not be the case in conditions where the preferences in word order are expected to be linked with the contextual marking of the target item or its clause-mate, as in the NEW-GIVEN, FOCUS-NEW and FOCUS-GIVEN conditions, where similar effects would result in similar plots. A first glance look suggest that there was a strong effect of focus, while there there was little or no effect of givenness. If an item was in Focus speakers preferred to place it in the directly post-verbal position as opposed to the clause final one.

The first step in the statistical analysis of the results was to determine if the preferences elicited by the BASELINE condition deviate from chance levels. This was done by the application of a one sample t-test in which the mean percentage of responses for this condition was compared to chance level (50%). The results indicate that this condition did not deviate from chance

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[4]For the sake of clarity the two positions in question will be abbreviated as PV (for the immediately post-verbal) and CF (for the clause final).
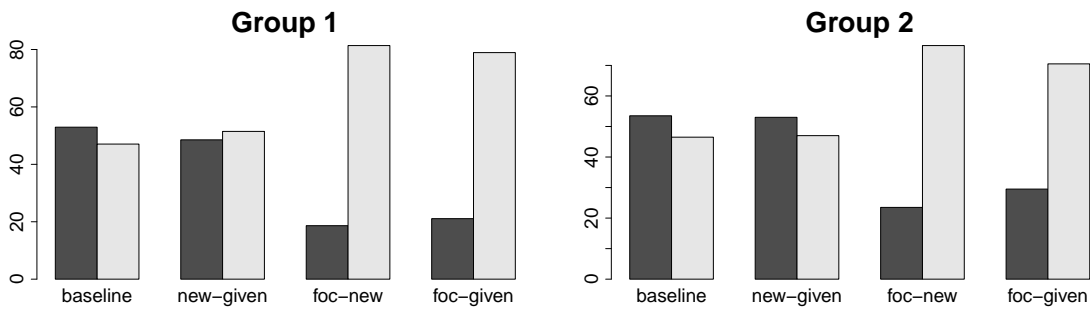
Figure 3.1: Effects of focus and givenness on preferences of target item placement in a two-alternative forced choice test for Simple Focus in percentage of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.

for either of the two groups (Group 1: $t = -0.839, p = 0.201$ Group 2: $t = -0.989, p = 0.161$), further more an ANOVA model comparison showed no significant effect for the group variable with respect to participant responses ($\chi^2 = 0.33, p = 0.56$). However, it is possible that this result masks underlying, possibly counteracting tendencies. This is supported by the fact that comparing models with an ANOVA where sentences were or were not taken up as random factors showed a marginally significant effect for this variable ($\chi^2 = 3.45, p = 0.063$). Therefore in the second step of the analysis the behaviour of the individual target sentences was examined. The results for the BASELINE condition are presented in Figure 3.2. The pairs of bars represent the responses given, in number of responses, for each of the 16 target sentences. As in the previous figure, here the light bars indicate the placement of the taret item in the immediately post-verbal position, while the dark bars indicate the placement of the target item in the clause final position. Likewise the target items differ for between groups, (XP$_1$ for Group 1 and XP$_2$ for group 2).
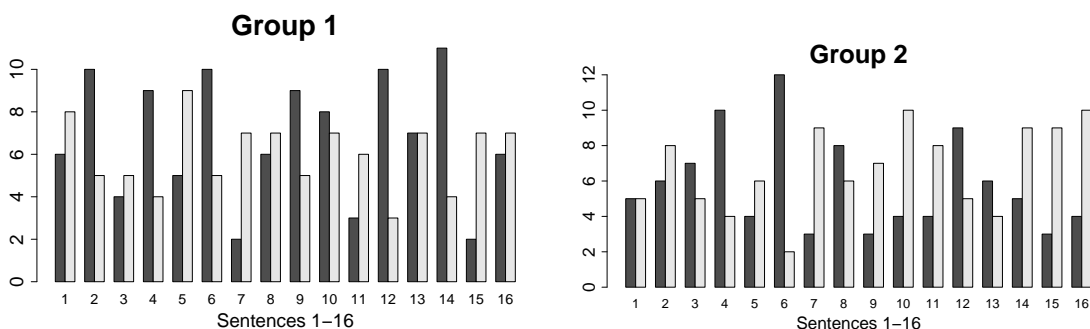

Figure 3.2: Placement of target item in the BASELINE condition for each sentence in both groups givne in number of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.

Upon first inspection it seems that there is a great deal of variation between sentences with respect to word order preferences in the baseline condition. However a more detailed comparison reveals that this picture is more balanced. Since, when broken down, the number of responses for each sentence is not particularly high, it was anticipated that a t-test comparing the word order preferences of individual sentences to chance levels would not have the required statistical power, therefore the following analytical approach was applied, the target sentences were grouped according to the tendencies they showed: preference for post-verbal, preference for clause final, or no clear preferred word order. In Group 1, there were 7 sentences (No: 2, 4, 6, 9, 10, 12, and 14) where speakers preferred to place the constituent that would eventually be Focus marked in the clause final position, while there were 8 sentences (No: 1, 3, 5, 7, 8, 11, 15, 16) where subjects opted to place this constituent more frequently in the immediately post-verbal position. There was one sentence (No 13), where the two word order preferences seemed to come up the same number of times. That is the number of target sentences divided by word-order preferences were roughly equal. Group 2 produced somewhat more skewed results. There, 9 sentences (No: 2, 5, 7, 9, 10, 11, 14, 15, and 16) elicited preferences for the placement of the eventually Focus marked constituent in the clause-final position, while 6 (No: 3, 4, 6, 12, 13, and 8) resulted in a preference for placing this constituent in the immediately post-verbal position, with again one sentence (No: 1) resulting in equal number of preferences for both positions.

While both of the post-verbal constituents in all target sentences were adjuncts controlled for size in terms of syllable number and syntactic structure, there might have been a number of additional factors that were not considered for inclusion in the material for the experiments. One potential factor that could have effected word order preferences, but was not controlled for was animacy.

Animate constituents appeared in 4 of the target sentences: 1, 7, 9, and 15. Sentences 1, 7, and 9 represent ones where the animate constituent would eventually be Focus marked in Group 1, while in the case of sentence 15 the animate constituent is Focus marked in Group 2. In Group 1, we see that the animate constituent was preferred in the immediately post-verbal position in sentences 1 and 7, while it was preferred in the clause final position in sentences 9 and 15. In Group 2, sentence 1 seemed to not elicit a preferred word order, while 7 and 9 showed preferences to place the animate constituent in the immediately post-verbal position, and sentence 15 showed preferences for the animate constituent in the clause-final position. It appears therefore that animacy did not have a significant influence over word order preferences, as the target sentences did not show similar patterns of sensitivity to its presence. Since

Sentence	XP_1	XP_2	Sentence	XP_1	XP_2
1	instr.-comitat.	superessivus	9	ablativus	illativus
2	ablativus	inessivus	10	temporalis	superessivus
3	inessivus	inessivus	11	ablativus	superessivus
4	inessivus	ablativus	12	temporalis	superessivus
5	ablativus	adessivus	13	instr.-comitat.	inessivus
6	instr.-comitat.	allativus	14	superessivus	instr.-comitat.
7	ablativus	illativus	15	inessivus	instr.-comitat.
8	temporalis	illativus	16	instr.-comitat.	inessivus

Table 3.2: Cases of post-verbal adjuncts for each target sentence

this factor was not controlled for adequately, conclusions on its effect on word order will not be drawn here, except for the assumption that it did not have a significant impact on the word order preferences observed in this experiment, in a way that would make the baseline condition as being unbalanced, or would confound the results of the factors that were the subject of this experiment.

Another possible factor that was not controlled for but may have influenced the outcome of the experiment in the BASELINE condition, was the case of the adjuncts in each target sentence. Table 3.2 lists the cases of each of the post-verbal constituents for each target sentence. In the table XP_1 indicates the constituent that is Focus marked by the contexts presented for Group 1, while XP_2 indicates the constituent that is focus marked by the contexts presented for Group 2. The case assignment for the constituents does not appear to be well balanced between XP_1 and XP_2. For example there are 4 instances of instrumental/comitative case assigned XP_1 and there are only 2 instances of this same case assigned to XP_2. Similarly, there are 4 instances of superessive case assigned to XP_2 but none to XP_1. However, if we look at the preferences elicited by these sentences in the baseline conditions as indicated in Figure (9), we can see that the tendencies reflected there do not seem to show clear biases as a result of case.

It seems therefore, that there were uncontrolled factors that had an influence on the word order preferences of constituents in the baseline conditions. While this was inevitable, it also appears that what ever unintended factors might have played a role, their effect was not great enough to skew all of the results in this condition. This is corroborated by the fact that when the results for all target sentences are combined, as shown in the first columns of the barplots in figure 3.1, these results do not show a deviation from chance leves as indicated by a one sample t-test (t= -0.839 for Group 1 and t = 0.989 for Group 2). For the objectives of this study the possible effects that resulted in the varying word order preferences in the baseline condition for each target sentence will not be further investigated. It will be assumed that while there were preferences for certain target sentences, these preferences showed enough variation that

when considered together they cancelled each other out in a way that the result of the baseline condition indicate that if neither Givenness nor Focus is present in the post-verbal domain, there is no clear word order preference for post-verbal adjuncts. Furthermore that the results of this condition can be used as a basis for the measurement of the effects of Givenness and Focus.

Prior to running the statistical analysis to compare the effects of Givenness and Focus to the baseline condition, these remaining conditions were also examined similarly to the baseline condition to investigate if the results reported in Figure 3.1 arrose from the uniformed behaviour of the target sentences, or if they reflect more complex, and thus possibly less meaningful behaviour.

As discussed above, the NEW-GIVEN condition contained contexts which marked one of the post-verbal constituents as given, while its clause mate was context new. The results for both groups are broken down for each target sentence and presented in Figure 3.3.
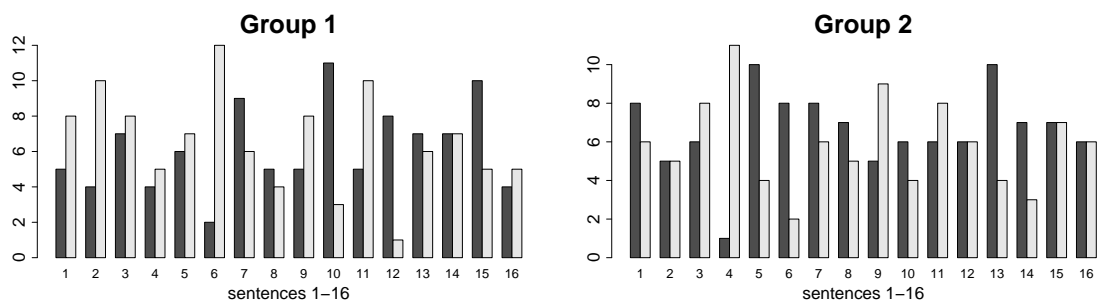

Figure 3.3: Placement of target item in the NEW-GIVEN condition for each sentence in both groups givne in number of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.

As in the case of the BASELINE condition, there is a large degree of variation with respect to word order preferences for each target item. When comparing the results for individual items to the results that these same items elicited in the BASELINE condition, we can observe that for some of the items the word order tendencies remained the same (8 sentences in Group 1 and 9 sentences in Group 2) while for other items these tendencies have shifted (8 sentences for Group 1 and 7 sentences for Group 2). Due to the small number of results for individual sentences, no formal statistical analysis was carried out for these differences, however visual observation of the plots seems to indicate that there were few instances (3 for Group 1, eg: sentences 2 and 6; and possibly 2 for Group 2), where shifts in preferences occurred for sentences where, in the baseline condition there was a very clear tendency for a preferred word order. Without the possibility of meaningful statistical analysis, it is difficult to ascertain if these shifts are

significant or not. If the data for all sentences is grouped together and compared to chance with a one sample t-test the results indicate that there are no significant differences: $t = 0.419, p = 0.33$ for Group 1 and $t = 0.846, p = 0.198$ for Group 2. It seems therefore that givenness, on its own did not have a significant effect on word order variation as compared to chance.

The results for the individual sentences for the FOCUS-NEW condition are presented in the plots in figure 3.4. Compared to the BASELINE and the NEW-GIVEN conditions this condition shows a clear tendency to place the focused constituent in the PV position. Importantly, there are no sentences where this tendency is not borne out. The only exception may be sentence 14 in Group 2, where there is no clear word order preference, and possibly sentence 8 in the same group, where there is the same tendency, but it is not clear if the results indicate a very strong preference. A one sample t-test over all results for each group reveals a significant difference from chance levels ($t = 11.481, p < 0.0001$ for Group 1, and $t = 8.816, p < 0.0001$ for Group 2). It can thus be concluded that the presence of focus has a significant effect on word order preferences in the post-verbal domain, in such a way that there is a preference to place the constituent in narrow focus in the immediately post-verbal position.
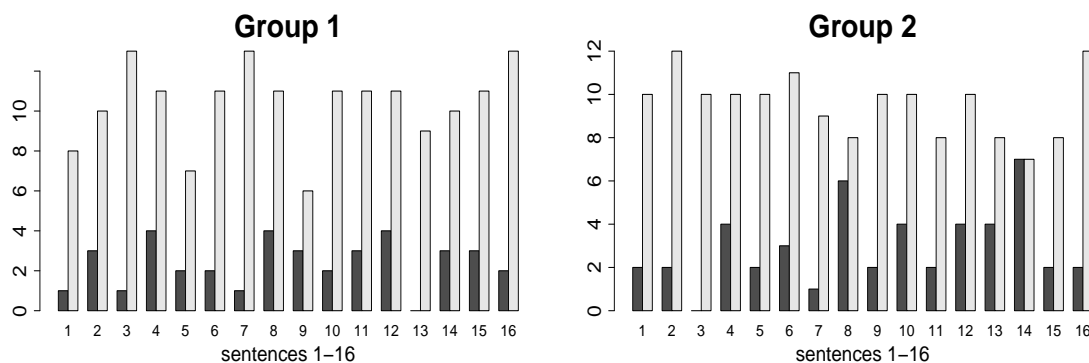

Figure 3.4: Placement of target item in the FOCUS-NEW condition for each sentence in both groups givne in number of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.

A similar result can be seen in the FOCUS-GIVEN condition, as indicated in the polts in figure 3.5. In this condition as in the FOCUS-NEW condition, there are no contradictory tendencies between individual sentences. But as was the case there, there are some sentences where the results seem to be near chance leves (as in the case of sentences 14 and 15 in Group 2). All-in-all, however, the results are significantly different from chance levels ($t = 10.103, p < 0.0001$ for Group 1 and $t = 6.34, p < 0.0001$ for Group 2) as revealed by one sample t-test conducted with the inclusion of all the results in each group.

The results discussed above allow for the following conclusions to be drawn. First, despite
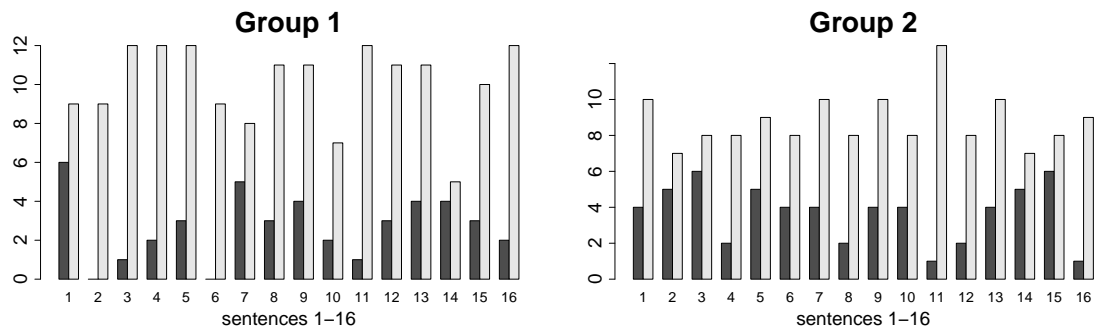
Figure 3.5: Placement of target item in the FOCUS-GIVEN condition for each sentence in both groups givne in number of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.

being controlled for size, structure and adjunct-hood, the target sentences exhibit a high degree of variation when it comes to word order preferences in the BASELINE condition. However, when all target sentences in this condition are considered as a whole, there are no clear preferences for the word order of the constituents in the post-verbal domain. Therefore it can be assumed that the BASELINE condition can be used as a point of comparison in a formal statistical analysis of the data, since any unforeseen factors that might skew the results have been successfully controlled for. Second, givenness does not influence the word order preferences in a way where these preferences deviate from chance levels. However it is possible that there is a complex interplay between factors inherent in the target sentences and givenness, which hides its possible effect. As these factors are not fully understood at the moment, this study will not investigate this possible interaction further. Alternatively it could be the possibility that mere textual givenness does not have an effect, but if the given item was somehow higher on the givenness hierarchy word order preferences would arise. This possibility will be explored in the following experiments. Third, focus seems to have a significant influence on the word order preferences, namely participants tend to place constituents in narrow focus in the immediately post-verbal position as opposed to the clause-final one.

To understand the effects of Information Structural marking, not only from chance levels, but form the BASELINE condition more formal statistical analysis was carried out using logistic mixed effects models as described in Section 3.1. These models took the choice for word order as the dependent variable and the conditions as the fixed effects, sentences (items) and subjects were included as random effects. The data analysed is presented in Figure (9), repeated here, while Table 3.3 show the results obtained by the logistic mixed effects models.

The analysis reaffirms the results of Figure 3.6. Namely that while givenness did not seem to play a role in effecting the word order preferences of post-verbal adjuncts, focus marking
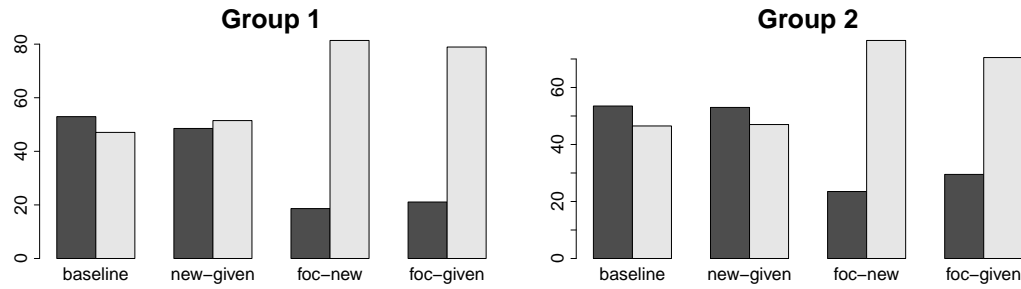
Figure 3.6: Effects of focus and givenness on word order preferences of target item placement in a two-alternative forced choice test for Simple Focus in percentage of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.

	Group 1				Group 2			
Condition	Estimate	Std.Er.	z value	Pr($>|z|$)	Estimate	Std.Er.	z value	Pr($>|z|$)
(Intercept)	-0.1174	0.1597	-0.735	0.462	0.14597	0.15784	0.925	0.355
New-Given	0.1714	0.2029	0.845	0.398	-0.01961	0.20367	-0.096	0.923
Focus-New	1.6472	0.2344	7.027	**2.11e-12**	-1.35809	0.22328	-6.082	**1.18e-09**
Focus-Given	1.4837	0.2273	6.529	**6.62e-11**	-1.04585	0.21451	-4.876	**1.09e-06**

Table 3.3: Results of Logistic Mixed Effects models for two alternative forced choice test for word order preferences as influenced by focus and givenness, compared to the Baseline condition.

resulted in highly significant effects, whereby subjects preferred to place the item in focus in the immediately post-verbal position as opposed to the clause-final one. It is interesting to note that while both the FOCUS-NEW and the FOCUS-GIVEN conditions are significantly different from the BASELINE condition, they appear to be systematically different from each other in both Group 1 and Group 2. Namely givenness seems to lessen the effect of focus. However logistic mixed effects models looking at the effect of givenness only within these two conditions reveal that givenness has no significant effect: z = -0.025, Pr($>|z|$) = 0.98 for Group 1 and z = 1.216, Pr($>|z|$) = 0.224 for Group 2.

To find out the global effects of the conditions across the two groups, the data was merged and a new model was fitted, this time incorporating groups as a random effect. The model was then analysed with the *lsmeans* package of R, in order to derive the pariwise comparisons between individual conditions. The results are indicated in the Table 3.4. As can be seen, there were two comparisons which did not result in significant diferences: BASLINE as compared to NEW-GIVEN, and FOCUS-GIVEN as compared to FOCUS-NEW. These were the comparisons where the effects of givenness on word order were isolated. The fact that they did not show significant differences means that givenness did not have a significant role in determining word order in the case of the simple focus experiment. The other conditions, where there was signif-

Contrasts	Estimate	Std.Er.	z.ratio	p-value
BASELINE ↔ FOCUS-GIVEN	-1.248	0.155	-8.040	<**.0001**
BASELINE ↔ FOCUS-NEW	-1.496	0.161	-9.287	<**.0001**
BASELINE ↔ NEW-GIVEN	-0.096	0.143	-0.672	0.9078
FOCUS-GIVEN ↔ FOCUS-NEW	-0.248	0.169	-1.463	0.4602
FOCUS-GIVEN ↔ NEW-GIVEN	1.152	0.154	7.439	<**0.0001**
FOCUS-NEW ↔ NEW-GIVEN	1.400	0.161	8.687	<**.0001**

Table 3.4: Comparison of conditions in the simple focus experiment for both groups

icant differences show either the effect of focus alone, or focus in combination with givenness. Since all of these comparisons show statistical significance it can be concluded that focus has, in all conditions, a significant impact on word order.

The main findings of the two alternative forced choice test for simple focus in the post-verbal domain can be summarised as follows:

3.2.3 Experiment 1: Main Findings

Finding 1.1: Focus has a significant effect on the word order preference of post-verbal constituents, namely the placement of a Focus marked item is preferred in the immediately post-verbal position as opposed to the clause final one.

Finding 1.2: Givenness, may interact with individual items but does not seem to have a global effect on word order either alone, or in combination with focus.

Finding 1.3: In the BASELINE condition there is considerable variation for the choice of word order, possibly having to do with factors internal to the target sentences, but when all target sentences are considered this variation balances out.

3.3 Experiment 2: Focus marked with *is*

The second experiment tested word order preferences with post-verbal foci that were marked with *is* 'also'. Recall from Section 2.3.3.2, this type of focus is by definition not allowed to appear in the pre-verbal focus position, but is relatively free to appear higher than that position, or post-verbally. It is not clear however, what effect this property has on its behaviour post-verbally, namely wether or not it will behave differently from simple post-verbal foci.

Finding 1.2 of Experiment 1 reported in the previous section stated that givenness did not have a measurable effect on word order preferences. This can be surprising given the cross-linguistically well attested Given-before-New generalisation (see Section 2.2.2), recall however that it was argued (see Section 2.1.2) that givenness is best understood as being scalar in nature

where types of givenness higher in the hierarchy may elicit different, more salient, effects than those lower in the hierarchy. It is because of this that in Experiment 2 it was attempted to "increase the givenness" of the given constituent. Recall from Section 2.2.2, that Cowles & Ferreira (2011) found that grammatically marking a constituent as a topic the context correlated with the earlier production of that constituent in terms of word order. Since this type of marking is easily achieved in Hungarian, further more, it does not change the context question in any other way, this strategy was employed in this experiment.

3.3.1   Materials

The experiment utilised the same methodology as the first experiment: subjects were asked to pick one of two possible word orders which they thought better fit a given context question. To include the focus particle some of the target sentences needed to be modified, specifically the sentences in the FOCUS-NEW and FOCUS-GIVEN contexts, which where changed to reflect the following structure:

(16)   a.   Topic (PRT)Verb [XP$_1$ *is*] XP$_2$

   b.   Topic (PRT)Verb XP$_2$ [XP$_1$ *is*]

The target sentences for the BASELINE condition were the same as in Experiment 1, as shown in example (3). Since these sentences were intended to be understood in a broad focus context, the *is* particle was not included as it would have had the effect of marking the constituent as being in some way focused, and thus conflating the BASELINE and the focus conditions. Examples for the target sentences are given in (17).

(17)   a.   Noémi kísérletezik   a   vegyszerekkel is   a   laborjában.
          Noémi experiment.3sg the chemicals.with also the laboratory.poss.3sg.in

   b.   Noémi kísérletezik   a   laborjában   a   vegyszerekkel is.
          Noémi experiment.3sg the laboratory.poss.3sg.in the chemicals.with also
          'Noémi is also experimenting with the chemicals in her lab.'

In terms of the context questions, those for the BASELINE condition were the were the same as in the case of Experiment 1. For the FOCUS-NEW condition these were altered from with the addition of the *még* ('else/more') particle which serves to licence the presence of the *is* focus marker in the post-verbal domain. An example is given for each of the two groups in (18) and (19).

(18) Még mivel   kísérletezik   a   barátnőd?   FOCUS-NEW Group 1
      Else what.with experimenting the girlfriend.yours
      'What else is your girlfriend experimenting with?'

(19) Még hol   kísérletezik   a   barátnőd?   FOCUS-NEW Group 2
      Else where experimenting the girlfriend.yours
      'Where else does your girlfriend do experiments?'

In the case of the NEW-GIVEN condition however, some modifications were made as noted above. Instead of using a merely textually given constituent in the context question a quality of topichood was also added to it. An example is given in (21).

(20) A laborjában még mivel   kísérletezik   a   barátnőd?   NEW-GIVEN Group 1
      the lab.hers.in else what.with experimenting the girlfriend.yours
      'What else is your girlfriend experimenting with in her lab?'

(21) A vegyszerekkel még hol   kísérletezik   a   barátnőd?   NEW-GIVEN Group 2
      the chemicals.with else where experimenting the girlfriend.yours
      'What else is your girlfriend experimenting with in her lab?'

In this context question the constituent *A laborjában* appeared in topic position, as opposed to the same condition in Experiment 1 where it would have been post-verbal. While this change was implemented for all NEW-GIVEN condition questions, the status of the given item in the context questions for the FOCUS-GIVEN condition were not changed, so that this condition would only differ from the matching condition of Experiment 1 in one variable. In summary, there were five conditions as shown in Table 3.5 : BASELINE, NEW-GIVEN, FOCUS-NEW and FOCUS-GIVEN, with the modifications outlined above.

Condition	XP_1 (target)	XP_2 (clausemate)	Focus
BASELINE	new	new	broad
NEW-GIVEN	new	given$_{topical}$	broad
FOCUS-NEW	focused	new	narrow
FOCUS-GIVEN	focused	given	narrow

Table 3.5: Conditions with associated discourse marking on post-verbal constituents in Experiment 2.

3.3.2 Results

The experiment was completed by 192 subjects (171 female, 21 male, age range: 18-85, mean: 33). As in the case of the firs experiment, there were again two groups, divided by which constituent received focus marking. There were a total of 1328 observations in Group 1 and 1728 observations for each condition in Group 2. The statistical analysis was completed in the same fashion as in the case of Experiment 1 as outlined in Section 3.1.1. The responses, broken down by conditions are shown in Figure 3.7.
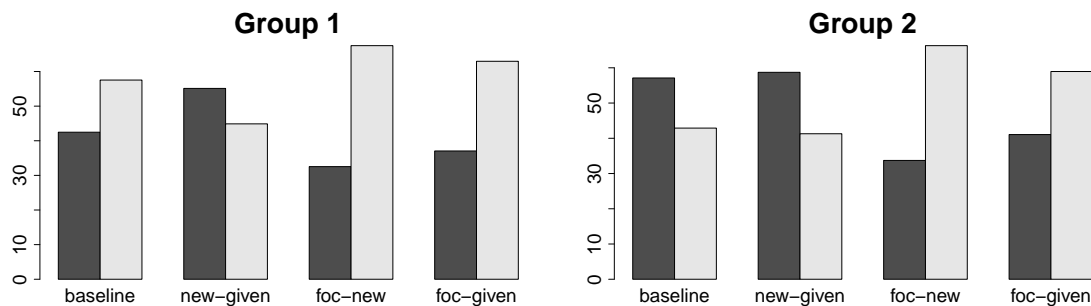

Figure 3.7: Effects of focus and givenness on preferences of target item placement in a two-alternative forced choice test for *is*-marked focus in percentage of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.

An informal investigation reveals the same sort of tendency that was observed in the case of the Simple Focus experiment: the BASELINE and NEW-GIVEN conditions behave similarly, with no clear preference for word order, while conditions involving narrow focus, especially condition FOCUS-NEW, show a marked tendency to place the item in narrow focus in the PV position.

It is expected therefore that the BASELINE conditions, will show preferences at chance levels. A one sample t-test reveals however, that this is not the case and the preference for placing XP_1 in the PV position, the target constituent in Group 1, are above chance levels ($t = 2.7, p = 0.002$ for Group 1 and $t = -2.9, p = 0.001$ for Group 2).

A closer investigation of the behaviour of the indvidual sentences is thus warranted for the BASELINE condition. The behaviour of the individual sentenes with respect to word order preferences is presented in Figure 3.12.

As in the BASELINE condition for the first experiment, in this case there is also a high degree of variation between sentences. However, while in this case there was a significant bias in the combined results of the BASELINE condition, the overall pattern for word order preferences seem to be similar, in that while certain sentences elicit clear preferences, there is a high degree of variation between sentences. While some sentences clearly elicit the placement of XP_1 in
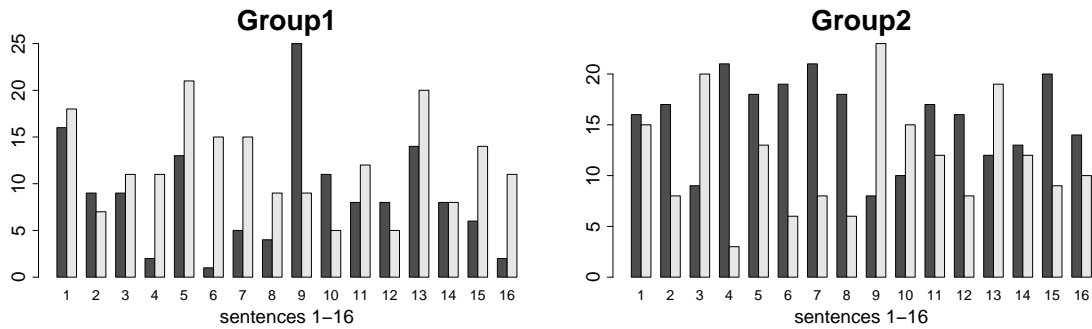
Figure 3.8: Placement of target item in the BASELINE condition for each sentence in both groups given in number of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.

the PV position (eg: sentences 4 and 6 in both groups), others elicit the opposite word orders (eg sentences 9 and 10 in both groups). There is also a significant number of sentences that do not exhibit clear preferences. It should also be noted that, due to the design of the experiment, the sentences are not represented in equal numbers in the conditions. This is due to the fact that if a participant began completing the experiment, but then did not finish it, their data was lost, but the following subjects received the subsequent grouping of target sentences, according to the latin square design. Therefore, the results of the one sample t-test discused above may best be understood as a skewing effect of a higher number of representations of sentences that favoured the placement of XP_1 in the PV position, instead of an inherent property of the post-verbal constituents that would have had the same effect and would have also skewed the results of the other conditions.

The results of the NEW-GIVEN condition were also examined with a one sample t-test. These test results show that the word order preferences were at or different from chance leves in the case of Group 1 ($t = -1.87, p = 0.03$), and significantly different for Group 2 ($t = -3.69, p = 0.0001$). In both cases the preferred word order was such that the contextually given constituent, which in this experiment was also topical was placed in the PV position. The word order preferences broken down for individual sentences are presented in Figure 3.9.

Note that these results differ somewhat from the NEW-GIVEN condition of Experiment 1. It seems that introducing the given element as the topic of the context question has elicited a stronger effect, than having this constituent being merely textually given. Regarding the strength of this effect, it is interesting look at the pattern exhibited by the individual sentences as presented in Figure 3.9. This pattern shows a great degree of variation between sentences, similar to the patterns exhibited by the BASELINE condition of both this and Experiment 1. Compared to the conditions containing focus – Figures 3.4 and 3.5 for Expriment 1, and their
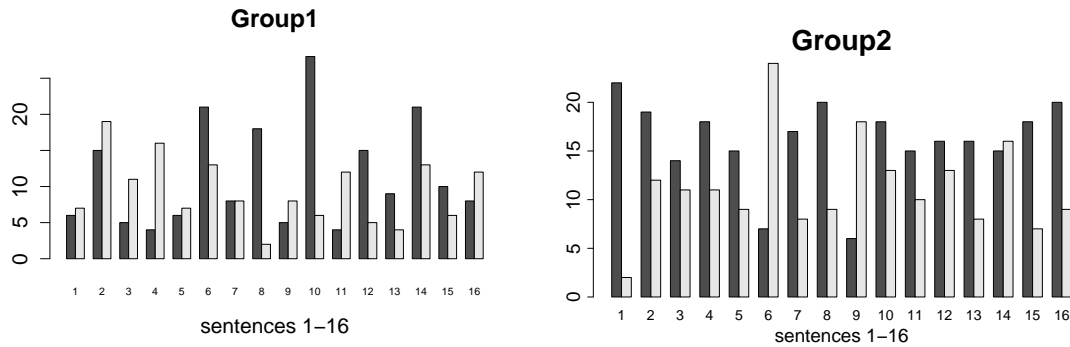
Figure 3.9: Placement of target item in the NEW-GIVEN condition for each sentence in both groups given in number of responses. Dark = given$_{topical}$ item in immediately post-verbal, Light = given$_{topical}$ item in the clause-final positon.

counterparts for Experiment 2 to be presented below – which show a clear preference for word order effects across the majority of target sentences, this result indicates that the effects of givenness combined with topicality while statistically significant are not as strong as those for focus.
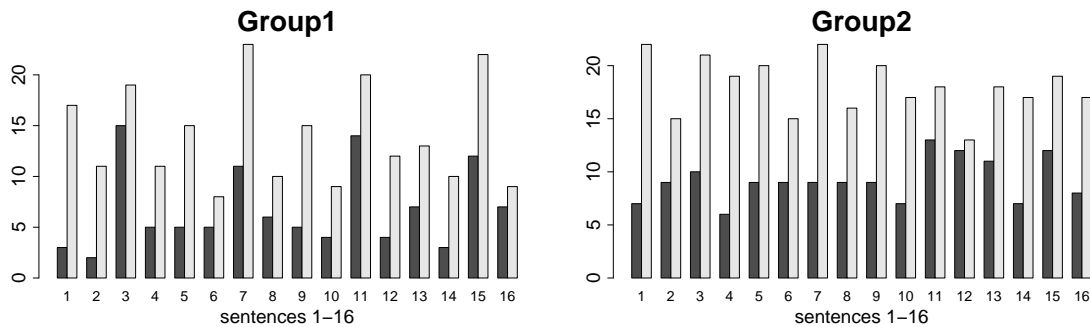

Figure 3.10: Placement of target item in the FOCUS-NEW condition for each sentence in both groups given in number of responses. Dark = target item in clause-final, Light = target item in the immediately post-verbal positon.

The results as broken down by individual target sentences for the focus conditions are presented in Figure 3.10 for condition FOCUS-NEW and Figure 3.11 for condition FOCUS-GIVEN. In the case of the FOCUS-NEW condition the results as shown by a one sample t-test were significantly different from chance ($t = 6.78, p_{¡}0.0001$ for Group 1 and $t = 7.18, p_{¡}0.0001$ for Group 2), as the plots indicate that there was a clear preference to place the Focus marked constituent in the immediately post-verbal position.

The same is true for the FOCUS-GIVEN condition, ($t = 4.87, p < 0.0001$ for Group 1 and $t = 3.79, p < 0.0001$ for Group 2). However, a visual examination of the two sets of plots indicates that while there was a statistically significant difference from chance, it was probably not to the same effect as in the case of the FOCUS-NEW condition, as there are a number of

sentences in both groups where the preferences for word order are not as clear as in that case, or even contradictory to the main effect (eg sentences 4, 9 15 in Group 1 or sentences 7 or 11 in Group 2). This observation seems to indicate that when Focus marking is not present by itself, but it shares a domain with Givenness marking the two might be in competition with Focus winning out most of the time to be placed in the immediately post-verbal position.
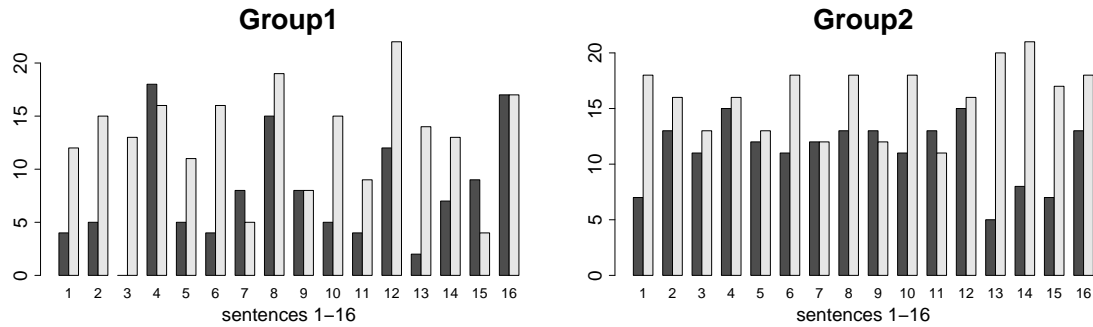

Figure 3.11: Placement of target item in the FOCUS-GIVEN condition for each sentence in both groups given in number of responses. Dark = target item in clause-final, Light = target item in the immediately post-verbal positon.

The data, as presented above, provides some indication of the behaviour of the individual target sentences in each condition. In the following the statistical analysis of the data will be presented in order to answer the main question posed for the experiment: what is the effect of givenness and focus and their interplay on the word order preferences in the post-verbal domain. Let us first re-examine these preferences for the two groups as borne out for the experimental conditions, as presented in Figure 3.7, repeated here in Figure 3.12.
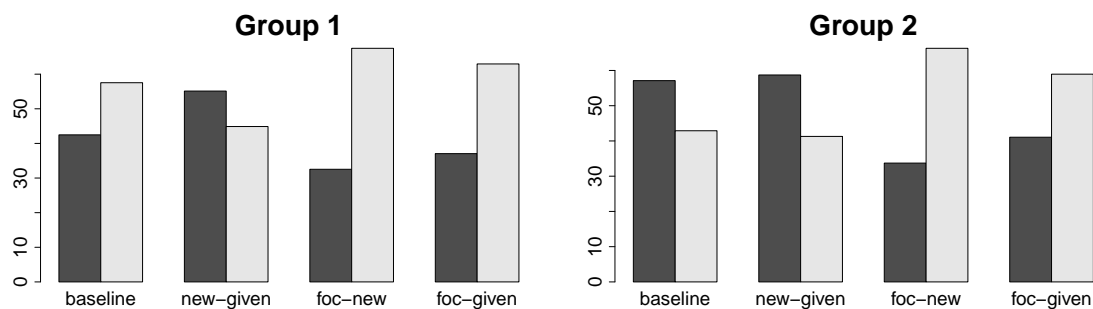
Figure 3.12: Effects of focus and givenness on preferences of target item placement in a two-alternative forced choice test for *is*-marked focus in percentage of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.

Logistic mixed effects models were fitted to investigate these effects. The results of which are provided in Table 3.6. As the results indicate in Group 1 conditions NEW-GIVEN and FOCUS-

	Group 1				Group 2			
Condition	Estimate	Std. Error	z value	Pr(>|z|)	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	0.3094	0.1302	2.376	**0.017**	-0.3412	0.1875	-1.819	0.06889
New-Given	-0.5215	0.1621	-3.217	**0.001**	-0.0532	0.2426	-0.219	0.82644
Focus-New	0.4434	0.1657	2.675	**0.007**	1.1445	0.2444	4.684	**2.8e-06**
Focus-Given	0.2536	0.1647	1.539	0.123	0.8045	0.2489	3.233	**0.0012**

Table 3.6: Results of logistic mixed effects model for word order preferences for is marked focus, both groups

NEW elicited significantly different preferences from BASELINE, while condition FOCUS-GIVEN did not. In the case of Group 2, both narrow focus conditions FOCUS-NEW and FOCUS-GIVEN elicited different preferences from BASELINE, while condition NEW-GIVEN did not. Next, the groups were combined and a new mixed effects model was fitted, which included group as a random effect. In order to better understand the relation between individual conditions the model was analysed with the *lsmeans* package of R, to reveal the pariwise comparisons, which are summarised in Table 3.7. As in the case of the simple focus experiment, here the effects of Focus are well accounted for, in the comparisons where the effect of focus is isolated or occurs together with Givenness we can see clear significant differences. The two comparisons where the effect of Givenness are isolated (BASELINE ↔ NEW-GIVEN and FOCUS-GIVEN ↔ FOCUS-NEW) exhibit p-values just below and just above the 0.05 level. These results would seem to indicate that Givenness has significant effect if its companion is context new, but doesn't show this effect if its companion is focus marked. The z-scores, however, indicate that both comparisons show significant differences. It should be noted however that when comparing the effects of Focus and Givenness, there seems to be clear differences between significance levels both in terms of p-values and z-scores.

Contrasts	Estimate	Std.Er.	z.ratio	p-value
BASELINE ↔ FOCUS-GIVEN	-0.498	0.106	-4.697	**<0.0001**
BASELINE ↔ FOCUS-NEW	-0.763	0.107	-7.101	**<0.0001**
BASELINE ↔ NEW-GIVEN	0.275	0.105	2.615	**0.0442**
FOCUS-GIVEN ↔ FOCUS-NEW	-0.265	0.108	-2.444	0.0691
FOCUS-GIVEN ↔ NEW-GIVEN	0.773	0.106	7.266	**<0.0001**
FOCUS-NEW ↔ NEW-GIVEN	1.038	0.108	9.556	**<0.0001**

Table 3.7: Comparison of conditions in the simple focus experiment for both groups

3.3.3   Experiment 2: Main Findings

Finding 2.1 Focus seems to play a significant role in determining word order even if an item is marked with the focus sensitive partile *is*, as evident from the results of the FOCUS-NEW conditions of both groups. However in this case there seems to be a stronger role of

Givenness when it co-occurs with Focus as noted above.

Finding 2.2 Givenness, when combined with topicality, seems to have a greater effect on word order preferences, than simple textual givenness as used in Experiment 1, as shown in the results for condition NEW-GIVEN.

Finding 2.3 There seems to be a difference between the results for Group 1 and Group 2 that was not present in Experiment 1, as shown by the different results for conditions NEW-GIVEN and FOCUS-GIVEN.

3.4 Experiment 3: Double Focus

The third type of focus examined in this study is the post-verbal member of a double focus construction (see Section 2.3.3.3). While simple focus and *is*-marked focus looked at in Experiment 1 and 2 fell into the information focus category of É. Kiss (1998b), the post-verbal member of a double focus construction is an instance of identification focus, in other words the same as the pre-verbal (word order marked) focus. The reason, therefore, to include it in the present study was to assess how a type of focus otherwise linked with a specific syntactic position behaves in the post-verbal domain. Recall that there have been two suggestions regarding the post-verbal position of this type of focus. One, where an iterated focus projection was proposed (Bródy, 1995; É. Kiss, 1998a), predicts it to be in the immediately post-verbal position, and the other where a mirror focus construction was proposed Alberti & Medve (2000) predicts it to be in the clause-final position.

There was also a change in the given condition from the previous two experiments. Recall that in Experiment 1 givenness was merely textual, while in Experiment 2 it was combined with topicality. In this experiment, due to the necessity of having a pre-verbal focus in the taret sentence, the given element was not only given, but it formed the background of the pre-verbal narrow focus.

3.4.1 Materials

The third focus type examined in this study, double focus, is characterised by a focus marked item in the pre-verbal focus postion, and its post-verbal pair. To reflect this the target sentences were modified to fit the structure in (22), with a linguistic example given in (23) showing both possible word orders.

(22)   a.   Focus Verb(PRT) XP_{1focus} XP_2

      b.   Focus Verb(PRT) XP_2 XP_{1focus}

(23)   a.   Pista esett össze a   tanévnyitón   a   fáradságtól
               Steve fel   PRT the opening.on of the school year the fatigue.from
               'It was Steve who colapsed from fatigue at the opening ceremony for the school

               year.'

      b.   Pista esett össze a   fáradságtól a   tanévnyitón
               Steve fel   PRT the fatigue.from the opening.on of the school year
               'It was Steve who colapsed from fatigue at the opening ceremony for the school

               year.'

The name, or referential expression which was previously the Topic was changed to be the pre-verbal Focus, note that this means that where there is a verbal particle present it is moved to the position just behind the verb. The two post-verbal constituents were free to appear in either of the two positions as shown in (22). Besides these changes the sentences were identical to the ones used in the previous experiments. The post-verbal constituents were controlled for adjuncthood, syllable number and syntactic structure. As in with the previous experiments there were four conditions, which are summarised in Table 3.8, these were adapted for the double focus design.

Condition	XP_1	XP_2	Focus
BASELINE	new	new	narrow pre-verbal
NEW-GIVEN	new	given$_{backgrounded}$	narrow pre-verbal
FOCUS-NEW	focused	new	narrow double
FOCUS-GIVEN	focused	given$_{backgrounded}$	narrow double

Table 3.8: Treatment conditions as resulting from the interaction of the independent variables.

The BASELINE condition was no longer in broad focus, as in the previous two experiments, instead it had one narrow focus marked element in the pre-verbal postion as noted in (22). This was necessary since it could not be ruled out that the presence of a pre-verbal focus may have an effect on the post-verbal word order, this effect might not be discerned from the effect of the post-verbal focus, if the broad focus baseline was used as in the previous experiments. Therefore the context question for this condition was as follows:

(24)   Ki   esett össze?   BASELINE Groups 1&2
         Who fell   PRT
         'Who colapsed?'

The next condition was NEW-GIVEN, where the post-verbal constituent that will be in narrow focus in subsequent conditions was context new, but its clause-mate was given. This effect was achieved by having this constituent be present in the context question in a post-verbal

position. This way it would be part of the background of the pre-verbal focus, thereby making the given constituent not merely textually given. The reason that it was not also topicalised was so that the effectes of backgrounding could be better compared with the effects of simple textual givenness as observed in Experiment 1. This way Experiment 2 and Experiment 3 would tease appart these two effects. The context questions in (25) and (26) require answers that have a pre-verbal narrow focus constituent. Additionally they include a post-verbal constituent that is thus part of the background of this pre-verbal focus.

(25) Melyik testvéred keltett feltünést a tanévnyitón? NEW-GIVEN Group 1
Which brother.yours caused attention the opening.on of the school year
'Which one of your borthers cause a scene at the opening ceremony of the school year?'

(26) Melyik testvéred lett legutóbb rosszul a fáradságtól?
Which brother.yours became most recently ill the fatigue.from
'Which one of your brothers was most recently ill from fatigue?' NEW-GIVEN Groups 2

As in the previous experiments context questions for conditions FOCUS-NEW and FOCUS-GIVEN required answers with a narrow focus marked constituent post-verbally, in this experiment this post-verbal focus was additional to the pre-verbal focus already present. Instead of using a pair-list type of double focus, the construction used here was simple double focus. This was thought necessary since in the case of a pair-list type of focus there might be a preference to place members of a pair as close to each other as possible. This might override any effects associated with focus marking on its own. A set of examples is presented in examples (27) through (30).

(27) Ki esett össze és mitől? FOCUS-NEW Group 1
who fell PRT and what.from
'Who collapsed and from what?'

(28) Ki esett össze és hol? FOCUS-NEW Group 2
who fell PRT and where
'Who collapsed and where?'

(29) A tanévnyitón ki esett össze és mitől? FOCUS-GIVEN Group 1
the opening.on of the school year who fell PRT and what.from
'Who collapsed at the opening ceremony of the school year and from what?

(30) A fáradságtól ki esett össze és hol? FOCUS-GIVEN Group 2
the fatigue who fell PRT and where
'Who collapsed from fatigue and where?'

Since Hungarian allows for multiple *wh*-fronting, it would also have been possible to use a context question as presented in (31), as opposed to those presented in (27) and (28).

(31)   Ki   mitől   esett össze?
        who what.from fell PRT
        'Who collapsed and from what?'

However, if two pre-verbal *wh*-words are presented they might very well provide a bias for an answer where the post-verbal focused constituent is already assumed to be in a given position relative to the pre-verbal focus, given the order of the pre-verbal operators. Much the same way as a pair-list type focus could bias the placement of the post-verbal focus marked constituent independent of focus marking. By opting for a coordinated structure as in the examples in (27) through (30) the *wh*-word associated with the post-verbal focus marked constituent appears alone in the pre-verbal operator position of a sentence that has been elided, as shown in (32).

(32)   Ki   esett össze és mitől   ~~esett össze~~?
        who fell PRT   and what.from fell   PRT
        'Who collapsed and from what?'

By employing this construction, it was thought that any word order biasing triggered by the multiple-*wh* construction would be averted, and the observable effects on word order would only be those of Focus marking.

As in the previous experiments there were 16 target sentences presented in a Latin Square design. There were 69 participants in total (47 female, 22 male), divided between the Group 1 (XP_1 marked for Focus) and Group 2 (XP_2 marked for Focus). Each participant gave judgements on 4 tokens of each condition resulting in a total of 1104 observations: 528 for Group 1 and 576 for Group 2.

3.4.2 Results

The results for all sentences grouped by conditions are shown in Figure 3.13. What is apparent at first sight is that Group 1 and Group 2 differ much more than in the previous two experiments. In fact, while Group 1 seems to conform to the trend set in Experiment 1: chance levels for BASELINE, no apparent effect of Givenness in the NEW-GIVEN condition, and a discernable effect of Focus in both of the narrow focus conditions, Group 2 deviates from this trend substantially. There seems to be major effect for Givenness in the NEW-GIVEN condition and an equal effect of Focus in the FOCUS-NEW condition, while the two Information Structural effects seem to be in competition in the FOCUS-GIVEN condition.

A closer inspection of the results of the BASELINE condition using one-sample t-tests reveals that selection of preferred word orders was at chance levels ($t = 0.77, p = 0.78$ for Group 1 and $t = -1, p = 0.84$ for Group 2). The behaviour of the individual sentences is presented in Figure
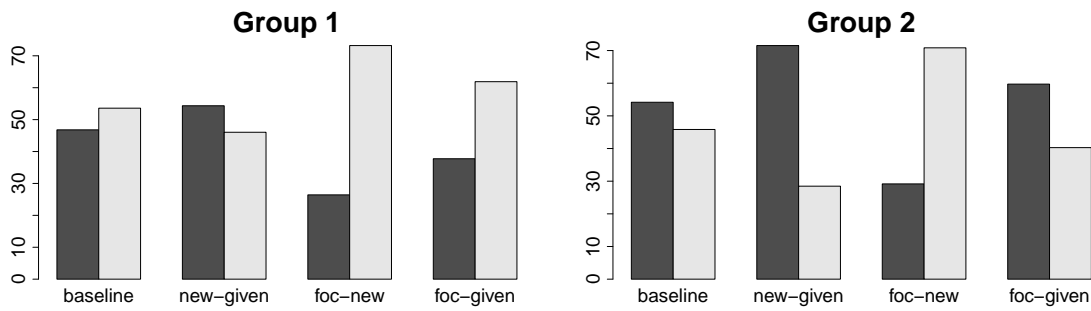
Figure 3.13: Effects of focus and givenness on preferences of target item placement in a two-alternative forced choice test for double focus in percentage of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.
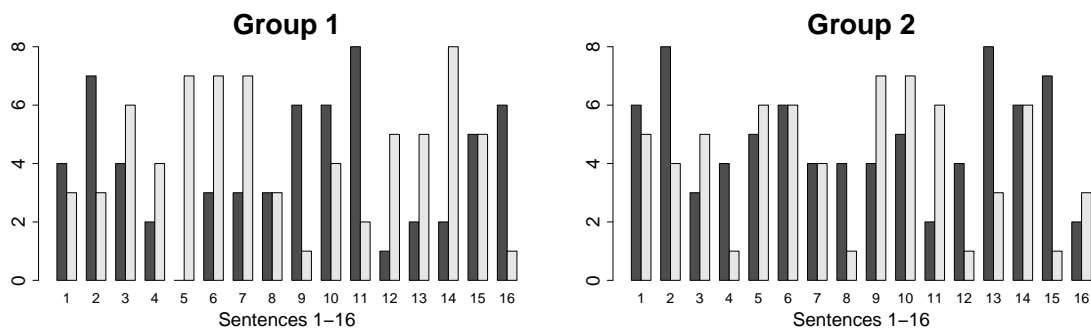
3.14.

Figure 3.14: Placement of target item in the BASELINE condition for each sentence in both groups given in number of responses. Dark = target item in clause final position Light = target item in immediately post-verbal position.

The pattern of word order preferences shows no clear tendency with a large degree of variation between sentences, meaning that there were likely factors present for individual items, but on a whole these balanced each other out. This accounts for the above finding, and falls in line with the findings of the previous experiments. The results for the NEW-GIVEN condition as broken down for individual sentences is presented in the plots in Figure 3.15.

As the two plots indicate the preferences for responses were somewhat different between the two groups, and this is underlined by the findings of the one-sample t-tests. The results for Group 1 indicate that there is no significant difference from chance in choosing the preferences for a given word order ($t = -0.953, p = 0.829$), however, in Group 2 there seems to be word order that is clearly preferred: one where the constituent marked as Given is placed in the immediately post-verbal position ($t = -5.704, p < 0.0001$). While it is not entirely surprising that givenness may or may not have an effect on word order as shown in the first and the
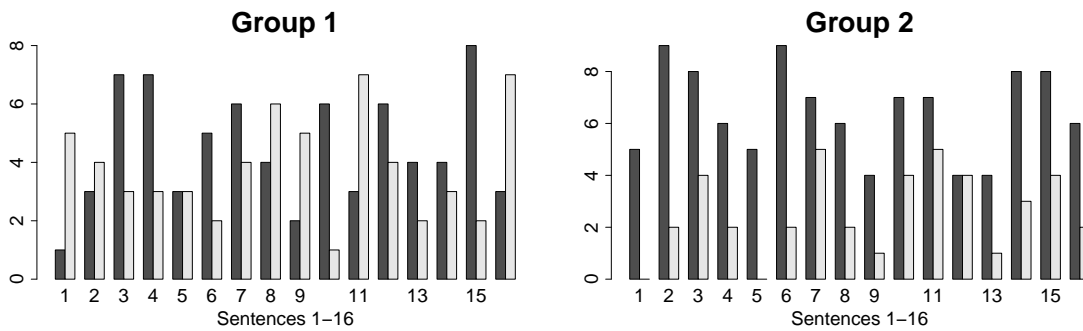
Figure 3.15: Placement of target item in the NEW-GIVEN condition for each sentence in both groups given in number of responses. Dark = given$_{backgrounded}$ item in immediately post-verbal positon, Light = given$_{backgrounded}$ item in the clause final positon.

second experiment presented above, it is surprising that there would be such a big difference between Groups, as subjects were selected for groups at random.

Based on the results of the previous experiments a strong effect for Focus was expected in the FOCUS-NEW condition, and it is attested in the plots in Figure 3.16. With a few exceptions all sentences behave similarly, placing the Focus marked item in the immediately post-verbal position. There are a few exceptions, notably sentences 7, 9 and 11 in Group 1, and sentences 5 and 12 in Group 2.

Figure 3.16: Placement of target item in the FOCUS-NEW condition for each sentence in both groups given in number of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.

One sample t-tests confirm that the choice for word order was not at chance levels ($t = 6.08, p < 0.0001$ for Group 1 and $t = 5.48, p < 0.0001$ for Group 2).

The results by sentence for the FOCUS-GIVEN condition are given in the plots in Figure 3.17. Here again, the two groups show different word order preferences. For Group 1 the majority of sentences (10/16) elicited the focus>>given word order in the case of only 3 sentences was there a preference to place the given constituent before the Focus marked on, with 3 sentences

where the preferences seemed to be at chance levels. In the case of Group 2 the majority of sentences (11/16) showed preferences for the given>>focus word order wile the remaining 5 showed preferences fot the focus>>given word order. It should also be noted that while in a lot of the cases the preferences seem to be quiet clear, there are several sentences where while a given word order was selected at a higher rate, the difference might not be significantly high.
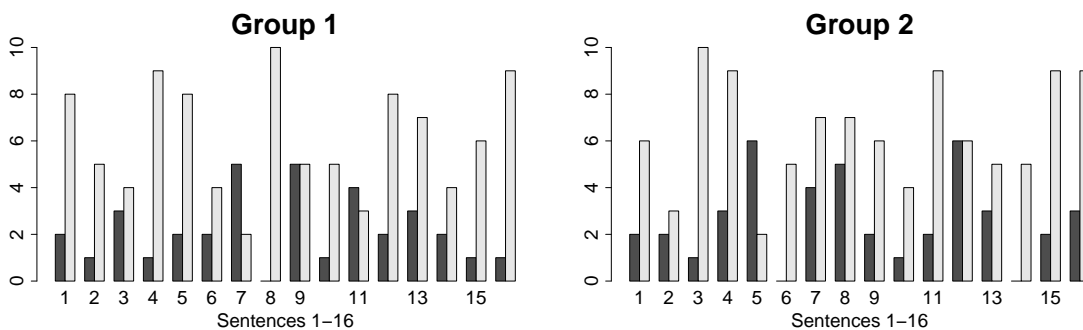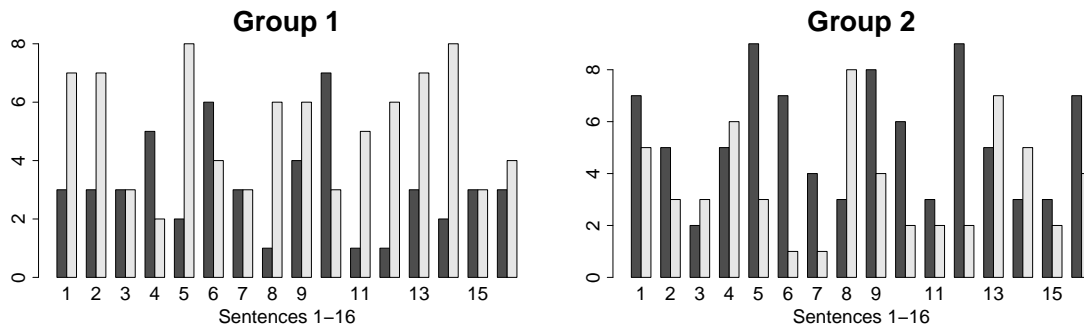

Figure 3.17: Placement of target item in the FOCUS-GIVEN condition for each sentence in both groups given in number of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.

When the results for all sentences are combined and their averages checked agains chance by a one sample t-test the finding is that the respective trends are significant: $t = 2.86, p = 0.002$ for Group 1, and $t = -2.37, p = 0.001$ for Group 2.

Now that differences from chance leves for each condition have been established let us turn to the differences between conditions as presented in figure 3.13 repeated here. As in pervious experiments the conditions containing marking for givenness and/or focus were compared to the BASELINE condition using logistic mixed effects models. The dependent variable was the choice in word order, while the fixed effect was the condition. The random effects were subjects and sentences (items). The results of the fitted model are presented in Table 3.9.

	Group 1				Group 2			
Condition	Estimate	Std.Er.	z value	Pr(>|z|)	Estimate	Std.Er.	z value	Pr(>|z|)
(Intercept)	0.1652	0.2078	0.795	0.4265	-0.1754	0.1876	-0.935	0.3498
NEW-GIVEN	-0.3344	0.2546	-1.314	0.1889	-1.0451	0.3770	**-2.772**	**0.0055**
FOCUS-NEW	0.8963	0.2718	**3.297**	**0.0009**	1.3630	0.4023	**3.388**	**0.0007**
FOCUS-GIVEN	0.3537	0.2581	1.370	0.1706	-0.3018	0.3127	-0.965	0.3344

Table 3.9: Differences in word order preferences from BASELINE for double focus constructions conditions as shown by logistic mixed effects model: dependent variable: word order choice, independent variable: condition, random effects: subject, item.

The results show that as in the case of the previous two experiments focus has a strong role in determining word order. The word order choices for the FOCUS-NEW condition were signifi-
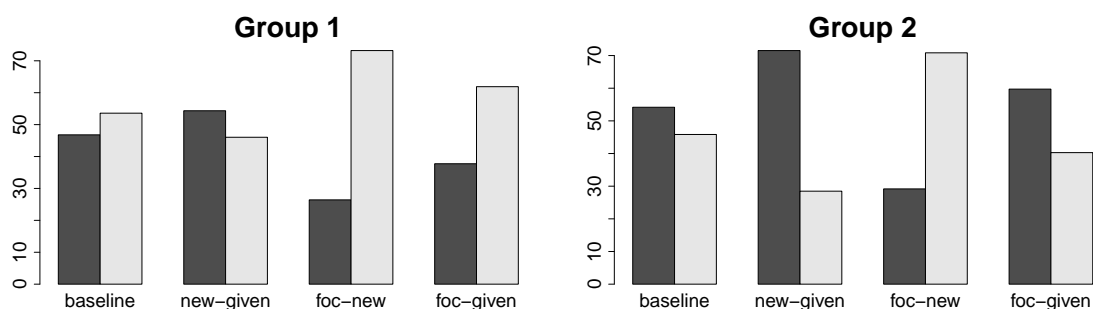
Figure 3.18: Effects of focus and givenness on preferences of target item placement in a two-alternative forced choice test for double focus in percentage of responses. Dark = target item in clause-final positon, Light = target item in immediately post-verbal positon.

cantly different from the BASELINE condition for both groups. As in the previous experiments, participants preferred to place the constituent in focus in the immediately post-verbal position, preceding the contextually new constituent.

In terms of givenness, this experiment tested the effects of givenness combined with back-grounding. The results of the logistic mixed effects models given in Table 3.9 show that this type of givenness effects word order preferences, at least in the case of Group 2 where its effects were significant as compared to the baseline ($z = -2.77, p = 0.005$). It is not clear why there is a difference between the two groups from this respect, however when comparing models fitted to the entire dataset, the effect of *group* was not shown to be significant ($\chi^2 = 2.416, p = 0.12$). These models still showed a significant difference for the effect of givenness in the NEW-GIVEN condition ($z = 3.16, p = 0.0083$), as shown in Table 3.10. Therefore, the effects of givenness combined with backgrounding will be taken as significant, such that participants preferred to place the given and backgrounded item in the immediately post-verbal position, as shown in Figure 3.18 above.

In order to investigate the global effects of the conditions the results of the two groups were combined and a new mixed effects model was fitted, this time *group* was added as a random effect. The model was then analysed by the *lsmeans* package of R, in order to derive the pariwise comparisons presented in Table 3.10. These comparisons indicate that all differences were significant except the one between the BASELINE condition and the FOCUS-GIVEN condition. This result underlines the findings discussed above, showing that in conditions where either focus or givenness were present word order preferences were affected.

Interestingly, when both focus and givenness are present in the post-verbal domain (condition FOCUS-GIVEN), there is no clear preference for word order as shown by the fact that this condition did not differ significantly from the BASELINE condition, further more it was signif-

icantly different from both the FOCUS-NEW and the NEW-GIVEN conditions. Therefore, since preferences for word order were the same as in the case of the BASELINE condition, yet both givenness and focus were present, it may be concluded that there was a competition between placing either the constituent in narrow focus, or the one that was given and backgrounded in the immediately post-verbal position, and that these two tendencies cancelled each other out.

Contrasts	estimate	SE	z.ratio	p-value
BASELINE ↔ FOCUS-GIVEN	-0.031	0.175	-0.181	0.9979
BASELINE ↔ FOCUS-NEW	-1.009	0.185	-5.436	**<.0001**
BASELINE ↔ NEW-GIVEN	0.565	0.178	3.168	**0.0083**
FOCUS-GIVEN ↔ FOCUS-NEW	-0.977	0.185	-5.266	**<.0001**
FOCUS-GIVEN ↔ NEW-GIVEN	0.597	0.178	3.349	**0.0045**
FOCUS-NEW ↔ NEW-GIVEN	1.575	0.189	8.301	**<.0001**

Table 3.10: Comparison of response means between all conditions.

3.4.3   Experiment 3: Main Findings

Finding 3.1 The presence of post-verbal narrow focus as member of a double focus construction influenced word order preferences in such a way that the constituent in narrow focus was preferred to occur in the immediately post-verbal position.

Finding 3.2 If a post-verbal constituent was given, and also formed the background of a pre-verbal narrow focus (given$_{backgrounded}$), than that constituent was preferred in the immediately post-verbal position.

Finding 3.3 If post-verbal narrow as member of a double focus construction co-occurred wit in a given$_{backgrounded}$ constituent there word order preferences were not affected, suggesting that the focus and given$_{backgrounded}$ are in competition for the immediately post-verbal position.

3.5   Potential issues with the material used.

This section will address a number of possible factors[5] that might have negatively influenced the outcome of this study.

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[5]I am indebted to Alexandra Markó, Kriszta Szedrői, Beáta Gyuris, Veronika Hegedűs and Ágnes Lukács, who were members of the defence committee at the in house defence of this thesis, as well as the members of the audience for raising points discussed in this section and offering valuable comments and suggestions.

3.5.1   Acceptability of the experimental material

A possible issue that may influence all three experiments presented above is the general acceptability of the target sentences as well as the acceptability of the context questions and the target sentences as realistic, or pragmatically feasible pairings. The factors which needed to be controlled for during the creation of the target sentences and the context questions placed considerable constraints on sentence creation. Recall that that the target sentences needed to have non-transitive verbs, followed by two constituents that were matched for syllable count and argumenthood. Further more, when it came to pairing the target sentences with context questions, both post-verbal constituents needed to be able to be selected for by a *wh*-word in all three experiments in such a way that the sentence-question pair was at least comprehensible.

One possible method would have been to create a large number of target sentences, where these criteria where not adhered to. This would have then allowed for factors such as syllable count and argumenthood, to be analysed statistically and their effects removed from the effects of information structure which were the main topic of this study. Instead, this study opted to control for as many factors as possible, in an effort to create as close to minimal pairings as possible, while concentrating on establishing as clear as possible the information structural marking of the context questions on the target sentences. This choice was necessary, because on the one hand at the planning stage of the experiment it was not known how big of a participant pool would be accesible. On the other hand due to the fact that the experiment was being conducted online by unsupervised participants, it was considered important that each participant spend as little time as possible with the task.

This method however resulted in an unquestionable degradation of the naturalness of the target sentences and in some cases the target sentence context question parings in a pragmatic sense. This degradation was deemed acceptable for the following reason: the paradigm used (the two alternative forced choice task) made it clear to the participants what the effect investigated in each task (each judgement given) was. Since the participants saw the context question and their two word order choices at the same time, it was believed that they would be explicitly aware of the effect of interest, and would choose their response based on that effect, ignoring the issue of the naturalness of the material presented in making their choice. This view is supported by the fact that in forced choice tasks, each judgement task is in essence an independent experiment onto its own (Schütze & Sprouse, 2014). Further more, while it cannot be ruled out, there is no principled reason to believe that the naturalness of the target sentences or that of the question-answer pairings would unequally effect the acceptability of the two word order variants given the nature of the post-verbal domain. Therefore, it was assumed that unnatu-

ralness, while present, would not interact with the information structural effects being tested, and that the results of the experiments would still provide valid data of the effects of givenness and focus on post-verbal word order.

Another, related issue is the pragmatic licensing of post-verbal foci in general. The pragmatic licensing of post-verbal foci is not undisputed in the case of simple focus constructions (Experiment 1). It can be argued that for questions which require a narrow focused element in their answers, as in the FOCUS-NEW and FOCUS-GIVEN conditions, the most natural answer would be to place the narrow focused item in the pre-verbal focus position (or in fact, to just present the narrow focused constituent with the rest of the sentence elided). In the case of the double focus constructions licensing of post-verbal foci is widely accepted. Consequently in Experiments 1 and 2, the participants were forced to choose between two suboptimal orders, which might explain the large degree of variation witnessed in the data. This may indeed be the case. However, the position taken in this study is that some amount of unnaturalness is acceptable in the experimental material, if this material allows for the systematic testing of the research questions.

The fact that there is an overwhelming preference, in natural discourse for the responses to questions with just the use of the narrow focused constituent means that all other forms will feel pragmatically somewhat unnatural. However, the high preference for a construction does not necessarily entail that other constructions are rulled out. In this question, this study adopts the view put forth by É. Kiss (1998a) regarding the possibility of post-verbal information foci. Further more, as pointe out above, the experimental task was such that it did not allow for the influence of forms which were not presented to the participants in the particular task, as they were forced to choose from the two possibilites presented. If simple foci are not acceptable post-verbally, then it stands to reason to argue that they would be equally unacceptable in either of the two post-verbal positions tested. Following this assumption, the logical prediction would be that focus will not have an effect on word order. As shown in the experiments above, this was not the case. Not only did simple focus have an effect, this effect was the same as in the case of focus marked with *is* and the double focus constructions. As argued for in Section 2.3.3.2, the availability of focus marked with *is* in the post-verbal domain well attested. The licensing of post-verbal members of double focus constructions is also not called into question. The fact that these three focus types behaved similarly suggests that the effects observed in Experiment 1 were that of focus.

This study will not make claims as to the level to which post-verbal foci are acceptable or licensed. While this is an important question, the approach taken in this study is to acknowledge

that are potential benefits to exploring linguistic phenomena by using material outside of the range of highly natural range, as this method may potentially reveal non-trivial information, which might not otherwise be attainable.

3.5.2   Animacy

As noted in Section 2.3.2 a number of possible factors may influence the word order preferences in the post-verbal domain. Therefore, when constructing the experimental material it was important that the two post-verbal constituents were equally matched for as many of these factors as possible. Animacy, the property of a referent to be alive and have agency could be one of these factors. In many cases the post-verbal constituents in the target sentences were not matched for animacy. There were 6 sentences[6] where one of the constituents was animate, but the other was not. The remainder of the sentences all had two inanimate constituents. In order to analise the impact of animacy on the responses the data was reanalysed, in such a way that the subset of sentences containing animate constituents was taken and the response variable was altered to reflect placement of the animate constituent instead of the target constituent in the BASELINE condition. Following this a binomial test was conducted to ascertain if animacy placed a role in the responses by measuring the results against a mean of 0.5 reflecting chance levels.

For Experiment 1, there were a total of 135 responses for target sentences with animate constituents. In 82 of the cases the animate constituent was preferred in the IPV position, while in 53 of the cases it was preferred in the clause final position. The results of the binomial test indicate that this was a significantly different from chance ($p = 0.015$). However, this result only reflects the effects of animacy on the sentences in the BASELINE condition. To see if animacy impacte the experiment as a whole it was taken up as a random factor in a logistic mixed effect model where the dependent variable was the placement of the target (focused) item and the independent variable was the condition with additional random effects being participants, sentences and group. The comparison of this model to one where animacy was not included in the as a random effect with an ANOVA revealed that it had no global effect on the experiment ($\chi^2 = 0, p = 1.0$).

For Experiments 2 and 3 a similar approach was adopted. In the case of Experiment 2, the binomial test for difference from chance levels revealed that animacy that like in Experiment 1, animacy had an a significant ($p = 0.014$) effect on word order. In this case there was a total of 342 responses for sentences with animate constituents with 149 choices to place the animate

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[6]Target sentences No.: 1, 3, 5, 7, 9, 15. As shown in Appendix A

constituent in the IPV position and 194 choices to place it in the CF position. Running the model comparison ANOVA, with one of the models having animacy as a random effect showed that it did not significantly impact the responses across conditions ($\chi^2 = 2.17$, $p = 1.0$). In the case of Experiment 3, there were a total of 108 responses for sentences with animate constituents with 46 choices to place the animate constituent in the IPV position and 62 to place it in the CF position. According to the binomial test this was not significantly different from chance levels ($p = 0.147$). As in the previous two experiments the model comparison revealed that animacy did not have an effect on the experiment as a random factor ($\chi^2 = 1.01$, $p = 1.0$).

It is clear therefore, that while animacy does seem to have an effect on word order, it was not strong enough to impact the effects of the experimental factors of focus and givenness. What is also clear is that the effect of animacy need to be better understood, as the results of Experiment 1 on the one hand (animate in IPV) and Experiment 2 on the other (animate in CF, with Experiment 3 showing a similar tendency) seem to contradict each other. The scope of this study however, does not require further investigation of this topic.

3.5.3 Argumenthood and Case

Besides animacy, another potential factor that might effect word order judgements relates to argumenthood as well as the case of the constituents. While having both constituents be adjuncts was a high priority during the creation of the material, it is unquestionable that this was achieved to varying degrees.

(33)   Az unokám   bevásárolt a   hétvégén   a   csarnokban.
       the grandson.mine prt.shopped the weekend.on the market hall.in
       'My grandson did the shopping on the weekend in the market hall'

(34)   Noémi kísérletezik   a   vegyszerekkel a   laborjában.
       Noémi experiment.3sg the chemicals.with the laboratory.poss.3sg.in
       'Noémi is experimenting with the chemicals in her lab.'

For example while in the sentence in (33) (target sentence No 8.) both constituents seem to be on equal footing from the point of view of argumenthood, this does not seem to be the case for the sentence in (34) (target sentence No. 16). In this case *a vegyszerekkel* 'with the chemicals' seems to be closer to the status of an argument than *a laborjában* 'in her lab'. When selecting for verbs and constituents, the test used for argumenthood was to see if the sentence would be grammatical with out the constituents present. All target sentences passed this test.

However, as Rákosi (2012) points out it is often the case, as for example with non-core partic-ipant PPs, that traditional tests cannot successfully unambiguously identify them as adjuncts or arguments. It is possible therefore that the two constituents were not equally matched for argumenthood in all of the target sentences. A factor which might influence their associated word order preferences. It would be possible to establish differences between sentences using various non-standard test. This would allow an analysis to factor in the possible effects that these differences might have had on the experiment as a whole. However, since in this case, unlike as with animacy above, differences would not be binary, with many constituents exhibit-ing properties along a scale of argumenthood. Since the material was not controlled for this it is unlikely that it would serve as an appropriate basis for exploring this issue systematically.

A similar problem might arrise due to the fact that the two constituents did not always have the same case endings. This issue was partially address in Section 3.2.2, with Table 3.2 showing the parings used. It is possible that the different cases used occupy different levels in a case hierarchy. Such a hierarchy could potentially influence the word order preferences, thereby skewing the results. While no cases like nomiative, accusative or dative which are near the tops of established hierarchies (Blake, 2001) were used. It is feasibly possible to create a hierarchy of the cases used in the target sentences along the lines of É. Kiss (1987) employing asymmetric binding phenomena, as shown in (35). However, the majority of the test sentence paris created to explore hierarchical differences between the cases used in the experiments suffer from a number of grammaticality issues which makes determining binding possibilites quiet challenging.

(35)   a.   A lányok   ismerik egymást.
               the girls(nom) know.3pl each other.acc
               'The girls know each other'

        b.   *A lányokat ismeri   egymás
               the girls.acc know.1sg each other

In is highly likely that these factors played a crucial role in the high degree of variability observed in the results of the forced choice experiments. Unfortunately, the experimental ma-terial is not suited to fully asses their effects on the results. With complex target sentences and even more complicated question-answer pairings it is highly likely that the factors involved in influencing word order preferences is much larger than the addressed in this section. None the less, the effects of the tested information structural factors were clearly observable despite the high degree of noise in the data. The position of this study is that this fact can be taken as an
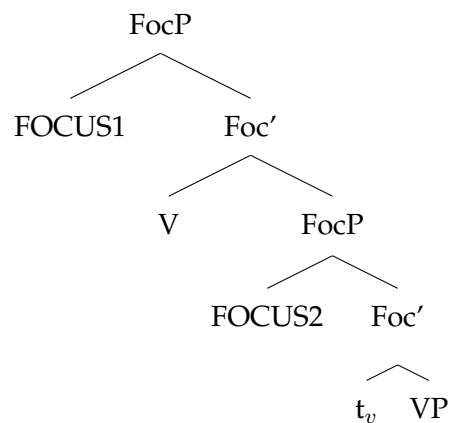
indication, that even if the target sentences were controlled for all possible unwanted factors, these effects would still show the same patterns.

3.6 Interim discussion: word order effects

The experiments presented above yielded two main results: focus affects post-verbal word order such that the constituent in focus is placed in the post-verbal position, and givenness, depending on its type, has the same effect. These results raise a number of questions for theories that have been formulated for the information structure - syntax interface in Hungarian.

The syntactic proposals which consider the Hungarian focus structure to be built up in an iterated fashion (eg. Bródy (1995); É. Kiss (1996, 1998b)) predict well the focus related results of Experiment 3. These models assume that in the case of multiple (identificational) foci the focus projections occur one on top of the other, with the focus constituents occupying the specifier positions, and the verb moving through the head of the lower one, to be spelled out in the head of the higher one as shown in (36). Such a construction would predict the placement of the focus in the immediately post-verbal position. Consequently this result does not support the *mirror focus* proposal of Alberti & Medve (2000), which would predict that the post-verbal member in the double focus construction would appear in the clause final positon.

(36)

```
                        FocP
                       /    \
                 FOCUS1      Foc'
                            /    \
                           V      FocP
                                 /    \
                            FOCUS2     Foc'
                                      /    \
                                    t_v     VP
```

However, the results of Experiment 1 & 2 are problematic for an iterated focus projection theory. On the one hand, these iterated projections only occur if there are two indentificational foci in a sentence, therefore there could not be a post-verbal focus position, as there would be no place for the verb to move above it. On the other hand the types of foci tested in Experiment 1 & 2 were information foci, which have not been suggested to occupy a specific syntactic position anyway (É. Kiss, 1998a, pg.259). Therefore, from a this point of view it is problematic that they are linked to any word order preferences at all.
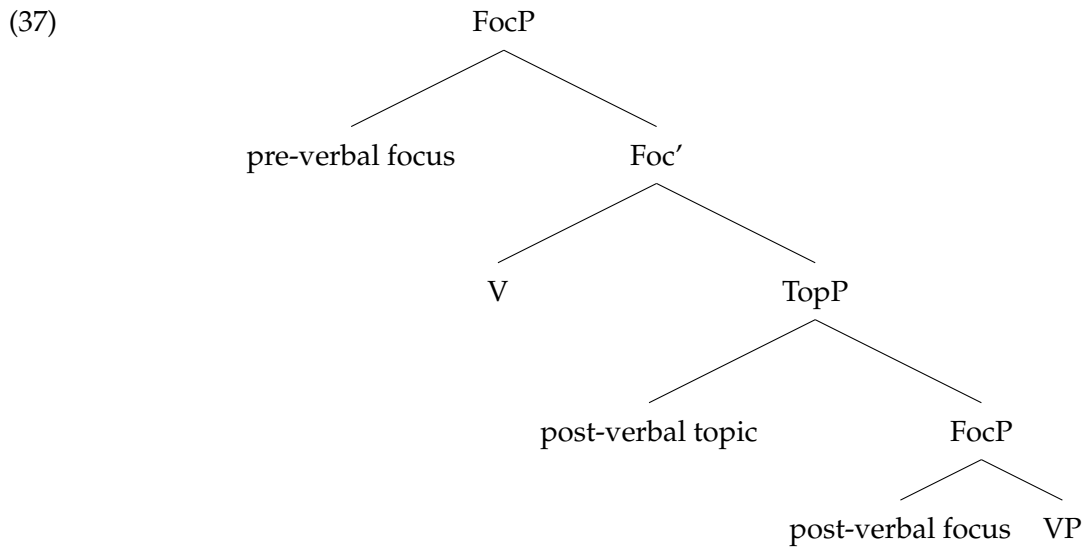
The effects associated with given$_{topical}$ and given$_{backgrounded}$ are also problematic for syntac-

tic approaches to Hungarian. Since the treatment of givenness effects does not feature promi-
nently in the Hungarian syntactic literature there are no detailed predictions that can be made
based on them. The proposal by Varga (1981) however can be used to interpret these results.
Recall (Section 2.5.1) that Varga argued that contextually given, and therefore deaccented con-
stituents are not acceptable in the clause final position due to the fact, that in his model the
clause final constituent is obligatorily associated with an accent. This proposal correctly pre-
dicts the behaviour of the contextually given constituents in Experiment 2 & 3. In order for
this approach to account for the results of Experiment 1, where word order was not effected
by givenness, it must be assumed that the type of givenness tested there, (merely contextually
given) is not associated with deaccentuation, therefore given constituents in that experiment
were free to occur in a position of accent placement. Since in some languages, like Italian
(Swerts et al., 2002) or Romanian (Ladd, 1990), givenness does not cause deaccentuation (as
discussed in Section 2.4.1), this assumption is tenable.

A syntactic analysis of givenness in the post-verbal domain could take the form of a given-
ness operator approach as suggested by Kučerová (2007, 2012) for Czech. This approach would
propose that a given$_{topical}$ or a given$_{backgrounded}$ constituent would have to fall under the scope
of a givenness operator, and to achieve this it would have to move to some syntactic position
immediately following the verb. There are notable differences between the Czech and the Hun-
garian data however. Kučerová (2007) suggests that the givenness operator divides the Czech
clause in two, with given constituents preceding it, and contextually new constituent follow-
ing it. This does not hold for Hungarian however, since the pre-verbal domain can contain
contextually new constituents. Further more, the movement of the given item, while preferred,
is not obligatory, as suggested for Czech by Kučerová (2007) (cf. Šimík et al. (2014)). Such
an approach would only work, if it was considerably altered from its original formulation, to
specifically fit the Hungarian data.

Another option would be assume that the Given-before-new generalisation does not hold
in Hungarian, and that it is not because of givenness that the given constituents in experiments
2 & 3 behaved as they did, but rather due to being marked as a topic on the one hand, and
being part of the background on the other hand. Two separate explanations could then be
made for their behaviour. In terms of topichood it can be proposed, that there is a post-verbal
topic position. Recall that É. Kiss (1996, 1998b) has made a proposal to this effect, but only in
the case of the double focus constructions. Her proposed structure is given in (37), where above
the post-verbal focus position there exists the same sort of structure that can be observed in the
pre-verbal domain, with a topic (and quantifier, which is not shown here) position between the

verb and the post-verbal focus.

(37)

```
                    FocP
                   /    \
        pre-verbal focus  Foc'
                         /    \
                        V     TopP
                             /    \
                post-verbal topic  FocP
                                  /    \
                      post-verbal focus  VP
```

Since Experiment 2, where the effects of given$_{topical}$ were testeded did not contain double focus constructions, if a post-verbal topic, and consequently focus position is to be proposed, then the proposal by É. Kiss (1996, 1998b) needs to be significantly modified. First, it must be assumed that the verb moves above these projections even if there is no higher focus projection. Since the target sentences used in Experiment 2 had a pre-verbal particle as well as a topic, it is possible that there was some syntactic position for the verb to move into. Second, since the condition that tested the effects of given$_{topical}$ did not contain a post-verbal focused constituent it must be assumed, that contrary to the proposal of É. Kiss as outlined above, post-verbal topic positions may occur even with out a post-verbal focus position. Even so, this proposal would fail to give the proper prediction of the preferences shown in the FOCUS-GIVEN condition of Experiment 2. Those results showed that when a focus and given$_{topical}$ constituent are both present in the post-verbal domain, then focus usually wins the competition for the immediately post-verbal position. If the post-verbal topic and focus structures were as shown in (37), then it would be predicted that given$_{topical}$ would always precede the post-verbal focus.

In terms of the effects associated with the given$_{backgrounded}$ type of givenness, a theory that may explain the results well is that of Neeleman & van de Koot (2008). Neeleman & van de Koot propose that movement associated with focus happens to provide a structure that can be interpreted by the semantic component of language (see Section 2.2.1). In this case it may be proposed that the backgrounded constituent appears in the post-verbal domain in order to maintain the continuity of the background of the pre-verbal focus, as shown in (38-a) as opposed to (38-b).

(38)   a.   [Pre-Verbal focus [Verb XP1]$_{background}$ XP2$_{new/foc}$]

        b.   [Pre-Verbal focus [Verb]$_{background}$ XP2$_{new/foc}$ [XP1]$_{background}$]

This approach would correctly predict the behaviour of the given$_{backgrounded}$ constituent in the NEW-GIVEN condition of Experiment 3. However, it would have difficulties in dealing with the results of the FOCUS-GIVEN constituent, where the given$_{backgrounded}$ and the focus constituent were in apparent competition for the immediately post-verbal position. Their model clearly separates background from focus, therefore it is unexpected to have these two categories compete for the same position. This competition is also problematic for theories that propose a unified approach to focus and givenness (eg. Schwarzschild (1999); Wagner (2012) Section 2.1.2), since under such an approach it would be highly unexpected for these two categories to target the same position.

The best overall categorisation of the forced choice experiments is that they show word order preferences and not categorical differences between word orders. This is an important point since it makes it difficult for any syntactic theory operating with the notion of feature checking and movement to specific functional projections to explain the data, with out an appeal to secondary processes, like scrambling or derivational processes which allow for both strict and free syntactic relations (as proposed by É. Kiss (2008). Section 2.3.2). It may therefore be best if non-syntactic motivations for the word order alternations shown by these experiments were found. The obvious choice is to look at how the prosodic realisation of post-verbal focus and givenness affects the word order choices, and whether or not a prosody motivated account may be better suited to capture these results.

Based on this summary the following research question for a prosodic production experiment can be formulated.

Research Question 1 Are post-verbal foci realised with different prosody if they occur in the immediately post-verbal, as opposed to the clause final position?

Research Question 2 How does the prosodic realisation of post-verbal foci happen? Is it through the prominence of the accent, or through prosodic phrasing?

Research Question 3 Is there a difference between focus types and their prosodic realisations?

Research Question 4 What are the primary cues used for marking information structure in the post-verbal domain (f0, duration, intensity)?

Chapter 4

Production Experiments

Three production experiments were carried out to test the prosodic realisation of simple post-verbal Focus, post-verbal Focus marked with the particle *is* 'also', and the post-verbal member of a double Focus construction. First, Section 4.1 will describe the general materials and procedures used in the experiments as well as the methods used in the analysis of the results. Subsequently Section 4.2, Section 4.3 and Section 4.4 will present materials that were specific to each experiment as well as the results of the experiments.

4.1   General methods

In order to better understand the interaction of word order, prosodic structure, and the prosodic correlates of focus and givenness in the post-verbal domain, production experiments were carried out. The experimental design needed to be such that it provided data for the following basic questions: (i) how is the prosodic realisation of a sentence affected by the placement of a focused/given constituent in the immediately post-verbal (IPV) position and (ii) how is the prosodic realisation of a sentence affected by the placement of a focused/given constituent in clause final (CF) position? As noted in Section 2.4 focus is associated with prosodic prominence. Since prosodic prominence is relative within a relevant domain, it is signaled not just on a given constituent, but also by the relation of the prosodic realisation of the prominent constituent and other material in the relevant domain. To fully understand this interaction it was not enough to look at the focused or given constituents in their relevant position, but also to consider the other material around them, which could in turn be marked as being given or in focus or contextually new. Considering these parameters a number of conditions were created as outlined in Table 4.1.

In the BASELINE condition both of the post-verbal constituents were contextually new. In

Condition	IPV	CF
BASELINE	new	new
FOCUS-NEW	focused	new
FOCUS-GIVEN	focused	given
NEW-FOCUS	new	focused
GIVEN-FOCUS	given	focused

Table 4.1: Conditions used in all three production experiments. IPV and CF refer to the post-verbal constituents: immediately post-verbal and clause final respectively. *new*, textitfocused and *given* represent their IS status.

the FOCUS-NEW and FOCUS-GIVEN conditions the IPV constituent was in narrow focus, while the CF constituent was either contextually new or given. In the NEW-FOCUS and GIVEN-FOCUS conditions the CF element was in narrow focus, while the IPV constituent was either contextually new or given. While the forced choice experiments presented in Chapter 3 showed a clear preference of placing the constituent in narrow focus in the IPV position, sentences with focus in the CF position cannot be ruled our as ungrammatical, therefore, it was necessary to include such structures in this study.

There were a total of 4 target sentences, 3 taken from the set created for the forced choice and one novel one created for this series of experiments[1]. The sentences were created in a way so that they would be optimal for phonetic analysis: the consonants in the CVC sting of the main target area for measurement, the initial syllables of the post-verbal constituents, were always nasals or liquids in order to ensure reliable tracking of pitch. The basic structure of these sentences was as presented in (1), however there were some minor variatons between the three experiments which were necessary because of the different focus types that were tested. These differences will be further discussed in the appropriate sections below.

(1)   a.   Topic PRT-Verb $XP_{1(foc)}$ XP_2

       b.   Topic PRT-Verb XP_1 $XP_{2(foc)}$

Unlike in the forced choice experiments, participants were not split into groups according to which constituent was the target, ie: marked for focus. All subjects encountered target sentences with focus marked elements in both XP_1 and XP_2, that is both the IPV and CF positions. The positions of the individual constituents were not modified, that is XP_1 always occurred in the PV position and XP_2 always occurred in the CF position. This was necessary since measurements were to be conducted on given syllables of the post-verbal constituents comparisons could only be made between syllables occurring in the same positions within the sentence.

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[1]This was necessary because out of the 4 sentences originally intended for the production experiment one was found to not meet criteria that would allow for successful measurements by Praat.

Thus varying the word order of the constituents was unnecessary. The basic target sentences are given in examples (2) to (5).

(2)   Attila elájult   a   málnásban   a   melegtől.
       Attila PRT-fainted the raspberry field.in the heat.from
       'Attila fainted in the raspberry field from the heat.'

(3)   Péter elhízott   a   malacsülttől   a   németeknél.
       Peter PRT-get fat the roast pork.from the germans.at
       'Peter got fat from the roast pork in Germany'

(4)   Kata elment   a   hajóval   a   malomhoz.
       Kata PRT-went the boat.with the mill.to
       'Kata went with the boat to the mill.'

(5)   Móni eltévedt júniusban Milánóban.
       Móni PRT-lost june.in   Milan.in
       'Móni got lost in june in Milan.'

As in the case of the forced choice experiments the contexts eliciting the information structure of the target sentences were presented in the form of questions, to which the target sentences were responses. Each of the 4 target sentences occurred in 5 conditions (as described in Table 4.1) with 26 fillers. There were three repetitions for each target sentence and filler, the repetitions were presented in three pseudorandomised blocks. The filler sentences were constructed to counterbalance the repetitions of the target sentences that arose from the fact all subjects saw each target sentence in all associated conditions. There were 5 filler sentences presented with various context questions. As in the case of the target sentences the fillers tested responses to information structural cues, mostly associated with pre-verbal focus and topic roles.

In an effort to elicit the target sentences as close to natural (spoken) speech as possible the following experimental design was created. The subjects were told that they will hear questions to which they have to respond using sentences that were given to them. The subject first saw the target sentence on a screen, which they were asked to memorise. For this they had as much time as they required. When the subjects indicated that they had memorised the target sentence the administrator of the experiment played the context question which the subjects heard through a speaker. While the question was being played the subject could still see the target sentence. Once the context question ended the target sentence disappeared from the screen, and the subjects answered the context question using the target sentence. It was thought that by having the subject memorise the target sentence and reproduce it from memory, the utterances would have a more natural quality to them then having been read. Similarly,

the choice to present the context questions as sounds, rather then text was meant to increase the communicative nature of the task. Furthermore, having the subjects listen to the context question ensured that they were properly exposed to it, if it was presented solely as text there would be no way of insuring that the subjects would actually read the questions, rather than just recite the sentences they have memorised.

The three experiments obtained data from a total of 42 participants, all women (mean: 21, min 18, max 25) divided between the three experiments to be presented below. The decision to use only women in a small age bracket was made in order to reduce the potential for intersubject variation which was deemed necessary because of the potentially small sample size of the production study. The subjects were collected through a student work center, and they were paid for their participation [2].

The experiments were carried out in a soundproof recording room at the Research Institute for Linguistics of the Hungarian Academy of Sciences. The recordings were done using a head mounted omnidirectional microphone (DPA 4044-f) and the SpeechRecorder recording software (v.2.12.16) (Draxler & Jänsch, 2004), which allowed for easy administration and controll of the experiments.

After the recordings were complete the target sentences were annotated on the phoneme level using the ProsodyLab-Aligner, a program which performs automated forced alignment of text to audio of speech using Hidden Markov Models (Gorman et al., 2011). The aligner was first trained on a corpus of Hungarian utterances, which included the data produced in these experiments. The annotations were checked on a number of randomly chosen sentences, and it was found that it had a high rate of success in annotating the areas from which measurements were extracted. The measurements were made using the TextGrid files that were the output of the ProsodyLab-Aligner and the sound files from the experiments by using Praat (v6.0.04) (Boersma, 2001).

The points where measurements were made were those what were thought to be associated with the the most relevant information regarding prosodic prominence and phrase structure (see Section 2.4). Namely the initial, stressed syllable of each post-verbal constituent as well as the final syllable of the verb and the first post-verbal constituent as shown by underlining in example (6). Since Hungarian always associates phrasal level accents with the first syllable a word, if there are phenomena indicating prominence related to the IS status of the constituents as manifested in their pitch accents it would be best captured here.

---

(6) Attila elájult a <u>má</u>lnásban a <u>mel</u>egtől.
Attila prt.fainted the raspberry gorve.in the heat.from
'Attila fainted in the raspberry field from the heat.'

Besides pitch accents, changes in IS status may also affect prosodic phrasing, which would be best captured by pre-boundary phenomena such as pre-final lengthening and the presence of boundary tones. Therefore the final syllables of the verb and the first post-verbal constituent were also considered as points of interest. These areas are marked by underlining in example (7) below.

(7) Attila elá<u>jult</u> <u>a</u> málnás<u>ban</u> <u>a</u> melegtől.

Attila prt.fainted the raspberry grove.in the heat.from

'Attila fainted in the raspberry grove from the heat.'

It is a well known phenomena that when syntactic constituents get mapped to prosodic phrases, function words at the edges of syntactic constituents like the definite article in (7) are often grouped with different prosodic phrases than the content words following them. Therefore in these examples the definite article was included as point of measurement for phrase final phenomena. When the measurements were done, the values for the final syllables of the verb and the IPV constituent and the definite articles were calculated separately. Note that unlike the target sentences in (2) to (4), the target sentence in (5) did not have definite articles before its post-verbal constituents, naturally this target sentence was not included in the analysis of the definite article.

For all of the experiments the following phenomena were considered as indicative of prominence, or as being associated with prosodic phrasing: f0, duration and intensity (see Section 2.4.1). Pauses between the verb and the first post-verbal constituent, as well as between the two post-verbal constituents were also taken into consideration, it was found however, that there was a low frequency of pauses in all three experiments. While their distribution correlated with the various conditions being tested, individual inspection revealed that a large number of them were the result of hesitation and not prosodic phrasing. Since the removal of pauses with hesitation further reduced the number of pauses, it was decided that they would not be taken into consideration in the analysis of the results.

The f0 was extracted in Herz by praat, using the vowel in the CVC sting as the window of extraction. While f0 targets such as maxima and minima might lie outside of this window, it was believed that the vowel would provide the most accurate measuring point with the least possibility of micro prosodic movement that would skew the results. During data analysis

the Herz values were converted into semitones using 20 Hz as a baseline for all speakers, in order to minimize differences in values that were speaker specific. The features investigated for f0 were: (i) the f0 maximum on the vowel of the accented syllable; (ii) the f0 minimum of the vowel of the accented syllable; (iii) the range of f0 movement on the vowel (the difference between f0 minima and maxima); (iv) the alignment of the f0 maxima on the accented vowel. (iv) was calculated by normalising the position of the f0 maximum within the duration of the vowel on a scale of 0 (start) to 1 (end).

The duration values, in seconds, were extracted for both the entire CVC sting as well as only for the vowel. However, as there were no differences in the patterns of these, in the following only results concerning syllables will be shown.

For the purposes of the analysis the intensity of the target areas was calculated as relative to the mean intensity of each individual utterance in decibels (dB). In the case of intensity the measurement window was always the CVC string. The relative intensity was calculated by subtracting the maximum intensity of the measurement window from the maximum intensity of the utterance.

The statistical analysis of the results was carried out in R (R Core Team, 2013) using linear mixed effects models implemented through the lme4 package (Bates et al., 2015). In the models the fixed effects were the conditions, while the random effects were the participants and the target sentences. After finding the model which fit the data best through the model comparison method described in Section 3.1.1 the lsmeans package (Lenth, 2016) was used to derive pairwise comparisons between conditions.

4.2   Experiment 1: Simple Focus

The target sentences were slightly modified from the ones presented in the previous section dealing with the forced choice experiments. They included the particle *már* 'already' in the pre-verbal domain as shown in (8). This particle facilitates the availability of a non-exhaustive reading, by entailing the existence of a set of alternative events, while some researches (eg É. Kiss, 1998), hold that post-verbal foci can only be non-exhaustive, it was decided that the inclusion of this particle would make that reading even more apparent for all speakers, thereby making the post-verbal occurrence of constituents in focus more acceptable, and the target sentence more natural.

(8)   Attila már   elájult   a   málnásban   a   melegtől.
        Attila already PRT-fainted the raspberry field.in the heat.from
        'Attila has already fainted in the raspberry field from the heat.'

As noted above, the contexts were elicited by questions heard by the subject. The context question for the BASELINE condition was meant to entail a broad focus reading over the verb and all post-verbal material. The topic of the target sentence was represented by a corefering NP, in order to avoid a possible contrastive reading that might arrise if it was repeated verbatum. The particle *már* 'already' was also included in the context question, to make its presence, and consequently the non-exhaustive reading of the post-verbal focus more apparen in the the focus conditions, in the BASELINE condition it was included to reduce the variation between this and other conditions. The context question for the sentence in (8) is presented in (9).

(9) Mi   miatt   került már   kórházba a   fiad?
     what because of got   already hospital.in the son.yours
     'For what reasons has your son been already hospitalised?'

The FOCUS-NEW and NEW-FOCUS conditions involved the narrow focus marking of one of the post-verbal constituents, while leaving the other as context new. This was achieved by the following set of context questions. One entailing a set of relevant alternatives for the immediately post-verbal constituent (10-a) and the other doing the same for the clause final one (10-b).

(10) a. A melegtől hol   ájult   már   el a fiad?
          the heat.from where fainted already PRT the son.yours
          'Where has your son already fainted from the heat?'

      b. A málnásban mitől ájult   már   el a fiad   a pókokon kívül?
          the heat.from   where fainted already PRT the son.yours the spiders   besides
          'Apart from spiders What else has your son fainted from in the raspberry field?'

While in some cases a very simple question, as in (10-a) was enough to achieve focus marking on one of the post-verbal constituents, other constituents required some additional information to facilitate the comprehension of the context and how focus marking of the given post-verbal constituent was possible, as in (10-b).

The experiment and the extraction of the data values was conducted as described above in Section 4.1. In this experiment there were 12 subjects. Each of their recordings were examined individually, there was none that showed signs of not understanding the task or of any other factor that would have merited their exclusion from the data analysis.

The following will present the results of the experiments, first the observations regarding accents on the two post-verbal constituents will be presented, followed by the observations regarding the possible prosodic phrasing of the post-verbal domain as influence by the condi-

tions of the experiments.

4.2.1 Results: Pitch Accents

First lets consider the observations for the initial CVC strings for each post-verbal constituent, the place where accents are realised. As noted in Section 2.4.1 focus is associated with prominence which may be realised prosodically in the form of increased phonetic cues visible on the accents associated with the constituent in focus. The cues considered here are associated with fundamental frequency, duration and intensity.

4.2.1.1 fundamental frequency

Turning first to fundamental frequency, first the f0 maxima of the accented syllables are considered as shown in Figure 4.1. The two box plots represent the results in semitones for the f0 maxima measured on the vowel of the accented syllables of the two post-verbal constituents, the first plot is the immediately post-verbal constituent, while the second plot is for the clause final constituent.

Figure 4.1: f0 maxima in semitones, of accented CVC for the immediately post-verbal (IPV) an clause-final (CF) constituents, broken down by conditions.

In the case of the IPV constituent the FOCUS-GIVEN condition seems to be the most distinct from the BASELINE condition, while the other condition in which focus was placed in this position (FOCUS-NEW) seems to show the same tendency, but to a lesser degree. The mixed effects models reveal that, if the IPV item is in focus it has significantly higher f0 maxima values, ($t = 4.75, p < 0.0001$) for the FOCUS-GIVEN condition and approaching significance ($t = 2.60, p = 0.07$) for the FOCUS-NEW condition. While the differences in f0 maxima are not significant in the other focus conditions as compared to the BASELINE (GIVEN-FOCUS: $t = 0.59, p = 0.97$; NEW-FOCUS $t = -2.42, p = 0.10$), there is a difference between them ($t = -3.01, p = 0.02$), indicating that pre-focally, givenness has an effect on f0 when compared to contextual newness, but that this difference is not present without a following narrow

focus.

In the case of the clause final element, patterning of the data seems to indicate a clear distinction between the conditions where this item was in focus, as compared to the BASE-LINE, FOCUS-NEW and FOCUS-GIVEN conditions. The mixed effect models indicate that in the FOCUS-GIVEN and FOCUS-NEW conditions, when the CF item was not in focus, there were no significant differences the f0 maxima of its accented syllable ($t = -0.13, p = 0.99$ and $t = 0.10, p = 1.0$ respectively), but when this constituent was in focus the f0 maxima are significantly higher: $t = 4.51, p = 0.0001$ for the GIVEN-FOCUS condition and $t = 2.85, p = 0.03$ for the NEW-FOCUS condition. These two conditions however were not different from each other ($t = 1.66, p = 0.45$). Therefore, the status of the IPV element had no effect on the f0 height.
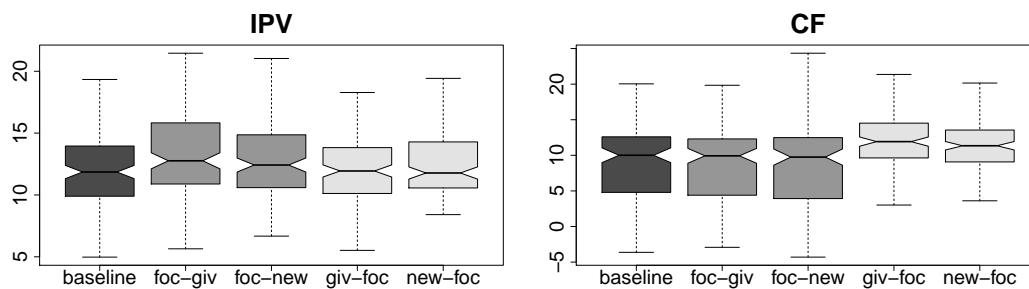

Figure 4.2: f0 minima in semitones, of accented CVC for the immediately post-verbal (IPV) an clause-final (CF) constituents, broken down by conditions.

The results for f0 minima, shown in Figure 4.2 pattern in a similar way to that of f0 maxima: the IPV constituent doesn't seem to show great differences between conditions, while the CF constituent does in the sense that the values are much more closely grouped in the conditions where this constituent is in focus. The mixed models analysis reveals that in case of the IPV constituent, in the FOCUS-GIVEN condition the differences in f0 approach significance ($t = -2.68, p = 0.06$), but are clearly not significant in the FOCUS-NEW condition ($t = -0.83, p = 0.91$), with no differences between these conditions($t = 1.83, p = 0.35$). Likewise in the conditions where focus was not on the IPV, the f0 minima of its accent was not different form the BASELINE. In the case of the CF constituent, if it was not in focus, there were no significant differences in f0 minima as compared to the BASELINE. In the GIVEN-FOCUS ($t = -5.69, p < 0.0001$) and the NEW-FOCUS ($t = -3.32, p = 0.0082$) conditions however, there were significant differences as compared to the BASELINE, such that f0 minima in these conditions was realised higher. There were no significant differences between these two conditions.

The f0 range for each of the conditions in the post-verbal and clause final positions are presented in Figure 4.3. In the case of the IVP constituent, it seems that the most distinct condition
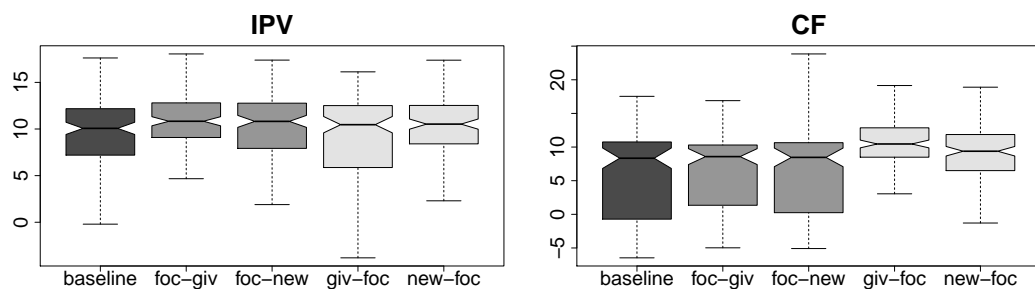
Figure 4.3: f0 range in semitones, of accented CVC for the immediately post-verbal (IPV) an clause-final (CF) constituents, broken down by conditions.

from the baseline is the GIVEN-FOCUS condition where the range of f0 movement seems to be compressed on the contextually given immediately post-verbal element, while in the other conditions where this element is either contextually new or in focus seem to pattern more closely with the BASELINE condition. The mixed effects models however show that there are no significant differences between the focus conditions and the BASELINE condition. In the case of the CF constituent, it seems that f0 range seems to show less variation if this constituent is in focus as compared to the BASELINE and other focus conditions. However, the statistical analysis did not find any significant differences on this syllable between any of the conditions.

The values representing the alignment of the f0 maxima were calculated by finding the position of the f0 maxima on the vowel of the accented CVC of each constituent and representing this position as a number between 0 and 1 where 0 is the starting point of the vowel and 1 is its end point. The results are shown in Figure 4.4.
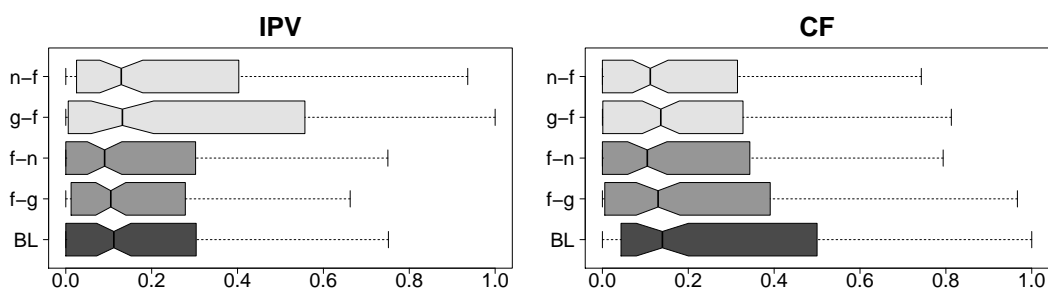
Figure 4.4: The alignment of the f0 maxima on the vowel of the accented CVC for the immediately post-verbal (IPV) an clause-final (CF) constituents, broken down by conditions. 0 = vowel initial, 1 = vowel final

The visual inspection of the plot reveals that in all conditions at both positions, the f0 maxima tended to fall near the begning of the vowel of the accented syllable, with not much variation between conditions. This observation is confirmed by the statistical analysis which did

not find any significant differences between any of the comparisons.

4.2.1.2 duration

As noted above, duration was calculated both on the vowel of the first syllable, and the first syllable as a whole. Since the results reflected identical patterns, only the data pertaining to syllable length will be presented here in Figure 4.5. The figure shows two box-plots, one each for the first syllable of the PV constituent and the first syllable of the CF constituent. The boxes indicate the results in seconds for each of the conditions: BASELINE, FOCUS-GIVEN, FOCUS-NEW, GIVEN-FOCUS and NEW-FOCUS, as observed on the two syllables.
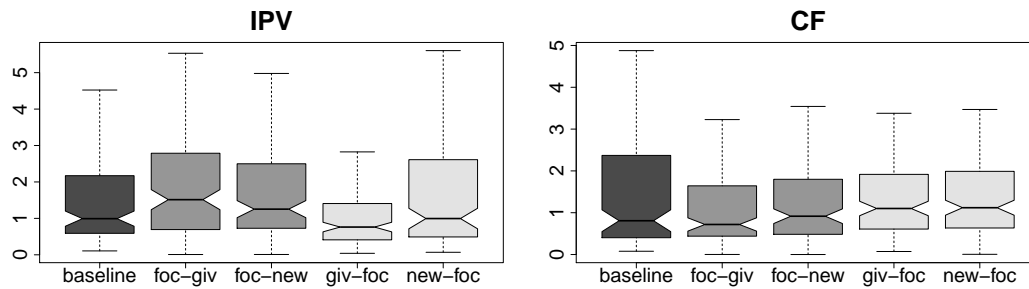

Figure 4.5: Duration, in seconds, of accented CVC for the immediately post-verbal (IPV) an clause-final (CF) constituents, broken down by conditions.

The box-plots suggest that there does not seem to be a major effect of focus placement on the duration of the accented syllables. They show that in the case of the IPV constituent in conditions where focus is in this position there is a tendency for syllables to be longer, but when focus occurs in the CF position this syllable is shorter or about the same as in the caser of the BASELINE condition. A similar tendency is shown in the case of CF constituent: if this constituent occurs after focus, duration seems to be shorter, while if it is in focus duration appears to be increased as compared to the BASELINE condition. The mixed effects models confirm this, they find no significant differences for duration in the case of the IPV constituent when that is in focus as compared to the BASELINE condition (FOCUS-GIVEN:$t = -2.38, p = 0.18$; FOCUS-NEW: $t = -2.70, p = 0.30$). The picture is similar in the case of the CF constituent: there were no significant differences in duration when this constituent was in focus (GIVEN-FOCUS:$t = -0.93, p = 0.87$; NEW-FOCUS: $t = -0.47, p = 0.98$). Other comparisons between conditions did not shown any significant differences either.

4.2.1.3 intensity

Turning now to intensity, the third parameter examined in association to focus and givenness realisation. The box plots in Figure 4.6 show the relative intensity of the accented syllable. The relative intensity was calculated by subtracting the maximum intensity measured in the accented syllable and subtracting from it the mean intensity measured for the entire utterance. In the case of the IPV constituent it can be seen that most focus conditions are not distinct from the BASELINE condition, except the GIVEN-FOCUS condition which shows a possible decrease in prominence. In the case of the CF constituent, the picture is more varied with the FOCUS-GIVEN and FOCUS-NEW conditions showing possible decreases of prominence, while the GIVEN-FOCUS and NEW-FOCUS conditions patterning more closely with the BASELINE condition or possibly showing an increases in intensity.
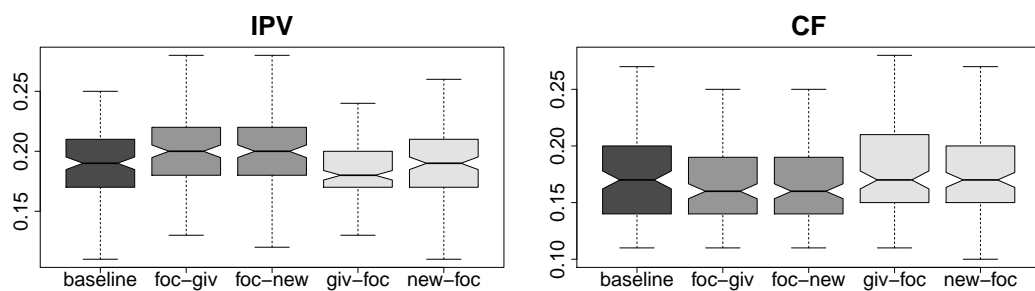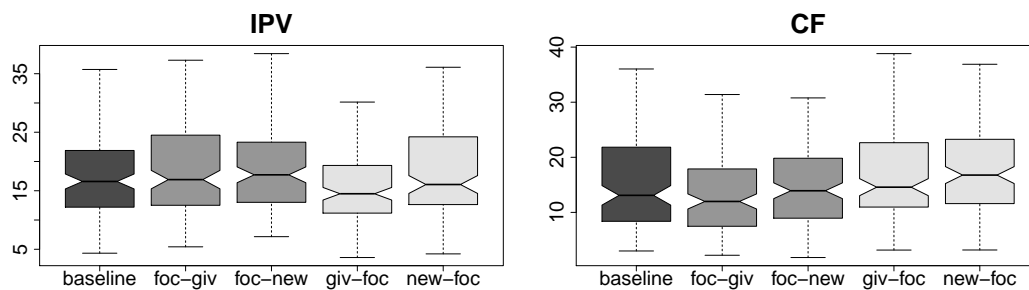

Figure 4.6: Relative intensity of the accented CVC for the immediately post-verbal (IPV) an clause-final (CF) constituents, broken down by conditions. As measured to the mean intensity of the utterance.

The statistical analysis reveals that in the case of the IPV constituent there were no significant differences between any of the focus conditions and the BASELINE condition ($t = 1.30, p = 0.68$ for FOCUS-GIVEN, $t = 1.62, = p0.48$ for FOCUS-NEW). In the case of the CF constituent however, there are significant differences between the condition where focus is realised in this position ($t = 2.73, p = 0.050$ for GIVEN-FOCUS and $t = 3.70, p = 0.002$ for NEW-FOCUS) with an increase in relative intensity as compared to the BASELINE. There is also a significant decrease in relative intensity when the CF constituent is given in the FOCUS-GIVEN condition ($t = -2.89, p = 0.033$), but there is no significant difference when this constituent is contextually new in the FOCUS-NEW condition ($t = -0.55, p = 0.98$).

4.2.1.4 accent on the verb

Of potential interest may be the accent realisation on the verb. Since marking of focus by shifting the accent from its default position is a strategy employed by many languages, the

realisation of the accent on the initial syllable of the verb may be informative. The plots in 4.7 show the results for f0 maximum and f0 range.
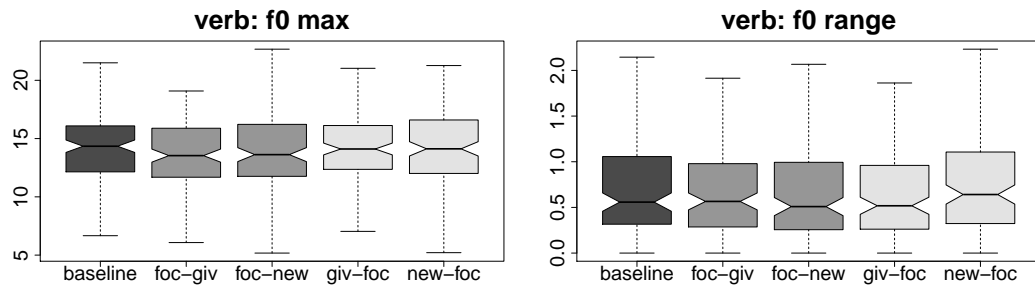
Figure 4.7: f0 maximum and f0 range on the accented syllable of the verb in semitones.

The statistical analysis shows no significant differences in these parameters between the BASELINE and the other conditions. Of highest interest is perhaps f0 maxima for the FOCUS-GIVEN ($t = 1.0$, $p = 0.81$) and the FOCUS-NEW conditions ($t = 0.65$, $p = 0.95$), as they present conditions where the focus is closest to the initial syllable of the verb.

4.2.2   Results: Boundaries

As noted in Section 2.4, the prosodic realisation of focus may be associated with prosodic phrasing. In this section evidence regarding phrasing in the post-verbal domain will be examined. The two relevant areas where phrasing related phenomena might be realised is the final syllable of the verb, which can act as the end of a prosodic unit before a prosodic unit beginning with the immediately post-verbal constituent, and the final syllable of the immediately post-verbal constituent, which would indicate the presence of a prosodic boundary between the two post-verbal constituents. The schematic positions of the possible prosodic boundaries are shown in (11).

(11)   Topic Verb $|_{possibleboundary1}$ XP1 $|_{possibleboundary2}$ XP2

In the following duration and fundamental frequency will be considered as potential indicators of pre-final lengthening and the presence of potential boundary tones or phrase final f0 movements respectively.

4.2.2.1   duration

Phrase final lengthening is the phenomenon when lengthening of syllables is observed in the final position of prosodic phrases. If such a lengthening is present before a focus accent, it

could mean that the focused element is preceded by a boundary, and thus it occupies the left head of a prosodic phrase. The results for duration are shown in the box plots in Figure 4.8. The plots show different patternings for the two final syllables. In the case of the final syllable of the verb, all focused conditions seem to patter alike, showing shorter durations than in the BASELINE condition. While in the case of the final syllable of the IPV constituent the BASELINE condition seems to show the shortest and least varied (in terms of interquartile range) results, while the focused conditions seem to indicate considerable lengthening, especially if focus is realised in the IPV position in the FOCUS-GIVEN and FOCUS-NEW conditions.
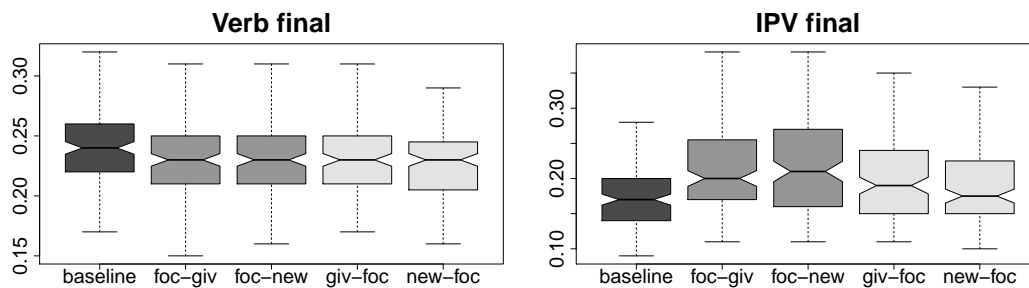
Figure 4.8: Duration of the final syllable of the verb and the IPV constituent in seconds.

The mixed effects models reveal that in the case of the first possible boundary, on the last syllable of the verb, none of the focus conditions produced results that were different from the BASELINE condition. (FOCUS-GIVEN: $t = -2.24 p = 0.20$; GIVEN-FOCUS: $t = -2.193, p = 0.24$; NEW-FOCUS: $t = -2.23, p = 0.22$; FOCUS-NEW: $t = -1.27, p = 0.71$). In the case of the boundary between the two post-verbal constituents, the last syllable of the IPV constituent was significantly longer than baseline in the FOCUS-GIVEN ($t = 3.25 p = 0.03$) and the FOCUS-NEW ($t = 4.44, p 0.004$) conditions, that is when the IPV constituent was in focus. The GIVEN-FOCUS ($t = 2.21, p = 0.26$) and the NEW-FOCUS ($t = 1.73, p = 0.44$) conditions, where the constituent in the CF position was in focus, did not show significant lengthening.

Since the definite article of each post-verbal constituent served as the potential final vowel of the each preceding prosodic unit, they were also considered here, for the three sentences that had them. The results for its duration are shown in the plots in Figure 4.9. The plots reveal that in the BASELINE conditions for both measurement points the rage of the duration of the definite article is roughly the same, although the distributions are different. While the duration of the article seems to be effected at both boundaries in conditions with focus, these effects do not seem to be clearly significant.

The statistical analysis reveals that in the case of boundary 1, there are no significant differences when comparing the focused conditions to the BASELINE condition (FOCUS-NEW: $t =$
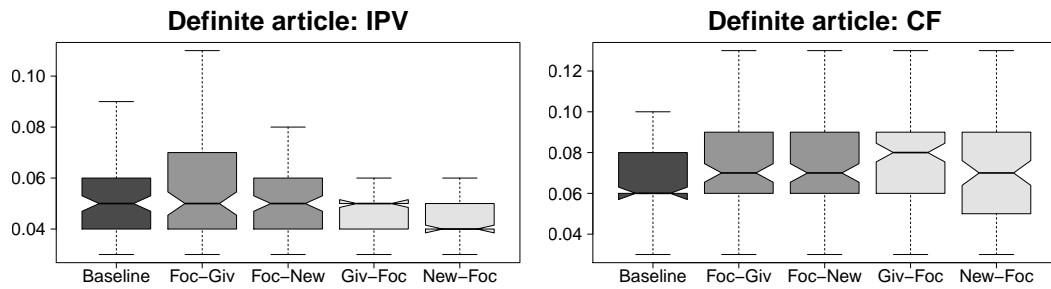
Figure 4.9: Duration of the constituent initial definite article at boundary 1 (Definite article: IPV) and boundary 2 (Definite article: CF) in seconds, for the BASELINE and the focused conditions

$0.150, p = 0.999$; FOCUS-GIVEN:$t = -1.24, p = 0.73$; GIVEN-FOCUS: $t = 1.11, p = 0.79$; NEW-FOCUS: $t = 1.0, p = 0.84$). In the case of boundary 2 however there are some significant differences between the BASELINE and the focused conditions: FOCUS-NEW: $t = -2.76, p = 0.046$; FOCUS-GIVEN: $t = -2.94, p = 0.028$ and GIVEN-FOCUS: $t = -3.96, p < 0.001$. The NEW-FOCUS condition however, did not differ significantly from the BASELINE ($t = -2.25, p = 0.16$).

4.2.2.2 fundamental frequency

Besides durational differences, differences in fundamental frequency might also be indicative of a prosodic boundary as discussed in Section 2.4.2. The box plots in Figure 4.10 show the results for f0 maxima as measured on the final syllables of the post-verbal constituents.
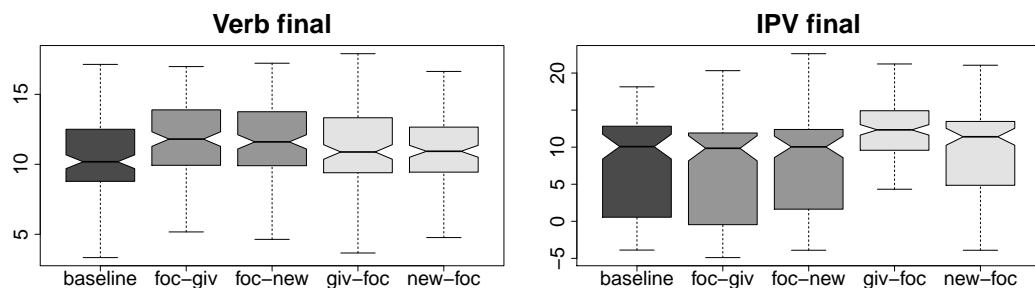
Figure 4.10: f0 maxima of the final syllable of the verb and the immediately post-verbal constituent in semitones.

The results for the last syllable of the verb indicate that FOCUS-GIVEN and FOCUS-NEW conditions have higher f0 values than the BASELINE, and this is confirmed by the mixed effects models (FOCUS-GIVEN: $t = 2.87, p = 0.033$; FOCUS-NEW: $t = 2.74, p = 0.048$). There are no other statistically significant differences for the verb-final syllable. In the case of the final syllable before boundary 2 there are no significant differences in f0 maxima between the focus

conditions and the BASELINE (FOCUS-GIVEN: $t = 0.23, p = 0.99$; FOCUS-NEW: $t = 0.38, p = 0.99$; GIVEN-FOCUS: $t = 2.88, p = 0.10$; NEW-FOCUS: $t = 2.10, p = 0.29$).
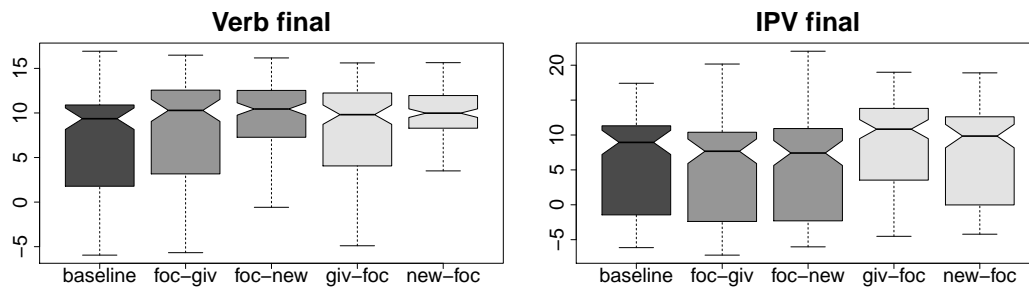
Figure 4.11: f0 minima in semitones, of the final syllable of the verb and the immediately post-verbal constituent.

The results for the f0 minima measured at the boundaries is presented in 4.11. In the case of boundary 1, it seems that while all focus conditions are slightly different form the BASELINE condition, the main similarities are not between focus placement, but conditions that contain new vs given constituents. The results of the mixed effects models reveal however that there are no statistical differences between any of the focus conditions and the BASELINE (FOCUS-GIVEN: $t = -1.51, p = 0.57$; FOCUS-NEW: $t = -1.58, p = 0.55$; GIVEN-FOCUS: $t = -1.46, p = 0.62$; FOCUS-GIVEN: $t = -1.92, p = 0.41$). In the case of boundary 2, while the the two focus conditions where focus is placed in the CF position appear to be distinct from the BASELINE and the other focus conditions, the analysis reveals that this difference is not significnat (GIVEN-FOCUS: $t = -2.7, p = 0.12$; NEW-FOCUS: $t = -1.8, p = 0.41$). The other focus conditions are clearly non-distinct from the BASELINE condition (FOCUS-GIVEN: $t = 0.8, p = 0.92$; FOCUS-NEW: $t = 0.23, p = 0.99$).
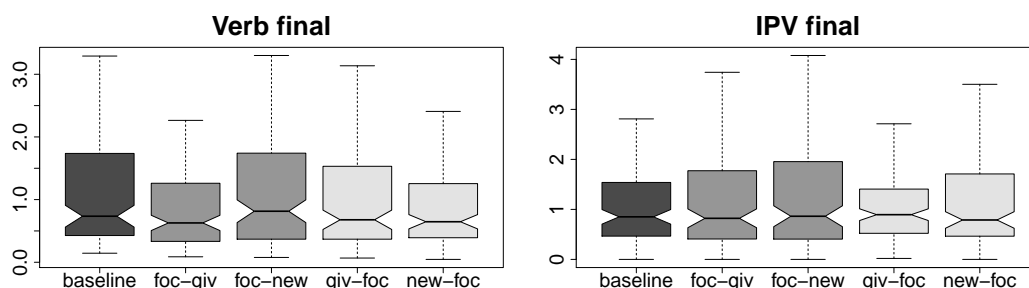
Figure 4.12: f0 range in semitones, of the final syllable of the verb and the immediately post-verbal constituent.

The range of f0 movement on the syllables before the boundaries was also investigated, the results are shown in 4.12. The polts indicate that this data was fairly uniform and the mixed

effects models confirm this with no significant differences between the BASELINE condition and any of the focus conditions. (The comparisons to the BASELINE are: FOCUS-GIVEN: $t = 0.53, p = 1.00$; FOCUS-NEW: $t = -0.04, p = 1.00$; GIVEN-FOCUS: $t = -0.24, p = 0.99$; FOCUS-GIVEN: $t = 1.89, p = 0.32$). The results for boundary 2 likewise do not show any significant differences. (The comparisons to the BASELINE are: FOCUS-GIVEN: $t = 0.81, p = 0.91$; FOCUS-NEW: $t = 0.93, p = 0.87$; GIVEN-FOCUS: $t = 0.08, p = 1.00$; FOCUS-GIVEN: $t = 0.17, p = 0.99$).

The final aspect of f0 investigated on the pre-boundary syllables was the alignment of f0maxima with relation to vowel in each syllable. This measure was calculated by finding the position of f0 maxima within the vowel and normalising it with respect to the vowel's duration. The resulting number, between 0 and 1 indicates the placement of the f0 maxima between the onset and the end of the vowel. The results are shown in the plots in Figure 4.13.
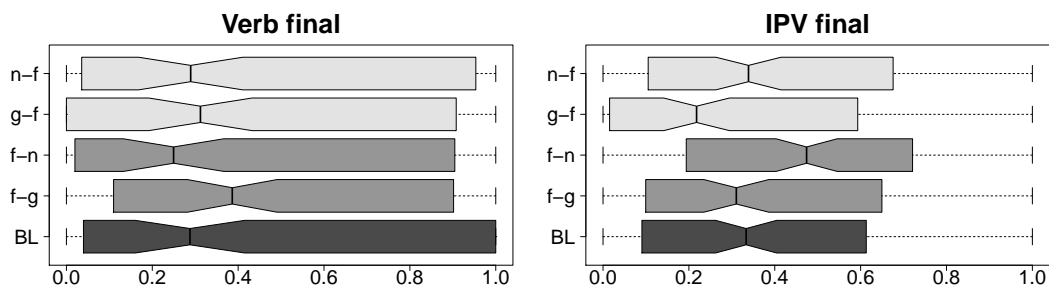
Figure 4.13: Alignment of the f0 maxima within the vowel of the final syllable of the verb and the immediately post-verbal constituent. 0 = onset; 1 = end

The plots indicate that the placement of the f0 maxima in the final syllable of the verb showed a much larger degree of variation than in the final syllable of the IPV constituent which also showed a considerable spread of f0 maxima placement. In both cases the mean values fell in the first half of the vowel's duration. The analysis of the mixed effects models reveals that there were no significant differences between focus and baseline conditions neither on the final syllable of the verb (FOCUS-GIVEN: $t = -0.4, p = 0.99$; FOCUS-NEW: $t = -1.1, p = 0.79$; GIVEN-FOCUS: $t = 0.94, p = 0.88$; NEW-FOCUS: $t = 0.61, p = 0.97$) nor the final syllable of the IPV (FOCUS-GIVEN: $t = -0.27, p = 0.99$; FOCUS-NEW: $t = -1.79, p = 0.42$; GIVEN-FOCUS: $t = 1.8, p = 0.34$; NEW-FOCUS: $t = 0.18, p = 0.99$).

4.2.3 Experiment 1: Summary

In summarising the results of Experiment 1, it can be stated that the realisation of focus is different in the two post-verbal positions. In terms of accents, while focus in the IPV position is indicated only by higher f0 maxima when compared with the baseline condition, focus accents

in the CF position are marked by higer f0 maxima and minima and intensity. The fact that in the case of the CF focus accents there no differences in f0 range indicates that the entire accent was realised higher than in the baseline, as opposed to being realised with a larger pitch excursion.

In terms of boundaries is also a notable differences between the IPV and CF foci. While the pre-focal boundaries were similar in both cases, in that the presence of focus did not seem to effect them, in the case of the IPV foci post-focally there were durational cues both on the final syllable of the IPV and the definite article following the IPV that suggest the enhanced marking of a boundary. This analysis is supported by the fact that there were no durational differences on the accented syllable of the IPV when it was in focus, therefore lengthening on the final syllable is more likely analysed as a boundary phenomena than prominence marking associated with the accent on the IPV. Further more, it seems that f0 movement was not strongly associated with pre-focal boundary tone marking. Higher f0 values in the case of the IPV focus may best be analysed as a shift towards meeting the higher f0 target on the accented syllable of the IPV constituent.

Since there were no consistent differences between the FOCUS-GIVEN and FOCUS-NEW conditions in terms of marking the non-target (focused) constituent, it may be concluded here that givenness, in the presence of focus, does not play a major role in the influencing the phonetic realisation of post-verbal constituents. There were none-the-less instances when the given constituent was differently realised from the baseline (but not from the new constituent in the presence of focus), most notably in terms of lower intensity of the given CF constituent. This finding is inline with the assumption that givenness correlates with decreased prominence.

4.3   Experiment 2: Focus marked with *is*

In order to investigate the effects of *is* marked focus on the prosodic realisation of the post-verbal domain, a production experiment was carried out. The experiment included four target sentences, which were the same as those used for the simple focus in Experiment 1, in order to reduce effects that might arrise from individual items accros focus types investigated in this study. The four trager sentences were modified, the focus marked item was now also marked with the *is* particle as shown below. This created syntactically unique sentences for each focused condition. The BASELINE condition, in which sentences appeared in borad focus conditions did not have an *is* particle.

(12)   a.   Attila már elájult a **málnásban**   **is**   a   melegtől.
              Attila also fainted the raspberry grove.in also the heat.from

        b.   Attila már elájult a   málnásban   **a melegtől is**.
               Attila also fainted the raspberry grove.in the   heat.from also
               'Attila also fainted in the raspberry grove from the heat'

(13)   a.   Péter már elhízott a   **malacsülttől**   **is**   a   németeknél.
               Peter also got fat   the roast pork.from also the germans.at

        b.   Péter már elhízott a   malacsülttől   **a németeknél is**.
               Peter also got fat   the roast pork.from the   germans.at also
               'Peter also got fat from the roast pork in Germany'

(14)   a.   Kata már elment   a   **hajóval**   **is**   a   malomhoz.
               Kata also went away the boat.with also the mill.to

        b.   Kata már elment   a   hajóval   **a malomhoz is**.
               Kata also went away the boat.with the   mill.to also
               'Kata also went away with the boat to the mill'

(15)   a.   Móni már eltévedt **júniusban is**   Milánóban.
               Móni also got lost june.in   also Milan.in

        b.   Móni már eltévedt júniusban **Milánóban is**.
               Móni also got lost june.in   Milan.in   also
               'Móni also got lost in june in Milan'

As in the case of the of the simple focus production experiment, here there were five conditions for the testing of the effects of focus as indicated in Table 4.1. As in that experiment, the target sentences in the BASELINE condition were also presented with context questions that requested and all new, broad focus answers. In order to better compare the two experiments these questions were the same as in that Experiment 1, reproduced here in example (16).

(16)   Mi   miatt   került már   kórházba a   fiad?
        what because of got   already hospital.in the son.yours
        'For what reasons has your son been already hospitalised?'

The context questions for focus conditions of this experiment were slightly altered versions of the ones used for the simple focus experiment. As the *is* particle explicitly entails a non-exhaustive reading to the interpretation of the focus, the context questions were altered to reflect this, by including the particle *még*, 'also' or 'besides', to make the use of the post-verbal focus more felicitous. An example is shown below in (17) for the FOCUS-NEW condition and (18) for the FOCUS-GIVEN condition.

(17)   A   fiad   még   hol   ájult   el?
        the son.yours besides where fainted prt
        'Where else has your son fainted?'

(18)   A   fiad   még   hol   ájult   el   a   melegtől?
        the son.yours besides where fainted prt the heat
        'Where else has your son fainted from the heat?'

The experiment was administered to 14 subjects, all female undergraduate students with a mean age of 21. There were 4 target sentences with 5 conditions, giving 20 target sentences in total, with 26 filler sentences. The methodology of the experiment was identical to that of Experiment 1, as described in Section 4.1.

As with the the experimental design, the methods used in the extraction of the data from the sound files and the analysis were also identical to Experiment 1, as described in Section 4.1. There were again two types of points of interest for gathering data, on the one hand the accented syllable of each post-verbal constituent, and on the other the syllable preceding the potential boundary before each post-verbal constituent. The following will present the results for accents in Section 4.3.1 and for boundaries in Section 4.3.2.

4.3.1   Results: Accents

In the case of pitch accents three cues were considered in association with prominence marking: fundamental frequency, duration and intensity. These three cues will be presented in the sections below.

4.3.1.1   fundamental frequency

In terms of fundamental frequency a number of aspects were considered, the f0 maxima and minima, the rage of f0 movement, as well as the placement of the f0 maxima on the vowel of the accented syllable.

The results for the values of f0 maxima are shown in the plots in Figure 4.14. The patterning of the results is correlates with the placement of focus, for the IPV constituent mean values are higher if this constituent is in focus (FOCUS-GIVEN, FOCUS-NEW conditions), likewise if the CF constituent is in focus the mean values are higher than in other focus, or the BASELINE conditions. Givenness does not seem to influence the f0 maxima values.

The linear mixed effects models reveal that the f0 maxima of the accented syllable of the

Figure 4.14: f0 maxima in semitones, of accented CVC for the immediately post-verbal (IPV) an clause-final (CF) constituents, broken down by conditions.

IPV constituent was significantly higher from the BASELINE condition if focus occurred there as in the FOCUS-GIVEN condition ($t = 5.94, p < 0.0001$) and in the FOCUS-NEW condition ($t = 6.12, p < 0.0001$). If focus was placed in the CF constituent, the f0 maxima values on the accented syllable of the IPV constituent were not different from the BASELINE (GIVEN-FOCUS: $t = -2.0, p = 0.26$; NEW-FOCUS: $t = -0.59, p = 0.97$). The results are similar in the case of the CF constituent, the GIVEN-FOCUS ($t = -5.10, p < 0.0001$) and the NEW-FOCUS ($t = -5.29, p < 0.0001$) conditions, where focus occurred in this constituent show higher f0 maxima, while the FOCUS-GIVEN ($t = 1.29, p = 0.69$) and the FOCUS-NEW ($t = 1.1, p = 0.8$) conditions are not different from the BASELINE condition. Givenness did not have a significant effect for either of the constituents when the other constituent was in focus.

The results for f0 minima are shown in the plots in Figure 4.15. As in the case of the f0 maxima, the f0 minima also show a pattering related to focus placement. If the IPV constituent is in focus f0 minima seem to be higher, than if its not. Similarly if the CF constituent is in focus, the f0 minima values on its accented syllable are higher than in other conditions when its contextually new or given. In the case of the CF constituent there is also a visible difference in the variation of values, if this constituent is in focus values show much less variation, than when its not in focus.

The statistical analysis shows that differences are not as great as may be expected from the plots. In the case of the IPV constituent, only the values for the FOCUS-GIVEN condition ($t = -3.32, p = 0.02$) were shown to be different from the BASELINE condition. (FOCUS-NEW: $t = -2.61, p = 0.1$; GIVEN-FOCUS: $t = -2.5, p = 0.14$; NEW-FOCUS: $t = -1.55, p = 0.54$). In the case of the CF constituent the picture is similar. In this case there is only a significant difference if the focus in the CF position is preceded by a contextually new constituent, as in the NEW-FOCUS condition ($t = -3.57, p = 0.02$), if focus is preceded by a contextually given constituent the values only approach the level of significane (GIVEN-FOCUS: $t = -2.8, p = 0.07$). If focus is

Figure 4.15: f0 minima in semitones, of accented CVC for the immediately post-verbal (IPV) an clause-final (CF) constituents, broken down by conditions.

not in the CF position the values are no different from the BASELINE condition (FOCUS-GIVEN: $t = -0.01, p = 1.0$; FOCUS-NEW: $t = 0.06, p = 1.0$). Givenness did not have an effect in either of the post-verbal positions.

As in the analysis of the previous experiment, the excursion of the f0 was also considered here. It was measured as the difference between the f0 maxima and minima for each accented syllable. The results are shown in Figure 4.16. The plots show that there are tendencies for larger f0 excursions on accents that are in focus, in the case of the IPV these are the FOCUS-GIVEN and FOCUS-NEW conditions, and in the case of the CF constituent they are the GIVEN-FOCUS and NEW-FOCUS constituents. It seems also that in the focus conditions, on constituents not in focus there is a decrease in f0 excursion as compared to the BASELINE.

Figure 4.16: f0 range in semitones, of accented CVC for the immediately post-verbal (IPV) an clause-final (CF) constituents, broken down by conditions.

The increase in f0 excursion in the case of accents in focus is significant only in the case of the CF constituent in the NEW-FOCUS condition ($t = 2.86, p = 0.03$). The GIVEN-FOCUS condition showed no significant differences in the case of the accent of the CF constituent ($t = 1.82, p = 0.33$). There were no significant increases of the pitch range in the case of the IPV constituent when it was in focus (FOCUS-GIVEN: $t = 0.91, p = 0.89$; FOCUS-NEW: $t = 0.45, p = 0.99$). If a constituent was not in focus, but was given or new, there was a significant compression of

f0 excursion on the accented syllable as compared to the BASELINE condition if the focus was in the CF position (GIVEN-FOCUS: $t = 3.25, p = 0.01$; NEW-FOCUS $t = 3.21, p = 0.01$). There was no difference however in the f0 range of these pre-focal accents ($t = 0.04, p = 1.0$). The f0 range of the accents of CF constituents following a focus when it occurred in the IPV position, did not differ from the BASELINE condition significantly (FOCUS-GIVEN: $t = 1.45, p = 0.59$; FOCUS-NEW: $t = 1.01, p = 0.85$).

The final aspect of fundamental frequency investigated was the alignment of the f0 maxima within the vowel of the accented syllable. The plots showing the results are given in Figure 4.17, where 0 indicates that the f0 maxima was realised at the onset of the vowel, and 1 indicates that it was realised at the end of the vowel.
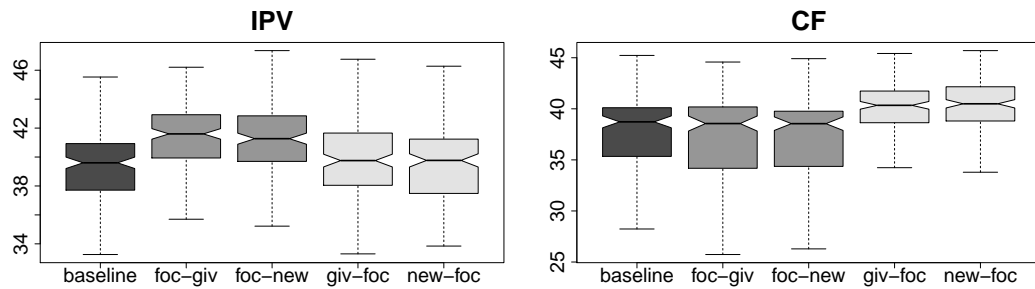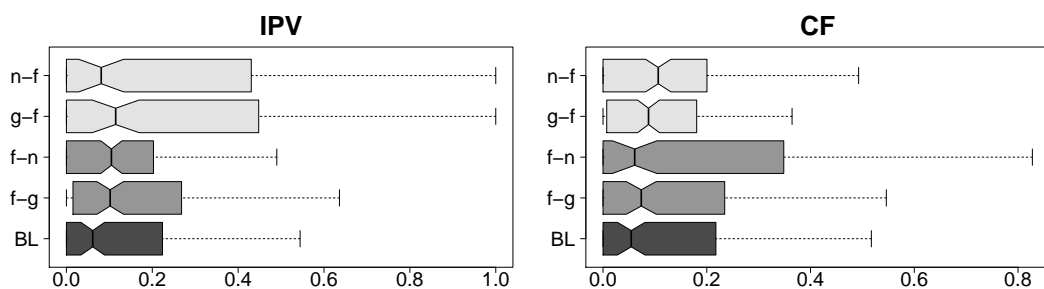

Figure 4.17: The alignment of the f0 maxima on the vowel of the accented CVC for the immediately post-verbal (IPV) an clause-final (CF) constituents, broken down by conditions. 0 = vowel initial, 1 = vowel final

It is apparent from the plots that overwhelmingly the f0 maxima were realised near the onset of the vowel in the accented syllable of both constituents with little to no effect of the presence of focus. The analysis of the mixed effects models shows that there were no significant differences between the BASELINE condition and the focus condition in the case of either the IPV (FOCUS-GIVEN: $t = -0.3, p = 0.99$; FOCUS-NEW: $t = -0.1, p = 1.0$; GIVEN-FOCUS: $t = -2.52, p = 0.32$, NEW-FOCUS:$-2.32, p = 0.32$) or the CF (FOCUS-GIVEN: $t = -0.19, p = 0.99$; FOCUS-NEW: $t = -1.07, p = 0.81$; GIVEN-FOCUS: $t = 0.36, p = 0.99$, NEW-FOCUS:$0.03, p = 1.00$) constituents. Givenness did not have any effect on the alignment of f0 maxima.

4.3.1.2 duration

Duration on the accented syllable was measured for both the syllabe and for the vowel,since there were no differences in the tendencies shown by the two, only the syllable durations are here in the plots in Figure 4.18. The plots indicate that there were minimal shifts towards longer durations for each constituent when it was in focus.
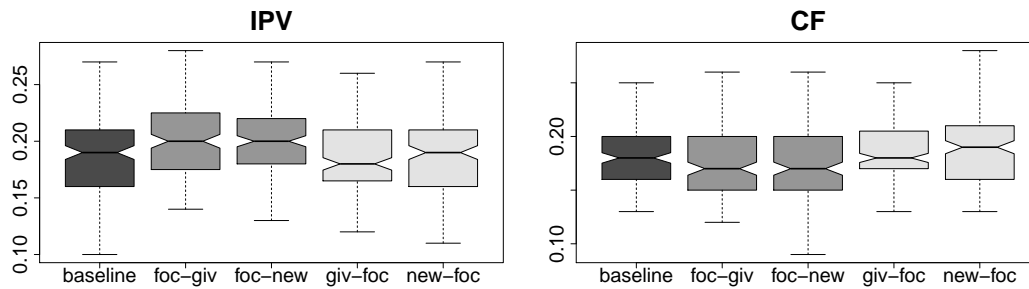
Figure 4.18: Duration of the accented syllable in seconds for the immediately post-verbal (IPV) and the clause final (CF) constituent, broken down by conditions.

The syllable duration for the accented syllable of the IPV constituent was significantly longer in the two conditions where this item was focus marked (FOCUS-GIVEN: $t = 3.2, p = 0.02$, FOCUS-NEW: $t = 3.5, p = 0.01$), but not in the conditions where focus occurred at the end of the clause (GIVEN-FOCUS: $t = -0.45, p = 0.98$, FOCUS-NEW: $t = 0.56, p = 0.97$). In the case of the CF constituent the syllable duration was significantly shorter as compared to the BASELINE condition when focus occurred in the IPV position (FOCUS-GIVEN: $t = -3.1, p = 0.01$; FOCUS-NEW: $t = 3.3, p = 0.006$). However, there were no significant differences in duration on this syllable if focus occurred here, in the CF position (GIVEN-FOCUS: $t = 1.9, p = 0.29$; NEW-FOCUS: $t = 2.2, p = 0.14$). Givenness did not have an effect on duration for either constituent.

4.3.1.3   intensity

The third feature of the accented syllable investigated was its relative intensity. Relative intensity was calculated by subtracting the mean intensity of the utterance from the maximum intensity measured on each accented syllable. The results are shown in the plots in Figure 4.19 in decibels. The plots show minor alternations between conditions, if the constituent is in focus, there does not seem to be a change in relative intensity, but if it is contextually given it seems to be realised with lower intensity.

The statistical analysis reveals that there is no effect for focus in the case of the accented syllable of the IPV constituent (FOCUS-GIVEN: $t = 0.27, p = 0.99$; FOCUS-NEW: $t = -2.3 p = 0.13$). If the IPV constituent was contextually new there was again no effect of on relative intensity (NEW-FOCUS: $t = 1.6, p = 0.49$). If, however, the IPV constituent was in contextually given, there was a significant decrease in intensity (GIVEN-FOCUS: $t = 3.57, p = 0.003$). But there was no difference between the GIVEN-FOCUS and NEW-FOCUS conditions ($t = -1.96, p = 0.28$). In the case of the CF constituent there was again no effect of focus on relative intensity (GIVEN-FOCUS: $t = -0.96, p = 0.85$; NEW-FOCUS: $t = -1.6, p = 0.55$). If the IPV was in focus
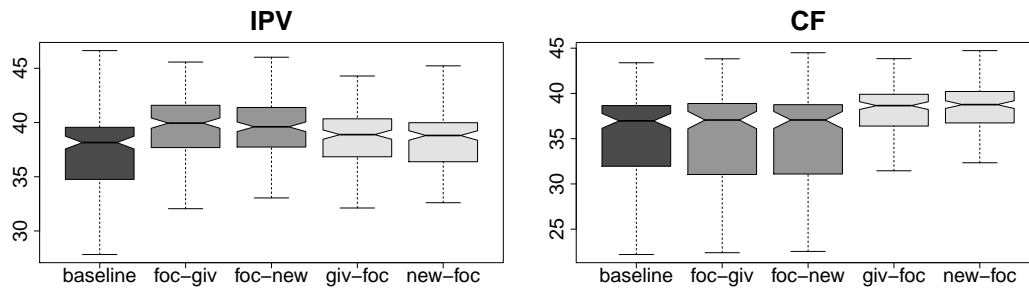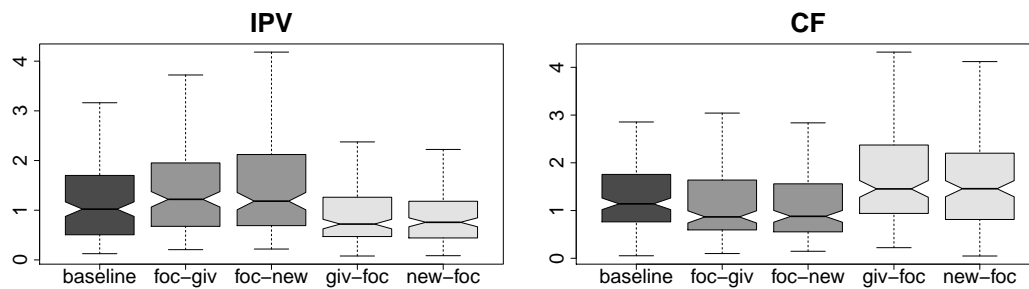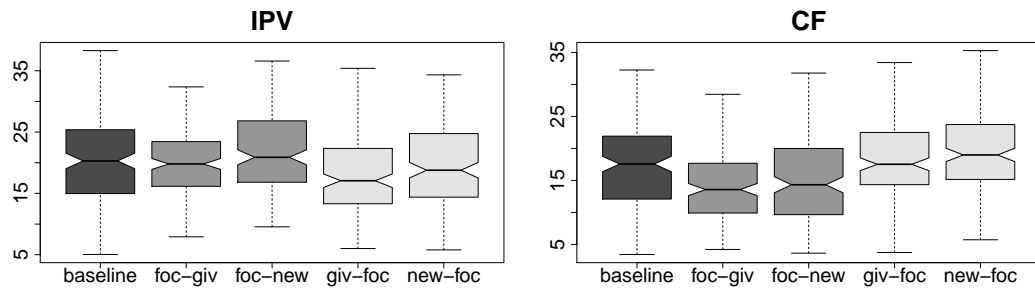
Figure 4.19: Relative intensity of the accented CVC for the immediately post-verbal (IPV) an clause-final (CF) constituents, broken down by conditions. As measured to the mean intensity of the utterance.

the relative intensity of the accented syllable of the CF constituent remained unchanged if it was contextually new or given (FOCUS-NEW: $t = 1.48, p = 0.62$; FOCUS-GIVEN: $t = 2.48, p = 0.26$). In this respect it behaved differently from the IPV constituent, where givenness had a significant effect.

4.3.1.4   accent on the verb

Of potential interest may be the accent realisation on the verb. Since marking of focus by shifting the accent from its default position is a strategy employed by many languages, the realisation of the accent on the initial syllable of the verb may be informative. The plots in 4.33 show the results for f0 maximum and f0 range.
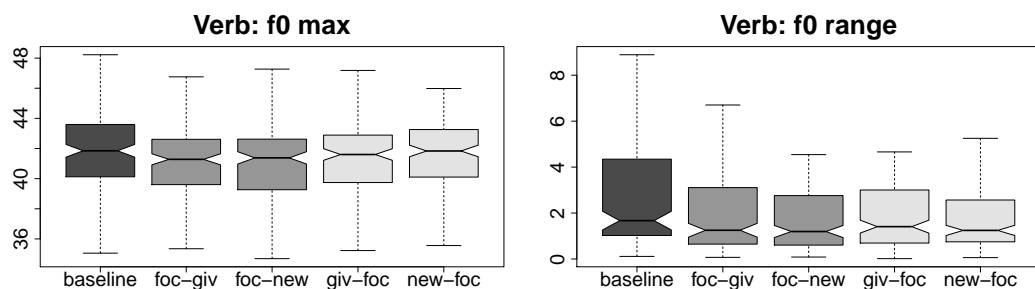
Figure 4.20: f0 maximum and f0 range on the accented syllable of the verb in semitones.

The statistical analysis shows no significant differences between the BASELINE and the other conditions for the f0 maximum. Of highest interest is perhaps the FOCUS-GIVEN ($t = 2.1$, $p = 0.19$) and the FOCUS-NEW conditions ($t = 2.0, p = 0.23$), as they present conditions where the focus is closest to the initial syllable of the verb. The same is ture for the the f0 range, where this values are $t = 1.78, p = 0.38$ for the FOCUS-GIVEN and $t = 1.99, p = 0.26$ for the FOCUS-NEW conditions.

4.3.2   Results: Boundaries

As in the previous experiment, prosodic boundaries were also considered here. There were two possible boundaries where differences may arise depending on the information structure of the sentence, these are shown in the schematic structure in (19). This means that there were two syllables where measurements were made to investigate boundary phenomena: the final syllable of the verb and the final syllable of the IPV constituent. The final syllable of the CF constituent was not considered, since in all conditions it was also the final syllable of the entire target sentence a fact which would confound any effect of the experimental conditions.

(19)   Topic Verb $|_{possible boundary 1}$ XP1 $|_{possible boundary 2}$ XP2

This experiment differed from Experiment 1 on Simple Focus since in this case there was a focus particle which followed the item in focus. This made comparisons of the target syllables more difficult, as this particle was placed between the final syllable of the item before the focus accent and the focus accent itself in the case of the clause-final element, but not for the immediately post-verbal element. However it was impossible to make all the conditions string identical therefore for the purposes of data extracting the particle was ignored. Since this particle is always deaccent it was hypothesised that its exclusion would not significantly hinder the analysis of the results. Therefore as in Experiment 1 duration and fundamental frequency were considered in the analysis of the final syllables.

4.3.2.1   duration

One of the primary indicators of prosodic boundaries is pre-final lengthening, therefore data related to duration was given primary consideration. Duration was measured on the syllable as well as the final vowel preceding the boundary. Since these two measurements gave the same results, only the values for syllable duration are presented here in Figure 4.21.
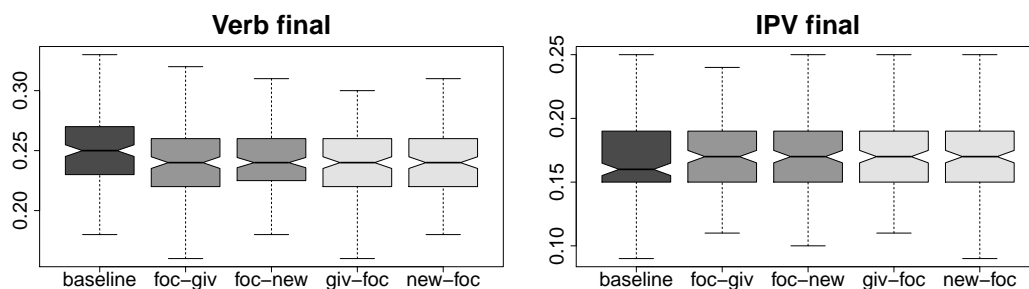
Figure 4.21: Duration of the final syllable of the verb and the IPV constituent in seconds.

According to the plots, in the case of the verb final syllable there is tendency for shorter durations in all focus conditions. This is somewhat confirmed by the analysis of the mixed effects models. In the case of the FOCUS-GIVEN ($t = 2.5, p = 0.09$), the FOCUS-NEW ($t = 2.5, p = 0.09$) and the NEW-FOCUS ($t = 2.5, p = 0.08$) conditions values approach the level of significance, while in the case of the GIVEN-FOCUS condition ($t = 3.5, p = 0.003$) they are significant. This seems to suggest that there is an effect of givenness, such that when the IPV constituent is given there is a significant reduction of duration at the end of the verb, but the comparison of the GIVEN-FOCUS and NEW-FOCUS constituents reveals no significant difference ($t = -1.0, p = 0.84$). In the case of the final syllable of the IPV constituent, there are no significant differences in syllable duration as compared to the BASELINE (FOCUS-GIVEN: $t = -0.9, p = 0.88$; FOCUS-NEW: $t = -0.43, p = 0.99$; GIVEN-FOCUS: $t = -1.8, p = 0.33$; NEW-FOCUS: $t = 1.93, p = 0.3$). In this case givenness of either the IPV or the CF constituent made no visible effects on duration.

As in the case of the previous experiment, the definite article each constituent was also examined for pre-final lengthening in the three target sentences that had them. The presence of the focus marking particle is also somewhat problematic in this respect since its occurrence displaces the definite article preceding the clause final constituent from the position that it occupies in the BASELINE target sentences. On the other hand, it provides a phrase final segment that is identical in all conditions, which might be more important in this experiment, since the final syllable of the constituent at boundary 2 is also displaced. As it is moved further away from the phrasal boundary, it might be less sensitive to pre-final phenomena. The results for the durational of the definite article are shown in Figure 4.22.
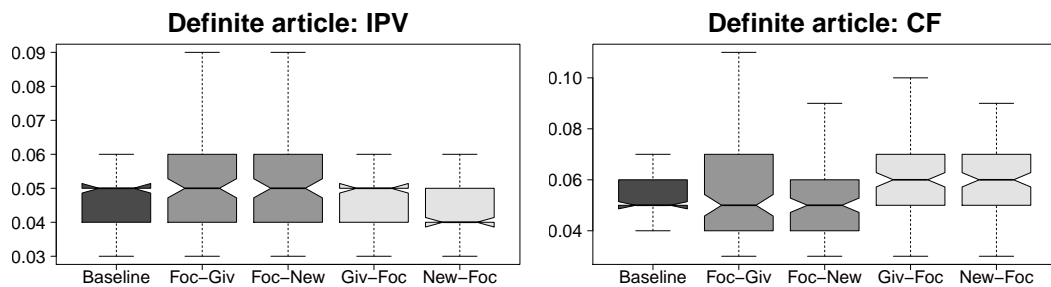
Figure 4.22: Duration of the definite article at boundary 1 (Definite article: IPV) and boundary 2 (Definite article: CF) in seconds.

The visual inspection of the figures seems to reveal some differences both between the two boundaries and the two sets of focused conditions. It can be stated that the difference between the two boundaries falls in line with the the observations thus far. The results for the focus condition at boundary 1 seem do pattern like that of the BASELINE condition, while the results

at boundary 2 are more distinct for both sets. The statistical analysis however did not reveal any significant differences between the durations of the definite article in either of the positions when compared to the BASELINE condition. In the case of the comparisons at boundary 1, the results were the following: FOCUS-GIVEN: $t = -0.19, p = 0.99$; FOCUS-NEW: $t = -0.104, p = 1.0$; GIVEN-FOCUS: $t = 1.23, p = 0.73$; NEW-FOCUS: $t = 0.24, p = 0.99$. In the case of the comparisons at boundary 2, the results were the following: FOCUS-GIVEN: $t = -0.19, p = 0.99$; FOCUS-NEW: $t = -0.39, p = 0.99$; GIVEN-FOCUS: $t = -0.71, p = 0.94$; GIVEN-FOCUS: $t = 0.66, p = 0.95$.

4.3.2.2 fundamental frequency

The other group of cues investigated on the final syllables of the verb and IPV constituent was fundamental frequency in terms of maxima, minima, range and the placement of the f0 maxima. The results of f0 maxima are presented in the plots in Figure 4.23.
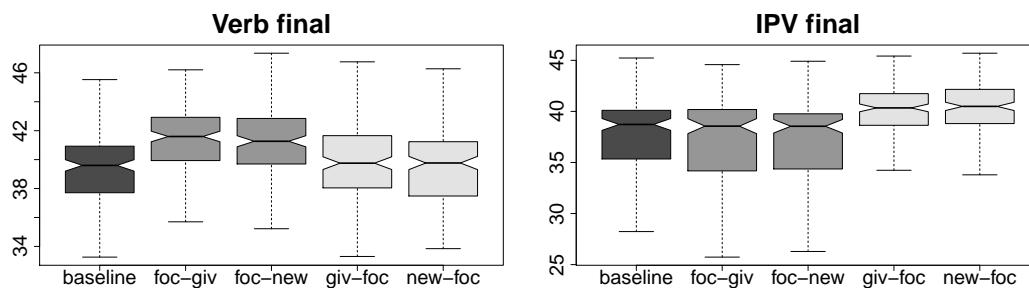
Figure 4.23: f0 maxima in semitones on the final syllable of the verb and the immediately post-verbal constituent.

The linear mixed effects models revealed that the f0 maxima of the final syllable of the verb was significantly higher in the conditions when it was followed by a constituent in focus (FOCUS-GIVEN: $t = -4.0, p = 0.009$; FOCUS-NEW: $t = -3.3, p = 0.04$), while it was not different if focus occurred in the CF position (GIVEN-FOCUS: $t = -2.12, p - 0.28$; NEW-FOCUS: $t = 1.78, p = 0.42$). The pattern was similar in the case of the final syllable of the IPV constituent. If the IPV constituent was in focus the f0 maxima was not different from the BASELINE (FOCUS-GIVEN $t = 0.37, p = 0.97$; FOCUS-NEW: $t = 0.47, p = 0.98$), but if this syllable was followed by focus the f0 maxima was significantly higher (GIVEN-FOCUS: $t = -3.47, p = 0.058$, NEW-FOCUS: $t = -3.54, p = 0.03$). There was no significant effect of givenness in either of the positions.

The f0 minima of the final syllable was also considered. The results are shown in Figure 4.24. The patterns for both the final syllable of the verb and the IPV constituent pattern like the f0 maxima shown above.
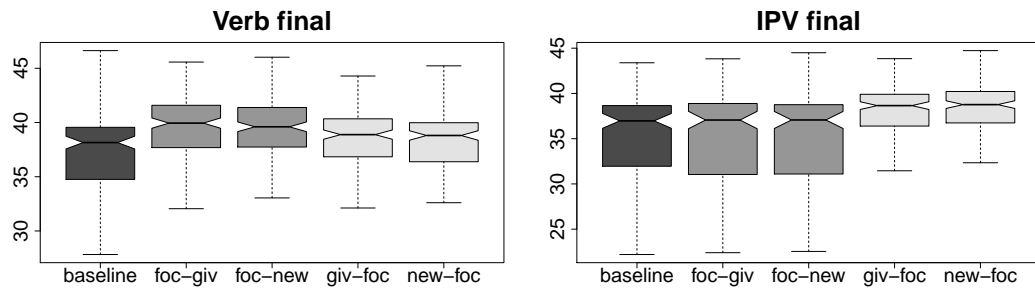
Figure 4.24: f0 minima in semitones on the final syllable of the verb and the immediately post-verbal constituent.

The similarity of the f0 minima to the f0 maxima is confirmed by the statistical analysis which found that in the case of the final syllable of the verb, if it was followed by a focus, f0 minima were significantly higher as compared to the BASELINE (FOCUS-GIVEN: $t = -3.23, p = 0.04$; FOCUS-NEW: $t = -3.23, 0.039$) but not when the focus occurred in the CF position (GIVEN-FOCUS: $t = -2.3, p = 0.20$; FOCUS-NEW: $t = -2.6, p = 0.14$). Likewise, in the case of the final syllable of the IPV constituent, if the IPV constituent itself was in focus the f0 minima were not significantly different from the BASELINE condition (FOCUS-GIVEN: $t = 0.61, p = 0.97$; FOCUS-NEW: $t = 0.12, p = 0.99$). However, if the following constituent was in focus the f0 minima was significantly higer (GIVEN-FOCUS: $t = -3.4 p = 0.04$; NEW-FOCUS: $t = 3.0, p = 0.05$). It is also interesting to observe that on the final syllable of the IPV both in therms of f0 minima and f0 maxima as shown in Figure 4.23 values show a much smaller variation in the conditions where focus occurs in the CF position, than in the other focus and the BASELINE conditions.

As in the case of the accents, f0 excursion on the pre-boundary syllables was calculated by finding the difference between the f0 maxima and minima of the syllable. The results are shown in the plots in Figure 4.25.
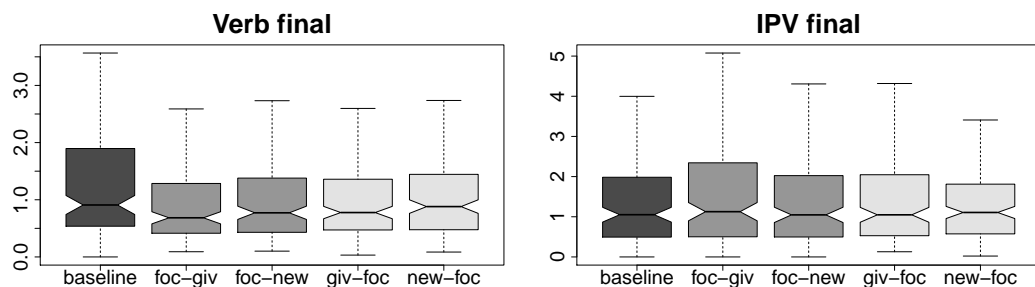
Figure 4.25: The range of f0 is semitones on the final syllable of the verb and the immediately post-verbal constituent.

The analysis of the linear mixed effects models indicates that in the case of the last syllable

of the verb there are no significant differences in f0 range between focus conditions and the BASELINE condition (FOCUS-GIVEN: $t = 1.3, p - 0.67$, FOCUS-NEW: $t = 1.8, p = 0.36$, GIVEN-FOCUS:$t = 2.0, 0.28$, NEW-FOCUS: $t = 1.6, p = 0.48$). The picture is much the same in respect to the final syllable of the IPV constituent, where again there were no significant differences measured (FOCUS-GIVEN: $t = -0.9, p = 0.88$, FOCUS-NEW: $t = -0.43, p = 0.99$, GIVEN-FOCUS: $t = -1.8, p = 0.33$, NEW-FOCUS: $t = -1.9, 0.30$). Givenness did not have any effect on the f0 range of either syllable.

The final aspect of fundamental frequency investigated was the alignment of the f0 maxima with respect to the vowel in final syllable before each boundary. The results are shown in Figure 4.26. The alignment of the f0 maxima in the final syllable of the verb shows a much larger distribution, as indicated by the interquartile ranges, than in the final syllable of IPV constituent. None-the-less, in this syllable f0 maxima tend to fall closer to the begingin of the vowel, suggesting a falling contour while in the case of the IPV values are closer to the center of the segment.
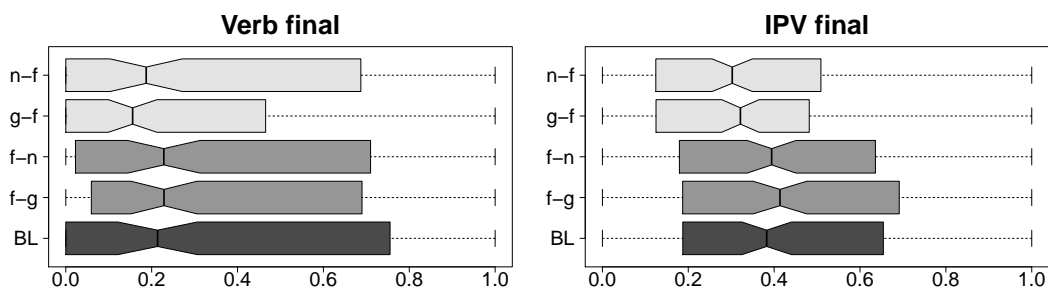
Figure 4.26: Alignment of the f0 maxima within the vowel of the final syllable of the verb and the immediately post-verbal constituent. 0 = onset; 1 = end

The statistical analysis indicates that there were no significant differences of the alignment of the f0 maxima in the final vowel of the verb as compared to the BASELINE condition (FOCUS-GIVEN: $t = 0.22, p = 0.99$; FOCUS-NEW: $t = -0.03, p = 1.0$, GIVEN-FOCUS: $t = 1.7, p = 0.38$; NEW-FOCUS: $t = 0.5, p = 0.97$) In the case of the final syllable of the IPV constituent if focus occurred in the CF position, the f0 maxima was realised significantly earlier than in the BASELINE condition (GIVEN-FOCUS: $t = 3.8, p = 0.001$; NEW-FOCUS: $t = 3.2, p = 0.009$). If however, focus occurred in the IPV constituent itself the realisation of f0 maxima did not differ from the BASELINE (FOCUS-GIVEN: $t = 0.14, p = 0.99$, FOCUS-NEW: $t = 0.52, p = 0.98$). The effect of the CF focus on the placement of the f0 maxima was, according to the estimates provided by the models (GIVEN-FOCUS: 0.11, NEW-FOCUS: 0.095) earlier realisation by about 10% of the vowel's duration.

4.3.3 Experiment 2: Summary

In summary it can be noted that the accents realised with foci marked with the *is* particle did not differ from each other depending on which position they were realised in. Both were marked with higher f0 maxima, and a tendency for higher f0 minima, which was significant in the case of the IPV focus in condition FOCUS-GIVEN and the case of the CF focus in condition NEW-FOCUS with condition GIVEN-FOCUS approaching the level of significance. The IPV focus was also shown to be associated with longer duration, but the CF focus was not. The other cues investigated were not affected by the presence of focus in either position.

In terms of boundaries there were slight differences between the IPV and the CF foci. Both were associated with higher f0 maxima and minima preceding the focus accents. This phenomena may best be characterised as the movement of the f0 contour to meet the higher f0 targets on the accented syllable. Post-focally on the boundary following the IPV constituent was not different from the baseline. It must be noted however, that at this point that the comparability of the measurements on the final syllable of the IPV constituent are problematic due to the presence of the IS particle when this constituent was in focus, and its absence in the BASELINE and NEW/GIVEN-FOCUS conditions. An unexpected result is the tendency for earlier realisation of f0 maxima pre-focally on the final syllable of the IPV, which was not attested on the final syllable of the verb.

4.4 Experiment 3: Double Focus

The production experiment testing for the prosodic realisation of double focus constructions was carried out along the lines of the two previous production experiments with the methodology described in Section 4.1. In this experiment there were 16 subjects, all female undergraduate students, their mean age was 23. They were asked to produce sentences that they had memorised in response to context questions. The context questions were constructed in such a way as to make it apparent that both the pre-verbal focus and one of the post verbal constituents formed a double focus construction. A schematic version of the target sentences is givne in (20), with a concrete example in (21).

(20) XP_{focus} Verb particle XP_{focus} YP

(21)   Attila ájult   el   a   melegtől   a   málnásban.
        Attila fainted prt the heat.from the raspberry field.in
        'It was Attila who fainted in the raspberry field form the heat'

As in the case of the previous production experiment there were 5 conditions: the BASELINE condition with all new post-verbal constituents, and the focus conditions, where the information structural status of the post-verbal constituents varied between new, given and focused: FOCUS-NEW, FOCUS-GIVEN, NEW-FOCUS, GIVEN-FOCUS. Unlike in the case of the previous two experiments, the BASELINE condition for Experiment 3 did not have a target sentence in borad focus. Instead the context question was such that it required an answer with a pre-verbal narrow focus, as shown in (22). This type of baseline was necessary instead of a broad focus one, since the presence of the pre-verbal focus may have an impact on the prosodic realisation of the post-focal elements, therefore any comparison of post-verbal constituents in a double focus construction must be done with sentences that have a pre-verbal narrow focus and not sentences in broad focus.

(22)   Ki   ájult   el?
         Who fainted prt
         'Who fainted'

The context questions for the focus conditions were created by using coordinate constructions, in order to avoid a pari focus interpretation, in which the pre-verbal and post-verbal foci would form a pair which would then be an alternative as compared to other pairs. This resulted in questions like the ones shown in (23).

(23)   a.   Ki   ájult   el és   hol?
              who fainted prt and where
              'Who fainted and where?'

         b.   A   melegtől ki   ájult   el és   hol?
              the heat.from who fainted prt and where
              'Who fainted from the heat and where?'

The question in (23-a) is an example of context questions in the FOCUS-NEW condition where the non-focused post-verbal constituent was contextually new. While (23-b) is an example of a context question in condition FOCUS-GIVEN where the non-focused constituent was given. As in the parallel forced choice experiment, the contextually given constituent was presented as a topic. In that experiment the intention was to not influence post-verbal word order, while here the reason was merely to not deviate from the forced choice experiment in the materials tested.

4.4.1   Results: Accents

As in the case of Experiments 1 & 2, the results are presented here first for the accented syllables of each post-verbal constituent, and then for the syllables preceding potential prosodic

boundaries at the end of the verb and in between the two post-verbal constituents. The values were collected and calculated as described in Section 4.1.

4.4.1.1 fundamental frequency

In terms of realisation of the accented syllable let us consider first the f0 maxima in that domain. The plot in 4.27 shows the relevant results. The plot on the left shows the f0 maxima measurements taken on the accented syllable of the immediately post-verbal constituent (IPV), where it seems that the focus conditions did effect the f0 maxima, however the differences seem to be minimal. In terms of the clause-final (CF) constituent there seems to be slight trend, such that if focus is not in this position (FOCUS-NEW, FOCUS-GIVEN), then f0 maxima seem to be in line with values for the BASELINE condition, however if the focus is in this position, then f0 maxima are realised slightly higer.
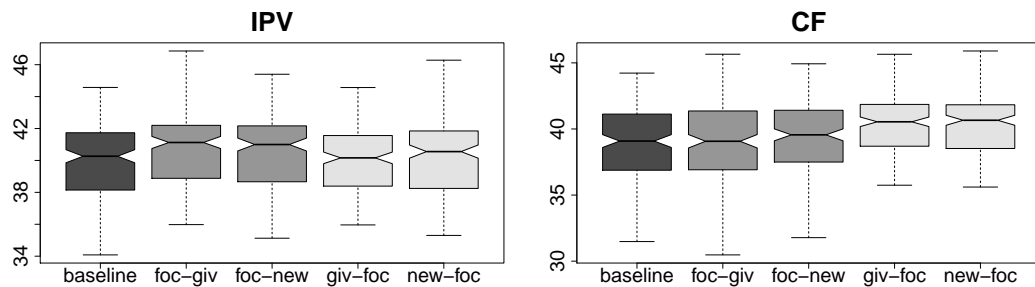
Figure 4.27: f0 maxima in semitones for the accented syllable of the immediately post-verbal (IPV) and the clause-final (CF) constituents for each condition.

The analysis indicates that in the case of the IPV constituent f0 maxima levels are significantly higher in the FOCUS-GIVEN conditions ($t = 2.98, p = 0.024$) but not for any of the other conditions (FOCUS-NEW: $t = 2.44, p = 0.107$; GIVEN-FOCUS: $t = 0.12, p = 1.0$; NEW-FOCUS: $t = 0.50, p = 0.98$). While the FOCUS-GIVEN and FOCUS-NEW showed different relations to the BASELINE condition, there was no difference between them ($t = 0.52, 0.98$). In the case of the CF constituent both conditions where focus was in this position showed significantly higher f0 maxima (GIVEN-FOCUS: $t = 4.53, p = 0.0001$; NEW-FOCUS: $t = 4.74, p < 0.0001$). While neither of the other two focus conditions were significantly different (FOCUS-GIVEN: $t = 0.20, p = 0.99$; FOCUS-NEW: $t = -1.56; p = 0.51$). As in the case of the IPV constituent, givenness did not effect f0 maxima values.

In conjunction with f0 maxima, f0 minima values were also considered. The results for the measurements are shown in Figure 4.28. The plots reveal that the patterning of f0 minima values is much the same as that of the f0 maxima.
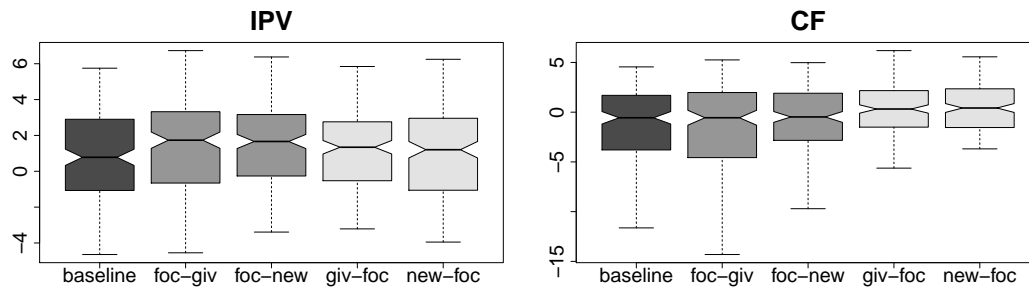
Figure 4.28: f0 minim in semitones for the accented syllable of the immediately post-verbal (IPV) and the clause-final (CF) constituents for each condition.

The analysis indicates that in the case of the accented syllable of the IPV constituent f0 minima none of the focus conditions produced significantly different values from the BASE-LINE. (FOCUS-GIVNE $t = -1.44, p = 0.63$; FOCUS-NEW: $t = -1.63, p = 0.53$; GIVEN-FOCUS: $t = -0.55, p = 0.97$, NEW-FOCUS: $t = -0.09, p = 1.00$). In the case of the CF constituent however, there were significant differences if this constituent was in focus, with f0 minima values being higher than that of the BASELINE (GIVEN-FOCUS: $t = -3.52, p = 0.004$; NEW-FOCUS: $t = -3.58, p = 0.003$), but not when it was contextually new ($t = 0.96, p = 0.86$) or given ($t = -0.09, p = 1.0$). There was no difference between given and new constituents in either the IPV ($t = 0.59, p = 0.97$) or the CF constituents ($t = -0.87, p = 0.90$).

The third value considered in term of f0 was the rage of f0 movement on the accented syllable of each constituent as measured between the f0 minima and maxima values. The results are indicated in Figure 4.29
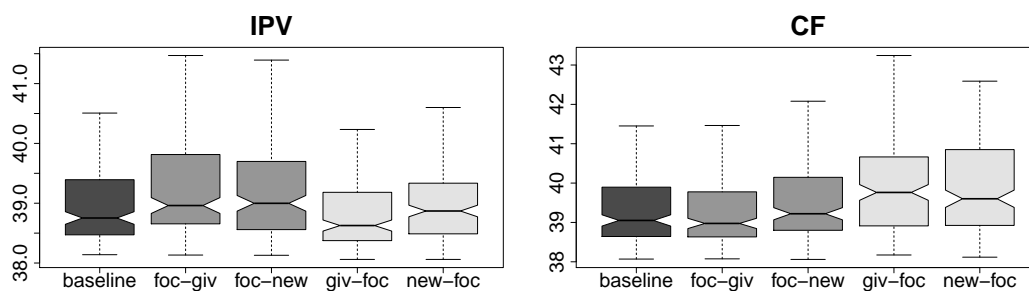
Figure 4.29: f0 movement in semitones for the accented syllable of the immediately post-verbal (IPV) and the clause-final (CF) constituents for each condition.

The linear mixed effects models indicate that in the case of the accented syllable of the first constituent there are no significant differences when comparing the focus conditions to the BASELINE (FOCUS-GIVEN: $t = -1.06, p = 0.82$; FOCUS-NEW: $t = -0.38, p = 0.99$, GIVEN-FOCUS: $t = 1.06, p = 0.82$; NEW-FOCUS: $t = -0.64, p = 0.96$). The picture is much the same in the case

of the accented syllable of the CF constituent (FOCUS-GIVEN: $t = 0.31, p = 0.99$; FOCUS-NEW: $t = -0.78, p = 0.93$, GIVEN-FOCUS: $t = -1.59, p = 0.48$; NEW-FOCUS: $t = -1.52, p = 0.54$), although in this case, according to the plot in Figure 4.29 there does seem to be two clear groups defined by focus placement, such that if focus is placed in the CF position it seems to have higher values for f0 movement than if this position was filed by a contextually new or given constituent.

The final value examined in therms of f0 was the alignment of the peek of the f0 maxima in relation to the vowel of the accented syllable. The values for this measurement are given in Figure 4.30. They were calculated by normalising the point of the f0 maxima in relation to the start (0) and end (1) of the vowel. The inspection of the plots reveals that in all conditions maxima were placed in the begingin of the vowel, a trend which is consistent with the falling accents dominant in Hungarian sentences.
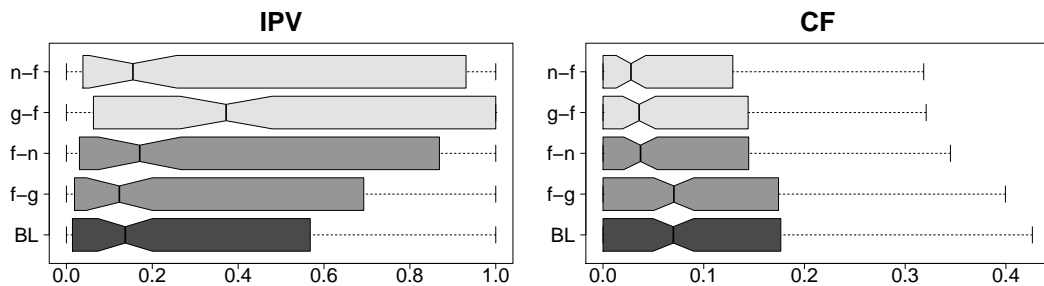
Figure 4.30: Alignement of the f0 maiximum in the vowel of the accented syllable of the immediately post-verbal (IPV) and the clause-final (CF) constituents for each condition. 0 = beginning, 1 = end

The statistical analysis reveals a few cases where differences were significant. In the case of the IPV constituent if this constituent was given and it was followed by a constituent in focus (the GIVEN-FOCUS conditions, g-f on the plot) the f0 maxima were realised significantly later ($t = -4.47, p = 0.0001$) on the vowel than if this constituent was contextually new as in the BASELINE condition. The other conditions did not show a difference as compared to the baseline (FOCUS-NEW: $t = -0.26, p = 0.99$; FOCUS-NEW: $t = -1.7, p = 0.43$, NEW-FOCUS: $t = -1.9, p = 0.316$) In the case of the CF constituent if this constituent is in focus the f0 maxima is realised significantly earlier in the GIVEN-FOCUS condition ($t = 2.94, p = 0.027$) and approaching significance in early alignment in the NEW-FOCUS condition ($t = 2.56, p = 0.078$). There is no significant differences in alignment for the FOCUS-GIVEN condition ($t = 0.292, p = 0.99$) and while difference in the FOCUS-NEW condition ($t = 2.410.11$) is also not significant, it is much closer to the significance than the FOCUS-GIVEN condition. This means that if the

constituent in the CF is in focus its f0 peak tends to be realised earlier, and if it is new and preceded by a focus this trend is also visible.

4.4.1.2   duration

The second group of values consider in the analysis of the accented syllables was duration. The plot in 4.31 shows the duration of the syllable in seconds. The plots reveal slight differences between accents that are in focus and non-focused accents for each constituent, such that focused accents were realised higher.
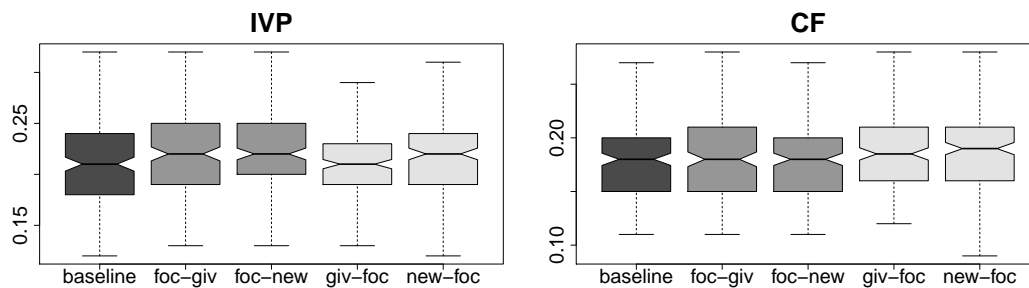
Figure 4.31: Duration, in seconds, of accented CVC for the immediately post-verbal (IPV) an clause-final (CF) constituents, broken down by conditions.

The analysis indicates that in the case of the IPV constituent, the duration of the accented syllable was significantly longer in the case of the FOCUS-GIVEN ($t = 3.21, p = 0.011$) and FOCUS-NEW ($t = 4.35, p = 0.0001$) conditions but not when this constituent was contextually new (GIVEN-FOCUS:$t = 1.3, p = 0.68$) or given (NEW-FOCUS$t = 0.07, p = 1.0$). In the case of the CF constituent the patterning was less obvious, but the analysis showed that the durational differences were at the level of significance for the GIVEN-FOCUS condition ($t = -2.7, p = 0.05$). While it seems from the plot that the NEW-FOCUS constituent patterned with the GIVEN-FOCUS constituent, its durational values were not different enough from the BASELINE to be considered significant ($t = -2.08, p = 0.22$). Similarly, there were no differences in syllable duration if this constituent followed a focus and was contextually new (FOCUS-NEW: $t = 0.59, p = 0.97$) or given (FOCUS-GIVEN: $t = 0.33, p = 0.99$). In comparing the results for GIVEN-FOCUS and NEW-FOCUS in the case of the IPV and FOCUS-NEW and FOCUS-GIVEN for the CF constituent, no effect of givenness could be shown.

4.4.1.3   intensity

The final measurement investigated on the accented syllables of the post-verbal constituents was intensity. Intensity was calculated in decibels relative to the mean intensity of the entire

utterance by subtracting the mean intensity from the intensity maximum measured on the syllable. The results are shown in Figure 4.32. The visual inspection of the plots reveals minimal differences between the conditions for the accented syllable of the IPV constituent, and a slight patterning in the case of the CF constituent, such that if this constituent was in focus the intensity of the accented syllable was higher than if it was not.
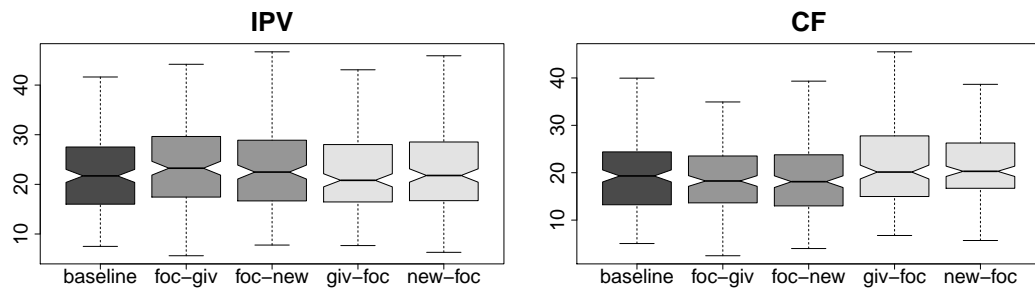
Figure 4.32: The maximum intensity of the accented syllables relative to the mean intensity of the utterance in dB, broken down by conditions for the immediately post-verbal (IPV) and the clause-final (CF) constituents.

The statistical analysis indicates that in the case of the IPV constituent the intensity there are no conditions which are significantly different from the baseline condition in terms of relative intensity (FOCUS-GIVEN: $t = -1.83, p = 0.39$, FOCUS-GIVEN: $t = -0.83, p = 0.91$, GIVEN-FOCUS: $t = 0.76, p = 0.94$, NEW-FOCUS: $t = 0.05, p = 1.0$) While in the case of the CF constituent in the conditions where this constituent was in narrow focus relative intensity was significantly higher (GIVEN-FOCUS: $t = 3.42, p = 0.005$, NEW-FOCUS: $t = 3.63, p = 0.002$), while there were no significant differences in the FOCUS-GIVEN ($t = 0.79, p = 093$) and the NEW-FOCUS ($t = 0.81, p = 0.92$) conditions.

4.4.1.4 accent on the verb

Of potential interest may be the accent realisation on the verb. Since marking of focus by shifting the accent from its default position is a strategy employed by many languages, the realisation of the accent on the initial syllable of the verb may be informative. The plots in 4.33 show the results for f0 maximum and f0 range.

The statistical analysis shows no significant differences between the BASELINE and the other conditions for the f0 maximum. Of highest interest is perhaps the FOCUS-GIVEN ($t = 0.33$, $p = 0.99$) and the FOCUS-NEW conditions ($t = 0.36, p = 0.99$), as they present conditions where the focus is closest to the initial syllable of the verb. The same is ture for the the f0 range, where this values are $t = 1.12, p = 0.79$ for the FOCUS-GIVEN and $t = 1.42, p = 0.61$ for the
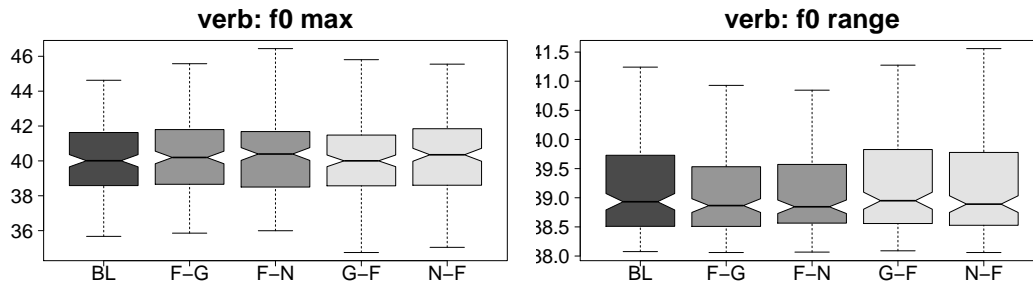
Figure 4.33: f0 maximum and f0 range on the accented syllable of the verb in semitones.

FOCUS-NEW conditions.

4.4.2   Results: boundaries

As in Experiments 1 & 2 prosodic phrasing associated with the realisation of the focus conditions was also investigated by examining cues before the expected boundaries as shown in (24), the relevant syllables therefore were the final syllable of the verb (Boundary 1) and the final syllable of the constituent (Boundary 2) in the immediately post-verbal position. As in the case of previous experiments, the cues considered were duration, as an indicator of pre-final lengthening, and f0 as an indicator of a boundary tone.

(24)   Topic Verb $|_{possibleboundary1}$ XP1 $|_{possibleboundary2}$ XP2

4.4.2.1   duration

The primary cue investigated to test for the presence of boundaries was duration, as an indicator of pre-final lengthening. The values for duration on of the final syllables of the verb and the IPV constituent are given in Figure 4.34. The graphs reveal that that the two pre-boundary syllables show different patterning of values. While the syllable at the end of the verb seems to not be affected by a focus immediately following it, it shows some a decrease in duration if the focus is in the CF position. While the syllable at the end of the IPV constituent seems to lengthen both if its preceding or following a focus.

The statistical analysis reveals that there are no significant differences in duration for the final syllable of the verb between the BASELINE condition and the focus conditions (FOCUS-GIVEN: $t = 0.08, p = 1.0$; FOCUS-NEW: $t = 0.21, p = 0.99$, GIVEN-FOCUS: $t = 2.5, p = 0.16$, NEW-FOCUS: $t = 1.61, p = 0.52$). In the case of the final syllable of the IPV constituent, there was a significant increase in duration if the IPV constituent was in focus (FOCUS-GIVEN: $t = 4.24, p = 0.005$; FOCUS-NEW: $t = 4.93, p = 0.0009$). The values still show a tendency for longer durations
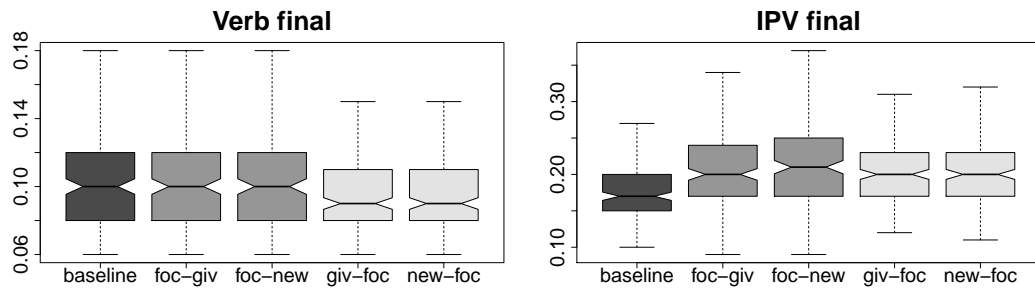
Figure 4.34: Duration in seconds of the final syllable of the verb and the immediately post-verbal constituent.

on this syllable of the CF constituent was in focus. However, they are only significantly longer in the case of the GIVEN-FOCUS constituent ($t = 3.23, p = 0.032$). In the case of the NEW-FOCUS constituent the values only approach the level of significance ($t = 2.75, p = 0.083$).

As in the previous experiments durational data was gather on the definite article preceding the post-verbal constituents, as pre-final lengthening would be visible on these as well. The results are shown in Figure 4.35. It is evident from the plots that durational values show different patterns at the two boundaries. While all conditions at boundary 1 seem to pattern alike, the focus conditions in at boundary 2 show a higher degree of variation, both in terms of their means and their distributions. The duration of the article in the BASELINE condition at boundary 2 seems to match its counterpart at boundary 1, both showing means of around 60 ms. In this the article behaves the same way as the final syllable as shown in Figure 4.35.
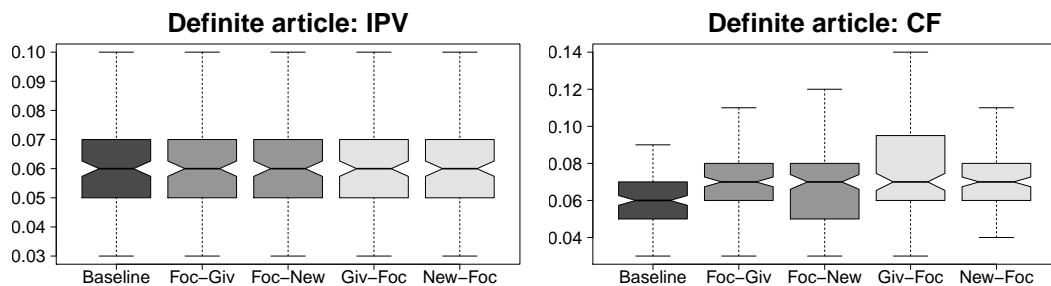
Figure 4.35: Duration of definite article at boundary 1 (Definite article: IPV) and boundary 2 (Definite article: CF) in seconds.

The statistical analysis confirms this only to a certain extent. As expected, there were no significant differences between the focused condition and the BASELINE condition in the case of boundary 1 (FOCUS-GIVEN: $t = -0.75, p = 0.94$; FOCUS-NEW: $t = -0.20, p = 0.99$; GIVEN-FOCUS: $t = 0.41, p = 0.78$; NEW-FOCUS: $t = 1.14, p = 0.78$). In the case of boundary 2, there was one condition, GIVEN-FOCUS, where the differences in duration were at the level of significance:

$t = -3.10, p = 0.0574$. As for the other conditions the differences were not significant (FOCUS-GIVEN: $t = -1.7, p = 0.50$; FOCUS-NEW: $t = -2.59, p = 0.18$; NEW-FOCUS: $t = -2.55, p = 0.13$). While the statistical analysis did not provide clear evidence that all focused conditions behaved differently at boundary 2 as compared to boundary 1, the trends in the box plots in Figure **??** seem to be clear: while there does not seem to be any difference between the focus condition and the BASELINE at boundary 1, at boundary 2 the focus conditions seem to show a shift towards longer durations, none-the-less, at present this shift was only confirmed in the case of the GIVEN-FOCUS condition.

4.4.2.2 fundamental frequency

The second group of cues investigated in terms of boundaries was fundamental frequency. This cue was examined from several measures: its maximum, its minimum, its range as well as the alignment of the maximum. The results for the f0 maximum are given in the plots in Figure 4.36. The plots reveal that there are minor changes in the f0 maxima of the pre-boundary syllables between conditions. It also seems that the patterning is less varied in the case of the final boundary of the verb.
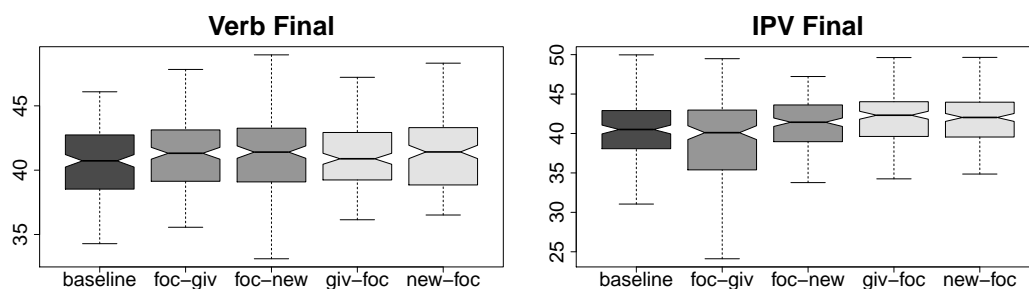
Figure 4.36: f0 maxima in semitones of the final syllables of the verb and the immediately post-verbal constituent.

The statistical analysis reveals that the f0 maxima on the last syllable of the verb did not differ significantly from the BASELINE condition in any of the test conditions (FOCUS-GIVEN: $t = 1.90, p = 0.31$; FOCUS-NEW: $t = 1.78, p = 0.38$ GIVEN-FOCUS: $t = 1.78, p = 0.38$; NEW-FOCUS: $t = 1.46, p = 0.59$). However, on the final syllable of the IPV constituent f0 maxima are significantly higher in the presence of a CF focus (GIVEN-FOCUS: $t = 4.15, p = 0.0004$; NEW-FOCUS: $t = -3.23, p = 0.011$). There were no effects on the f0 maxima of these syllables of givenness.

The minimum f0 was also investigated on the final syllable of the verb and the post-verbal constituent. The plots shown in Figure 4.37, show that there is minimal variation in f0 minima

in the case of the final syllable of the verb. In the case of the final syllable of the IPV constituent it seems that the presence of a focus in CF, as in the GIVEN-FOCUS and NEW-FOCUS constituent there seem to be values that show a smaller degree of variation, and tend to be somewhat higer.
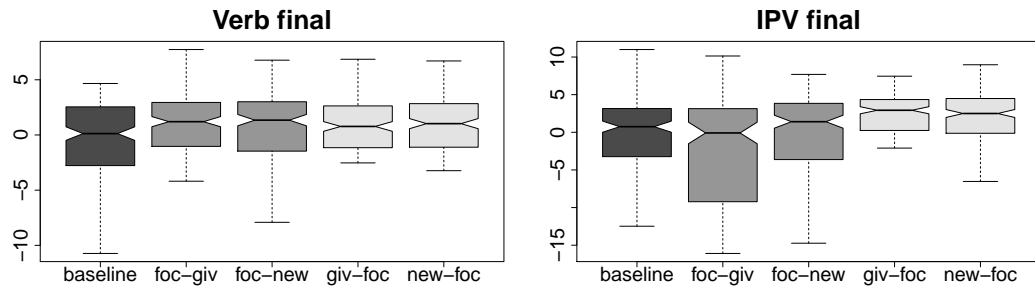
Figure 4.37: f0 minimum in semitones of the final syllables of the verb and the immediately post-verbal constituent.

The statistical analysis reveals that there are no significant differences from the BASELINE condition in the case of the final syllable of the verb (FOCUS-GIVEN: $t = 1.7, p = 0.48$; FOCUS-NEW: $t = -2.29, p = 0.29$; GIVEN-FOCUS: $t = 1.27, p = 0.47$; NEW-FOCUS: $t = 1.53, p = 0.57$). In the case of the final syllable of the IPV constituent however there are significant differences in the case of the GIVEN-FOCUS ($t = 4.14, p = 0.0004$) and the NEW-FOCUS ($t = 3.23, p = 0.01$) conditions where f0 minima were higher, but not in the FOCUS-GIVEN ($t = 1.58, p = 0.51$) and the FOCUS-NEW ($t = 1.58, p = 0.50$) conditions. As in the case of the f0 maxima there were no discernable effects of givenness.

The range of f0 movement was also investigated on the final syllable of the verb and the IPV constituent. The movement of f0 was calculated by finding the difference between the f0 maxima and minima of the syllable. The plots of the results are given in Figure 4.38, they show little to no effect of focus or givenness on the range of f0 movement.
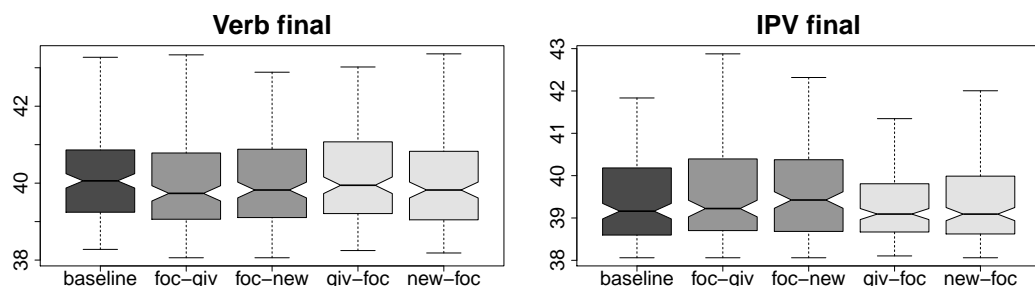
Figure 4.38: Range of f0 movement semitones of the final syllables of the verb and the immediately post-verbal constituent.

This is confirmed by the statistical analysis which found no significant differences from

the BASELINE for any of the conditions in the case of the final syllable of the verb (FOCUS-GIVEN: $t = 0.99, p = 0.85$; FOCUS-NEW: $t = 1.41, p = 0.61$; GIVEN-FOCUS: $t = 0.65, 0.96$; NEW-FOCUS: $t = 1.15, p = 0.77$) or the final syllable of the IPV constituent (FOCUS-GIVEN: $t = -1.15, p = 0.77$; FOCUS-NEW: $t = -1.12, p = 0.79$; GIVEN-FOCUS: $t = 0.29, 0.99$; NEW-FOCUS: $t = 0.54, p = 0.98$). Givenness did not have an effect on the f0 range.

The final aspect of fundamental frequency examined by on the final syllable before a boundary was the alignment of the f0 maxima in relation to the start point (0) and end point (1) of the vowel in the syllable. The results are shown in Figure 4.39.
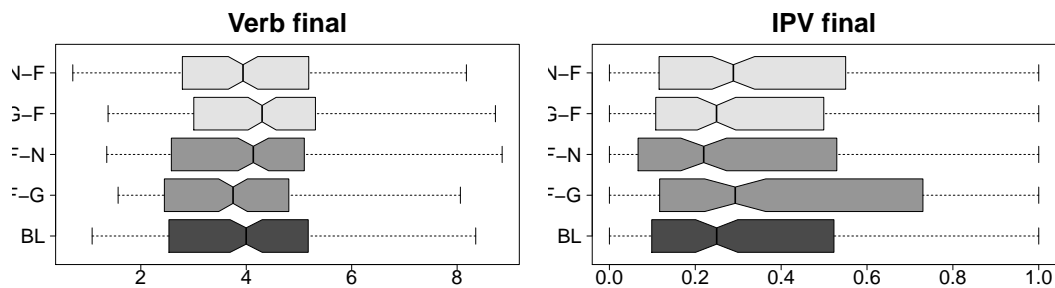
Figure 4.39: Alignement of the f0 maiximum in the vowel of the final syllable of the verb and the IPV constituents for each condition. 0 = beginning, 1 = end

The plots indicate that the tendency for the placement of the f0 maxima in the final syllable of the verb was near the 0.4 mark, suggesting that there was no clear falling of the f0 contour. As it can be seen from the plot there all conditions behaved relatively similarly, the statistical analysis confirms that there were no significant differences between the focus conditions and the BASELINE (BL in the plot) condition (FOCUS-GIVEN: $t = 1.5, p = 0.55$; FOCUS-NEW: $t = -0.13, p = 0.99$; GIVEN-FOCUS: $t = -0.15, p = 0.2$; NEW-FOCUS: $t = 0.62, p = 0.97$). In the case of the final syllable of the IPV constituent the variation in f0 maxima placement was seems to be larger, further more, the alignment of the f0 maxima is closer to the beginning of the vowel, with means falling between 0.2 and 0.3. According to the statistical analysis there were no significant differences between any of the focus conditions and the BASELINE condition (FOCUS-GIVEN: $t = 1.5, p = 0.55$; FOCUS-NEW: $t = -0.13, p = 0.99$; GIVEN-FOCUS: $t = -0.15, p = 0.2$; NEW-FOCUS: $t = 0.62, p = 0.97$).

4.4.3   Experiment 3: Summary

In summary it can be noted that accents of post-verbal members of foci are marked primarily by an increase in f0 maxima. Duration also seems to be a correlated of focus in both the IPV and the CF focus positions: while both conditions which placed focus in the IPV position saw

an increase of duration on the accented syllable, in the case of foci in the CF while the tendency was there for both conditions these only reached the level of significance in the GIVEN-FOCUS condition. Besides f0 maxima and duration accents of foci in the IPV position were not marked by any other cue, while those in the CF position were realised with higher f0 minima and intensity as compared to the baseline condition. The higher values for both f0 maxima and minima, while no significant differences in f0 range indicate that focused accents in the CF position are shifted higher in their entirety. This shift with the added presence of higher intensity means that focused accents in the CF position are marked by more phonetic cues than those in the IPV position.

In terms of boundaries it can be stated that there was no visible boundary between the verb and the IPV in any of the focused conditions. If the increased duration on the final syllable of the IPV constituent when it was in focus in the FOCUS-GIVEN and FOCUS-NEW conditions can be understood as pre-final lengthening, then the boundary between the IPV and CF constituents can be understood as being more prominent in these conditions. In conditions where the focus was in the CF constituent, there is some indication of a boundary as shown by the longer duration on the IPV final syllable in the GIVEN-FOCUS condition. Fundamental frequency did not seem to play a role at the boundary between the verb and the IPV constituent. In the case of the boundary between the two post-verbal constituents f0 (maxima and minima) was only different if focus was in the CF position. This tendency may be analysed such that the pitch contour had already started to move, at this point, to meet the higher target on the accented syllable of the focus in the CF position.

The results did not show that givenness played an important independent role, when appearing with focus. There was only one instance when a given constituent was marked differently from a contextually new constituent when both were compared to the BASELINE conditions: if a given item appeared in the IPV position the f0 maxima on the vowel of its accented syllable was realised latter. There were however no instances when given and contextually new constituents, which appeared as clause mates of focus were significantly different from each other.

4.5 Interim discussion: prosodic realisation

This section has presented three experiments designed to investigate the phonetic realisation of post-verbal foci. Three different focus types were used in an effort to increase the empirical coverage of the experiments. These were "simple" focus (Experiment 1), focus marked with the focus sensitive particle *is* 'also' (Experiment 2), and the post-verbal member of a double focus

construction (Experiment 3). These focus types differed in their syntactic marking: the foci in Experiment 1 & 3 were unmarked, while Experiment 2 was marked; and their exhaustivity: the foci in Experiment 1 & 2 were non-exhaustive (information foci) while in Experiment 3 focus was exhaustive (identification focus). The results of the series of forced choice tests presented in Chapter 3 indicated speakers show a preference for placing focus in the immediately post-verbal (IPV) position, over the clause-final (CF) position. There fore, the experiments presented in this chapter investigated the effect of word order on the phonetic realisation of focus. The following will summaries the results while trying to answer the following questions: (1) Which cues were used to mark focus in the post-verbal domain? (2) Was there a difference in the real-isation of different focus types? (3) Was there a difference in the realisation of foci depending on their syntactic position (IPV vs CF)? (4) Can any effect of givenness be identified from the data gathered in these experiments?

Data regarding the realisation of focus was gathered in two ways. First the accented sylla-bles of the post-verbal constituents were examined for any correlation with focus marking, then areas where prosodic boundaries were postulated were examined for any effects of prosodic phrasing associated with focus marking.

4.5.1   Accent realisation

The results for the accented syllables are shown in Table 4.2. In the table, the results for the FOCUS-GIVEN and FOCUS-NEW as well as the GIVEN-FOCUS and NEW-FOCUS conditions were merged in order to reflect only focus marking. If there was a significant effect of focus in either one of these conditions then the effect was considered to be significant. For example, in Exper-iment 3, higher f0 maxima was only attested in the FOCUS-GIVEN condition, but in the table this cue is considered to be associated with focus none-the-less. The rationale behind merging conditions like this, was that often, even if a tendency was only statistically significant in one member of the condition pairs, the barplots often indicated it was also present in the other member as well. The cues shown are f0 maxima, minima and range, as well as the alignment of f0 maxima within the vowel of the accented syllable, syllable duration and intensity relative to the utterance mean.

In answering question (1) above, the table shows that the primary correlate of focus ac-cros all focus types and post-verbal positons was higher f0 maxima. While other features, like higher f0 minima and longer duration were also present, these do not show the same consis-tency and are more influence by focus type and position. Section 2.5.2 presented findings from two recent studies Mády (2012, 2015) and Genzel et al. (2015) which examined the prosodic

Focus type	Position	f0				Duration	Intensity
		max	min	range	align.		
simple foc.	IPV	higher					
	CF	higher	higher				higher
is foc	IPV	higher	higher			longer	
	CF	higher	higher	larger			
double foc.	IPV	higher				longer	
	CF	higher	higher		earlier	longer	higher

Table 4.2: Cues associated with focus on the accented syllable of each post-verbal constituent: immediately post-verbal (IPV) and clause-final (CF), for the three types of focus tested. New/given conditions were merged to reflect only focus marking.

realisation of pre-verbal narrow foci. Mády (2012); Mády (2015) did not find that pre-verbal focus was produced characteristically differently from non-focused items in the pre-verbal position, she found minimal differences in this respect. Specifically she found no consistent effect of focus on f0 maxima, but she did find that focus correlated with latter alignment of f0 maxima. Non-the-less, Mády (2015) reported the results of a perception study where participants showed a preference for higher f0 maxima as a marker of focus. Genzel et al. (2015) did find an effect of focus in higher f0 maxima in pre-verbal foci, as well as a steeper fall of the f0 contour. The study reported here confirms the correlation between focus and higher f0 maxima reported in Genzel et al. (2015). In terms of alignment and slope however the picture is not as clear. While Mády (2015) reported on lager alignment of f0 maxima, this study only found evidence for earlier alignment, and that only only the CF position of the double focus experiment. The present analysis did not consider f0 slope, and leaves a more detailed examination of that aspect for a later study. However, the fact that higher f0 maxima was often also accompanied by higher f0 minima and the relatively unaffected f0 maxima alignment and range suggest that the contour of the accents remained, for the most part unchanged, rather it was their prominence in terms of pitch height that was modified.

Table 4.2 also reveals that there were different trends in marking of focus between focus types. One way to quantify this difference is to look at how many cues each focus type was associated with. In this respect "simple" focus, seems to show the least amount of marking. This focus type is only associated consistently in both the IPV and CF positions with higher f0 maxima, while the CF position also displays higer f0 minima and intensity. Focus marked with *is* seems to be associated with higher accent realisation as shown by consistently higher f0 maxima and minima in both the CF and the IPV positions. The post-verbal member of a double focus construction is consistently marked not only by higher f0 maxima, but also by longer duration, in both positions.

If it is assumed that focus marking in Hungarian is performed as an interaction of syntactic

and prosodic phenomena, than it is safe to say that focus types which are clearly marked syn-tactically are more likely to be less marked prosodically. In comparing the trends observed for "simple" and *is* marked foci the oposite may be observed. Both of these focus types are iden-tification foci, therefore the only difference between them is the presence of the focus sensitive particle, which should, if the above hypothesis is correct, lessen the need for prosodic focus marking. None-the-less, the oposite trend is observed. One possible explanation for this may be found in the nature of the experiments. The presence of the *is* particle may have enforced the particular constituent's focus status, leading to a more consistent prosodic realisation. While participants may have produced the unmarked variant with out expressing its focus status. In this respect syntactic marking of focus with the particle in the post-verbal domain is different from syntactic marking in the canonical pre-verbal focus position, in that, the presence of a focus in the pre-verbal position is expected while post-verbal foci may be less felicitous, such that if unmarked their they may be less frequently realised as actual foci.

The comparison of "simple" focus and focus marked with *is* with double focus, serves to highlight the difference between informational and identification focus types. While all three were consistently marked with higher f0 maxima, only the double focus was consistently also marked with an increase in duration. While other focus types also exhibit durational marking, and a higher number of statistically significant cues related to f0, it is important to note that duration in the case of double focus is present regardless of the position of focus in the post-verbal domain. This may be understood to mean that while information focus is consistently only marked with f0, identification focus is marked with the additional feature of duration. Therefore, identification focus is marked along more parameters than information focus. This is consistent with the view, as suggested by eg. Féry (2013), which holds that foci higher in the focus hierarchy are associated with a higher consistency of otherwise optional focus marking cues.

Turning now to differences between the IPV and CF positions, Table 4.2 reveals that there is a trend for the association of the focus in the CF position with greater degree of phonetic focus marking. In the case of "simple" focus this means that while focus in the IPV position was only associated with higher f0 maxima, focus in the CF position was realised with higher f0 maxima and minima as well as higher intensity. A similar trend is observable in the case of double focus, where focus in the CF position is "matched" with the cues associated with focus in the IPV position (higher f0 maxima, longer duration) and is also associated with higher relative intensity and earlier f0 maxima alignment. The trend seems to be broken in the case of focus marked with *is*, where foci in the IPV and CF positions seem to be matched for marking in

terms of number of significant cues, and the focus in the IPV can be considered to be marked on more accounts since duration is class of cues not associated with focus in the CF position. As noted earlier the reason for the different behaviour of this focus type is likely the fact that it is syntactically marked. Since neither "simple" focus or double focus are marked overtly their association with a given word order position likely has a larger bearing on their prosodic realisation, than in the case of focus marked with *is* where syntactic marking is independent of word order. If this reasoning is on the right path, then the interpretation of the results is the following: the accented syllables of post-verbal foci are associated with a higher number of cues when they appear in the clause final position as opposed to the pre-verbal position. Thus it can be concluded that the accents of foci in the CF position are more prominent than those in the IPV position.

In terms of the accent realisation on the verb it can be noted that there is little evidence to suggest that deaccentuation of the this accent occurs in the focused conditions. This would imply that accent realisation in the post-verbal domain does not involve the shifting of prominence from the verb initial syllable into the post-verbal domain.

4.5.2 Boundary realisation

Besides accents, the study also examined potential boundaries to ascertain if the presence of focus alters the prosodic phrasing of the post-verbal domain. Pre-final lengthening (duration) and f0 were considered in this respect, the main findings of the study are presented in Table 4.3. The table breaks down the results for each experiment according to three potential boundaries. The final syllable of the verb is potentially a pre-focal boundary if the constituent in the IPV is in focus as in the FOCUS-GIVEN and FOCUS-NEW conditions. The final syllable of the IPV constituent may be a post-focal boundary if the IPV constituent itself if in focus (FOCUS-GIVEN, FOCUS-NEW), or it might be a pre-focal boundary if the CF constituent is in focus as in the GIVEN-FOCUS and NEW-FOCUS conditions. The changes indicated in the table related to the comparison of the focus conditions with the BASELINE condition. The table shows the results of duration, both on the final syllable of the verb/IPV constituent, as well as the definite article preceding each post-verbal constituent, which usually form part of the preceding prosodic phrase. The table also shows the results of measurements taken of the f0 contour: f0 maxima, minima, range and the alignment of the f0 maxima.

The data shown in Table 4.3 suggest that the presence of focus in the post-verbal domain has some effects on duration and f0 on syllables preceding potential boundaries. longer duration was observed on the final syllable of the IPV constituent most often when the IPV constituent

Focus type	Boundary	Duration		f0			
		fin. syl.	def. art.	max	min	range	align.
simple foc.	pre IPV-foc			higher			
	post IPV-foc	longer	longer				
	pre CF-foc		longer				
is foc	pre IPV-foc			higher	higher		
	post IPV-foc						
	pre CF-foc			higher	higher		earlier
double foc	pre IPV-foc						
	post IPV-foc	longer	longer				
	pre CF-foc			higher	higher		

Table 4.3: Cues potentially associated with prosodic boundaries as measured on the final syllable of the verb and the IPV constituent.

was itself in focus, as in the case of the "simple" focus and the double focus experiments. Recall from the results regarding accents shown in Table 4.2 that at least in the case of "simple" focus there was no observed lengthening on the accented syllable of IPV focus. It stands to reason therefore, that the lengthening observed on the final syllable of the IPV when it was in focus relates not to the prominence of the accented syllable, but to the boundary following this constituent.

In the case of post-verbal members of double focus constructions, there was an observed durational difference on the accent as well, it is conceivable therefore, to assume that the increased duration is in relation to the prominence reflected by the fact that the IPV constituent was in focus. Another possible interpretation would be to assume that the increased duration on the accented syllable is due to this focus type's status as identification focus and is localised to the accent, while the lengthening observed on the final syllable of the constituent, as well as the definite article following it, is a boundary phenomena. The advantage of this second interpretation is that it is in line with the observations made in the case of "simple" focus, since in both cases the effect would be due to a boundary, while the difference in duration of the accented syllable is due to the difference in focus type. This question can be further explored by considering the duration of word internal syllables in the IPV constituent.

No durational differences were found on the final syllable of the verb or the IPV in the case of focus marked with *is*. If the trend in this case is similar to the other two type of focus, then no lengthening is expected on the final syllable of the verb or the IPV if the IPV is followed by focus is the CF position. The problematic case is when the IPV is in focus, and lengthening is expected based on the other two experiments. The fact that no durational differences were measured could be due to the design of the materials. In this experiment sentences like the one in (25-a) served as the baseline for sentences like (25-b).

(25)   a.   Attila már   elájult   a   málnásban   a   melegtől.
           Attila already prt.fainted the raspberry field.in the heat.from

      b.   Attila már   elájult   a   málnásban   is   a   melegtől.
           Attila already prt.fainted the raspberry field.in also the heat   from
           'Attila has already fainted (also) in the raspberry field from the heat.'

Unfortunately, since the particle *is* is associated with focus it could not be included in the baseline, borad focus condition. Its inclusion however meant that the two sentences were not string identical, crucially the particle is located at the end of the IPV constituent, therefore making comparisons with the baseline imprecise. Because of this, it is reasonable to argue that the lack of durational differences with regard to the focused IPV constituents should not be taken as a counter argument to the presence of pre-final lengthening as suggested by the other two experiments.

Table 4.2 also shows the presence of differences in f0. Higher f0 maxima were observed on final syllables of the verb and the IPV if they were followed by focus, in some cases this was also reflected in higher f0 minima and in one case there was a change in the alignment of f0 maxima. In the case of simple focus this was observed on the final syllable of the verb, in the case of focus marked with IS on both the final syllable of the verb and the IPV constituent, and in the case of double focus, only on the final syllable of the IPV constituent. Except for the possibility that, as in the case of accents outlined above, consistent upward shift of both f0 maxima and minima were only observed on focus which was also syntactically marked, there is little systematic patterns observable in the distribution of these results. Measurements of f0 were taken in order to determine if f0 is used to mark a boundary before or after a focused constituent. A boundary can be marked by a high or a low boundary tone. The fact that f0 maxima are higher before foci however, do not mean that there is a presence of a high boundary tone, their presence is also consistent with the notion that f0 movement on pre-focal syllables changes in an effort to meet the higher f0 maxima values seen on the accented syllables of focused constituents. This explanation is supported by the fact that higher f0 phenomena do not correlate with durational cues which may be understood as instances of pre-final lengthening. In the following analysis therefore, f0 values measured on the final syllables will not be considered in terms of prosodic phrasing.

Since differences between focus types regarding pre-final lengthening have already been considered above, let us turn now to differences in prosodic phrasing regarding the position of focus. If the focus occurred in the IPV position, it was not preceded by any durational cues indicating the presence of a boundary, however in the "simple" focus and double focus experiments the final syllable of the IPV showed durational cues consistent with pre-final lengthening, as

argued for above. If the focus occurred in the CF position, it was, in most cases, not preceded by durational cues indicating a prosodic boundary. The boundary following the focus in the CF position was the final boundary of the sentence, it was considered that any focus related boundary phenomena would be confounded by this fact, therefore it was not considered in this analysis. It appears therefore, that the only consistent boundary phenomena found by this study were durational cues that can be analysed as pre-final lengthening following a focus in the IPV position.

4.5.3 Givenness

The production study reported in this section did not consider givenness as an independent factor, only in combination with focus. The reason for this was methodological. Including givenness would have raised the number of conditions in each experiment from 5 to 7, it was believed that such a high repetition of various versions of the target sentences would have had an adverse effect on isolating the effects of the individual information structural categories. Therefore a more detailed investigation of givenness was left for further research.

There is something to be said about the effects of givenness in the background of focus, by comparing conditions where focus was in one of the post-verbal position and the other was either contextually new or given (for example: GIVEN-FOCUS with NEW-FOCUS). It can be stated that in most cases the non-focused constituent in these conditions did not exhibit differences from each other. There were very few cases where givenness had an effect which distinguished it from its contextually new counterpart. In most cases where there was a difference, the difference was visible only when comparing the given constituent against its baseline controll, where the given constituent (GIVEN-FOCUS) was different but the new constituent (NEW-FOCUS) was not. This difference however often disappeared when the non-focused constituent were compared with each other. It can be assumed therefore, that at least in the presence of focus, givenness has little effect on the constituent with which it is associated.

4.5.4 Prominence marking

Recall from 2.5.2, that Mády et al. (2016) investigated prominence marking in Hungarian by a production experiment where aspects such as information structure and syntax were reduced as much as possible to investigate only prosodic prominence marking. That study found that prominent items were preceded by significantly more pauses and pre-final lengthening than their non-prominent counterparts, further more, lengthening was observed on the final syllables of the target items. While there were not a significantly larger number of pauses following

the target items their duration was lengthened when the target items were prominent.

Pauses were initially taken into consideration by this study, but they were not included in the final analysis. The reason for this decision was that there was a relatively low number of pauses (5-25 pauses for 960 conditions per experiment), when these pauses were inspected it was found that a high number of them constituted hesitations. It was concluded therefore, that a more systematic study of the pauses would be conducted by further research of the material gathered in the experiments reported here. None-the-less some comparison can be made between Mády et al. (2016) and the present study. In the case of the IPV constituent there was no observed pre-boundary lengthening observed before focus/prominence, but there was lengthening on the final syllable of the prominent item, which was argued above to be a case of pre-final lengthening. In the case of the CF constituent there was limited pre-final lengthening observed before a prominent item. It can be conclude that the presence of syntactic structure, as compared to the lack of syntactic structure in the study by Mády et al. (2016) had an influence on the application of prosodic marking of prominence. This is further supported by the findings discussed above that the accents of the two post-verbal constituents are realised differently when they are focused.

4.5.5 Summary

The main findings of the series of experiments on the prosodic realisation of post-verbal focus can be summaries as follows:

Finding 1 : Primary marking of focus on accented syllables is achieved by higher f0 maxima. Other cues, like higher f0 minima and range, as well as intensity and duration may also present.

Finding 2 : Focus does not correlate with an increase in boundary strength preceding the focused constituent in either the IPV or the CF position. Focus does correlate with the increase of boundary prominence as indicated by the durational cues on the final syllable of IPV foci.

Finding 3 : Higher level, identification focus is marked by a higher number of cues than lower level information foci.

Finding 4 : Focus that is also marked by an overt particle behaves differently from focus that is only marked through prosody, in that it is often realised with more prosodic cues.

Finding 5 : Focus is realised with different prosody when it occurs in the IPV vs the CF position. In the IPV it is primarily associated with higher f0 maxima as well as a post-focal

boundary, while in the CF position other cues, like higher f0 minima and range as well as intensity are also present beside f0 maxima, but there is not a strong correlation with increased pre-focal boundary prominence.

Chapter 5

Main Discussion

This final section will propose an account for the data gathered in the two sets of experiments reported in this study. In the discussion of the forced choice experiments on word order in Section 3.6 it was concluded that word order phenomena associated with focus and givenness in the post-verbal domain would be difficult to grasp from a point of view of a theory operating strictly within the domains of syntax, and that they would be better understood as the result of the interaction between the syntactic properties of this domain, the prosodic structure of the language and the needs and requirements in terms of prominence of the two information structural categories examined here. In order to set up such a theory it is important to formulate the exact requirements that it would have to meet interms of accounting for the main empirical findings of this study:

The results of the forced choice experiments : which found that constituents in focus tend to appear in the immediately post-verbal position as opposed to the clause final position. Further more that $given_{topical/backgrounded}$ are also preferred in the immediately post-verbal position, while simple textually given constituents do not show word order preferences.

The results of the production experiments : which found that the prosodic realisation of post-verbal focused constituents is different depending on the position (IPV vs CF) that they occupy. If the focus is in the immediately post verbal position it is not preceded by a boundary, but it is followed by one, and its accent is minimally (consistently only by f0 maxima) different from its broad focus counterpart. If the focus is in the clause final position, its accent is consistently more marked than its broad focus counterpart as compared to a focus accent in the IPV position, by way of higher f0 maxima and minima as well as higher intensity. It is some cases may also be preceded by a boundary, but not in a very

consistent way.

The nature of the data : Further more, the data present some problematic issues for a potential model. Primarily the fact that word order preferences, and prosodic realisations seem to be preferential in nature, and not obligatory. Therefore the model must allow for some amount of flexibility. Second, post-verbal focus and given$_{topical/backgrounded}$ material seems to prefer the same position, which is unexpected from a theoretical standpoint, and also requires an added level of flexibility in the model.

How interface theories already formulated for Hungarian can deal with the empirical findings of the study in Section 5.1 and then, in Section 5.2 a proposal will be outlined which addresses some of the problematic issues detailed in Section 5.1 as well as accounting for the findings.

5.1   The findings and previous approaches

Recall from Section 2.5 that there are a number of theories, most notably Varga (1983, 2002); Kálmán & Nádasdy (1994), which do not assume that the prosodic structure which is mapped onto a sentence has a default most prominent position. This means that these approaches do not provide any prosodic motivation for word order variation. For example, in the case of Varga (2002), any syntactic constituent may be made more prominent by applying a prominence marking rule.

In terms of givenness the situation is the same, since there isn't a default non-prominent position, then there is no ban on given items appearing there. Recall from Section 2.5, that despite this, the claim by Varga (1981), that contextually given material does not occur in the sentence final position, seem to hold for the results of forced choice Experiment 1 & 2. In Varga's model however, this is not due to the fact that the IPV position is less prominent than the CF position, but merely because he deems the clause final accent obligatory, and assumes that given material must be deaccented. He does not however differentiate between different types of givenness, in the example provided in Varga (1981), the given item is merely contextually given, not topicalised or backgrounded.

Most approaches within the generative grammatical theory (Szendrői, 2001, 2003; É. Kiss, 2002) assume that there is a prominent position in Hungarian prosodic structure, and that this position is on the left-edge of intonational phrase and in the syntax-prosody mapping it is aligned with the left-edge of the predicate, as shown in (1).

(1) $[_{Predicate}$ (Focus/PRT) Verb ... XP YP]
         (* $)_{IP}$

As noted in Section 2.5.1, this assumption was used by Szendrői (2001, 2003) to create a theory of focus movement to the pre-verbal focus position which sees the driving force behind this movement as a need of the constituent in focus to be aligned with the most prominent accent of the sentence. By framing the motivation for focus movement as in interface related phenomena, this type of approach solves many of the problems associated with purely syntactic analyses as outline in Section 2.2.1. The theory of prosody driven focus movement proposed by Szendrői (2001, 2003) has been further developed in Hamlaoui & Szendrői (2015); Szendrői (2017). Hamlaoui & Szendrői (2015) modify Szendrői's (2001) original proposal by positing a flexible approach to syntax-prosody mapping which doesn't identify a particular projection to mapped onto an IP, instead this projection is defined by the position of the finite verb, such that its highest projection is understood as the clause, which is then mapped onto an IP. The other important claim by Hamlaoui & Szendrői (2015) is their formulation of the *nuclear stress rule*, which states that the default position of nuclear stress is often at the edges of IPs, and languages may vary in which edge this is at (right: English, Italian; left: Hungarian).

In trying to account for the word order phenomena found by the forced choice experiments let us look at a simplified version of the left-headed proposal. It can be argued that the preference for the placement of focus in the immediately post-verbal position is due to the fact that after mapping from syntax to prosody that position is at the left-edge of an IP. The simplest assumption would be to say that the structure looks something like in (2), where the clause is mapped onto an IP, with its left-edge coinciding with the left edge of the predicate (which in this case is occupied by the verbal particle), as proposed by Szendrői (2001), and with in it, there is another IP, which contains the post-verbal constituents. In this case, one possible assumption would be to posit that the inner IP is mapped onto the VP, while the matrix IP is mapped onto the largest extended projection of the verb (as proposed by Szendrői (2001)).

(2)   (Prt-Verb $(XP1_{foc} XP2)_{IP})_{IP}$

Such a structure would account for the fact that post-verbal foci are preferred in the immediately post-verbal position, since the item in the IPV would be on the left edge of the IP which is mapped onto the VP, thereby it would be in a prominent (edge) position. This account would also account for the fact that foci in the two post-verbal positions were realised differently, with a greater degree of prosodic modification on the accent of the constituent if it was in focus in

the CF position. Since a focus in the CF is not on the left-edge of in IP it would need to achieve prominence by way of an accent shift, whereby the prominent accent from the IPV position is shifted to the CF position resulting in the more prominent values observed there. Putting aside the question of how would such a proposal fit into the theoretical framework proposed by Szendrői (2001), it must be concluded that this structure fails to account for other important findings of this study. If the IPV position is on the left-edge of an IP there is no accounting for the observed boundary phenomena after the IPV focus. Further more, the fact that given$_{topical}$ and given$_{backgrounded}$ constituents prefer this same position casts doubt on its status as being prominent by default. It would also be problematic that there was no real deaccentuation observed on the IPV constituent when focus was in the CF constituent, as would be expected in the case of an accent shift.

Another possibility would be to say that prosodic prominence in the case of post-verbal foci is not assigned by placing them in a position of default prominence. Hamlaoui & Szendrői (2015) propose that this is the case for the *is*-marked foci and universal quantifiers in Hungarian. Neither of these two are acceptable in the pre-verbal focus position, due to the fact that their interpretation is not compatible with exhaustivity Szabolcsi (1994). Hamlaoui & Szendrői (2015) propose two possible strategies for linking these types of phrases with the nuclear accent of the sentence: accent shift and mapping misalignment.

(3)   a.   *A vizsgán mindenki MINDENT oldott meg egy óra alatt.
             the exam.on everyone everything.acc solved prt one our under

        b.   A vizsgán mindenki MINDENT megoldott egy óra alatt.
             the exam.on everyone everything.acc prt.solved one our under

        c.   A vizsgán mindenki megoldott MINDENT egy óra alatt.
             the exam.on everyone prt.solved everything.acc one our under
             'At the exam, everyone solved EVERYTHING in an hour'

The examples in (3) are taken from Szendrői (2017). The sentence in (3-a) illustrates the unacceptability of a universal quantifier the pre-verbal focus position. (3-c) illustrates accent shift. Szendrői (2017) claims that in this case the nuclear accent is shifted from its default position to the post-verbal position of the universal quantifier. (3-b) illustrates the strategy of misaligned mapping, where the universal quantifier is not in the position normally mapped as the left-edge of an IP, but the mapping (at a cost) is done in such a way that the left-edge is aligned with the quantifier. These two possibilities are also available for the *is*-marked focus.

The possibility of accent shift makes it available at least in the case of the *is*-marked focus to

achieve prosodic prominence. However, this suggestion does not directly account for the word order preferences observed in the forced choice experiments, since if accent shift is possible, it may be shifted to either one of the post-verbal constituents. It may be argued that in this case the constituent in IPV is preferred, since it is closer to the original placement of the main accent. However the accent shift approach does not account for the fact that there was a difference between the prosodic realisation of the two constituents, since supposedly a shifted accent would be realised in the same way on either one. Further more, there was no indication in the results of the production study that would suggest a decrease in prominence on the verbal particle. This would be unexpected given the marked prosodic structure that would arise in a situation of accent shift. Finally, since this account does not propose an asymmetry in the default prominences of the post-verbal positions it could not easily account for the word order phenomena associated with givenness. Givenness effects would then have to be accounted for non-prosodically.

The approach outlined in Hamlaoui & Szendrői (2015); Szendrői (2017) also formulates three constraints which are claimed to be active in Hungarian, and other languages to derive the correct prosodic structures for each. These are shown in (4).

(4)   a.   **EndRule-L**: Main stress is on the leftmost phonological phrase of the IP.

   b.   **EndRule-R**: Main stress is on the rightmost phonological phrase of the IP.

   c.   **Stress-IP**: Every IP has a stressed phonological phrase (Violated by headless IP.)

These constraints, together with the Stress-Focus Correspondence Principle (Reinhart (1995, 2006), Section 2.4.3) derive the movement associated with pre-verbal focus in Hungarian, in which case the ordering of the rules is such: Stess-IP >> EndRule-L >> EndRule-R. Other languages may have other rankings of these constraints, Szendrői (2017) brings Italian as an example, where she proposes that the ranking is reversed in terms of the EndRule constraints: Sterss-IP >> EndRule-R >> EndRule-L. This ranking derives the position of the focus in Italian as being at the end of the clause.

Italian, however has focus constructions where the the focus can appear sentence medially or even on the left-periphery. If Italian can be considered as the mirror image of Hungarian with regards to the ranking of the EndRule constraints, then can the model developed for it by Szendrői (2017) be used to account for Hungarian? In other words, if the pre-verbal focus in Hungarian is the equivalent of the sentence final focus in Italian, can the IPV focus and the CF focus be accounted for in the same way as the sentence medial and left-peripheral focus in Italian?

Szendrői (2017) argues that in Italian both sentence medial and left-peripheral foci are in the right most position with their IPs, and that any material occurring to the right of them is the result of right dislocation of that material. It is argued that in such cases this material does not receive the main stress reserved for focus. If Hungarian were to work in a similar way, it must be assumed that both the IPV focus and the CF focus occur on the left-edges of their IPs, with any material to their left being there as a result of left dislocation. Concentrating now only on the prosodic evidence gathered in this study, and leaving aside the syntactic aspects of such a proposal, it can be seen that it would be difficult to analyse Hungarian in the same way. Primarily it doesn't seem as though the accent on the verbal particle/verb is diminished by the fact that there is a focus in the post-verbal domain. Second, if the focus is in the IPV there does not seem to be a boundary before it. Third if the focus is in the CF position, the accent on the constituent in the IPV does not seem to be diminished.

Left-headed approaches therefore face problems when accounting for the data, if a position of default prominence is proposed in the post-verbal domain it does not account for some of the observation of a prosodic boundary following the IPV constituent. If there is no position of default prominence in the post-verbal domain and the possibility of accent shift is used, then word order phenomena associated with both givenness and focus remain unaccounted for, as well as the accent on the verbal predicate/verb.

5.2   A proposal for a prosody based account

This section will present a possible way to account for the data gathered in this study. Although there can be many different possibilities to achieve this, the proposal outlined here will rely on notions that have already been put forward for Hungarian syntax and prosody as closely as possible. One premise that may be adopted here regards the notion of the presence of default prominence (or headedness) observable within the IP. While both headed and non-headed approaches have been suggested for Hungarian, an approach which holds that there is a position of default prominence in the intonational representation is perhaps better suited to account for word order variation related to the needs of constituents to either achieve prominence or be deaccented.

If a model based on this premise is to account for the results of this study then the following assumption must also be made: there is position of prominence in the post-verbal domain, which attracts constituents in focus and "repels" given$_{topical/backgrounded}$ material. The difficulty is that that this position of prominence has to be able to be associated both with the IPV, to account for the preference of focus in that position, and the CF position to account for the

dispreference of given constituents in that position. In this latter aspect it is not wholly unlike the proposal by Varga (1981), albeit in a completely different theoretical approach.

While the left-headed approach propagated by Szendrői (2001, 2003) and its later development in Hamlaoui & Szendrői (2015); Szendrői (2017) cannot account for the results of this study in their present form, the formulation of the prosodic structural constraints in Hamlaoui & Szendrői (2015) provide a good starting point for developing a model that can deal with this data, because it includes a reliance on phrase edges to mark out prominence.

It is proposed therefore that something like the Hamlaoui & Szendrői's (2015) EndRule-L and EndRule-R are present in Hungarian, making the edges of IPs structurally prominent positions. For the time being, no position is taken on the ranking of which edge is more prominent or which of them is associated with a the notion of "head". Furthermore, it is also assumed that there is a redundancy in focus marking: when it comes to the pre-verbal focus both syntactic and prosodic markings are used. The syntactic marking is achieved by fronting to the special pre-verbal syntactic position, manifested by the post-verbal occurrence of the verbal particle in sentences that contain one. While the prosodic marking is achieved by placing the focused constituent at the left-edge of an IP. There also must be a general requirement to mark focus, either syntactically or prosodically, to distinguish narrow focus from broad focus constructions. Based on these the following constraints may be formulated. The two constraints in (5-c) and (5-d) are in obvious conflict. For now they will be considered to be tied in their ranking, and issue which will be considered later.

(5)   a.   **Mark-F**: Mark narrow focus either prosodically or syntactically.

     b.   **IP-edgeProm**: The edges of IPs are prominent.

     c.   **Align-FocLeft**: Align a constituent in focus with the left-edge of an IP.

     d.   **Align-FocRight**: Alight a constituent in focus with the right-edge of an IP.

Let us now see how these constraints account for the data. First, lets consider a syntactic structure with a pre-verbal narrow focus and its associated prosodic structure as shown in (6)

(6)   [XP$_{foc}$ Verb prt YP ZP]
     (*   )$_{IP}$

It can be seen that the focus is marked syntactically, as also shown by the post-verbal position of the verbal particle, and that it is marked prosodically by conforming to the Align-FocLeft contraint, which aligns the constituent in focus with the left-edge of an IP. But what distinguishes the structure above from one where the prominence and thus focus is aligned with the right

edge at the position of ZP? In other word why is Align-FocLeft used here? At this point there are two options, it may be that Align-FocLeft is ranked higher than Align-FocRight, therefore, all things being equal it will determine alignment. It is also a possibility that pre-verbal identificational focus is distinguished from post-verbal information focus through a requirement that it occupy the canonical pre-verbal focus position, therefore the adherence to the Align-FocLeft constraint happens independently of the prosodic requirement of focus. This way the pre-verbal focus is marked redundantly. At this point there is no position taken on the mechanism which achieves pre-verbal focus movement (wether it be syntactic or prosody driven). However a mapping rule such as that proposed by Hamlaoui & Szendrői (2015), where in IP is mapped onto the extended projection of the position where the finite verb ends up at spell out, is assumed to be active. This results in an unmarked prosodic structure, where an single IP contains the whole clause. This IP will not have marked intonation, as Hamlaoui & Szendrői (2015) also proposes.

Turning now to the constructions tested in this study, let us consider first the preferred word order for focus, where the post-verbal focus occurs in the IPV, as shown in (7). As noted earlier if a prosody driven explanation is sought, than this position must be made prominent somehow by the prosodic structure.

(7)   [Prt.Verb XP_{foc} YP]

(8)   a. $((Prt.Verb\ XP_{foc})_{IP}\ YP)_{IP}$

          b. $(Prt.Verb\ (XP_{foc}\ YP)_{IP})_{IP}$

          c. $(Prt.Verb\ (XP_{foc})_{IP}\ YP)_{IP}$

          d. $(Prt.Verb)_{IP}\ (XP_{foc})_{IP}\ (YP)_{IP}$

This may be achieved by the prosodic structure in (8-a), where an IP final boundary is inserted after the IPV focus. This way the IPV focus would be aligned with the right edge of an IP, thus satisfying the Align-FocRight constraint. The Mark-F constraint is thus also satisfied. While the option for left aligned structure is also available as in (8-b), the predictions this structure would make are not borne out, as most visible in the lengthening indicating a post-focal boundary after the IPV focus (as discussed above). The prosodic structures in (9) and (10-a) would also satisfy the constraints in (5). In both cases the focused constituent is on the edge of an IP and is therefore marked for focus. These structures however are ruled out on the one hand due to the fact that the there was no pre-boundary lengthening observed at the end of the verb, on the other the mapping of IPs in such would entail the formulation of a mapping rule that could not be restricted since it does not assign IPs to syntactic structure in a principled way.

The placement of focus in the CF position (9) is not preferred, but it is not excluded either, therefore this proposal should be able to account for it in some way.

(9)   [Prt.Verb XP YP$_{foc}$]

(10)   a.   (Prt.Verb XP (YP$_{foc}$)$_{IP}$)$_{IP}$
        b.   (Prt.Verb XP YP$_{foc}$)$_{IP}$

The structure in (10-a) would achieve prosodic marking by placing the clause final focus in an IP of its own, abiding by the Align-FocLeft constraint, or by simply leaving the prosodic structure in its unmarked form as in (10-b). This seems the most economical, out of all possibilities for post-verbal focus, yet it is not the preferred position for focus as indicated by the forced choice experiments. This maybe because placing the focus in this position and not altering the prosody of the sentence violates the Mark-F constraint. The focus in the clause final position (or any post-verbal position) is not marked syntactically. While it is on the right edge of an IP, seemingly abiding by the Align-FocRight constraint, it still violates the Mark-F constraint, because having focus in this position with an unmarked prosodic structure makes it indistinguishable form broad focus sentences. A different strategy must then be applied, namely increasing the prominence of the accent on the focused constituent. This was observed in the production experiments and accounts for the reason why the accents on the CF focus constituent were realised differently than those on the IPV constituent.

In terms of givenness, the approach outlined thus far also seems to make the correct predictions. It must be assumed however that simple textual givenness, as texted in Experiment 1 of the forced choice experiments, is not associated with deaccentuation, but that given$_{backgrounded}$ and given$_{topical}$ are deaccented. In a prosody driven movement approach this would mean that material that is deaccented is moved out of positions which bear prominence. Since the force choice experiments showed that the preferred word order for given$_{backgrounded/topical}$ material is as shown in (11), it must mean that this position is in some way less prominent from the CF position.

(11)   [Prt.Verb XP$_{backgrounded/topical}$ YP]

(12)   ($_{L-edge}$Prt.Verb XP$_{backgrounded/topical}$ YP)$_{R-edge}$

In the model being outlined here, this, in fact, is the case, as the IP shown in (12) is what is being mapped onto the sentence in (11) in the default case. This means that while the left and right-edges of the IP bear some sort of prominence in accordance with the IP-edgeProm

constraint in (5-b), the IP internal IPV position does not, therefore it is the ideal position for deaccented or non-prominent material. This way the assumption that not only the left, but also the right edge of an IP bears some prominence also explains the word order preferences associated with givenness. Further more, it solves the problem of why given and focused material wanted to appear in the same position. While syntactically it was the same IPV position in both cases, prosodically this position was mapped onto a much diffrent structure. The fact that some of the forced choice experiments showed an apparent competition for the IPV position between the given and the focused constituents can be best explained by the flexibility of the focus realisation. If post-verbal focus was strictly associated with only the IPV position it would likely always win out agains given constituents. However, since under the proper conditions focus may be realised in the CF position as well, when another factor which effects word order, like givenness is introduced to the post-verbal domain then its effects can be realised despite the preference for focus placement in the IPV.

This model however raises some questions, primarily regarding its compatibility with the left-headed IP approach of Szendrői. The underlying issue regards the headedness of the IP, in Szendrői's model it is essential that the IP has its head position, that is the accent of default prominence, at its left-edge. Whereas the model outlined above, up to this point, makes no assumptions about which edge of the IP is more prominent. In fact, it seems from the data, that given the choice, in the post-verbal domain at any rate, a right prosodic boundary is used, instead of a left one to signal the presence of focus in the IPV position. Can this be understood as an argument against the left-headed approach as suggested by Szendröi?

Under one possible formulation (MODEL1) of the model developed here this seems to be the case. At its most basic, the model does not assume that either of the edges of an IP are more prominent, just that they are more prominent as compared to IP medial positions. This would mean that under this formulation the premise adopted by Szendrői (2001) and in her subsequent work, that the default prominence of the left most accent in the IP is what drives focus movement would be inadequate. In this case the model could not differentiate between the pre-verbal identificational focus and the post-verbal information focus. To work around this, one possibility would be to assume that focus is not associated with the pre-verbal position. Meaning that focus can be marked either by the left or the right boundary, but identificational focus moves to the pre-verbal position for prosody independent reasons, such as exhaustivity as proposed by Horváth (1997, 2007). This would also mean that the stress-focus correspondance principle of Reinhart (1995, 2006) would also not apply, since under this formulation there is no *one* position of main accent within the IP. This model would take Hungarian out of

the head-edge prominence (Jun, 2005, 2014) group of languages, and pace it the edge promi-
nence group at least on the level of the intonational phrase.

In another formulation of the model (MODEL2) it is not necessary to do away with the
left-headed approach if it is reformulated somewhat. It is possible to assume a model where
both alignment with an edge of a prosodic phrase and prominence due to a singular default
prominence positon play a role. It may be assumed that while both edges can be used to
mark focus, one of them is more prominent than the other, making it, namely the left-edge,
the head of the IP. For our model this means that Align-FocLeft is ranked higher than Align-
FocRight, making it a stronger requirement. In this case, it could be argued that pre-verbal,
exhaustive foci are marked by both the edge of the IP as well as the head, while post-verbal
information foci are merely marked with an alignent with the edge of prosodic phrase. This
marking distinction may be derived if we consider the two focus types as members of a "focus
hierarchy". In such a hierarchy foci which are higher (identificational focus) are marked by
more prominent features (the edge-head complex on the left of the IP) while foci which are
lower (information focus) are marked by less prominent means (edge only). In this way the
distinction between information and identificational is achieved by prosodic means only, while
also keeping Szendrői's (2001) original motivation for pre-verbal focus movement.

A proposal for distinguishing between prominence (association with a prosodic head) and
alignment in this way is developed by Féry (2013). She argues that while prominence often
coincides with alignment in marking focus, alignment is the default correlate of focus. Further
more that foci which are stronger[1] are more likely to be realised with prominence as well as
alignment. This suggestion coincides with what has been said above regarding MODEL2.

This section has outlined the basics of a constraint based model that is driven by the data
gathered from the two sets of experiments reported in this thesis. It has argued that constituents
in focus must be marked somehow in Hungarian, and that this marking can either be syntactic
or prosodic. Two variants have been suggested, in MODEL1 the syntactic realisation of pre-
verbal focus was attributed to a semantic interpretational need as suggested by Horváth (1997,
2007) and in MODEL2 this word order variation was tied to the prosodic structure as originally
proposed by Szendrői (2001). An aspect at the heart of the proposal is the MarkF constraint as
outlined in (5-a). The exact status of this constraint raises some interesting questions. It can be
formulated in two ways, it can either be a grammatical constraint or a more general functional
constraint.

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[1] Féry (2013) sets up the following hierarchy: broad focus << information focus << identificational (exhaustive)
focus << association with focus particle (eg only) << contrastive focus << corrective focus. See Zimmermann &
Onea (2011) for more the focus hierarchy.

If it is considered to be a grammatical constraint with direct access to syntactic representations, then a more substantial formulation is needed than the one give in (5-a). Namely regarding the nature of syntactic focus marking, and how its realised. If it is considered more of a functional constraint, then it could be formulated such that there is a general requirement that a constituent in narrow focus be identifiable as such. This type of formulation would handle better the prosodic marking variation observed in the experiments. These two possibilities open up a number of questions on how exactly the MarkF constraint is associated with focus related phenomena observed across various domains. This work will not address these in detail, leaving them for further research. It will merely be stated here that the set of data produced in within this study requires its presence in the models outlined above.

Chapter 6

Conclusion

This study considered the interaction of syntax, prosody and information structure in the post-verbal domain of the Hungarian sentence. The motivation for this research was the fact that the unique nature of the post-verbal domain, namely that it exhibits free constituent order as opposed to the strict order observable in the pre-verbal domain presented an opportunity to investigate the complex interaction of syntax, prosody and information structure in an experimental way. The goal of the study was to establish on the one hand if there are word order differences associated with focus and givenness in this domain, and on the other to investigate the prosodic realisation of these categories and how those realisations are affected by potential word order differences. The study placed a strong emphasis on the empirical data as obtained by sound experimental methodology. Subsequently two series of experiments were conducted to investigate the research questions.

The first set of experiments presented in Chapter 3 were meant to investigate the effect on word oder of focus and givenness. The experiments employed a forced choice design where participants were asked to chose between different word order variations presented with context questions. Three types of post-verbal foci were alongs side three types of givenness. The foci were simple post-verbal information focus in the sense of É. Kiss (1998a), focus marked with the particle *is* 'also' and constructions with a post-verbal member of a double focus. These focus types represented all possible ways in which focus might be present in the post-verbal domain and thus served to gain a detailed picture.

The findings of this set of experiments indicate that there is an effect of focus on the word order of Hungarian in the post-verbal domain such that constituents in focus, regardless of focus type, are preferred in the immediately post-verbal position (IPV). This result is unforeseen from the point of view of theories such as É. Kiss (1998a, 2002) which while suppose the existence of post-verbal, informational focus, do not make any predictions as to its placement

157

in that domain. It is also unexpected from the point of view of theories like Szendrői (2001), which argue against classifying this type of focus as focus. More specifically, Szendrői (2001) argues that the prominence associated with items that É. Kiss (1998a) classifies as post-verbal information foci is not on the same level as that associated with focus, and can occur in either of the two post-verbal position surveyed in this study. The results of the forced choice experiment seem to indicate that this is not the case, and that prominence may be realised differently in these two positions. An interesting additional result of these experiments was the finding that a contextually given constituent is also preferred in the IPV position, and further more, that not all types of givenness are reflected by word order variation in the post-verbal domain. The association of given and focused constituents with the same position is problematic for any theory which seeks to account for these results.

A set of experiments designed to investigate the prosodic realisation of post-verbal focus also found differences between the realisation of foci in the two post-verbal positions, supporting the original finding of the forced choice experiments. It was revealed that accented syllables of foci in the CF position are distinct from their non-focused counterparts on more cues, (higher f0maxima, higher f0 minima, higher relative intensity) than foci in the IPV position. Further more, perhaps contrary to the widely heald assumption that IPs in Hungarian are left-headed (Szendrői, 2001; É. Kiss, 2002; Genzel et al., 2015, among others), cues indicating boundaries before focused constituents in either the IPV or the CF position were not found in abundance. Instead there was significant evidence to suggest the presence of a boundary after the focus in the IPV position.

Based on the evidence from the two sets of experiments an analysis was proposed which sees the word order phenomena best explained by a theory of prosody motivated word order realisation. The evidence calls for a theory which can create a position of prosodic prominence in the IPV position to account for the placement of focus, but it must be flexible enough to allow this position to be of low prosodic prominence as well to account for the behaviour of certain given constituents. It was argued that the best way to achieve this is to tie prosodic focus marking to IP boundaries, and not primarily to the head (position of default prominence) in an IP. This type of theory could account for the phenomena observed in both experiments while also distinguishing between pre and post-verbal foci in terms of their type.

The theory proposed in this study is on a rudimentary level pending further investigations. Givenness, while throughly examined in the forced choice experiments was not considered in the prosodic experiments for methodological reasons. It will be the task of further research to examine the prosodic realisations of the different types of givenness identified and tested in

the forced choice experiments. Further more, the study limited itself to two post-verbal constituents, therefore it cannot distinguish between ordering (the notion of the placement of post-verbal constituent relative to each other) and structural position (the immediately post-verbal vs clause final syntactic positions). It would therefore be interesting to see how focus and givenness are realised with at least three post-verbal constituents. An interesting, as yet conceptual proposal was the constraint MarkF, which is responsible for the distinction of focused and non-focused constituents, and thus the driving force behind much of the mechanism in the model developed at the end of this study. This constraint, is little understood so far and will need further development before it can be fully formulated as either a functional or a grammatical entity.

Appendix A

Material: Forced Choice experiments

This appendix contains the materials used in the forced choice experiments presented in Chapter 3. Each target sentence firs, followed by the context questions. For each condition there are two context questions: one for each group.

A.1 Experiment 1: Simple focus

Target sentence 1.

(1) Pista felvonult   a   katonákkal   a   súgárúton.
     Steve prt.paraded the soldiers.with the avenue.on
     'Steve paraded with the soldiers on the avenue.'

Condition questions:
BASELINE

(2) Hol   volt tegnap   a   fiad?
     where was yesterday the son.yours
     'Where was your son yesterday?'

GIVEN-NEW (Group 1 & 2)

(3) Miért volt a   fiad   a   sugárúton?
     Why was the son.yours the avenue.on
     'Why was your son on the avenue?'

(4) Mit   csinált a   fiad   a   katonákkal?
     What did   the son.yours the soldiers.with
     'What did your son do with the soldiers?'

FOCUS-NEW (Group 1 & 2)

(5) Kikkel   vonult   fel a   fiad?
     With.who paraded prt the son.yours
     'With who did your son pared with?'

(6)   Hol   vonult   fel a   fiad?
        Where paraded prt the son.yours
        'Where did your son go on a parade?'

FOCUS-GIVEN (Group 1 & 2)

(7)   Kikkel   vonult   fel a   fiad   a   sugárúton?
        With.who paraded prt the son.yours the avenue.on
        'With who did your son pared with on the avenue?'

(8)   Hol   vonult   fel a   fiad   a   katonákkal?
        Where paraded prt the son.yours the soldiers.with
        'Where did your son go on a parade with the soldiers?'

Target sentence 2.

(9)   István összeesett   a   fáradságtól a   tanévnyitón.
        Steven prt.collapsed the fatigue.from the opening of the school year.on
        'Steven collapsed from fatigue at the opening ceremony of the school year.'

Condition questions:
BASELINE

(10)   Miért küldték haza a   bátyádat?
        Why sent   home the elder brother.yours
        'Why was your brother sent home?'

GIVEN-NEW (Group 1 & 2)

(11)   Mi   történt   a   bátyáddal   a   tanévnyitón?
        What happened the elder brother.yours.with the opening of the school year.on
        'What happened to your brother at the opening ceremony of the school year?'

(12)   Mi   történt   a   bátyáddal   a   fáradságtól?
        What happened the elder brother.yours.with the fatigue.from
        'What happened to your brother due to fatigue?'

FOCUS-NEW (Group 1 & 2)

(13)   Mitől   esett   össze a   bátyád?
        What.from collapsed prt   the elder brother.yours
        'What caused your brother to collapse?'

(14)   Hol   esett   össze a   bátyád?
        Where collapsed prt   the elder brother.yours
        'Where did your brother collapse?'

FOCUS-GIVEN (Group 1 & 2)

(15)   Mitől   esett   össze a   bátyád   a   tanévnyitón?
        What.from collapsed prt   the elder brother.yours the opening of the school year.on

'What caused your brother to collapse at the opening ceremony of the school year?'

(16)   Hol   esett   össze a   bátyád   a   fáradságtól?
        Where collapsed prt   the elder brother.yoursthe fatigue.from
        'Where did your brother collapse from fatigue?'

Target sentence 3.

(17)   Anna felszólalt a   menekültek ügyében a   parlamenti ülésen.
        Anna prt.spoke the refugees   case.in   the parliament session
        'Anna spoke up about the case of the refugees in the session of parliament'

Condition questions:
BASELINE

(18)   Mit   csinált ma   délelõtt Anna?
        What did   today morning Anna
        What did Anna do this morning?

GIVEN-NEW (Group 1 & 2)

(19)   Miért volt a   húgod   a   parlamenti ülésen?
        Why was the younger sister.yours the parliament session.on
        'Why was your sister at the session of parliament today?'

(20)   Mit   tett a   húgod   a   menekültek ügyében?
        What did the younger sister.yours the refugees   case.in
        'What did your sister do in the case of the refugees?'

FOCUS-NEW (Group 1 & 2)

(21)   Miről   szólalt fel a   húgod?
        What.about spoke prt the younger sister.yours
        'What did your sister speak about?'

(22)   Hol   szólalt fel a   húgod?
        Where spoke prt the younger sister.yours
        'Where did your sister speak?'

FOCUS-GIVEN (Group 1 & 2)

(23)   Miről szólalt fel a   húgod   a   parlamenti ülésen?
        What speak prt the younger sister.yours the parliament session.on
        'What did your sister speak up about at the session of parliament?'

(24)   Hol   szólalt fel a   húgod   a   menekültek ügyében?
        [Where spoke prt the younger sister.yours the refugees   case.in
        'Where did your sister speak in the case of the refugees?'

Target sentence 4.

(25)   Attila elájult   a   málnásban   a   melegtől.
         Attila prt.fainted the raspberry field.in the heat.from
         'Attila fainted in the raspberry field from the heat.'

Condition questions:
BASELINE

(26)   Miért hívtátok ki a mentőt   tegnap?
         Why called   prt the ambulance yesterday
         'Why did you call the ambulance yesterday?'

GIVEN-NEW (Group 1 & 2)

(27)   Mi   történt   a fiaddal   a   málnásban?
         What happened the son.yours the raspberry field in
         'What happened to your son in the raspberry field?'

(28)   Mit csinált a fiad   a   melegtől?
         What did   the son.yours the heat.from
         'What did your son do because of the heat?'

FOCUS-NEW (Group 1 & 2)

(29)   Mitől   ájult   el a fiad?
         What.from fainted prt the son.yours
         'What did your son faint from?

(30)   Hol   ájult   el a fiad?
         Where fainted prt the son.yours
         Where did your son faint?

FOCUS-GIVEN (Group 1 & 2)

(31)   Mitől   ájult   el a fiad   a   málnásban?
         What.from fainted prt the son.yours the raspberry field in
         'What did your son faint from?'

(32)   Hol   ájult   el a fiad   a   melegtől?
         Where fainted prt the son.yours the heat.from
         Where did your son faint?

Target sentence 5.

(33)   Péter elhízott   a malacsülttől   a   németeknél.
         Peter prt.got.fat the roast pork.from the Germans.at
         'Peter got fat from the roast pork in Germany.

Condition questions:
BASELINE

(34)   Hogy van mostanában az öcséd?
          How is   nowadays   the younger brother.yours
          'How is your brother doing these days?'

<small>GIVEN-NEW</small> (Group 1 & 2)

(35)   Mi   történt   az öcséddel   a   németeknél?
          What happened the younger brother yours the Germans.at
          'What happened to your younger brother in Germany?'

(36)   Mi   történt   az öcséddel   a   sok malacsülttől?
          What happened the younger brother.yours the lots roast pork.from
          'What happened to your brother from all that roast pork?'

<small>FOCUS-NEW</small> (Group 1 & 2)

(37)   Mitől   hizott el az öcséd?
          What.from got.fat prt the younger brother.yours
          What did your brother get fat from?

(38)   Hol   hízott el az öcséd?
          Where got.fat prt the younger brother.yours
          'Where did your brother get fat?'

<small>FOCUS-GIVEN</small> (Group 1 & 2)

(39)   Mitől   hizott el az öcséd   a   németeknél?
          What.from got.fat prt the younger brother.yours the Germans.at
          What did your brother get fat from in Germany?

(40)   Hol   hízott el az öcséd   a   malacsülttől?
          Where got.fat prt the younger brother.yours the roast pork.from
          'Where did your brother get fat from roast pork?'

Target sentence 6.

(41)   Kata elment a hajóval a malomhoz.
          Kata prt.went the boat.with the mill.to
          'Kata went with the boat to the mill'

Condition questions:
<small>BASELINE</small>

(42)   Hol   van a nővéred?
          Where is   the older sister.yours
          'Where is your sister?'

<small>GIVEN-NEW</small> (Group 1 & 2)

(43)   Mit   csinált a nővéred   a hajóval?
          What did   the older sister.yours the boat.with

What did your sister do with the boat?

(44)   Hogy került a   nővéred   a   malomhoz?
         How got   the older sister.yours the mill.to
         'How did your older sister get to the mill?'

FOCUS-NEW (Group 1 & 2)

(45)   Hova ment el a   nővéred?
         Where went prt the older sister.yours
         Where did your sister go to?

(46)   Mivel   ment el a   nővéred?
         What.with went prt the older sister.yours
         'What did your sister leave with?'

FOCUS-GIVEN (Group 1 & 2)

(47)   Hova ment el a   nővéred   a   hajóval?
         Where went prt the older sister.yours the boat   with
         Where did your sister go to?

(48)   Mivel   ment el a   nővéred   a   malomhoz?
         What.with went prt the older sister.yours the mill.to
         'Whit what did your sister go to the mill?'

Target sentence 7.

(49)   Ildi elmenekült a   medvétől a   városba.
         Ildi prt.escaped the bear.from the city.to
         'Ildi escaped from the bear to the city.'

Condition questions:
BASELINE

(50)   Miért futott annyira a   nővéred?
         Why ran   so much the older sister.yours
         'Why did your sister run so much?'

GIVEN-NEW (Group 1 & 2)

(51)   Hogy került a   nővéred   a   városba?
         How got   the older sister.yours the city.in
         'How did your sister get to the city?'

(52)   Hogy szabadult meg a   nővéred   a   medvétől?
         How got.free prt the older sister.yours the bear.from
         'How did your sister get free from the bear?'

FOCUS-NEW (Group 1 & 2)

(53)   Mitől   menekült el a   nővéred?
         What.from escaped   prt the older sister.yours
         'What did your older sister escape from?'

(54)   Hova menekült el   a   nővéred?
         Where escaped   prt the older sister.yours
         'Where did your sister escape to?'

FOCUS-GIVEN (Group 1 & 2)

(55)   Mitől   menekült el a   nővéred   a   városba?
         What.from escaped   prt the older sister.yours the city.in
         'From what did your older sister escape to the city?'

(56)   Hova menekült el   a   nővéred   a   medvétől?
         Where escaped   prt the older sister.yours the bear.from
         'To where did your sister escape from the bear?'

Target sentence 8.

(57)   Az unokám   bevásárolt a   hétvégén   a   csarnokban.
         The grandson.mine prt.shopped the weekend.on the market hall.in
         'My grandson did the shopping on the weekend in the market hall.'

Condition questions:
BASELINE

(58)   Hogy segített neked Andris?
         How helped you.for Andrew
         'How did Andrew help you?'

GIVEN-NEW (Group 1 & 2)

(59)   Mit   csinált Andris a   csarnokban?
         What did   Andrew the market hall.in
         'What did Andrew do in the market hall?'

(60)   Mit   csinált Andris a   hétvégén?
         What did   Andrew the weekend.on
         'What did Andrew do on the weekend?'

FOCUS-NEW (Group 1 & 2)

(61)   Mikor vásárolt be Andris?
         When shopped prt Andrew
         'When did Andrew do the shopping?'

(62)   Hol   vásárolt be Andirs?
         Where shopped prt Andrew
         'Where did Andrew do the shopping?'

FOCUS-GIVEN (Group 1 & 2)

(63) Mikor vásárolt be Andris a csarnokban?
When shopped prt Andrew the market hall.in
'When did Andrew do the shopping in the market hall?'

(64) Hol vásárolt be Andirs a hétvégén?
Where shopped prt Andrew the weekend.on
'Where did Andrew do the shopping on the weekend?'

Target sentence 9.

(65) Anna elbújt a rablóktól a szekrényben.
Anna prt.hid the robbers.from the wardrobe.in
'Anna hid in the wardrobe from the robbers.'

Condition questions:
BASELINE

(66) Mit csinált a húgod tegnap este?
What did the younger sister.yours yesterday night.
'What did your sister do last night?'

GIVEN-NEW (Group 1 & 2)

(67) Mit keresett a húgod a szekrényben?
What searched the younger sister.yours the wardrobe.in
'What did your sister do in the wardrobe?'

(68) Hogy menekült meg a húgod a rablóktól?
How escaped prt the younger sister.yours the robbers.from
'How did your sister escape the robbers?'

FOCUS-NEW (Group 1 & 2)

(69) Kitől bújt el a húgod?
Who.from hid prt the younger sister.yours
'From who did your sister hide?'

(70) Hol bújt el a húgod?
Where hid prt the younger sister.yours
'Where did your sister hide?'

FOCUS-GIVEN (Group 1 & 2)

(71) Kitől bújt el a húgod a szekrényben?
Who.from hid prt the younger sister.yours the wardrobe.in
'From who did your sister hide in the wardrobe?'

(72) Hol bújt el a húgod a rablóktól?
Where hid prt the younger sister.yours the robbers.from

'Where did your sister hide from the robbers?'

Target sentence 10.

(73) Bernadett jógázott a   szülinapján a   tengerparton.
      Bernadett did yoga the birthday.her the beach.on
      'Bernadett did yoga on her birthday on the beach'

Condition questions:
BASELINE

(74) Most milyen furcsaságot csinált az unokatestvéred?
      Now what   weird thing did   the cousin.yours
      'What did weird thing did your cousin do now?'

GIVEN-NEW (Group 1 & 2)

(75) Mit   csinált az unokatestvéred a   tengerparton?
      What did   the cousin.yours   the beach.on
      'What did your cousin do on the beach?'

(76) Mit   csinált az unokatestvéred a   szülinapján?
      What did   the cousin.yours   the birthday.her.on
      'What did your cousin do on her birthday?'

FOCUS-NEW (Group 1 & 2)

(77) Mikor jógázott az unokatestvéred?
      When did yoga the cousin.yours
      'When did your cousin do yoga?'

(78) Hol   jógázott az unokatestvéred?
      Where did yoga the cousin.yours
      'Where did your cousin do yoga?'

FOCUS-GIVEN (Group 1 & 2)

(79) Mikor jógázott az unokatestvéred a   tengerparton?
      When did yoga the cousin.yours   the beach.on
      'When did your cousin do yoga on the beach?'

(80) Hol   jógázott az unokatestvéred a   szülinapján?
      Where did yoga the cousin.yours   the birthday.her.on
      'Where did your cousin do yoga on her birthday?'

Target sentence 11.

(81) Zsuzsa elaludt az unalomtól   az előadáson.
      Susan   prt.slept the boredom.from the lecture.on
      'Susan fell asleep from boredom at the lecture'

Condition questions:
BASELINE

(82)   Hogy telt   a   barátnőd   estéje?
         How passed the girlfriend.yours evening
         'How was your girlfriends evening?'

GIVEN-NEW (Group 1 & 2)

(83)   Mit   csinált az előadáson a   bartátnőd?
         What did   the lecture.on the girlfriend.yours
         'What did your girlfriend do at the lecture'

(84)   Mit   csinált az unalomtól   a   bartátnőd?
         What did   the boredom.from the girlfriend.yours
         'What did your girlfriend do out of boredom?'

FOCUS-NEW (Group 1 & 2)

(85)   Mitől   aludt el a   barátnőd?
         What.from slept prt the girfriend.yours
         'What did your girlfriend fall asleep from?'

(86)   Hol   aludt el a   barátnőd?
         Where slept prt the girlfriend.yours
         'Where did your girlfriend fall asleep?'

FOCUS-GIVEN (Group 1 & 2)

(87)   Mitől   aludt el a   barátnőd   az előadáson?
         What.from slept prt the girfriend.yours the lecture.on
         'What did your girlfriend fall asleep from at the lecture?'

(88)   Hol   aludt el a   barátnőd   az unalomtól?
         Where slept prt the girlfriend.yours the boredom.from
         'Where did your girlfriend fall asleep from boredom?'

Target sentence 12.

(89)   Attila pincérkedett tavasszal külföldön.
         Attila waited   spring.in abroad.on
         'Attila did work as a waiter abroad in the spring'

Condition questions:
BASELINE

(90)   Mivel   keresett ennyit   a   fiad?
         What.with earned   this much the son.yours
         'With what did your son earn this much?'

GIVEN-NEW (Group 1 & 2)

(91)   Mit   csinált a fiad   külföldön?
          What did   the son.yours abroad.on
          'What did your son do abroad?'

(92)   Mit   csinált tavasszal a   fiad?
          What did   spring.in the son.yours
          'What did your son do in the spring?'

FOCUS-NEW (Group 1 & 2)

(93)   Mikor pincérkedett a   fiad?
          When waited   the son.yours
          'When did your son do work as a waiter?'

(94)   Hol   pincérkedett a fiad?
          Where waited   the son.yours
          'Where did your son do work as a waiter?'

FOCUS-GIVEN (Group 1 & 2)

(95)   Mikor pincérkedett a   fiad   külföldön?
          When waited   the son.yours abroad.on
          'When did your son do work as a waiter?'

(96)   Hol   pincérkedett a fiad   tavasszal?
          Where waited   the son.yours spring.in
          'Where did your son do work as a waiter?'

Target sentence 13.

(97)   Laci tüntetett   a traktorjával   a   fővárosban.
          Laci demonstrated the tracktor.his.with the captial.in
          'Laci demonstrated with his tractor in the capital'

Condition questions:
BASELINE

(98)   Miért mérges a   polgármester a   sógorodra?
          Why angry   the mayor   the brother-in-law.your.on
          'Why is the mayor angry with your borother-in-law?'

GIVEN-NEW (Group 1 & 2)

(99)   Miért volt a   sógorod   a   fővárosban?
          Why was the brother-in-law.your the capital.in
          'Why was your brother in law in the capital?'

(100)   Mit   csinált a sógorod   a   traktorjával?
           What did   the brother-in-law.your the tractor.his.with
           'What did your borther-in-law do with his tractor?'

FOCUS-NEW (Group 1 & 2)

(101)   Mivel   tüntetett   a   sógorod?
         What.whit demonstrated the borther-in-law.your
         'What did your brother-in-law use to demonstrate?'

(102)   Hol   tüntetett   a   sógorod?
         Where demonstrated the brother-in-law.yours
         'Where did your brother-in-law demonstrate?'

FOCUS-GIVEN (Group 1 & 2)

(103)   Mivel   tüntetett   a   sógorod   a   fővárosban?
         What.whit demonstrated the borther-in-law.your the capital.in
         'What did your brother-in-law use to demonstrate in the capital?'

(104)   Hol   tüntetett   a   sógorod   a   traktorjával?
         Where demonstrated the brother-in-law.yours the tractor.his.with
         'Where did your brother-in-law demonstrate with his tractor? '

Target sentence 14.

(105)   Géza jegyzetel   az előadáson a   laptopján.
         Géza takes notes the lecture.on the laptop.his.on
         'Géza is taking notes on his laptop during the lecture'

Condition questions:
BASELINE

(106)   Hogy készül   a   barátod   a   vizsgára?
         How prepares the friend.yours the exam.for
         'How is your friend preparing for the exam?'

GIVEN-NEW (Group 1 & 2)

(107)   Mit   csinál a   barátod   a   laptopján?
         What does   the friend.yours the laptop.hi.on
         'What is your friend doing on his laptop?'

(108)   Mit   csinál a   barátod   az   előadáson?
         What does   the friend.yours the exam.on
         'What is your friend doing at the lecture?'

FOCUS-NEW (Group 1 & 2)

(109)   Hol   jegyzetel a   barátod?
         Where takes notes the freind.yours
         'Where is your friend taking notes?'

(110)   Mivel   jegyzetel a   barátod?
         What.with takes notes the friend.yours

'What does your friend use to take notes?'

FOCUS-GIVEN (Group 1 & 2)

(111)   Hol   jegyzetel   a   barátoda   a   laptopján?
         Where takes notes the freind.yours the laptop.his.on
         'Where does your friend use his laptop to take notes?'

(112)   Mivel   jegyzetel   a   barátod   az előadáson?
         What.with takes notes the friend.yours the lecture.on
         'What does your friend use to take notes at the lecture?'

Target sentence 15.

(113)   Rita leltározik   a   raktárban a   segéddel.
         Rita does inventory the warehouse the assistant.with
         'Rita is doing the inventory in the warehouse with the assistant'

Condition questions:
BASELINE

(114)   Hol   van most a   titkárnőd?
         Where is   now the secretary.yours
         'Where is your secretary now?'

GIVEN-NEW (Group 1 & 2)

(115)   Mit   csinál a   titkárnőd   a   segéddel?
         What does   the secretary.yours the assistant.with
         'What is your secretary doing with the assistant?'

(116)   Mit   csinál a   titkárnőd a   raktárban?
         What does   the secretary the warehouse.in
         'What is your secretary doing in the warehous?'

FOCUS-NEW (Group 1 & 2)

(117)   Hol   leltározik   a   titkárnőd?
         Where does inventory the secreatry.yours
         'Where is your secretary doing the inventory?'

(118)   Kivel   leltározik   a   titkárnőd?
         Who.with does inventory the secreatry.yours
         'Who is your secretary doing the inventory with?'

FOCUS-GIVEN (Group 1 & 2)

(119)   Hol   leltározik   a   titkárnőd   a   segéddel?
         Where does inventory the secreatry.yours the assistant.with
         'Where is your secretary doing the inventory with the assistant?'

(120)   Kivel   leltározik   a   titkárnőd   a   raktárban?
         Who.with does inventory the secreatry.yours the warehouse.in
         'Who is your secretary doing the inventory with in the warehouse?'

Target sentence 16.

(121)   Noémi kísérletezik a   vegyszerekkel a   laborjában.
         Noemi experiments the chemicals.with the lab.hers.in
         'Noemi is experimenting with the chemicals in her lab.'

Condition questions:
BASELINE

(122)   Mivel   foglalkozik a   barátnőd?
         What.with does   the girlfriend.yours
         'What does your girlfriend do?'

GIVEN-NEW (Group 1 & 2)

(123)   Mit   csinál a   barátnőd   a   laborjában?
         What does   the girlfriend.yours the lab.hers.in
         'What does your girlfriend do in her lab?'

(124)   Mit   csinál a   barátnőd   a   vegyszerekkel?
         What does   the girfriend.yours the chemicals.with
         'What does your girlfriend do with the chemicals?'

FOCUS-NEW (Group 1 & 2)

(125)   Mivel   kísérletezik a   barátnőd?
         What.with experiments the girfriend.yours
         'What does your girlfriend experiment with?'

(126)   Hol   kísérletezeik a   barátnőd?
         Where expereiments the girlfriend.yours
         'Where does your girlfriend experiment?'

FOCUS-GIVEN (Group 1 & 2)

(127)   Mivel   kísérletezik a   barátnőd   a   laborjában?
         What.with experiments the girfriend.yours the lab.hers.in
         'What does your girlfriend experiment with in her lab?'

(128)   Hol   kísérletezeik a   barátnőd   a   vegyszerekkel?
         Where expereiments the girlfriend.yours the chemicals.with
         'Where does your girlfriend experiment with chemicals?'

A.2   Experiment 2: focus marked with *is*

In Experiment 2, each target sentence had two variants, one with the the particle *is* for conditions involving narrow focus (FOCUS-NEW, FOCUS-GIVEN), and one without, for conditions that did not have narrow focus (BASELINE, NEW-GIVEN). Both versions are presented below.

Target sentence 1.

(129)   Pista felvonult   a   katonákkal   a   súgárúton.
Steve prt.paraded the soldiers.with the avenue.on
'Steve paraded with the soldiers on the avenue.'

(130)   Pista felvonult   a   katonákkal   is   a   súgárúton.
Steve prt.paraded the soldiers.with also the avenue.on
'Steve paraded also with the soldiers on the avenue.'

(131)   Pista felvonult   a   katonákkal   a   súgárúton is.
Steve prt.paraded the soldiers.with the avenue.on also
'Steve paraded with the soldiers also on the avenue.'

Condition questions:
BASELINE

(132)   Hol   volt tegnap   a   fiad?
where was yesterday the son.yours
'Where was your son yesterday?'

GIVEN-NEW (Group 1 & 2)

(133)   A   sugárúton miért volt a   fiad?
the avenue.on why   was the son.yours
'Why was your son on the avenue?'

(134)   A   katonákkal   mit   csinált a   fiad   ?
the soldiers.with what did   the son.yours the soldiers.with
'What did your son do with the soldiers?'

FOCUS-NEW (Group 1 & 2)

(135)   Még kikkel   vonult   fel a   fiad?
else with.who paraded prt the son.yours
'With who else did your son pared with?'

(136)   Még hol   vonult   fel a   fiad?
else where paraded prt the son.yours
'Where else did your son go on a parade?'

FOCUS-GIVEN (Group 1 & 2)

(137)   Még kikkel   vonult fel a fiad   a sugárúton?
         else who.with paraded prt the son.yours the avenue.on
         'With who else did your son pared with on the avenue?'

(138)   Még hol   vonult fel a fiad   a katonákkal?
         else where paraded prt the son.yours the soldiers.with
         'Where else did your son go on a parade with the soldiers?'

Target sentence 2.

(139)   István összeesett   a fáradságtól a tanévnyitón.
         Steven prt.collapsed the fatigue.from the opening of the school year.on
         'Steven collapsed from fatigue at the opening ceremony of the school year.'

(140)   István összeesett   a fáradságtól is a tanévnyitón.
         Steven prt.collapsed the fatigue.from also the opening of the school year.on
         'Steven collapsed also from fatigue at the opening ceremony of the school year.'

(141)   István összeesett   a fáradságtól a tanévnyitón   is.
         Steven prt.collapsed the fatigue.from the opening of the school year.on also
         'Steven collapsed from fatigue also at the opening ceremony of the school year.'

Condition questions:
BASELINE

(142)   Miért küldték haza a bátyádat?
         Why sent   home the elder brother.yours
         'Why was your brother sent home?'

GIVEN-NEW (Group 1 & 2)

(143)   A tanévnyitón   mi történt   a bátyáddal?
         the opening of the school year.on What happened the elder brother.yours.with
         'What happened to your brother at the opening ceremony of the school year?'

(144)   a fáradságtólmi történt a   bátyáddal ?
         the fatigue.from   what   happened the   elder brother.yours.with
         'What happened to your brother due to fatigue?'

FOCUS-NEW (Group 1 & 2)

(145)   Még mitől   esett   össze a bátyád?
         else what.from collapsed prt   the elder brother.yours
         'What else caused your brother to collapse?'

(146)   Még hol   esett   össze a bátyád?
         else where collapsed prt   the elder brother.yours
         'Where else did your brother collapse?'

FOCUS-GIVEN (Group 1 & 2)

(147)   Még mitől   esett   össze a   bátyád   a
         else what.from collapsed prt   the elder brother.yours the
         tanévnyitón?
         opening of the school year.on
         'What else caused your brother to collapse at the opening ceremony of the school
         year?'

(148)   Még hol   esett   össze a   bátyád   a   fáradságtól?
         else where collapsed prt   the elder brother.yours the fatigue.from
         'Where else did your brother collapse from fatigue?'

Target sentence 3.

(149)   Anna felszólalt a   menekültek ügyében a   parlamenti ülésen.
         Anna prt.spoke the refugees   case.in   the parliament session
         'Anna spoke up about the case of the refugees in the session of parliament'

(150)   Anna felszólalt a   menekültek ügyében is   a   parlamenti ülésen.
         Anna prt.spoke the refugees   case.in   also the parliament session
         'Anna spoke up also about the case of the refugees in the session of parliament.'

(151)   Anna felszólalt a   menekültek ügyében a   parlamenti ülésen is.
         Anna prt.spoke the refugees   case.in   the parliament session also
         'Anna spoke up about the case of the refugees also in the session of parliament. '

Condition questions:
BASELINE

(152)   Mit   csinált ma   délelõtt Anna?
         What did   today morning Anna
         What did Anna do this morning?

GIVEN-NEW (Group 1 & 2)

(153)   A   parlamenti ülésen   miért volt a   húgod?
         the parliament session.on why   was the younger sister.yours
         'Why was your sister at the session of parliament today?'

(154)   A   menekültek ügyében mit   tett a   húgod?
         the refugees   case.in   what did the younger sister.yours
         'What did your sister do in the case of the refugees?'

FOCUS-NEW (Group 1 & 2)

(155)   Még miről   szólalt fel a   húgod?
         else what.about spoke prt the younger sister.yours
         'What else did your sister speak about?'

(156)   Még hol szólalt fel a   húgod?
         Where else spoke prt the younger sister.yours
         'Where else did your sister speak?'

FOCUS-GIVEN (Group 1 & 2)

(157) Még miről szólalt fel a   húgod   a   parlamenti ülésen?
       else What speak prt the younger sister.yours the parliament session.on
       'What else did your sister speak up about at the session of parliament?'

(158) Még hol   szólalt fel a   húgod   a   menekültek ügyében?
       else where spoke prt the younger sister.yours the refugees   case.in
       'Where else did your sister speak in the case of the refugees?'

Target sentence 4.

(159) Attila elájult   a   málnásban   a   melegtől.
       Attila prt.fainted the raspberry field.in the heat.from
       'Attila fainted in the raspberry field from the heat.'

(160) Attila elájult   a   málnásban   is a   melegtől.
       Attila prt.fainted the raspberry field.in also the heat.from
       'Attila fainted also in the raspberry field from the heat.'

(161) Attila elájult   a   málnásban   a   melegtől is.
       Attila prt.fainted the raspberry field.in the heat.from
       'Attila fainted in the raspberry field also from the heat.'

Condition questions:
BASELINE

(162) Miért hívtátok ki a   mentőt   tegnap?
       Why called   prt the ambulance yesterday
       'Why did you call the ambulance yesterday?'

GIVEN-NEW (Group 1 & 2)

(163) A   málnásban   Mi   történt   a   fiaddal?
       the raspberry field in what happened the son.yours
       'What happened to your son in the raspberry field?'

(164) A   melegtől mit   csinált a   fiad?
       the heat.from what did   the son.yours
       'What did your son do because of the heat?'

FOCUS-NEW (Group 1 & 2)

(165) Még mitől   ájult el a   fiad?
       else what.from fainted prt the son.yours
       'What else did your son faint from?'

(166) Még hol   ájult el a   fiad?
       Where fainted prt   the son.yours
       Where else did your son faint?

FOCUS-GIVEN (Group 1 & 2)

(167)   Még mitől   ájult el a fiad   a málnásban?
         else what.from fainted prt the son.yours the raspberry field in
         'What else did your son faint from?'

(168)   Még hol   ájult el a fiad   a melegtől?
         else Where fainted prt the son.yours the heat.from
         Where else did your son faint?

Target sentence 5.

(169)   Péter elhízott a malacsülttől   a németeknél.
         Peter prt.got.fat the roast pork.from the Germans.at
         'Peter got fat from the roast pork in Germany.

(170)   Péter elhízott a malacsülttől   is a németeknél.
         Peter prt.got.fat the roast pork.from also the Germans.at
         'Peter got fat also from the roast pork in Germany.

(171)   Péter elhízott a malacsülttől   a németeknél is.
         Peter prt.got.fat the roast pork.from the Germans.at also
         'Peter got fat from the roast pork also in Germany.

Condition questions:
BASELINE

(172)   Hogy van mostanában az öcséd?
         How is   nowadays   the younger brother.yours
         'How is your brother doing these days?'

GIVEN-NEW (Group 1 & 2)

(173)   A németeknél mi   történt   az öcséddel?
         the Germans.at what happened the younger brother yours
         'What happened to your younger brother in Germany?'

(174)   A sok malacsülttől   mi   történt   az öcséddel?
         the lots roast pork.from what happened the younger brother.yours
         'What happened to your brother from all that roast pork?'

FOCUS-NEW (Group 1 & 2)

(175)   Még mitől   hízott el az öcséd?
         else what.from got.fat prt the younger brother.yours
         What else did your brother get fat from?

(176)   Még hol   hízott el az öcséd?
         else where got.fat prt the younger brother.yours
         'Where else did your brother get fat?'

FOCUS-GIVEN (Group 1 & 2)

(177) Még mitől hizott el az öcséd a németeknél?
else what.from got.fat prt the younger brother.yours the Germans.at
What else did your brother get fat from in Germany?

(178) Még hol hízott el az öcséd a malacsülttől?
else where got.fat prt the younger brother.yours the roast pork.from
'Where did your brother get fat from roast pork?'

Target sentence 6.

(179) Kata elment a hajóval a malomhoz.
Kata prt.went the boat.with the mill.to
'Kata went with the boat to the mill'

(180) Kata elment a hajóval is a malomhoz.
Kata prt.went the boat.with also the mill.to
'Kata went also with the boat to the mill'

(181) Kata elment a hajóval a malomhoz is.
Kata prt.went the boat.with the mill.to also
'Kata went with the boat also to the mill'

Condition questions:
BASELINE

(182) Hol van a nővéred?
Where is the older sister.yours
'Where is your sister?'

GIVEN-NEW (Group 1 & 2)

(183) A malomhoz hogy került a nővéred?
the mill.to how got the older sister.yours
'How did your older sister get to the mill?'

(184) A hajóval mit csinált a nővéred?
the boat.with what did the older sister.yours
'What did your sister do with the boat?'

FOCUS-NEW (Group 1 & 2)

(185) Még mivel ment el a nővéred?
else what.with went prt the older sister.yours
'What else did your sister go with?'

(186) Még hova ment el a nővéred?
else where went prt the older sister.yours
Where else did your sister go to?

FOCUS-GIVEN (Group 1 & 2)

(187)　　Még mivel　　　ment el a　nővéred　　　　　a　malomhoz?
　　　　　else what.with went prt the older sister.yours the mill.to
　　　　　'With what else did your sister go to the mill?'

(188)　　Még hova ment el a　nővéred　　　　　a　hajóval?
　　　　　else where went prt the older sister.yours the boat　　　with
　　　　　Where else did your sister go to with the boat?

Target sentence 7.

(189)　　Ildi elmenekült a　medvétől a　városba.
　　　　　Ildi prt.escaped the bear.from the city.to
　　　　　'Ildi escaped from the bear to the city.'

(190)　　Ildi elmenekült a　medvétől is　a　városba.
　　　　　Ildi prt.escaped the bear.from also the city.to
　　　　　'Ildi escaped also from the bear to the city.'

(191)　　Ildi elmenekült a　medvétől a　városba is.
　　　　　Ildi prt.escaped the bear.from the city.to　also
　　　　　'Ildi escaped from the bear also to the city.'

Condition questions:
BASELINE

(192)　　Miért futott annyira a　nővéred?
　　　　　Why ran　　so much the older sister.yours
　　　　　'Why did your sister run so much?'

GIVEN-NEW (Group 1 & 2)

(193)　　A　városba hogy került a　nővéred?
　　　　　the city.in　how got　　the older sister.yours
　　　　　'How did your sister get to the city?'

(194)　　A　medvétől hogy szabadult meg a　nővéred?
　　　　　the bear.from how got.free　prt the older sister.yours
　　　　　'How did your sister get free from the bear?'

FOCUS-NEW (Group 1 & 2)

(195)　　Még mitől　　　menekült el a　nővéred?
　　　　　else what.from escaped　prt the older sister.yours
　　　　　'What else did your older sister escape from?'

(196)　　Még hova menekült el a　nővéred?
　　　　　else where escaped　prt the older sister.yours
　　　　　'Where else did your sister escape to?'

FOCUS-GIVEN (Group 1 & 2)

(197)   Még   mitől   menekült el   a   nővéred a   városba?
        What.from escaped prt   the older sister.yours the   city.in
        'From what else did your older sister escape to the city?'

(198)   Még hova   menekült el   a   nővéred a   medvétől?
        Where escaped prt   the older sister.yours the   bear.from
        'To where else did your sister escape from the bear?'

Target sentence 8.

(199)   Az unokám   bevásárolt a hétvégén   a csarnokban.
        The grandson.mine prt.shopped the weekend.on the market hall.in
        'My grandson did the shopping on the weekend in the market hall.'

(200)   Az unokám   bevásárolt a hétvégén   is a csarnokban.
        The grandson.mine prt.shopped the weekend.on also the market hall.in
        'My grandson did the shopping also on the weekend in the market hall.'

(201)   Az unokám   bevásárolt a hétvégén   a csarnokban   is.
        The grandson.mine prt.shopped the weekend.on the market hall.in
        'My grandson did the shopping on the weekend also in the market hall.'

Condition questions:
BASELINE

(202)   Hogy segített neked   Andris?
        How helped you.for Andrew
        'How did Andrew help you?'

GIVEN-NEW (Group 1 & 2)

(203)   A csarnokban   mit csinált Andris ?
        the market hall.in what did   Andrew
        'What did Andrew do in the market hall?'

(204)   A hétvégén   mit csinált Andris?
        the weekend.on what did   Andrew
        'What did Andrew do on the weekend?'

FOCUS-NEW (Group 1 & 2)

(205)   Még mikor vásárolt be Andris?
        else when shopped prt Andrew
        'At what other time did Andrew do the shopping?'

(206)   Még hol   vásárolt be Andirs?
        else where shopped prt Andrew
        'Where else did Andrew do the shopping?'

FOCUS-GIVEN (Group 1 & 2)

(207)   Még mikor vásárolt be Andris a   csarnokban?
         else when shopped prt Andrew the market hall.in
         'At what other time did Andrew do the shopping in the market hall?'

(208)   Még hol   vásárolt be Andris a   hétvégén?
         else where shopped prt Andrew the weekend.on
         'Where else did Andrew do the shopping on the weekend?'

Target sentence 9.

(209)   Anna elbújt a   rablóktól   a   szekrényben.
         Anna prt.hid the robbers.from the wardrobe.in
         'Anna hid in the wardrobe from the robbers.'

(210)   Anna elbújt a   rablóktól   is   a   szekrényben.
         Anna prt.hid the robbers.from also the wardrobe.in
         'Anna hid in the wardrobe from the robbers.'

(211)   Anna elbújt a   rablóktól   a   szekrényben is.
         Anna prt.hid the robbers.from the wardrobe.in also
         'Anna hid in the wardrobe from the robbers.'

Condition questions:
BASELINE

(212)   Mit   csinált a   húgod   tegnap   este?
         What did   the younger sister.yours yesterday night.
         'What did your sister do last night?'

GIVEN-NEW (Group 1 & 2)

(213)   A szekrényben mit   keresett a   húgod?
         the wardrobe.in what searched the younger sister.yours
         'What did your sister do in the wardrobe?'

(214)   A rablóktól   hogy menekült meg a   húgod?
         the robbers.from how escaped   prt the younger sister.yours
         'How did your sister escape the robbers?'

FOCUS-NEW (Group 1 & 2)

(215)   Még kitől   bújt el a   húgod?
         else who.from hid prt the younger sister.yours
         'From who else did your sister hide?'

(216)   Még hol   bújt el a   húgod?
         else where hid prt the younger sister.yours
         'Where else did your sister hide?'

FOCUS-GIVEN (Group 1 & 2)

(217) Még kitől   bújt el a húgod   a szekrényben?
       else who.from hid prt the younger sister.yours the wardrobe.in
       'From who else did your sister hide in the wardrobe?'

(218) Még hol bújt el a húgod   a rablóktól?
       Where else hid prt the younger sister.yours the robbers.from
       'Where else did your sister hide from the robbers?'

Target sentence 10.

(219) Bernadett jógázott a szülinapján a   tengerparton.
       Bernadett did yoga the birthday.her the beach.on
       'Bernadett did yoga on her birthday on the beach'

(220) Bernadett jógázott a szülinapján is   a   tengerparton.
       Bernadett did yoga the birthday.her also the beach.on
       'Bernadett did yoga also on her birthday on the beach'

(221) Bernadett jógázott a szülinapján a   tengerparton is.
       Bernadett did yoga the birthday.her the beach.on   also
       'Bernadett did yoga on her birthday also on the beach'

Condition questions:
BASELINE

(222) Most milyen furcsaságot csinált az unokatestvéred?
       Now what   weird thing did   the cousin.yours
       'What did weird thing did your cousin do now?'

GIVEN-NEW (Group 1 & 2)

(223) A tengerparton mit csinált az   unokatestvéred?
       the beach.onWhat did the   cousin.yours
       'What did your cousin do on the beach?'

(224) A szülinapján   mit csinált az unokatestvéred?
       the birthday.her.on what did   the cousin.yours
       'What did your cousin do on her birthday?'

FOCUS-NEW (Group 1 & 2)

(225) Még mikor jógázott az unokatestvéred?
       else when did yoga the cousin.yours
       'At what other time did your cousin do yoga?'

(226) Még hol   jógázott az unokatestvéred?
       else where did yoga the cousin.yours
       'Where else did your cousin do yoga?'

FOCUS-GIVEN (Group 1 & 2)

(227)   Még mikor jógázott az unokatestvéred a   tengerparton?
         else when did yoga the cousin.yours   the beach.on
         'At what other time did your cousin do yoga on the beach?'

(228)   Még hol   jógázott az unokatestvéred a   szülinapján?
         else where did yoga the cousin.yours   the birthday.her.on
         'Where else did your cousin do yoga on her birthday?'

Target sentence 11.

(229)   Zsuzsa elaludt az unalomtól   az előadáson.
         Susan   prt.slept the boredom.from the lecture.on
         'Susan fell asleep from boredom at the lecture'

(230)   Zsuzsa elaludt az unalomtól   is   az előadáson.
         Susan   prt.slept the boredom.from also the lecture.on
         'Susan fell asleep also from boredom at the lecture'

(231)   Zsuzsa elaludt az unalomtól   az előadáson is.
         Susan   prt.slept the boredom.from the lecture.on also
         'Susan fell asleep from boredom also at the lecture'

Condition questions:
BASELINE

(232)   Hogy telt   a   barátnőd   estéje?
         How passed the girlfriend.yours evening
         'How was your girlfriends evening?'

GIVEN-NEW (Group 1 & 2)

(233)   A   bartátnőd   mit   csinált az előadáson?
         the girlfriend.yours what did   the lecture.on
         'What did your girlfriend do at the lecture'

(234)   A   bartátnőd   mit   csinált az unalomtól?
         the girlfriend.yours what did   the boredom.from
         'What did your girlfriend do out of boredom?'

FOCUS-NEW (Group 1 & 2)

(235)   Még mitől   aludt el a   barátnőd?
         else what.from slept prt the girfriend.yours
         'What else did your girlfriend fall asleep from?'

(236)   Még hol   aludt el a   barátnőd?
         eése where slept prt the girlfriend.yours
         'Where else did your girlfriend fall asleep?'

FOCUS-GIVEN (Group 1 & 2)

(237)   Még mitől   aludt el a   barátnőd   az előadáson?
        else what.from slept prt the girfriend.yours the lecture.on
        'What else did your girlfriend fall asleep from at the lecture?'

(238)   Még hol   aludt el a   barátnőd   az unalomtól?
        else where slept prt the girlfriend.yours the boredom.from
        'Where else did your girlfriend fall asleep from boredom?'

Target sentence 12.

(239)   Attila pincérkedett tavasszal külföldön.
        Attila waited   spring.in abroad.on
        'Attila did work as a waiter abroad in the spring'

(240)   Attila pincérkedett tavasszal is   külföldön.
        Attila waited   spring.in also abroad.on
        'Attila did work as a waiter abroad also in the spring'

(241)   Attila pincérkedett tavasszal külföldön is.
        Attila waited   spring.in abroad.on also
        'Attila did work as a waiter also abroad in the spring'

Condition questions:
BASELINE

(242)   Mivel   keresett ennyit   a   fiad?
        What.with earned   this much the son.yours
        'With what did your son earn this much?'

GIVEN-NEW (Group 1 & 2)

(243)   Külföldön mit   csinált a   fiad?
        abroad.on what did   the son.yours
        'What did your son do abroad?'

(244)   Tavasszal mit   csinált a   fiad?
        spring.in what did   the son.yours
        'What did your son do in the spring?'

FOCUS-NEW (Group 1 & 2)

(245)   Még mikor pincérkedett a   fiad?
        else when waited   the son.yours
        'At what other time did your son do work as a waiter?'

(246)   Még hol   pincérkedett a   fiad?
        else where waited   the son.yours
        'Where else did your son do work as a waiter?'

FOCUS-GIVEN (Group 1 & 2)

(247)   Még mikor pincérkedett a   fiad   külföldön?
         else when waited   the son.yours abroad.on
         'At what other time did your son do work as a waiter?'

(248)   Még hol   pincérkedett a   fiad   tavasszal?
         else where waited   the son.yours spring.in
         'Where else did your son do work as a waiter?'

Target sentence 13.

(249)   Laci tüntetett   a   traktorjával   a   fővárosban.
         Laci demonstrated the tracktor.his.with the captial.in
         'Laci demonstrated with his tractor in the capital'

(250)   Laci tüntetett   a   traktorjával   is   a   fővárosban.
         Laci demonstrated the tracktor.his.with also the captial.in
         'Laci demonstrated also with his tractor in the capital'

(251)   Laci tüntetett   a   traktorjával   a   fővárosban is.
         Laci demonstrated the tracktor.his.with the captial.in   also
         'Laci demonstrated with his tractor in the capital also.'

Condition questions:
BASELINE

(252)   Miért mérges a   polgármester a   sógorodra?
         Why angry the mayor   the brother-in-law.your.on
         'Why is the mayor angry with your borother-in-law?'

GIVEN-NEW (Group 1 & 2)

(253)   A fővárosban miért volt a   sógorod?
         the capital.in   why was the brother-in-law.your
         'Why was your brother in law in the capital?'

(254)   A traktorjával   mit csinált a   sógorod?
         The tractor.his.with What did   the brother-in-law.your
         'What did your borther-in-law do with his tractor?'

FOCUS-NEW (Group 1 & 2)

(255)   Még mivel   tüntetett   a   sógorod?
         else what.whit demonstrated the borther-in-law.your
         'What else did your brother-in-law use to demonstrate?'

(256)   Még hol   tüntetett   a   sógorod?
         else where demonstrated the brother-in-law.yours
         'Where else did your brother-in-law demonstrate?'

FOCUS-GIVEN (Group 1 & 2)

(257)   Még mivel   tüntetett   a   sógorod   a   fővárosban?
         else what.whit demonstrated the borther-in-law.your the capital.in
         'What did your brother-in-law use to demonstrate in the capital?'

(258)   Még hol   tüntetett   a   sógorod   a   traktorjával?
         else where demonstrated the brother-in-law.yours the tractor.his.with
         'Where else did your brother-in-law demonstrate with his tractor? '

Target sentence 14.

(259)   Géza jegyzetel   az előadáson a   laptopján.
         Géza takes notes the lecture.on the laptop.his.on
         'Géza is taking notes on his laptop during the lecture'

(260)   Géza jegyzetel   az előadáson is   a   laptopján.
         Géza takes notes the lecture.on also the laptop.his.on
         'Géza is taking notes also on his laptop during the lecture'

(261)   Géza jegyzetel   az előadáson a   laptopján   is.
         Géza takes notes the lecture.on the laptop.his.on also
         'Géza is taking notes on his laptop also during the lecture'

Condition questions:
BASELINE

(262)   Hogy készül   a   barátod   a   vizsgára?
         How prepares the friend.yours the exam.for
         'How is your friend preparing for the exam?'

GIVEN-NEW (Group 1 & 2)

(263)   A laptopján   mit csinál a   barátod?
         the laptop.hi.on what does the friend.yours
         'What is your friend doing on his laptop?'

(264)   Az előadáson mit   csinál a   barátod?
         the exam.on   what does the friend.yours
         'What is your friend doing at the lecture?'

FOCUS-NEW (Group 1 & 2)

(265)   Még hol   jegyzetel a   barátod?
         else where takes notes the freind.yours
         'Where else is your friend taking notes?'

(266)   Még mivel   jegyzetel   a   barátod?
          else what.with takes notes the friend.yours
          'What else does your friend use to take notes?'

FOCUS-GIVEN (Group 1 & 2)

(267)   Még hol   jegyzetel   a   barátoda   a   laptopján?
          else where takes notes the freind.yours the laptop.his.on
          'Where else does your friend use his laptop to take notes?'

(268)   Még mivel   jegyzetel   a   barátod   az   előadáson?
          else what.with takes notes the friend.yours the lecture.on
          'What else does your friend use to take notes at the lecture?'

Target sentence 15.

(269)   Rita leltározik   a   raktárban a   segéddel.
          Rita does inventory the warehouse the assistant.with
          'Rita is doing the inventory in the warehouse with the assistant'

(270)   Rita leltározik   a   raktárban is   a   segéddel.
          Rita does inventory the warehouse also the assistant.with
          'Rita is doing the inventory also in the warehouse with the assistant'

(271)   Rita leltározik   a   raktárban a   segéddel   is.
          Rita does inventory the warehouse the assistant.with also
          'Rita is doing the inventory in the warehouse also with the assistant'

Condition questions:
BASELINE

(272)   Hol   van most a   titkárnőd?
          Where is   now the secretary.yours
          'Where is your secretary now?'

GIVEN-NEW (Group 1 & 2)

(273)   A segéddel   mit csinál a   titkárnőd?
          the assistant.with what does   the secretary.yours
          'What is your secretary doing with the assistant?'

(274)   A raktárban   mit csinál a   titkárnőd?
          the warehouse.in what does   the secretary
          'What is your secretary doing in the warehouse?'

FOCUS-NEW (Group 1 & 2)

(275)   Még hol   leltározik   a   titkárnőd?
          else where does inventory the secreatry.yours
          'Where else is your secretary doing the inventory?'

(276)   Még kivel   leltározik   a   titkárnőd?
         else who.with does inventory the secreatry.yours
         'Who else is your secretary doing the inventory with?'

<small>FOCUS-GIVEN</small> (Group 1 & 2)

(277)   Még hol   leltározik   a   titkárnőd   a   segéddel?
         else where does inventory the secreatry.yours the assistant.with
         'Where is your secretary doing the inventory with the assistant?'

(278)   Még kivel   leltározik   a   titkárnőd   a   raktárban?
         else who.with does inventory the secreatry.yours the warehouse.in
         'Who is your secretary doing the inventory with in the warehouse?'

Target sentence 16.

(279)   Noémi kísérletezik a   vegyszerekkel a   laborjában.
         Noemi experiments the chemicals.with the lab.hers.in
         'Noemi is experimenting with the chemicals in her lab.'

(280)   Noémi kísérletezik a   vegyszerekkel is   a   laborjában.
         Noemi experiments the chemicals.with also the lab.hers.in
         'Noemi is experimenting also with the chemicals in her lab.'

(281)   Noémi kísérletezik a   vegyszerekkel a   laborjában is.
         Noemi experiments the chemicals.with the lab.hers.in also
         'Noemi is experimenting with the chemicals also in her lab.'

Condition questions:
<small>BASELINE</small>

(282)   Mivel   foglalkozik a   barátnőd?
         What.with does   the girlfriend.yours
         'What does your girlfriend do?'

<small>GIVEN-NEW</small> (Group 1 & 2)

(283)   A   laborjában mit   csinál a   barátnőd?
         the lab.hers.in what does   the girlfriend.yours
         'What does your girlfriend do in her lab?'

(284)   A   vegyszerekkel mit   csinál a   barátnőd?
         The chemicals.with what does   the girfriend.yours
         'What does your girlfriend do with the chemicals?'

<small>FOCUS-NEW</small> (Group 1 & 2)

(285)   Még mivel   kísérletezik a   barátnőd?
         else what.with experiments the girfriend.yours
         'What else does your girlfriend experiment with?'

(286)   Még hol   kísérletezeik a   barátnőd?
        else where expereiments the girlfriend.yours
        'Where does your girlfriend experiment?'

FOCUS-GIVEN (Group 1 & 2)

(287)   Még mivel   kísérletezik a barátnőd   a   laborjában?
        else what.with experiments the girfriend.yours the lab.hers.in
        'What else does your girlfriend experiment with in her lab?'

(288)   Még hol   kísérletezeik a   barátnőd   a   vegyszerekkel?
        else where expereiments the girlfriend.yours the chemicals.with
        'Where else does your girlfriend experiment with chemicals?'

A.3   Experiment 3: Double focus constructions

This experiment included target sentences with a pre-verbal narrow focused constituent.

Target sentence 1.

(289) Pista vonult   fel a katonákkal a súgárúton.
       Steve prt.paraded prt the soldiers.with the avenue.on
       'It was Steve who paraded with the soldiers on the avenue.'

Condition questions:
BASELINE

(290) Ki   vonult fel?
       Who paraded prt
       'Who went on parade?'

GIVEN-NEW (Group 1 & 2)

(291) Melyik tiszt volt a   sugárúton?
       Which officer was the avenue.on
       'Which officer was on the avenue?'

(292) Melyik tiszt volt a   katonákkal?
       Which officer was the soldiers.with
       'Which officer was with the soldiers?'

FOCUS-NEW (Group 1 & 2)

(293) Ki   vonult fel és kikkel?
       who paraded prt and who.with
       'Who paraded and with whom?'

(294) Ki   vonult fel és hol?
       who paraded prt and where
       'Who paraded and where?'

FOCUS-GIVEN (Group 1 & 2)

(295) A sugárúton ki   vonult fel és kikkel?
       the avenue.on who paraded prt and who.with
       'Who paraded and with whom on the avenue?'

(296) A katonákkal ki   vonult fel és hol?
       the soldiers.with who paraded prt and where
       'Who paraded and where with the soldiers?'

Target sentence 2.

(297)   István esett   össze a fáradságtól a   tanévnyitón.
           Steven collapsed prt   the fatigue.from the opening of the school year.on
           'It was Steven who collapsed from fatigue at the opening ceremony of the school year.'

Condition questions:
BASELINE

(298)   Ki   esett   össze?
           Who collapsed prt
           'Who collapsed?'

GIVEN-NEW (Group 1 & 2)

(299)   Melyik testvéred   keltett feltünést a   tanévnyitón?
           which brother.yours made scene   the opening of the school year.on
           Which of your brothers made a scene at the opening ceremony of the school year?

(300)   Melyik testvéred   lett legutóbb   rosszul a   fáradságtól
           which brother.yours got most recently sick   the fatigue.from
           Which one of your brothers got sick most recently from fatigue?

FOCUS-NEW (Group 1 & 2)

(301)   Ki   esett   össze és   mitől?
           who collapsed prt   and what.from
           Who collapsed and from what?

(302)   Ki   esett   össze és   hol?
           who collapsed prt   and where?
           'Who collapsed and where?'

FOCUS-GIVEN (Group 1 & 2)

(303)   A tanévnyitón   ki   esett   össze és   mitől?
           the opening of the school year.on who collapsed prt   and what.from
           Who collapsed and from what at the opening ceremony of the school year?

(304)   A fáradságtól ki   esett   össze és   hol?
           he fatigue.from who collapsed prt   and where?
           'Who collapsed and where from fatigue?'

Target sentence 3.

(305)   Anna szólalt fel a   menekültek ügyében a   parlamenti ülésen.
           Anna spoke prt the refugees   case.in   the parliamnet session.on
           It was Anna who spoke up about the case of the refugees in the session of parliament.

Condition questions:
BASELINE

(306)   Ki   szólalt fel?
          Who spoke prt
          'Who spoke up?'

GIVEN-NEW (Group 1 & 2)

(307)   Melyik képviselő   kezdte ma   a   napot a   parlamenti ülésen?
          which representative started today the day   the parliament session.on
          'Which representative began the session of parliament today?'

(308)   Melyik munkatársad tett   valamit   a   menekültek ügyében?
          which colleage.yours made something the refugees   case.in
          'Which one of your colleagues did something the case of the refugees?'

FOCUS-NEW (Group 1 & 2)

(309)   Ki   szólalt fel és   miről?
          who spoke prt and what.about
          Who spoke up and about what?

(310)   Ki   szólalt fel és   hol?
          Who spoke prt and where
          Who spoke up and where?

FOCUS-GIVEN (Group 1 & 2)

(311)   A   parlamenti ülésen   ki   szólalt fel és   miről?
          the parliament session.on who spoke prt and what.about
          Who spoke up and about what at the session of parliament?

(312)   A   menekültek ügyében ki   szólalt fel és   hol?
          the refugees   case.in   who spoke prt and where
          Who spoke up and where about the case of the refugees?

Target sentence 4.

(313)   Attila ájult   el a   melegtől a   málnásban.
          Attila fainted prt the heat.from the raspberry field.in
          'It was Attila who fainted from the heat in the raspberry field.'

Condition questions:
BASELINE

(314)   Ki   ájul   el?
          who fainted prt.
          Who fainted?

GIVEN-NEW (Group 1 & 2)

(315)   Melyik fiad   lett   rosszul a   málnásban?
          which son.yours became sick   the raspberry field.in

'Which one of your sons got sick in the raspberry field.'

(316)   Melyik fiad   lett   rosszul a   melegtől?
          which   son.yours became sick   the heat.from
          Which one of your sons became sick from the heat?

FOCUS-NEW (Group 1 & 2)

(317)   Ki   ájult   el   és   mitől?
          who fainted prt and what.from
          'Who fainted and from what?'

(318)   Ki   ájult   el   és   hol?
          who fainted prt and where
          Who fainted and where?

FOCUS-GIVEN (Group 1 & 2)

(319)   A málnásban   ki   ájult   el   és   mitől?
          the raspberry field.in who fainted prt and what.from
          'Who fainted and from what in the raspberry field?'

(320)   A melegtől ki   ájult   el   és   hol?
          the heat.from who fainted prt and where
          Who fainted and where from the heat?

Target sentence 5.

(321)   Péter hízott el a   malacsülttől a   németeknél.
          Peter got fat prt the roast pork   the Germans.at
          'It was Peter who got fat from the roast pork in Germany.'

Condition questions:
BASELINE

(322)   Ki   hízott el?
          who got fat prt
          Who got fat?

GIVEN-NEW (Group 1 & 2)

(323)   Melyik osztálytársad változott meg a   legjobban a   németeknél?
          which classmate   changed prt the most   the Germans.at
          'Which of your classmates changed the most in Germany?

(324)   Melyik osztálytársad változott meg a   sok malacsülttől?
          which classmate   changed prt the lost roast pork
          'Which of your classmates chagned from the lots of roast pork?'

FOCUS-NEW (Group 1 & 2)

(325)   Ki   hízott el és mitől?
        who got fat prt and what.from
        'Who got fat and from what?'

(326)   Ki   hízott el és hol?
        who got fat prt and where
        'Who got fat and where?'

FOCUS-GIVEN (Group 1 & 2)

(327)   A németeknél   ki   hízott el és   mitől?
        the Germans.at who got fat prt   and what.from
        'Who got fat and from what in Germany?'

(328)   A malacsülttől ki   hízott el és hol?
        the roast pork   who got fat prt and where
        'Who got fat and where from the roast pork?'

Target sentence 6.

(329)   Kata ment el a   malomhoz a   hajóval.
        Kate went prt the mill.to   the boat.with
        It was Kate who when to the mill with the boat.

Condition questions:
BASELINE

(330)   Ki   ment el?
        who went prt
        'Who left?'

GIVEN-NEW (Group 1 & 2)

(331)   Melyik nővéredet   láttad   a   hajóval?
        which elder sister.yours saw.2sg the boat.with
        Which of your sisters did you see with the boat?

(332)   Melyik nővéredet   küldték el a   malomhoz?
        which elder sister.yours sent   prt the mill.to
        Which of your sisters was sent to the mill?

FOCUS-NEW (Group 1 & 2)

(333)   Ki   ment el és hova?
        who left   prt and where
        Who left and where to?

(334)   Ki   ment el és mivel?
        who left   prt and what.with
        'Who left and with what?'

FOCUS-GIVEN (Group 1 & 2)

(335)   A   hajóval   ki   ment el és   hova?
         the boat.with who left prt and where
         Who left with the boat and where to?

(336)   A   malomhoz ki   ment el és   mivel?
         the mill.to   who left prt and what.with
         'Who left to the mill and with what?'

Target sentence 7.

(337)   Ildi menekült el a   medvétől a   városba.
         Ildi escaped   prt the bear.from the city.to
         'Ildi escaped from the bear into the city.'

Condition questions:
BASELINE

(338)   Ki   menekült el?
         who escaped   prt
         'Who escaped?'

GIVEN-NEW (Group 1 & 2)

(339)   Melyik szomszédod   jutott el a   városba?
         which neighbour.yours got   prt the city.to
         'Which one of your neighbours got to the city?'

(340)   Melyik testvéred   élete változott meg legjobban a   medvétől?
         which sibling.yours life changed   prt most   the bear.from ?
         'Which one of your siblings' lifes changed the most from the bear?'

FOCUS-NEW (Group 1 & 2)

(341)   Ki   menekült el és   mitől?
         who escaped   prt and what.from
         'Who escaped and from what?'

(342)   Ki   menekült el és   hova?
         who escaped   ort and where.to
         'Who escaped and where to?'

FOCUS-GIVEN (Group 1 & 2)

(343)   A   városba ki   menekült el és   mitől?
         the city.to   who escaped   prt and what.from
         'Who escaped to the city and from what?'

(344)   A   medvétől ki   menekült el és   hova?
         the bear.from who escaped   ort and where.to

'Who escaped from the bear and where to?'

Target sentence 8.

(345) Az unokám   vásárolt be a hétvégén   a csarnokban.
the grandson.mine shopped prt the weekend.on the market hall.in
It was my grandson who did the shopping on the weekend in the market hall.

Condition questions:
BASELINE

(346) Ki   vásárolt be?
who shopped prt
'Who did the shopping?'

GIVEN-NEW (Group 1 & 2)

(347) Melyik rokonod   volt a   csarnokban?
which   relative.yours was the market hall.in
Which one of your relatives was in the market hall?

(348) Melyik rokonod   segített neked a   hétvégén?
which   relative.yours helped you.for the weekend.on
'Which one of your relatives helped you over the weekend?'

FOCUS-NEW (Group 1 & 2)

(349) Ki   vásárolt be és   mikor?
who shopped prt and when
Who did the shopping and when?

(350) Ki   vásárolt be és   hol?
who shopped prt and where
Who did the shopping and where?

FOCUS-GIVEN (Group 1 & 2)

(351) A   csarnokban   ki   vásárolt be és   mikor?
The market hall.in who shopped prt and when
Who did the shopping in the market hall and when?

(352) A   hétvégén   ki   vásárolt be és   hol?
the weekend.on who shopped prt and where
Who did the shopping on the weekend and where?

Target sentence 9.

(353) Anna bújt el a   rablóktól   a   szekrényben.
Anna hid prt the robbers.from the wardrobe.in
'It was Anna, who hid in the wardrobe from the robbers.'

Condition questions:
BASELINE

(354)   Ki   bújt el?
        who hid prt
        'Who hid?'

GIVEN-NEW (Group 1 & 2)

(355)   Melyik húgod   törte össze a   tálakat a   szekrényben?
        which   younger sister.yours broke prt   the plates the wardrobe.in
        'Which one of your sisters broke the plates in the wardrobe?'

(356)   Melyik szereplő menekült meg a   rablóktól?
        which   character escaped   prt the robbers.from
        'Which one of the characters escaped from the robbers?'

FOCUS-NEW (Group 1 & 2)

(357)   Ki   bújt el és   kiktől?
        who hid prt and who.from
        Who hid and from whom?

(358)   Ki   bújt el és   hol?
        who hid prt and where
        Who hid and where?

FOCUS-GIVEN (Group 1 & 2)

(359)   A   szekrényben ki   bújt el és   kiktől?
        the wardrobe.in who hid prt and who.from
        Who hid in the wardrobe and from whom?

(360)   A   rablóktól   ki   bújt el és   hol?
        the robbers.from who hid prt and where
        Who hid from the robbers and where?

Target sentence 10.

(361)   Bernadett jógázott a   szülinapján   a   tengerparton.
        Bernadett did yoga the birthday.her.on the beach.on
        'It was Bernadett, who did yoga on her birthday on the beach.'

Condition questions:
BASELINE

(362)   Ki   jógázott?
        who did yoga
        'Who did yoga?'

   GIVEN-NEW (Group 1 & 2)

(363)   Melyik unokatestvéred volt a   tengerparton?
         which cousin.yours   was the beach.on
         'Which one of your cousins was on the beach?'

(364)   Melyik unokatestvéred sportolt   a   szülinapján?
         which cousin.yours   did a sport the birthday.hers.on
         'Which one of your cousins worked out her birthday'

FOCUS-NEW (Group 1 & 2)

(365)   Ki   jógázott és   mikor?
         who did yoga and when
         'Who did yoga and when?'

(366)   Ki   jógázott és   hol?
         who did yoga and where
         'Who did yoga and where?'

FOCUS-GIVEN (Group 1 & 2)

(367)   A   tengerparton ki   jógázott és   mikor?
         the beach   who did yoga and when
         'Who did yoga on the beach and when?'

(368)   A   szülinapján   ki   jógázott és   hol?
         the birthday.hers.on who did yoga and where
         'Who did yoga her birthday and where?'

Target sentence 11.

(369)   Zsuzsa aludt el az unalomtól   az előadáson.
         Susan slept prt the boredom.from the lecture.on
         'It was Susan who fell asleep from boredom at the lecture.'

Condition questions:
BASELINE

(370)   Ki   aludt el?
         who slept prt
         Who fell asleep?

  GIVEN-NEW (Group 1 & 2)

(371)   Melyik osztálytársad   nem tanult   semmit az előadáson?
         which classmate.yours not learned nothing the lecture.on?
         Which of your classmates did not learn anything at the lecture?

(372)   Az unalomtól   melyik osztálytársad   nem haladt   az tanulmányaival?
         the boredom.from which classmate.yours not progressed the studies.hers.with
         'Which one of your classmates is not progressing because of boredom?'

FOCUS-NEW (Group 1 & 2)

(373)　Ki　aludt el　és　mitől?
who slept prt and what.from
Who fell asleep and from what?

(374)　Ki　aludt el　és　hol?
who slept prt and where
Who fell asleep and where?

FOCUS-GIVEN (Group 1 & 2)

(375)　Az előadáson ki　aludt el　és　mitől?
the lecture.on who slept prt and what.from
Who fell asleep at the lecture and from what?

(376)　A unalomtól　ki　aludt el　és　hol?
the boredom.from who slept prt and where
Who fell asleep from boredom and where?

Target sentence 12.

(377)　Attila pincérkedett tavasszal külföldön.
Attila waited　spring.in abroad.on
'It was Attila who worked as a waiter in spring abroad.'

Condition questions:
BASELINE

(378)　Ki　pincérkedett?
who waited
Who did work as a waiter?

GIVEN-NEW (Group 1 & 2)

(379)　Melyik fiad　volt külföldön?
which son.yours was abroad.on
Which one of your sons was abroad?

(380)　Melyik fiad　dolgozott tavasszal?
which son.yours worked spring.in
'Which one of your sons worked in the spring time?'

FOCUS-NEW (Group 1 & 2)

(381)　Ki　pincérkedett és　mikor?
who waited　and where
Who did work as a waiter and when?

(382)　Ki　pincérkedett és　hol?
who waited　and where

Who did work as a waiter and where?

FOCUS-GIVEN (Group 1 & 2)

(383)   Külföldön ki   pincérkedett és   mikor?
         abroad.on who waited   and where
         Who did work as a waiter abroad and when?

(384)   Tavasszal ki   pincérkedett és   hol?
         spring.in who waited   and where
         Who did work as a waiter in the spring time and where?

Target sentence 13.

(385)   Laci tüntetett   a   traktorjával   a   fővárosban.
         Laci demonstrated the tracktor.his.with the capital.in
         'It was Laci, who demonstrated with his tractor in the capital.'

Condition questions:
BASELINE

(386)   Ki   tüntetett?
         who demonstrated
         'Who demonstrated?'

GIVEN-NEW (Group 1 & 2)

(387)   Melyik sógorod   volt a   fővárosban?
         which brother-in-law.yours was the captial.in
         'Which one of your borthers-in-law was in the capital?'

(388)   Melyik sógorod   politizált   a   traktorjával?
         which brother-in-law.yours participated in politics the tractor.his.with
         Which one of your brothers-in-law participated in politics with his tractor?

FOCUS-NEW (Group 1 & 2)

(389)   Ki   tüntetett   és   mivel?
         who demonstrated and what.with
         'Who demonstrated and with what?'

(390)   Ki   tüntetett   és   hol?
         who demonstrated and where
         'Who demonstrated and where?'

FOCUS-GIVEN (Group 1 & 2)

(391)   A   fővárosban ki tüntetett és   mivel?
         the capital   in who   demonstrated and   what.whit
         'Who demonstrated in the capital and whit what?'

(392)   A traktorjával   ki   tüntetett   és   hol?
         the tractor.his.with who demonstrated and where
         'Who demonstrated with his tractor and where?'

Target sentence 14.

(393)   Géza jegyzetel   az előadáson a   laptopján.
         Géza takes notes the lecture.on the laptop.his.with
         'It was Géza, who took notes at the lecture with his laptop.'

Condition questions:
BASELINE

(394)   Ki   jegyzetel?
         who takes notes
         Who is taking notes?

GIVEN-NEW (Group 1 & 2)

(395)   Melyik barátod   lóg   mindig a   laptopján?
         which friend.yours hangs always the laptop.his.on
         Which one of your friends is always on his laptop?

(396)   Melyik barátod   tudja legjobban, hogy mi   hangzott el az előadáson?
         which frined.yours knows best   that what said   prt the lecture.on
         'Which one of your friends knows best what was said at the lecture?'

FOCUS-NEW (Group 1 & 2)

(397)   Ki   jegyzetel és   hol?
         who takes notes and where
         'Who is taking notes and where?'

(398)   Ki   jegyzetel és   mivel?
         Who takes notes and what.with
         'Who is taking notes and with what?'

FOCUS-GIVEN (Group 1 & 2)

(399)   A   laptopján   ki   jegyzetel és   hol?
         the laptop.his.on who takes notes and where
         'Who is taking notes with his laptop and where?'

(400)   A   előadáson ki   jegyzetel és   mivel?
         The lecture.on Who takes notes and what.with
         'Who is taking notes at the lecture and with what?'

Target sentence 15.

(401)   Rita leltározik   a   raktárban   a   segéddel.
         Rita doing inventory the warehouse.in the assistant.with
         'It is Rita, who is doing the inventory with the assistant in the warehouse.'

Condition questions:
BASELINE

(402)   Ki   leltározik?
         who does inventory
         'Who is doing the inventory'

GIVEN-NEW (Group 1 & 2)

(403)   Melyik titkárnő dolgozik együtt   a   segéddel?
         which   secretary works   together the assistant.with
         'Which secretary is it, who is working together with the assistant?'

(404)   Melyik titkárnő dolgozik a   raktárban?
         which   secretary works   the warehouse.in
         'Which secretary is it, who is working in the warehouse?'

FOCUS-NEW (Group 1 & 2)

(405)   Ki   leltározik   és   hol?
         who does inventory and where
         'Who is doing the inventory and where?'

(406)   Ki   leltározik   és   kivel?
         who does inventory and who.with
         'Who is doing the inventory and with whom?'

FOCUS-GIVEN (Group 1 & 2)

(407)   A segéddel   ki leltározik   és   hol?
         the assistan.wtih who does inventory and where
         'Who is doing the inventory and where?'

(408)   A raktárban   ki leltározik   és   kivel?
         the warehouse.in who does inventory and who.with
         'Who is doing the inventory and with whom?'

Target sentence 16.

(409)   Noémi kísérletezik   a   vegyszerekkel a   laborjában.
         Noemi experimenting the chemicals.with the lab.hers.in
         'It is Noemi, who is experimenting with the chemicals in her lab.'

Condition questions:
BASELINE

(410)   Ki   kísérletezik?
         who experimenting
         'Who is experimenting?'

GIVEN-NEW (Group 1 & 2)

(411)   Melyik kollégád   dolgozik a   laborjában?
         which colleague works   the lab.hers.in
         'Which one of your colleagues works in her lab?'

(412)   Melyik kollégád   dolgozik a   vegyszerekkel?
         which colleague works   the chemicals.with
         'Which one of your colleagues works with the chemicals?'

FOCUS-NEW (Group 1 & 2)

(413)   Ki   kísérletezik és   mivel?
         who experiments and what.with
         'Who is experimenting and with what?'

(414)   Ki   kísérletezik és   hol?
         who experiments and where
         'Who is experimenting and where'

FOCUS-GIVEN (Group 1 & 2)

(415)   A   laborjában ki   kísérletezik és   mivel?
         the lab.hers.in who experiments and what.with
         'Who is experimenting in her lab and with what?'

(416)   A   vegyszerekkel ki   kísérletezik és   hol?
         the chemicals.with who experiments and where
         'Who is experimenting with chemicals and where'

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