

2

Focus in Burmese: an investigation and experimental study of information structure and prosody

Andrew Simpson and Justin Watkins¹
School of Oriental and African Studies, London
as4@soas.ac.uk and jw2@soas.ac.uk

1 Introduction

This chapter considers the interaction of information structure, focus and prosody in Burmese. For many years research has been carried out on the potential impact of focus structures on word order, and recently an increasing number of works has begun to investigate the possible linking of focus with prosody and intonation. Primarily initiated in studies of Romance and Germanic languages (e.g. Cinque 1993, Ladd 1996, Zubizarreta 1998 among many others), this latter work is now growing in its coverage of other, non-European languages, and in the area of eastern Asia there have been recent, interesting investigations of prosodic effects on word order in Japanese and also Korean, in Ishihara (2002), Deguchi and Kitagawa (2002) and Jun (1996). Such work has complemented a growing body of research into the effects of focus in so-called 'free-word order' languages, where it is observed that a wide range of word order possibilities seem to be available within a single language. For example, in descriptions of languages having a neutral SOV-type word order such as Japanese, Korean, Turkish and Hindi, it is common to find it noted that a di-transitive clause may actually allow for a whole range of word order permutations as schematised in (1). Where the verb-final property of such languages may be less strictly imposed, as, for example, in Hindi, it may also be possible for other combinations to occur, and for arguments of the verb to be optionally positioned following the verb.

- (1) Common word order permutations in 'SOV' 'free word order' languages
'John gave a book to Mary'
Sub = subject, DO = direct object, IO = indirect object

¹ We are grateful to all the Burmese consultants who have provided the syntactic and perceptual judgements, translations and recordings on which this study is based, in particular Pyu Cyn, Khin Mar Mar Kyi and MT. Many thanks are also due to John Okell for many hours commenting on the data presented to informants and for valuable intuitions about the results obtained from native speakers. Thanks also to Bernard Howard for invaluable assistance in making the recordings.

- a. Sub IO DO V
- b. Sub DO IO V
- c. DO Sub IO V
- d. DO IO Sub V
- e. IO Sub DO V
- f. IO DO Sub V

The primary goal of most investigations of this kind of free word order has generally been to attempt to discover whether such word order really is free and random, or whether it is actually governed and even predicted by the interaction of syntactic, semantic and pragmatic factors, and possibly also prosody. In order to account for the complex patterns attested, a wide range of different theoretical approaches have been proposed in both formal and functionalist frameworks, with particularly significant work carried out by Lambrecht (1994), Vallduvi (1992), Givón (1990), Choi (1999), and Neeleman and Reinhart (1998) to name just a few. However, in spite of the increased and large amount of work carried out on the information-structure and prosodic factors potentially governing word order, there are still many central issues that are not well-resolved, and there are clear disagreements as to how to best capture the patterns observed. In addition to this, it is also not uncommon to find important disagreements about the basic 'facts' which obtain in certain of the languages studied, e.g. German, Korean, Japanese. There is consequently a pressing need for more careful studies on such matters to be carried out, and for information from a wider array of languages to be brought to bear on the general issues of word order variation and its relation to information structure and prosody. The aim of the current chapter is therefore to see how a study of Burmese may be able to contribute to this ongoing debate, and to examine what factors may seem to be responsible for the appearance/occurrence of 'free word order' patterns within the language. Burmese being typologically similar to Japanese, Korean, Hindi and Turkish in many relevant ways, it is hoped that a careful examination of word order permutation in Burmese will not only serve towards a better understanding of Burmese itself, but also be of value in more general cross-linguistic comparative research into word order variation within SOV languages.

The structure of the chapter is now as follows. Section 2 first provides a general background introduction to the notion of focus and various other factors often taken to have effects on word order in different languages. Section 3 then turns to Burmese and discusses at some length a wide range of word order patterns investigated in the language, together with information on how and why such patterns were investigated and the conclusions which seem to be indicated by the data. Following this examination of the influence of primarily discourse-related, pragmatic factors on word order patterns, section 4 presents the second major part of the present study, which was an investigation of the prosodic properties of word order variation and the occurrence of stress patterns in focus-related sentences. Section 5 then concludes the study with a summary of observations on the interaction of prosody with information structure and the limits of variation which seem to be attested in word order variation in Burmese.

2 Factors governing word order variation: a brief overview

Before proceeding into the investigation of Burmese proper, it will be useful to note and clarify certain commonly assumed notions and ideas relating to the study of focus and word order variation.

One common approach to modeling patterns such as those abstractly schematised in (1) is to argue that the different possible word orders which occur in a language result from the interaction of various different constraints relating to syntax and pragmatics (and sometimes also prosodic weight). Such an approach is highly formalised in work carried out within Optimality Theory, as e.g. in Choi (1999), and is also present in spirit in a range of earlier works such as Bresnan and Kanerva (1989), Givón (1990), Herring (1990). The central idea in many of these works is that (a) all discourse referents/Noun Phrases/NPs are associated with a number of properties (case, grammatical function, semantic role, degree of animacy etc), (b) each individual property system dictates its own optimal ordering of the elements which are specified with properties of that system, and (c) sometimes the particular clustering of properties within NPs in a sentence may give rise to competition and conflict between the different property systems, with different languages potentially resolving these conflicts in different ways.

A number of these property systems and their assumed effects on word order can be noted here as relevant illustration. First of all, it is widely assumed that information which is referentially old or 'given', such as the topic of a sentence, is commonly positioned before information that is new, resulting in the linear ordering of elements with old/new referential properties as in (2):

- (2) Old/new information status
given/old > new

Secondly, there is evidence to indicate that the ordering of NPs in a sentence may be regulated by the different grammatical roles they bear, hence cross-linguistically it has been observed to be very common for subjects to precede objects in neutral word order patterns, and elements with other grammatical roles are quite possibly also positioned according to a canonical type of order, as in (3):

- (3) Grammatical relations
subject > object > oblique > adjunct

Other hierarchical orderings that have been assumed to cause a linear ordering of elements relate to the semantic roles, case relations and degree of animacy borne by NPs in a sentence, as represented in (4)–(6). In each case, an element on the higher end of the scale is assumed to 'win out' over elements lower in the scale, and in many cases cause a parallel linear left-to-right ordering if other factors do not conflict with this:

- (4) Thematic hierarchy of NPs
agent > patient > goal...
- (5) Case hierarchy
nominative > accusative > dative...

(6) Animacy hierarchy

human 1st/2nd person > human 3rd person > animate non-human > inanimate

In an ideal kind of case, an element which is higher than some other element on one hierarchical scale will also be higher than the second element on all other scales, hence be uniformly more prominent than the second element with regard to all relevant properties. For example, it may be found that a subject NP occurs in nominative case, is human and an agent and is also old information, and that an object NP has accusative case, is inanimate, new information and semantically a patient, as in (7). This is assumed to lead to an automatic positioning of the subject NP before the object NP.

(7) 'John read a book.'

subject	>	object
nominative	>	accusative
agent	>	patient
old	>	new
human	>	inanimate

However, there may also be many cases where a conflict arises and the case, animacy and other values for two referents may not follow the same hierarchical ordering in all instances. Such cases are suggested to potentially result in different kinds of word order outputs in different languages, depending on the relative importance a language may give to the hierarchies in (2-6). The present investigation pays particular attention to the status of referents with regard to the new-old distinction in (2) and observes how this plays a clearly important role in the ordering of elements within a sentence in Burmese.

As in many other investigations into word order variation, we also consider the effects that *focus* has on different types of word order. The term 'focus' is commonly used in two significantly different senses. The first of these is to refer to *new* information introduced into a sentence against a background of presupposed, old information. This kind of focus is often referred to as *information focus* or *completive focus*, and can be naturally identified by the use of *wh* question-answer pairs, the element which supplies a value for a *wh*-constituent in a question always functioning as a new information focus in the answer, as e.g. in (8):

(8) Q: What did John buy?

A: I think he bought a book.

When a new information focus is instantiated by a single constituent such as an object or a subject (or a verb), this is furthermore referred to as an instance of '*narrow focus*', as in (8) above. If, however, a new information focus is instantiated by a larger constituent such as a VP or even a full sentence as in (9) and (10), the term '*broad focus*' is used to indicate that the extent of the focus is larger than cases of simple narrow focus:

(9) Q: What did John do?

A: I think he bought a book.

(10) Q: What happened?

A: John bought a book.

A second type of focus which is often distinguished, on the grounds that it may have different effects on word order, is *contrastive focus*, and involves the focal contrast of one element with another in the discourse context, as e.g. in (11):

(11) It was John who bought a book, not Mary.

In certain languages (for example Hungarian; Kiss 2002), an NP which has the interpretation of being in contrastive focus is forced to occur in a special position in the sentence (pre-verbally in Hungarian), whereas NPs that instantiate new information focus occur in other kinds of position (post-verbally in Hungarian). In the present study of Burmese, we consider both how new information focus patterns (narrow and broad) and the effects of contrastive focus.

Turning now briefly to certain ideas concerning prosody, and how prosodic factors may relate to focus and information structure, in many languages it has been observed that a clear sentence-final stress intonation coincides with new information focus occurring in such a position. This default intonation pattern is referred to as *nuclear stress* and the suggestion is made that nuclear stress highlights as new information focus whatever element occurs finally in a sentence, as for example in (8) where 'a book' receives the nuclear stress intonation. In certain languages such as Italian, it has also been noted that a new information focus *must* occur in the sentence-final position where nuclear stress falls, and that if the use of a neutral word order pattern would cause the new information focus to occur elsewhere in the sentence, such a neutral word order must be converted into a non-neutral pattern so that the element instantiating completive focus does occur finally in the sentence. This is illustrated in (12) below. Although Italian has a neutral SVO word order like English, if the subject NP is the answer to a *wh*-question (12)a and instantiates new information focus, it must be positioned following the verb as in (12)b and a pre-verbal positioning of the subject as in (12)c is quite inappropriate:

- | | | | | | |
|---------|--------------------|----|-----------------------|----|---------------------|
| (12) a. | Chi è arrivato? | b. | È arrivato Gianni. | c. | #Gianni è arrivato. |
| | who has arrived | | has arrived Gianni | | Gianni has arrived |
| | 'Who has arrived?' | | 'Gianni has arrived.' | | |

Generally, it is important to note here that the occurrence of focus in a sentence-final position is frequently attributed to the prosodic reason that nuclear stress naturally falls in such a position, and so syntactic structures may need to be built in which a focused element occurs in the sentence-final stress position.

Note that in verb-final languages such as German, it has been argued that the relevant sentence-final position where nuclear stress highlights a new information focus is actually the immediately pre-verbal position, and that the notion 'sentence-final' may actually be thought of as 'most deeply embedded' in a syntactic structure (Cinque 1993).

It can also be added that certain languages permit exceptions to the automatic application of nuclear stress in sentence-final position. In languages such as English, sentence-final elements which constitute old-given information may be invisible to the application of nuclear stress to a sentence-final element, allowing this nuclear stress to fall on a preceding element such as the verb in example (13). This is commonly referred to as

the possibility of de-accenting presupposed material in a sentence, and is a prosodic operation which is available in some but certainly not all languages (Ladd 1996; Cruttenden 2003).

- (13) a. I was thinking of giving John a bottle of whisky.
 b. But John doesn't like whisky.
 c.? But John doesn't like whisky.

Having outlined in brief a few of the relevant concepts and terms that will be referred to regularly in the rest of the chapter, we are now in a position to describe the full investigation of focus and prosody in Burmese which was carried out.

3 Focus-related word order variation

In order to gather information on information structure and prosody in Burmese, it was decided to divide the investigation into two main parts. The first major part of the investigation, described here in section 3, consisted in a comprehensive examination of different types of word order and the interpretations which are possible and natural in such orderings. The second part of the investigation, which built on the findings of the first part, was a controlled production and perception test which set out to examine the use of intonation and stress in focus-related sentences.

As a starting point for the study, certain fairly uncontroversial and commonly-made assumptions about basic word order patterns in Burmese were adopted as background hypotheses, and these subsequently appeared to be borne out by the general patterning of the data. First of all it was assumed that Burmese has an underlying neutral word order which is SOV in transitive sentences, and S-IO-DO-V in di-transitive sentences involving verbs of giving. Apart from being the most frequently occurring neutral pattern, there is evidence from case-marking that SOV order is basic in Burmese. If the object occurs adjacent to the verb, there is no particular pressure for it to be marked with accusative-like objective-case, whereas if it precedes the subject in an OSV order, it is commonly marked with the case-particle *-kou*. This provides an explicit indication to a hearer that the sentence-initial NP should not be given a default interpretation as a subject and is instead an 'out of place' object.

Secondly, given the observation in a number of works that *wh*-question words occur commonly before the verb in Burmese, we anticipated finding that focused elements in general might regularly appear in pre-verbal position. If this were to be so, it would group Burmese with the considerable number of SOV languages described as having a special pre-verbal focus position, e.g. Turkish, Hindi, Bengali, German. In certain of these languages, such as Hindi and Turkish, there are furthermore claims that a focused element *must* always come immediately before the verb. One of the goals of the investigation of Burmese was therefore identified as establishing the extent to which Burmese might require its focused elements to occur in immediately pre-verbal position, and also how any pre-verbal focus patterning is syntactically derived.

Because the study was interested in collecting information on both information focus and contrastive focus, the kinds of data examined included both *wh*-questions and correction sentences. *Wh*-questions were used as in other studies of focus to determine where the new information corresponding to a *wh*-question word is normally placed in a long answer form, as e.g. in (8).

While the most frequent type of answer to a *wh*-question is certainly a short answer form providing simply a value for the questioned element, long answer forms repeating more of the material in an input question are nevertheless quite grammatical and occur frequently in certain registers of speech/certain situations. As they are particularly revealing with regard to the effect of information status on sentence structuring, they are the type of answer-form that was predominantly examined here, as indeed in other studies of focus and information structure.

As Burmese is a language which does not automatically position its *wh*-question words sentence-/clause-initially in questions, unlike languages such as English and German (i.e. Burmese seems descriptively be a *wh* in situ language), the study also examined the positioning of *wh*-question words (as foci) relative to other elements in the sentence. Correction sentences such as the second part of speaker B's reply in (14) were used to examine where an element most naturally occurs if it is understood to be a focal centre in strong contrast with some other element, i.e. the patterning of contrastive focus:

(14) A: John likes Sue, I hear.

B: No, you're wrong. Bill likes Sue, (not John).
contrastive focus: Bill

(15) Sentence types/data considered in the study

(a) wh-questions and their answers

- used to examine new information focus by:
 - (i) the positioning of the answers to *wh*-questions
 - (ii) the positioning of *wh*-question words themselves

(b) corrections

- used to examine the positioning of contrastive focus

In terms of actual sentence structures, the study examined simple transitive sentences composed of a subject, object and verb in both SOV and OSV patterns, di-transitive double object constructions with an indirect object present in various combinations with the subject and the direct object, and also sentences with 'circumstantial' adverbs expressing the time and/or place of an event (e.g. 'yesterday', 'in the market' etc), which tend to occur most neutrally either before or after the subject of the sentence, as summarised in (16):

(16) Basic sentence patterns used

- (a) simple transitive sentences: (i) S O V
(ii) O S V
- (b) di-transitive 'double object constructions':
 - (i) Sub IO DO V
 - (ii) Sub DO IO V etc
- (c) sentences with 'circumstantial' adverbs:
 - (i) Sub Adv Ob V
 - (ii) Sub Ob Adv V etc

Concerning the various language informants consulted in the study, during the first part of the investigation where informants were quizzed about their intuitions on the grammaticality and naturalness of different focus-related sentences (as well as being asked to translate various focus sentences), the informants were all native speakers of Burmese with a particular sensitivity to language — either teachers of Burmese, or journalists who regularly wrote news reports and carried out radio broadcasts in Burmese. These informants also had a high level of proficiency in English. In the second part of the investigation which focused on the acoustic production and perception experiments, native speakers were consulted who did not necessarily have any ability in English or a profession related to the production/teaching of Burmese language. With regard to the actual collection of information and testing of data for the first part of the study, this was carried out in two main ways. Most commonly, informants were presented with a variety of constructed data and asked to indicate which forms were grammatical, appropriate in the specified context, and most preferred in the specified context. Certain informants were also asked to translate sentences from English into Burmese, as a means to further establish preferred, natural equivalents to focus structures in English. In the investigation of the positioning of new information focus in Burmese, informants were also often given an initial input in the form of a *wh*-question in English, and asked to respond with a long-answer form in Burmese. Here the use of English had a clear potential advantage over using questions in Burmese to elicit new information focus, as it disallowed the possibility of informants directly (and blindly) copying the physical shape of an input question in Burmese directly into their response form. The use of English in eliciting data and judgements in certain contexts and tests however also required careful attention. Given the fact that Burmese does not have definite and indefinite articles, particular care was necessary to ensure that informants interpreted NPs in English input data in the intended way as being either given/old information when preceded by the definite determiner, or new information when preceded by the indefinite article.

(17) Information collection procedures

- (a) Judgements on constructed data: informants were presented with a range of possible Forms for focus/*wh*-question sentences and asked to indicate which were considered (i) grammatical, (ii) appropriate in the particular context, (iii) most preferred
- (b) Judgements on available interpretations: informants were quizzed about the interpretations they felt were available in various different word orders.
- (c) Translation: informants were asked to translate English sentences into their most natural Burmese equivalents, establishing informants' first natural preference.

In the construction of data to be tested with informants, a number of further variables were manipulated. The first of these was the in/definiteness of the NP referents and given/new distinctions. This was done in various ways: (i) by presenting the NP in the test-target sentence also in a preceding sentence to ensure that it was interpreted as definite/familiar/old information, (ii) by explicit instruction to informants that certain determinerless NPs in Burmese data should be interpreted as new in the discourse and indefinite/previously unidentified, and (iii) in instances where explicit disambiguation of

information was deliberately not provided, informants were asked about their interpretations of NPs and whether these could be naturally construed as familiar/old information, or whether they were interpreted as new, indefinite/previously unidentified information. As anticipated, the in/definiteness value of NPs turned out to be an important factor influencing their placement in the sentence. However it also became necessary to distinguish between different kinds of interpretation with indefinite NPs, namely the specific vs. non-specific interpretation open to indefinite NPs, and generic/type vs. token interpretations.

A second variable controlled for was the relative animacy of NP referents, specified by the values of two parameters: $\pm$ human and $\pm$ animate. Such animacy values also seemed to have a potential influence on the placement of NPs in a sentence, but one which is considerably less important than other factors relating to information structure. Finally, a third potentially influential factor that was paid attention to in constructing data to be tested was the prosodic weight/length of NP referents. In experimental data it was found that the prosodic weight of NPs did not seem to have obvious strong effects on the placement of NPs, despite the fact that other languages may show regular repositioning of lengthy NPs in certain configurations (e.g. Heavy NP Shift in English). This is not to claim that prosodic weight effects are fully absent from Burmese. In newspaper-style reporting it is common for long clausal objects to be positioned before a short NP subject, resulting in a non-canonical OSV word order. However, in the regular spoken style of Burmese investigated here, the length of NPs did not seem to have much effect on their positioning, and other factors relating to in/definiteness and specificity seemed to be significantly more important.

During the course of the investigation, for each sentence type and pattern in (15) and (16), and for each information collection procedure type in (17), the variables noted immediately above were manipulated for each grammatical role. Results from investigation of the different sentence types in (15) and (16) and manipulation of the variables were then cross-checked and compared to ensure consistency of judgements across construction types and informants. Where any discrepancies were discovered, relevant data and patterns were checked again. Careful comparison and consideration of the body of data which had been generated then led to the generalisations reported in sections 3.1–3.5 below.

3.1 Object focus in transitive sentences

The study began by looking at sequences in which the object of the sentence was in focus. What was consistently found here was that focused objects and objects which were *wh*-question words were placed in the pre-verbal position (which also corresponds to the assumed base position of an object in neutral SOV word order in Burmese). Sentences (18)–(25) show a range of typical patterns and data, subdivided according to whether the object was the reply to a *wh*-question (new information focus), a contrastive focus in a correction sentence, or a *wh*-question word itself.

- Objects as new information focus: replies to *wh*-questions
- Generalisation: the object occurs in the pre-verbal position/its base-position, whether the object is indefinite or definite: S O V

(18) Input question: 'What did John buy?'

Response: ဂျန် DVDကို ဝယ်တာ။
 ʤùN dìvìdì.gò wè.dà
 John DVD.OBJ buy.REAL^{NOM}
 'John bought a DVD.'

(19) Input question: Who does Mary like?

Response: မယ်ရီ ဂျန်ကို ချစ်တယ်။
 mèrì ʤùN.gò tɕʰi?tè
 Mary John.OBJ love.REAL
 'Mary loves John.'

- Objects as contrastive foci in correction sentences.
- Generalisation: the object again occurs in the pre-verbal position, whether the object is indefinite or definite: S Q V

(20) ဂျန်က DVD ဝယ်တာ၊ VCR မဟုတ်ဘူး။
 ʤùN.gà dìvìdì wè.dà, vɪsɪ?à mǎ.hou?pʰú
 John.SUBJ DVD buy.REAL^{NOM}, VCR NEG.be.NEG
 'John bought a DVD, not a VCR.'

(21) မယ်ရီက ဘစ်(လ်)ကို ချစ်တာ၊ ဂျန် မဟုတ်ဘူး။
 mèrì.gà bi?kò tɕʰi?dà ʤùN mǎ.hou?pʰú
 Mary.SUBJ Bill.OBJ love.REAL^{NOM}, John NEG.be.NEG
 'Mary loves Bill, not John.'

- Objects as *wh*-question words
- Generalisation: the object occurs in the pre-verbal position: S Q V

(22) မယ်ရီ ဘာ ဝယ်သလဲ။
 mèrì bà wè.ðǎ.lé
 Mary what buy.REAL.Q-WH
 'What did Mary buy?'

These patterns were confirmed by asking informants whether it would be possible to position the object in sentences such as the above *before* the subject. Informants consistently indicated that this was *not* possible, whether the object was definite or indefinite:

(23) cf (20) ?? DVDက ဂျန်က ဝယ်တာ၊ VCR မဟုတ်ဘူး။
 dìvìdì.gò ʤùN.gà wè.dà vɪsɪ?à mǎ.hou?pʰú
 DVD.OBJ John.SUBJ buy.REAL^{NOM} VCR NEG.be.NEG

(24) cf (21) ?? ဘစ်(လ်)ကို မယ်ရီက ချစ်တယ်။ ဂျန် မဟုတ်ဘူး။
 bi?kò mèrì.gà tɕʰi?tè ʤùN mǎ.hou?pʰú
 Bill.OBJ Mary.SUBJ love.REAL John NEG.be.NEG

- (25) cf (22) * ဘာ မယ်ရီ ဝယ်သလဲ။
 bà mèrì wè.ðə.lé
 what Mary buy.REAL.Q-WH

3.2 Subject focus in transitive sentences

Having examined the positioning of focused objects in transitive sentences involving simply a subject, object and a verb, the study then considered where the subject is positioned in similar transitive sentences when it is in focus as a new information focus, a contrastive focus, and as a *wh*-phrase. The common finding was that focused subjects are, like focused objects, regularly and most naturally positioned before the verb, resulting in an OSV order. Note that the data in this section observes the patterning when the object NP is definite. The combination of subject focus with an object that is indefinite is described in section 3.3.

- Subjects as new information focus: replies to WH-questions (26)
- Generalisation: the subject-focus commonly occurs in the pre-verbal position, following the object, when the object is definite: O S V:

- (26) Input question: Who helped you?

Response: ကျွန်တော့်ကို ဂျွန်က ကူညီတာပါ။
 tɕəŋg.gò ɕùn kùjì.dà.bà
 I.OBJ John.SUBJ help.REAL^{NOM}.POL
 'John helped me.'

- Subjects as contrastive foci: in correction sentences (27)
- Generalisation: the subject again occurs in the pre-verbal position, following a definite object: O S V:

- (27) ဒီစာအုပ်ကို ဂျွန်က ယူလာတာ၊ မယ်ရီက မဟုတ်ဘူး။
 dì.sà?ou?kò ɕùn.ga jù.là.dà, mèrì.ga mə.hou?p^hú
 this.book.OBJ John.SUBJ bring.come.REAL^{NOM}, Mary.SUBJ NEG.be.NEG.
 'John brought this book, not Mary.'

- Subjects as *wh*-question words (28)
- Generalisation: the subject occurs in the pre-verbal position, following a definite object: O S V

- (28) ဒီစာအုပ်ကို ဘယ်သူက ယူလာသလဲ။
 dì.sà?ou?kò bɛ̀ðùn.ga jù.là.ðə.lé
 this.book.OBJ who.SUBJ bring.come.REAL.Q-WH
 'Who brought this book?'

The data in (18)–(28) therefore all indicate that the focus of a sentence is commonly placed in pre-verbal position. Such a generalisation applies to both new information focus and contrastive focus.

3.3 Indefinite objects in subject focus sentences

The study also investigated the distribution of indefinite objects in subject focus sentences. Although it is more common for objects to be definite/old information in subject-focus sentences, comprising part of the background, presupposed information, there are certain contexts in which a subject focus sentence can naturally contain an object which is indefinite. The testing of a variety of such sentences/contexts led to results which were partly different from those where the object is definite. What was observed was that certain indefinite objects were placed in a position preceding the subject (as in subject focus sentences where the object is definite), but others were positioned in a position following the subject, resulting in an SOV order which reflects the neutral/assumed underlying order of elements in Burmese. Concerning the first, OSV ordering, this was found to occur in two sets of conditions. The first of these was where an NP functioning as an indefinite object in a subject focus sentence had been explicitly referred to in some way as a type, or generic member of a group. For example, (30) below was a translation task, and informants were asked to translate the English sentence: 'Who picked a history book?'. As a background to the target sentence, informants were given a particular context which involved schoolchildren picking prizes after answering questions in a classroom quiz, and the prizes available were history books, novels, and writing pads. This pre-mention of 'history books' as a type then resulted in informants commonly producing an OSV order, as indicated in (29) below:

- Subject (*wh*) focus sentence, indefinite (but pre-mentioned) generic/type object
- Generalisation: OSV order

- (29) Context given: children in a school are picking prizes from three types of objects: history books, novels, writing pads.

သမိုင်းစာအုပ်ကို	ဘယ်သူ	ရွေးသလဲ။
θəmáin.sàʔouʔ.kò	bèðù	jwé.ðə.lé.
history.book.OBJ	who	choose.REAL.Q-WH

'Who picked a history book?' → O S V

The second condition which resulted in the production of an OSV order was where the context given to informants led them to interpret the object as a *specific* indefinite NP (i.e. as an NP whose identity is known to either the speaker or some other discourse referent, but not the hearer). For example, informants were asked to imagine that they were watching a film of a crime scene investigation in which police agents were searching an apartment for a letter they believed must have been written and also must have been hidden in the apartment. With such a background context, informants were asked to translate the target sentence: 'Which policeman is looking for a letter to the general?', and this regularly resulted in an OSV order with the specific indefinite NP object positioned before the questioned/focal subject, as in (30).

- Subject (*wh*) focus sentence, specific indefinite object
- Generalisation: OSV order
- Context given: the investigation of a murder scene at which several policemen are carrying out various tasks.

(30)

မိုလ်ချုပ်ဆီရေးတဲ့စာကို ဘယ်ရဲသားက ရှာနေတာလဲ။
 bòdzouʔ.sʰi.jé.dɛ.sà.gò bɛ́jéðá.ga ʃà.nè.dà.lé.
 general.to.write.ATTR.letter.OBJ which.policeman.SUBJ search.CONT.REAL^{NOM}.Q-WH

'Which policeman is searching for a letter to the general?' → O S V

When the above two conditions did not hold and indefinite objects were *not* pre-mentioned or inferable as specific, however, it was found that an SOV order resulted, and non-specific indefinite objects were positioned following the focused/*wh* subject, as in (31).

- Subject (*wh*) focus sentence, non-specific indefinite object
- Generalisation: SOV order
- Context: a picture presented to informants with various people engaged in different activities. Task: translate the sentence: 'Who is reading a book?'

(31) ဘယ်သူ စာအုပ် ဖတ်နေသလဲ။
 bɛ́ðù sàʔouʔ pʰaʔ.nè.ðə.lé.
 who book read.CONT.REAL.Q-WH
 'Who is reading a book?'

Data such as (31) therefore indicate that a *wh*-question word does not have to occur immediately before the verb, but can be separated from the verb by a non-specific indefinite object NP. Such examples may however also allow for the analysis that the object is *incorporated* into the verb and so forms a complex verbal predicate. If such an analysis could be maintained, one might not need to conclude that *wh* elements may be separated from the verb by other syntactic arguments.

Note that in addition to sentences with *wh* subjects, similar patterns were found to occur in sentences where the subject occurred as a new information focus and as a contrastive focus, i.e. an SOV order was found with non-specific indefinite objects, and an OSV order with specific or pre-mentioned generic object NPs.

3.4 Focus patterns in double object/di-transitive constructions

The positioning of focused elements was also investigated in sentences with both a direct object NP and an indirect object NP introduced by a di-transitive verb such as *pé* 'give'. When the focused element was the direct object of the verb, it was found that this occurs immediately preceding the verb, as shown in (32)(33) and (35), where the object is respectively a *wh*-phrase, a new information focus, and a contrastive focus. Examples (34) and (36) illustrate that it is not possible/is highly unnatural to place the direct object in a position preceding the indirect object when the direct object is interpreted as being in focus.

- Direct objects as foci in double object/di-transitive sentences
- Generalisation: S IO DO V order, and not: */?? S DO IO V

- (32) ခင်ဗျား ညွှန်မှူးကို ဘာ ပေးလိုက်သလဲ။
 k'həmjá ɲùnɴmú.gò bà pé.laiʔ.θə.lé.
 you director.to what give.just.REAL.Q-WH
 'What did you give to the director?' → S IO DO V.
- (33) ကျွန်တော် ညွှန်မှူးကို မှတ်တမ်း ပေးလိုက်တယ်။
 tɕənò ɲùnɴmú.gò ɲaʔtán pé.laiʔ.tè.
 I director.to report give.just.REAL.
 'I gave the director the report.' → S IO DO V
- (34) ?? ကျွန်တော် မှတ်တမ်း ညွှန်မှူးကို ပေးလိုက်တယ်။
 tɕənò ɲaʔtán ɲùnɴmú.gò pé.laiʔ.tè.
 I report director.to give.just.REAL.
- (35) ဂျန် ကျောင်းသားကို ဗွီဒီယိုတိပ် ပေးတာ၊ စာအုပ် မဟုတ်ဘူး။
 ʤùn tɕáunθá.gò vɪdijò.teiʔ pé.dà, sàʔouʔ mə.houʔ.pʰú
 John student.to video.tape give.REAL^{NOM}, book NEG.be.NEG
 'John gave the student a video tape, not a book.' → S IO DO V
- (36) ?? ဂျန် ဗွီဒီယိုတိပ် ကျောင်းသားကို ပေးတာ၊ စာအုပ် မဟုတ်ဘူး။
 ʤùn vɪdijò.teiʔ tɕáunθá.gò pé.dà, sàʔouʔ mə.houʔ.pʰú
 John video.tape student.to give.REAL^{NOM}, book NEG.be.NEG
- Data where the indirect object is in focus was then tested. Interestingly, it was found here that two different orders were commonly indicated as being available. First of all, if the direct object is definite/old information, it is possible for an S DO IO V order to occur, as shown in (37)–(39) where the indirect object occurs as a *wh*-phrase, a new information focus, and as a contrastive focus.
- Indirect objects as foci in double object/di-transitive sentences
 - Possibility I, if the direct object is definite: S DO IO V
- (37) ဂျန် မှတ်တမ်းကို ဘယ်သူ့ကို ပေးလိုက်သလဲ။
 ʤùn ɲaʔtán.gò bɛ̀ðy.gò pé.laiʔ.θə.lé.
 John report.OBJ who.to give.just.REAL.Q-WH
 'Who did John give the report to?' → Sub DO IO V
- (38) ကျွန်တော်သိသလောက် ဂျန် မှတ်တမ်းကို ညွှန်မှူးကို ပေးလိုက်တယ်။
 tɕənò.θi.ðə.lauʔ ʤùn ɲaʔtán.gò ɲùnɴmú.gò pé.laiʔ.tè.
 I know.REAL.extent John report.OBJ director.to give.just.REAL
 'As far as I know, John gave the report to the director.' → Sub DO IO V

- (39) မဟုတ်ပါဘူး။ ဂျန် မှတ်တမ်းကို အတွင်းရေးမှူးကို ပေးတာ။
 mə.houʔ.pà.pʰú dzùn məʔtán.gò ʔətwínjémú.gò pé.dè.
 NEG.be.POL.NEG John report.OBJ secretary.to give.just.REAL^{NOM}
 'No, that's not right. John gave the report to *the secretary* [not to the director].'
 → Sub DO IO V

Elsewhere, however, it was found that the focused indirect object could occur preceding the direct object resulting in a S IO DO V order. Significantly, this possibility also seems to be available whether the direct object is indefinite or definite and so is not linked to the information status of the direct object, as in (40), (41) and (42).

- Indirect objects as foci in double object/di-transitive sentences
- Possibility II: S IO DO V available whether the direct object is definite or indefinite

- (40) ဂျန် ဘယ်ကလေးကို နာရီ ပေးသလဲ။
 dzùn bɛ.kʰələ.gò nəjì pé.ðə.lé.
 John which.child.to watch give.REAL.Q-WH.
 'Which of his children did John give a watch to?'
 → Sub IO DO V

- (41) ဂျန် မယ်ရီကို နာရီ ပေးတယ်။
 dzùn mɛrì.gò nəjì pé.dè.
 John Mary.to watch give.REAL.
 'John gave *Mary* a watch.' → Sub IO DO V

- (42) မဟုတ်ပါဘူး။ ဂျန် အတွင်းရေးမှူးကို မှတ်တမ်း ပေးတာ။
 mə.houʔ.pà.pʰú dzùn ʔətwínjémú.gò məʔtán pé.dà.
 NEG.be.POL.NEG John secretary.to report give.REAL^{NOM}
 'No, that's not right. John gave the report to *the secretary* [not to the director].'
 → Sub IO DO V

The possibility that a focused indirect object can be separated from the verb by a direct object which is interpreted as *definite* and referential as in (42) suggests that the DO+V sequence here is *not* a case of simple morphological incorporation of the object with the verb, as incorporation is normally restricted to applying only to indefinite nouns. Consequently, examples of S IO DO V orders with definite direct objects are cases where the focused NP in a sentence actually does *not* immediately precede the verb and is separated from it by another referential argument NP.

3.5 Focused adverbs/PPs

A similar optional ability for an object to occur separating a focused element from the verb was found where the focused element was an *adverb* or a PP (postpositional phrase) indicating place, time or reason. Here as in the case of double object constructions with a focused indirect object two patterns were actually indicated to be naturally available.

Frequently the object of the verb (and all other arguments) precede the focused Adv/PP, so that the focused Adv/PP is in fact immediately pre-verbal, as shown in (43):

- Adverbs/PPs as foci in transitive sentences
- Possibility I: Sub Ob Adv/PP V

(43) မဟုတ်ဘူး။ ဦးလှသိန်း ကွန်ပျူတာ မနေ့က ဝယ်တာ၊
 mə.houʔ.pʰú ʔú.ʔəθéin kùnpjùtə mənɛgə wɛ̀.dà,
 NEG.be.NEG. UHlaThein computer yesterday buy.REAL^{NOM},

ဒီနေ့ မဟုတ်ဘူး။
 dìŋɛ mə.houʔ.pʰú
 today NEG.be.NEG

'No. U Hla Thein bought a computer *yesterday*, not today.'

However, it was also found to be possible for either an indefinite *or* a definite object to follow a focused Adv/PP, as in (44).

- Adverbs/PPs as foci in transitive sentences
- Possibility II: Sub Ob Adv/PP V

(44) Question prompt to answer: When did you read the report?

ကျွန်တော် မနေ့က မှတတမ်း ဖတ်တယ်။
 tɕənò mənɛgə məʔtán pʰaʔ.tɛ̃.
 I yesterday report read.REAL.
 'I read the report *yesterday*.'

3.6 Summary of observed patterns

Certain global generalisations about the positioning of focus in Burmese can be extracted from a comparison of the patterns in 3.1–3.5, and these can be usefully described as deviations from the most neutral ordering of elements in a sentence. (45) below represents what can be taken to be the neutral, basic word of arguments and circumstantial adverbs in Burmese, and is a sequencing which does not automatically result in any special kind of topic or focus interpretation of any of the elements present, unlike other kinds of ordering. See also Wheatley (1982) and Okell (1969) for reference to canonical word-order patterns in Burmese.

(45) Neutral surface word order in Burmese

Sub Adv/PP_(time/place) IO DO V

When any of the elements Sub, Adv/PP, IO or DO are the focus of the sentence, the data observed in sections 3.1–3.5 indicate that two patterns generally appear to be possible. In one common pattern it can be suggested that the focused element remains/occurs in the position it would regularly occur in in the neutral template in (45) and any other element which would otherwise normally occur between this focused element and the verb (in a

neutral ordering of elements) is (re-)positioned to the left of the focus. This results in the 'pre-verbal' focus effect, as schematised in (46) (focus underlined), and non-focal material which might intervene between the focus and the verb is evacuated from this position so that the focus occurs immediately preceding the verb. Described via the metaphor of 'movement' within a transformational approach, it can be suggested that the neutral underlying order of elements in (45) is converted into a different sequencing via the leftwards movement of non-focal elements which would otherwise intervene between the focus and the verb.

(46) Leftward repositioning of non-focal material

	<i>Neutral order</i>	<i>Order with focus</i>	<i>Analysed as movement</i>
a.	Sub IO DO V	Sub DO <u>IO</u> V	Sub DO <u>IO</u> DO V
b.	Sub DO V	DO <u>Sub</u> V	DO <u>Sub</u> DO V
c.	Sub Adv/PP DO V	Sub DO <u>Adv/PP</u> V	Sub DO <u>Adv/PP</u> DO V

Investigation indicates that this re-positioning of non-focal material is generally possible only when the repositioned material is informationally old in some sense: preferentially definite, and specific if indefinite (as in (30)), or pre-mentioned if a non-specific generic/type NP (as in (29)). Further data not presented here also indicate that the more 'affected' the non-focal material is by the action of the verb, and the more it is possible for the non-focal material to be a potentially emotive centre/centre of interest, the more natural this repositioning becomes. The leftwards repositioning described here can therefore be seen as a sub-type of clause-internal topicalisation—although the repositioning does not *necessarily* promote the NP to become a topic, like the leftwards positioning of elements to sentence-initial topic position, it is restricted to occurring with elements that are referentially given (in a certain sense).

It should also be noted that the NPs which undergo clause-internal repositioning in (46)a–c could alternatively be positioned in sentence/clause-initial position preceding the subject, which would result in an increase in prominence of the NP and more of a necessary topic-like interpretation.

A potentially different analysis of the relation of neutral base forms to derived surface focus structures might be to suggest that it is the focused element itself which moves/undergoes repositioning from its underlying base position to a position to the immediate left of the verb, as e.g. in (47), and that all other non-focal elements remain in their underlying base positions:

(47) Sub DO V → Sub DO Sub V

However, if such an analysis were to be maintained, there would be no explanation of why this movement should be restricted to occur only when the non-focal material intervening between the focus and the verb is informationally old. If non-focal material is assumed to simply remain in its underlying, regular base position, it should clearly be possible for non-specific indefinite NPs that are informationally new to be 'moved over' by the focus. However, the output sequencing in (47) is not possible if the DO is informationally new. This restriction is much easier to capture in an analysis which assumes that it is informationally old material that moves away from the pre-verbal focus position allowing the focused element to occur linearly before the verb. Furthermore, if the DO is assumed

to be in its base position in (47) and occur as the complement of the verb forming a constituent with the verb, there should be no syntactic position available for the focused subject to move to, so such rightwards focus movement can be ruled out on purely theoretical grounds as well.

The second pattern observed in 3.1–3.5 is for non-focal elements to the right of a focused NP/Adv/PP to remain in their base positions (i.e. to remain in the position that they would otherwise occur in in the template in (45)). This is most common with direct objects when some other element further to the left in the underlying/base order such as the subject or an Adv/PP is focused. Such a strategy results in the focused subject/Adv/PP *not* being immediately adjacent to the verb. This second patterning is again consistent with the assumption that the focused element itself is not moved/repositioned away from its base position. What (arguably) occurs in the second patterning is that the direct object simply fails to move away from its underlying, normal pre-verbal position:

(48) Non-repositioning of non-focal elements which occur to the right of the focus in underlying/base word order

Neutral order	Order with focus
(a) Sub DO V	<u>Sub</u> DO V
(b) Sub Adv/PP DO V	Sub <u>Adv/PP</u> DO V

What does *not* seem to be found, apparently, therefore, is any obvious, regularised repositioning of focal elements themselves (unlike in languages such as Hungarian, where contrastively focused and *wh* elements are clearly always moved to a special pre-verbal position from their post-verbal base positions). During the course of the investigation, informants were in fact also presented with data in which a focused element was deliberately removed from its regular base/underlying position and relocated further to the left as schematised in (49). Such data, in which a focused element occurs to the *left* of elements which would normally occur to its right in neutral word order, were regularly rejected as unnatural and inappropriate. Examples of such orders are given in (49). The symbol # indicates that sequences of this type are ill-formed in the context of the underlined element being the focus of the sentence (the answer to a *wh*-question, or contrastive focus in a correction sentence):

(49) Orders not attested (inappropriate in context/unnatural)

- (a) #Ob Sub V
- (b) #Sub DO IO V
- (c) #Adv/PP Sub DO V
- (d) #Sub Ob Adv/PP IO V

The occurrence of the orders in (46) and (48) but non-occurrence of those in (49) can be accounted for most naturally, it would seem, if it is assumed that focused elements do not tolerate repositioning within a sentence and simply remain in their underlying/base position, whereas other, informationally old elements may be optionally repositioned further to the left of the element in focus. The data examined furthermore indicates that this generalisation holds equally of both new information focus *and* contrastive focus. Studies of other languages with neutral SOV word order such as Korean and German have

indicated that contrastively focused NPs can be repositioned further to the left in the clause than their regular base position, hence that orders such as those in (49) are in fact possible with contrastive (but not complete) focus. It was therefore partly anticipated that this might be possible in Burmese too. However, informants regularly resisted the leftwards shifting of contrastively focused NPs, suggesting that Burmese is rather different from Korean and German in this respect.

Finally, it can be noted that the general observation of apparently optional word order variation in certain focus sentences (schematised in (46) and (48)) requires some further qualification. First of all, concerning frequency and naturalness of occurrence, informants tended to make much more spontaneous use of the first 're-positioning' strategy (i.e. the forms in (46)) in interview sessions, and the second strategy (schematised in (48)) where non-focal elements occurring to the right of the focus are not repositioned to the left was often noted to be possible only when informants were specifically quizzed further about different potential word orders in focus sentences. This was particularly the case when the intervening non-focal material was a definite or specific indefinite object rather than a non-specific indefinite object. Secondly, there appear to be limits on the way that the second strategy can be naturally used. Essentially it was found that a focused element such as a subject, adverbial/PP or indirect object can be naturally separated from the verb by one element (normally an object), as schematised in (50), but if more material occurs separating the focus from the verb, as schematised in (51), this results in the focus sequence being considerably less natural. Note also that the generalisation that one constituent can naturally/tolerably intervene between the focus and the verb does not allow for sequences such as those in (49) to occur, however, where the focus constituent is repositioned leftwards from its neutral base position. The separation of a focused constituent from the verb appears to be possible only when this results from the non-removal of an intervening (non-focal) constituent from its neutral/base position in the template sequence in (45).

(50) Acceptable occurrence of a single element between the focus and the verb

- (a) Sub DO V
- (b) Sub Adv/PP DO V
- (c) Sub IO DO V

(51) Unnatural occurrence of more than one element between the focus and the verb

- (a) ?? Sub Adv/PP DO V
- (b) ?? Sub IO DO V
- (c) ??? Sub Adv/PP IO DO V

There consequently appears to be a 'tolerance level' regulating how far a focused element can be naturally distanced/separated from the pre-verbal position, and when more than one element intervenes between the focus and the verb, such forms clearly deteriorate in their acceptability. What regularly occurred when the attempt was made to elicit subject focus sentences where more than one other element occurred in addition to the verb was that informants would either make use of the repositioning strategy so that the subject came to be adjacent to the verb, as for example in (52), or they would switch to a rather different syntactic construction, a cleft structure, as in (53):

(52) Sub IO DO V → IO Sub IO DO V

မဟုတ်ပါဘူး။ မယ်ရီကို ဂျန်က စာအုပ် ပေးတယ်။
 mə.houʔ.pà.bú mɛ̀rì.gò d͡ʒùɴ.gà sàʔouʔ pé.dɛ̃
 NEG.be.POL.NEG Mary.OBJ John.SUBJ book give.REAL
 'No, that's not right, John gave Mary a/the book.' [i.e. not Bill]

(53) မဟုတ်ပါဘူး။ မယ်ရီကို စာအုပ်ကို ပေးတာက ဂျန်ပါ။
 mə.houʔ.pà.bú mɛ̀rì.gò sàʔouʔ pé.dà.gà d͡ʒùɴ.bà
 NEG.be.POL.NEG Mary.OBJ book give.REAL^{NOM}.SUBJ John.POL
 'No, that's not right, John gave Mary a/the book.' [i.e. not Bill]

Due to such qualifications, and in order to test how the alternations between the two strategies might perhaps relate to prosodic factors, a second part of the investigation was initiated focusing on intonation and the potential use of stress in focus sentences. This is now described in section 4.

4 Prosody and intonation in focus sentences

The general aim of the second part of the investigation was to test whether there is any prosodic signaling of focus in Burmese, perhaps via the use of stress. Having established that there is a strong *positional* encoding of focus and that focused elements occur either in the immediately preverbal position or sometimes separated from the verb by a single constituent, we hoped to determine whether this positioning is accompanied by any additional prosodic indication of focus. We also wanted to try to establish whether there might be sufficient intonational information present with focused elements to even disambiguate potentially ambiguous sentences presented out of context. A potential complicating factor here is the fact that Burmese is a tone language. It has often been assumed that the existence of tone may interfere with, constrain or even block the use of stress to highlight elements within a language. In the experimental work reported here, lexical items were deliberately selected so that all syllables used in the data have low tone. This was done so as to keep such a preliminary investigation to a manageable scale by excluding comparisons across tonal categories from the experimental design. Further study will therefore be required to investigate the effects of focus on stress patterns across all four lexical tones in Burmese. Finally, a related question we hoped to probe in the study was whether the pre-verbal positioning of foci in Burmese might possibly be attributed to the default location of *nuclear stress* in such a position, as argued by certain authors for verb-final focus structures in other languages such as German and Hindi.

4.1 Design of the phonetic experiment

The experiment consisted of two major parts – a production experiment designed to gather information on intonational patterns in sentences with focus occurring on different constituents, and a perception test, structured so as to establish how well the identity of the focus in a sentence can (or cannot) be perceived from intonational patterns alone. The two parts of the investigation fed into each other, and recordings made in the production experiment were played to those participating in the perception experiment (a different

group of native speakers). As the goal of the perception test was to establish how well focus could be perceived from the phonetic signal alone, an important aspect of the experiment was to make use of sentences which structurally would allow for the possibility of different constituents being interpreted as the focus of the sentence (i.e. be potentially ambiguous as to what part of the sentence corresponds to). In order to allow for this and to gather a range of different information, the two sentences in (54) and (55) were used extensively in the experiments.

- (54) မာမာ နာရီ ဝယ်ပါတယ်။
 mà mà nàjì wè.bà.dè
 MarMar watch buy.POL.REAL
 'Mar Mar bought a/the watch/watches.'

- (55) မာမာ ရန်ကုန်မှာ နာရီ ဝယ်ပါတယ်။
 mà mà jàngòUN.mà nàjì wè.bà.dè
 MarMar Yangon.in watch buy.POL.REAL
 'Mar Mar bought a/the watch/watches in Yangon.'

Given the observation from section 3 that a focused element need not always be immediately pre-verbal, the sentences (54) and (55) can theoretically serve as the reply to a number of questions, in which case the part of the sentence which provides an answer value to the question will constitute new information focus. For example, sentence (54) can naturally serve as the reply to any of the following questions:

- (56)
- a. What did MarMar buy? narrow object focus
 - b. Who bought a watch? narrow subject focus
 - c. What did MarMar do? VP focus
 - d. What happened? broad S focus

(54) used to reply to questions of the type in (56) will produce narrow focus on the object နာရီ nàjì 'watch' when responding to an (a)-type question, and narrow focus on the subject မာမာ mà mà 'MarMar' when responding to the (b). When (c) and (d) type questions are asked, (54) will produce new information focus on နာရီဝယ် nàjì.wè 'watch.buy' (VP focus) for a (c)-type question, and broad sentential focus (consisting in the whole of (54)) for a (d)-type input.

In a similar way, sentence (55) can naturally serve as the answer form to the questions in (57):

- (57)
- a. What did MarMar buy? narrow object focus
 - b. Where did MarMar buy a watch? narrow adverb focus
 - c. What did MarMar do? VP focus
 - d. What happened? broad S focus

Note that because it is felt to be quite unnatural for a focus to be separated from the verb by more than one constituent, sentence (55) could not be used as a natural reply to a fifth

possible question 'Who bought a watch in Rangoon?'. As the experiment hoped to gather information on narrow focus on an Adverb/PP preceding a direct object, and also wanted to test narrow focus on a subject preceding some other constituent, this resulted in the need for two sentences to be used rather than one. (54) critically allows for testing of narrow focus on the subject, and (55) for narrow focus on an Adv/PP. Finally, note that both sentences (54) and (55) follow the neutral ordering of elements in a sentence (i.e. (45)), hence there is no biasing towards any particular order due to the positions that the elements occur in.

In the production/elicitation experiments, four native speakers were recorded pronouncing sentences (54) and (55) as if they were the replies to the range of different questions in (56) and (57), varying the prosody of (54) and (55) as appropriate and necessary. Four speakers were chosen to produce the spoken material, all from Yangon and in their twenties or thirties. None reported abnormal speech or hearing, and one of the four was an experienced radio broadcaster and newsreader. The varied questions in (56)a–d and (57)a–d triggering the pronunciation of (54) and (55) as reply forms were asked by an interviewer in Burmese in quasi-random order, and the question and answer-pairs were recorded in the sound-proofed recording studio at the School of Oriental and African Studies in London on digital audio tape (DAT) using an electret condenser microphone with a Bruel-Kjaer 2069 preamplifier. Each of the four consultants responded a total of three times to each question, yielding ($4 \times 3 \times 4 =$) 48 tokens for each experiment. Finally, it can be noted that the sentences (54) and (55) used as reply forms were designed so that the consonants which occur at constituent boundaries are either sonorants or resonants, to keep pitch perturbation effects to a minimum.

Recordings of the same sentences pronounced with different interpretations in mind allowed for a careful acoustic analysis of the potential prosodic manifestation of focus in each case, and extensive phonetic information about both narrow and broad focus. In the follow-up perception test, the various recordings of the sentences in (54) and (55) were presented to native-speaker subjects as described in section 4.3 below. The subjects were asked to indicate which of the various interpretations in (56) and (57) the sentences were responding to. This test was intended to formally establish whether there was sufficient prosodic information in the pronunciation of focus sentences to disambiguate different focus structures within a single sequence of words.

4.2 Results I: the production experiments

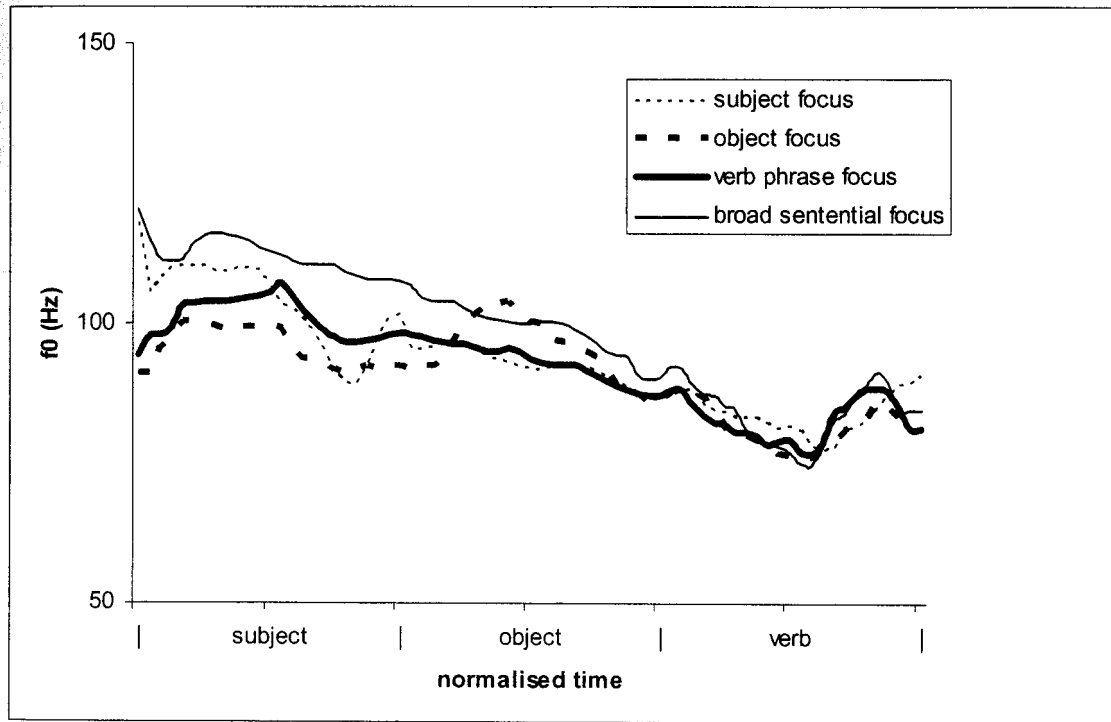
The recordings of the production experiments detailed below were analysed using Praat (version 4.3.12) speech analysis software, also making use of a time-normalising script by Yi Xu (Xu 2005).

Production experiment 1

(58) and (59) illustrate pitch traces (measured as fundamental frequency in Hz) of four versions of sentence (54) spoken by two of the consultants — one male and one female — in response to the four prompt questions. The duration of the subject, object and verb phrase have been normalised for ease of comparison, so the duration of each appears equal on the horizontal axis.

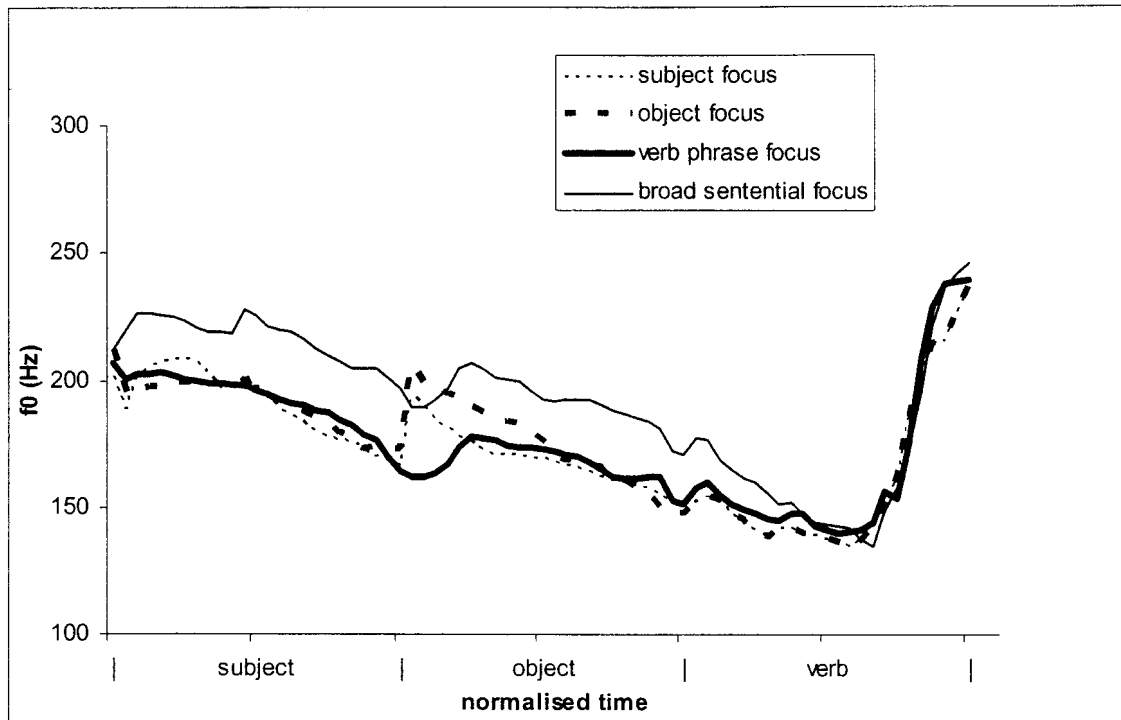
The representations of pitch change in (58), (59), (63) and (64) show a final rise in pitch on the sentence-final verb marker တယ် *tè*. This rise is associated with a formal reading speech-style, and is not relevant to the focus-related pitch changes under investigation.

- (58) Sample, typical fundamental frequency traces (male speaker) of sentence (54) 'Mar Mar bought a watch'.



မာမာ နာရီ ဝယ်ပါတယ်။
 mà mà nà jì wè.bà.dè
 MarMar watch buy.POL.REAL

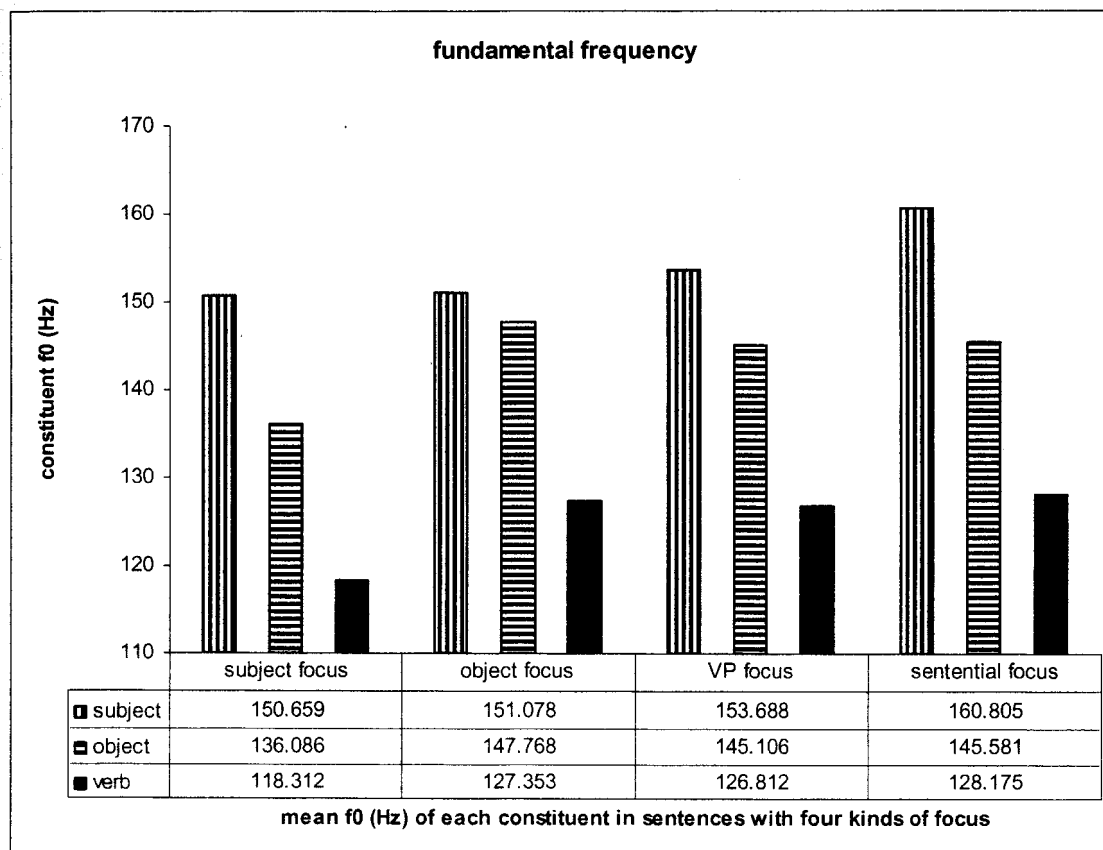
(59) Sample, typical f0 traces (female speaker) of sentence (53) 'Mar Mar bought a watch'



မာမာ နာရီ ဝယ်ပါတယ်။
 mà mà nàjì wè.bà.dè
 MarMar watch buy.POL.REAL

Patterns in the data were sought by listening to and scrutinising the sentences, and by using the Praat software to reduce the f0 traces from all 64 sentences to a mean f0 measurement for each constituent in each sentence. The mean f0 data are displayed in (60) below. Each set of three columns represents the mean f0 (pitch height) of the three constituents (မာမာ mà mà 'MarMar', နာရီ nàjì 'watch' and the final verbal cluster) in the twelve sentences spoken with each focus type. The bars thus represent the pooled data of all four speakers, two male and two female. It is assumed in calculating these means that between-speaker variation in the pitch, duration and loudness of the habitual speaking voices of the four speakers is constant.

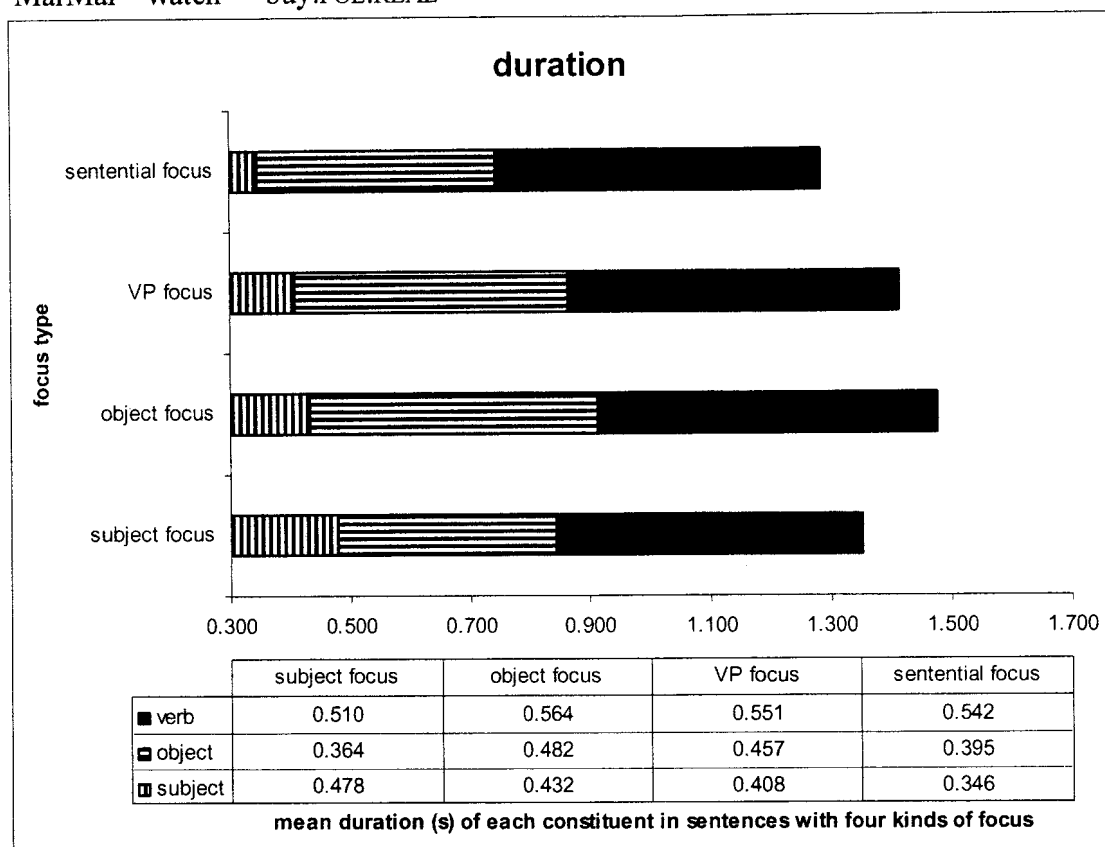
(60) mean (n=12) fundamental frequency of each constituent in sentence (54) spoken with each of four kinds of focus (i.e. as answers to Burmese equivalents of (56)a-d).



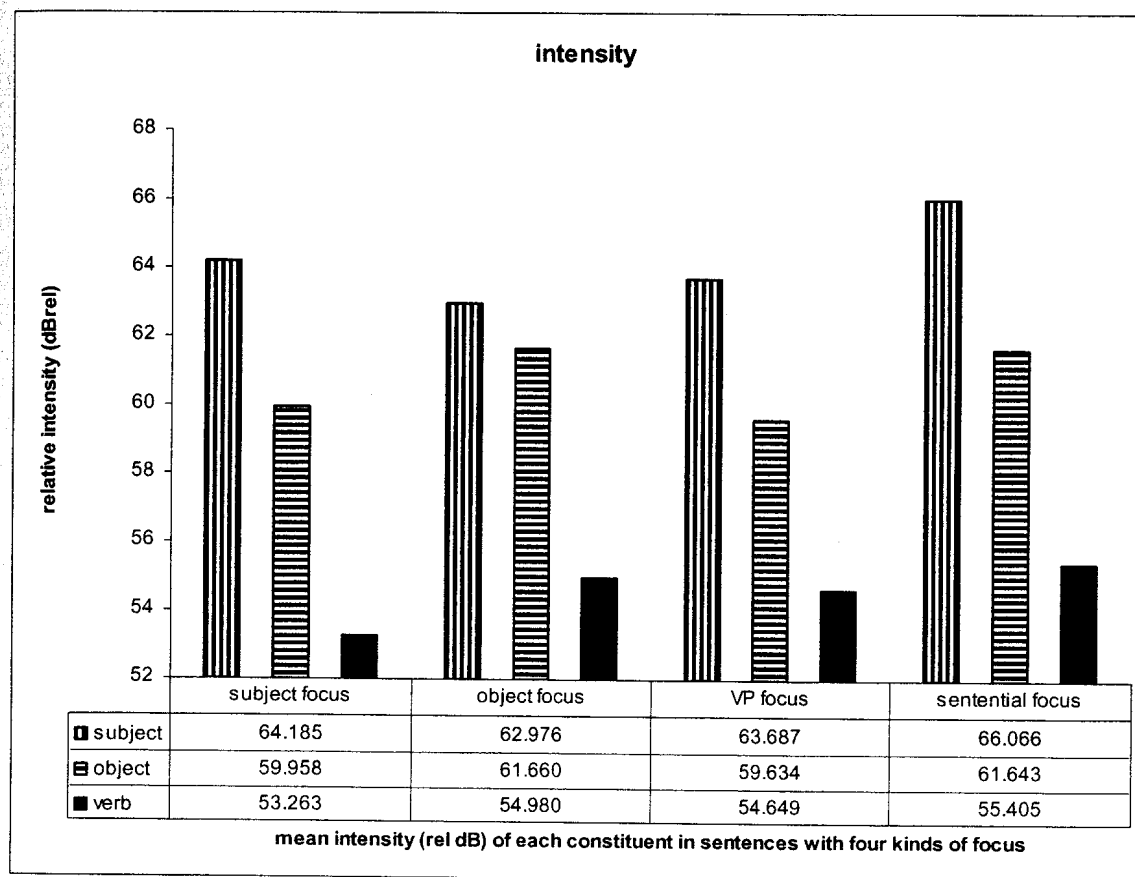
The intensity and duration measurements of each constituent in each sentence were pooled in a similar fashion. The results are displayed in (61) and (62) below. To allow visual comparison of the total utterance length, mean duration is displayed using horizontal bars.

(61) mean (n=12) duration of each constituent in sentence (54) spoken with each of four kinds of focus.

SUBJECT OBJECT VERB
 မာမာ နာရီ ဝယ်ပါတယ်။
 mà mà nàjì wè.bà.dè
 MarMar watch buy.POL.REAL



(62) mean (n=12) relative intensity of each constituent in sentence (54) spoken with each of four kinds of focus.



Observations

Note that the declination of fundamental frequency and intensity through all of the sentences is a universal prosodic template and is not attributable to any focus effects (i.e. it is natural for speakers to gradually lower their pitch levels and reduce the loudness of their speech during the course of a sentence, whether producing a sentence with focus in it or not). However, scrutiny of the pooled data and the individual traces like those in (58) suggests that focus affects sentence prosody according to the following general patterns of deviation from this template:

fundamental frequency

- VP vs broad sentential focus: f_0 generally starts higher and declines more rapidly for broad sentential focus than for verb phrase focus
- object focus: object f_0 is higher
- subject focus: object and V f_0 is lower (deaccented), but subject f_0 is no higher.

duration

- VP vs broad focus: the sentence is shorter with broad sentential focus than with VP focus; the subject is very short with broad sentential focus
- object focus: the subject is shorter, the object is longer

- subject focus: the subject is longer, the object and the verb are shorter (deaccented)

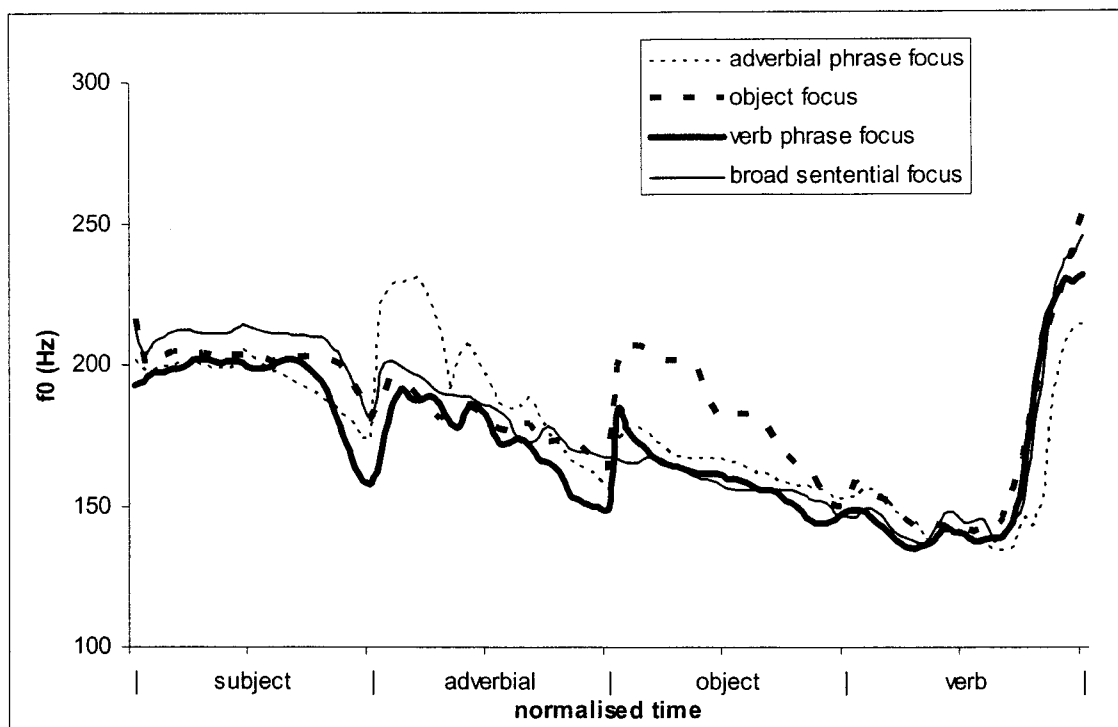
intensity

- VP vs broad sentential focus: all constituents are relatively more amplified (i.e. sound 'louder') with broad sentential focus than with VP focus
- object focus: the subject is slightly attenuated (de-accented), the object is more amplified
- subject focus: the subject is amplified, the object and the verb are attenuated (de-accented)

Production experiment 2

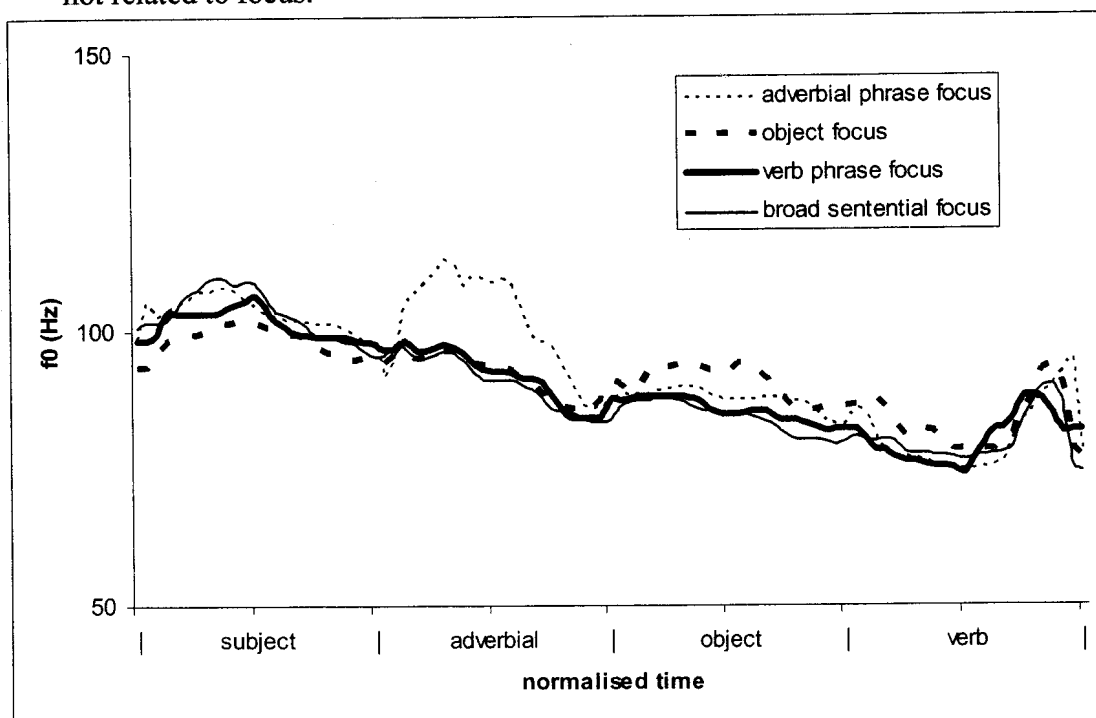
The results of *Experiment 2* are presented below in the same order and format as for *Experiment 1* above. Here, figures (63) and (64) relate to the longer sentence (55). The observations derived from the data follow table (67).

- (63) Sample, typical pitch trace (female speaker) of sentence (55) 'Mar Mar bought a watch in Yangon.' NB The final rise is associated with formal reading style, and is not related to focus.



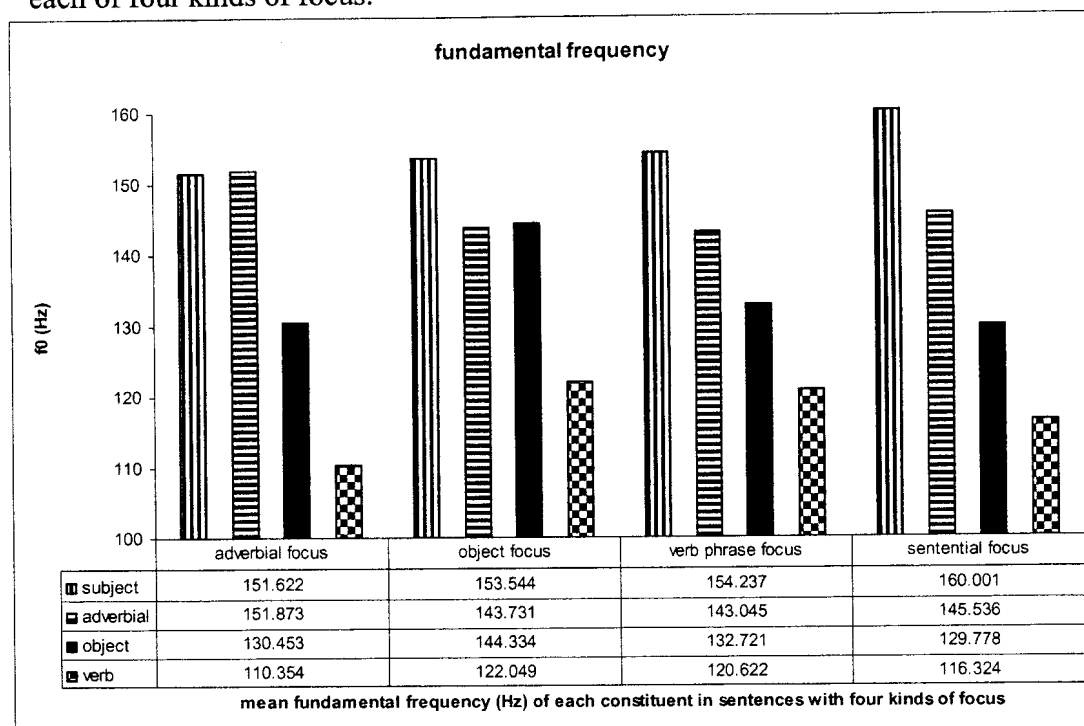
မာမာ ရန်ကုန်မှာ နာရီ ဝယ်ပါတယ်။
 mà mà jàngòun.mà nàjì wè.bà.dè
 MarMar Yangon.in watch buy.POL.REAL

- (64) Sample, typical pitch trace (male speaker) of sentence (55) 'Mar Mar bought a watch in Yangon.' NB The final rise is associated with formal reading style, and is not related to focus.

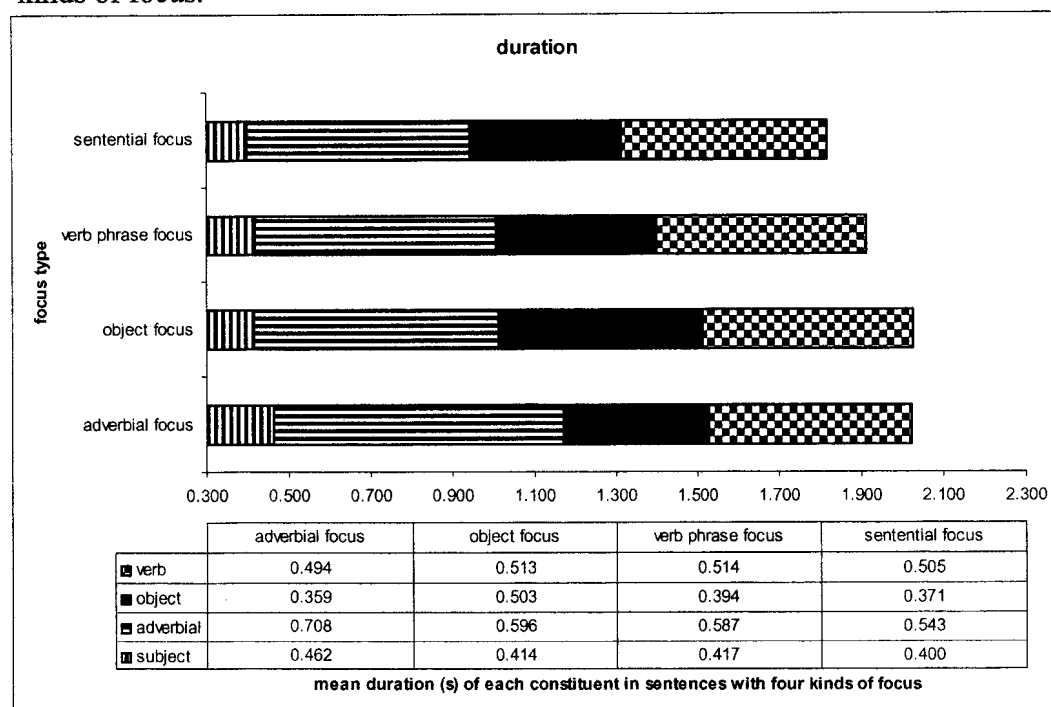


မာမာ ရန်ကုန်မှာ နာရီ ဝယ်ပါတယ်။
 mà mà jàngòun.mà nàjì wè.bà.dè
 MarMar Yangon.in watch buy.POL.REAL

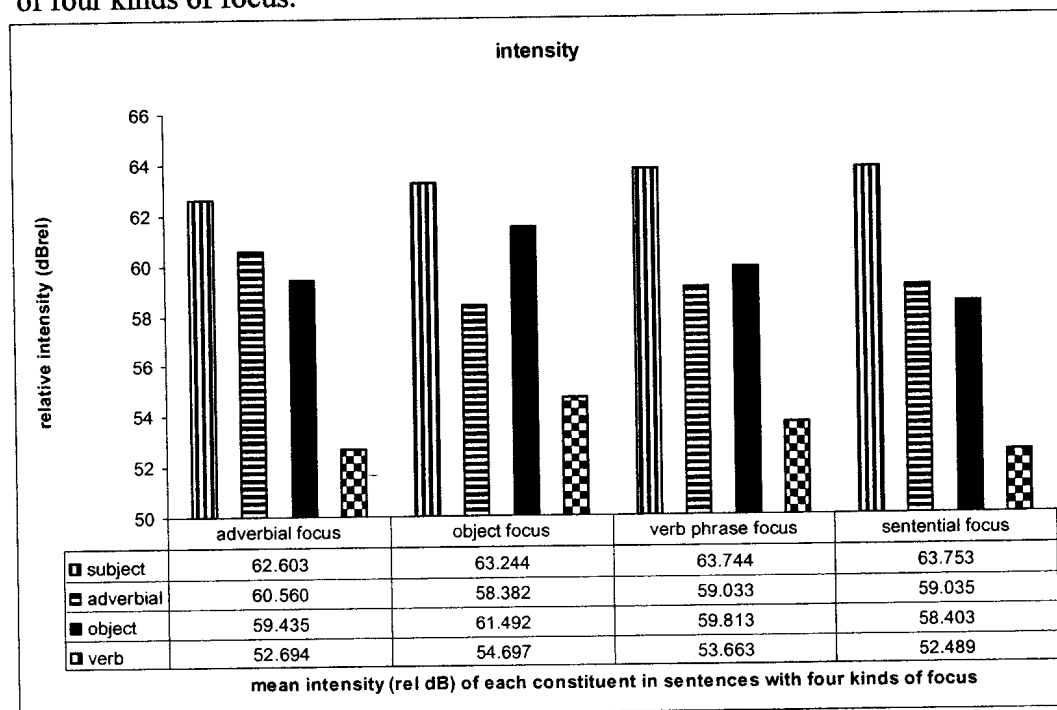
(65) mean (n=12) fundamental frequency of each constituent in sentence (55) spoken with each of four kinds of focus.



(66) mean (n=12) duration of each constituent in sentence (55) spoken with each of four kinds of focus.



(67) mean (n=12) relative intensity of each constituent in sentence (55) spoken with each of four kinds of focus.



Observations

For the reasons noted earlier, the sentence used in *Production experiment 2* cannot be used to elicit an acceptable/natural subject focus. We can, however, observe the effects of the four types of focus compared in *Production experiment 2* on all four constituents in the sentence, including the subject.

Not surprisingly, with four constituents in the sentence instead of three, the patterns appear more complex. The universal template of declining fundamental frequency and intensity applies here also, but with four constituents to fit into the sentence's intonation pitch range instead of three, the relative 'pitch space' of each is smaller and the perturbations attributable to focus are thrown into sharper relief.

fundamental frequency

- VP vs sentential focus: no discernible difference in relative pitch of individual constituents, but sentential focus starts higher and declines more sharply
- object focus: the object is raised in pitch, on average slightly higher than the preceding adverbial phrase
- adverbial phrase focus: the adverbial phrase is raised in pitch, on average slightly higher than preceding subject; the pitch of the object is slightly lowered

duration

- VP vs sentential focus: sentential focus is globally shorter than VP focus.
- object focus: the object has a longer duration
- adverbial phrase focus: the adverbial phrase is longer, the object shorter

intensity

Often, intensity and fundamental frequency are correlated in speech, i.e. higher pitch sounds are generally also louder, but such a correlation is not observed in *Experiment 2*.

- VP vs sentential focus: no clear effect
- object focus: object (and V) amplified, preceding adverbial phrase attenuated
- adverbial phrase focus: adverbial phrase amplified

Generalisations

VP and sentential focus are not differentiated by prosodic effects on particular constituents. Rather, sentential focus is characterised by globally raised pitch with more rapid rate of declination through the sentence, by globally increased intensity and by reduced duration – i.e. a faster speech rate.

When the object, adjacent to the verb, is in focus, this is signaled by the object constituent being higher, longer and louder, and these are taken to be the phonetic correlates of stress in this position. There is some evidence from the pooled data that stressing the object in this way also results in stressing the verb to some degree as well. Alternatively, the same statistical effect could indicate that some speakers are conflating the object and verb phrase into one prosodic phrase and jointly stressing this single prosodic unit.

When a constituent in focus is not adjacent to the verb, as is the case with subject focus in *Experiment 1* and adverbial phrase focus in *Experiment 2*, then the constituent between the focus and the verb, and indeed the verb itself, are de-accented. The phonetic correlates of de-accenting are lower pitch, shorter duration and lower intensity.

Here, constituents positioned to the left of the focus appear to undergo de-accenting to a lesser degree than those positioned between the element in focus and the verb phrase.

4.3 Results II: the perception of focus

Two perceptual experiments were devised to test the extent to which listeners were able to recover the intended focus in the speech material elicited for Production Experiments 1 and 2 above. In essence, subjects were asked to listen to the various recordings of the sentences (54) and (55), and to judge which of the questions in (56)a–d and (57)a–d the sentences were responding to. These tests were intended to establish whether there is sufficient prosodic information in the pronunciation of focus sentences to disambiguate different focus structures within a single sequence of words.

Experimental design

The experiments were conducted as follows. The subjects selected were nineteen native speakers of Burmese, all current or former residents of Yangon, none of whom had formal training in linguistics or reported speech or hearing abnormalities. For both experiments, a set of sixty-four stimuli was assembled:

- four speakers;
- four types of focus (stimuli responding to one of four prompt questions) ;
- two repetitions produced by each speaker

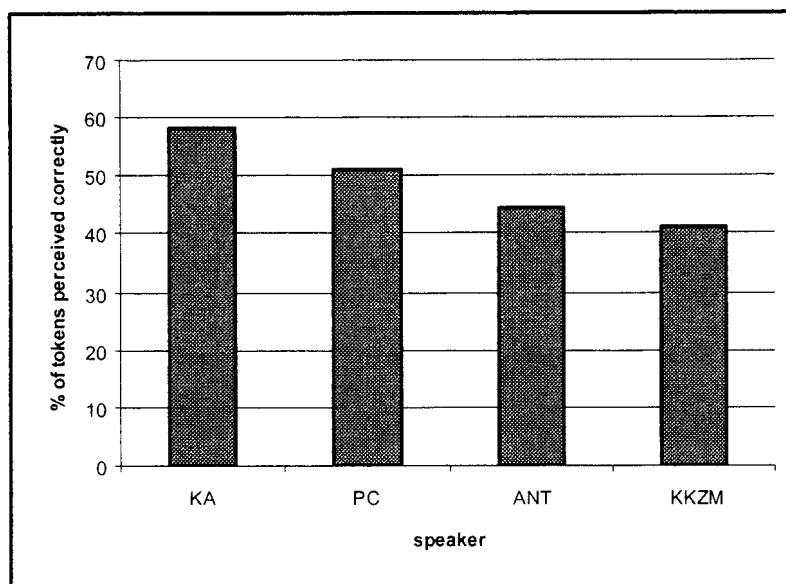
- each sentence presented twice in the experiment
→ $4 \times 4 \times 2 \times 2 = 64$ sentences in each set.

The experiments were conducted using the Praat speech analysis software's 'multiple forced choice' facility, which presented the set of stimuli to each subject in quasi-randomised order, avoiding repetitions of the same stimulus. On hearing each sentence, subjects were required to select which of the four questions it was responding to by clicking with a mouse on the appropriate place on a computer screen. The judgements were made without time pressure, but subjects did not have the option of changing their mind.

Results of the perception tests

The first thing to note in the results is a relatively high degree of variation between the speakers who produced the stimuli used in the perceptual experiment. Chart (68) shows the percentage of all sentences which were judged correctly for each of the four speakers whose recordings were used in the perceptual experiments. The speakers can be ranked for their 'general intelligibility of focus'. In other words, it was apparently globally easier for subjects to perceive intended focus in the speech of certain speakers than for others. This suggests that there may be a between-speaker difference in the extent to which Burmese uses prosody rather than syntax to convey focus. This variation falls outside any significant effect within the experimental design.

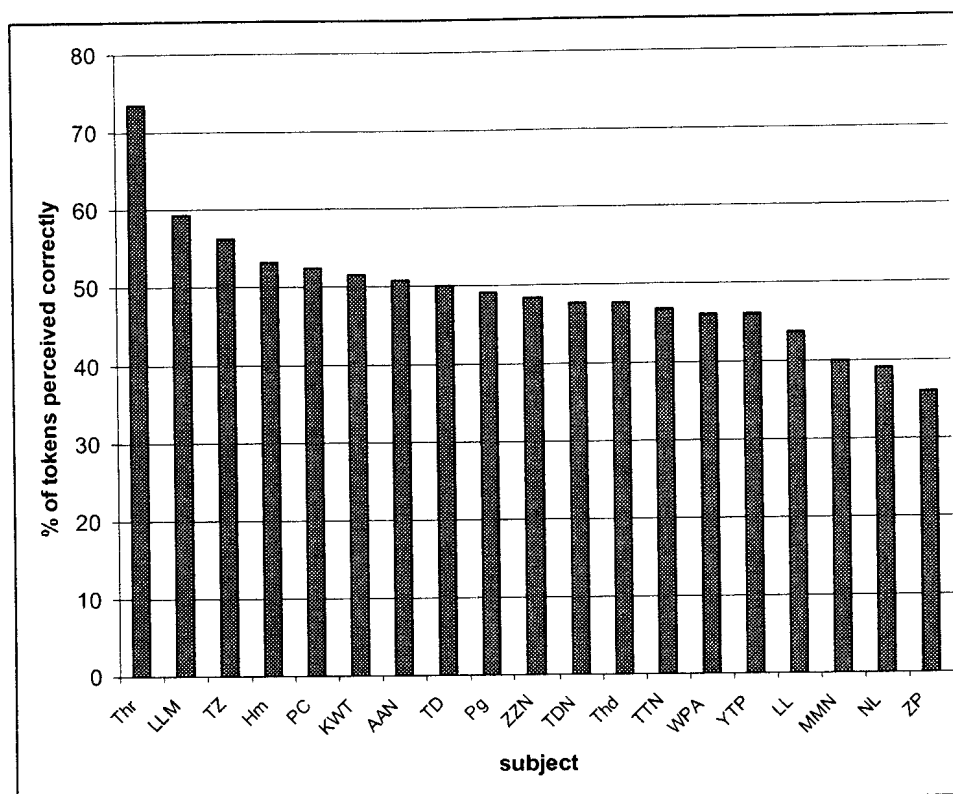
- (68) % of tokens perceived correctly by all subjects, ranked by speaker
Mean = 48.75%



Conversely, chart (69) shows the percentage of correct judgements made across both experiments by each subject, ranked according to decreasingly successful 'performance'. A few subjects performed much better than most, and a few much worse, but the distribution appears relatively normal. It is perhaps the case that the 'good' subjects learnt to discriminate between categories in the test which might not be considered normally

perceptible, and that some subjects never really grasped the purpose of the task in hand. Again, this variation between subjects has to be taken into account when interpreting the results.

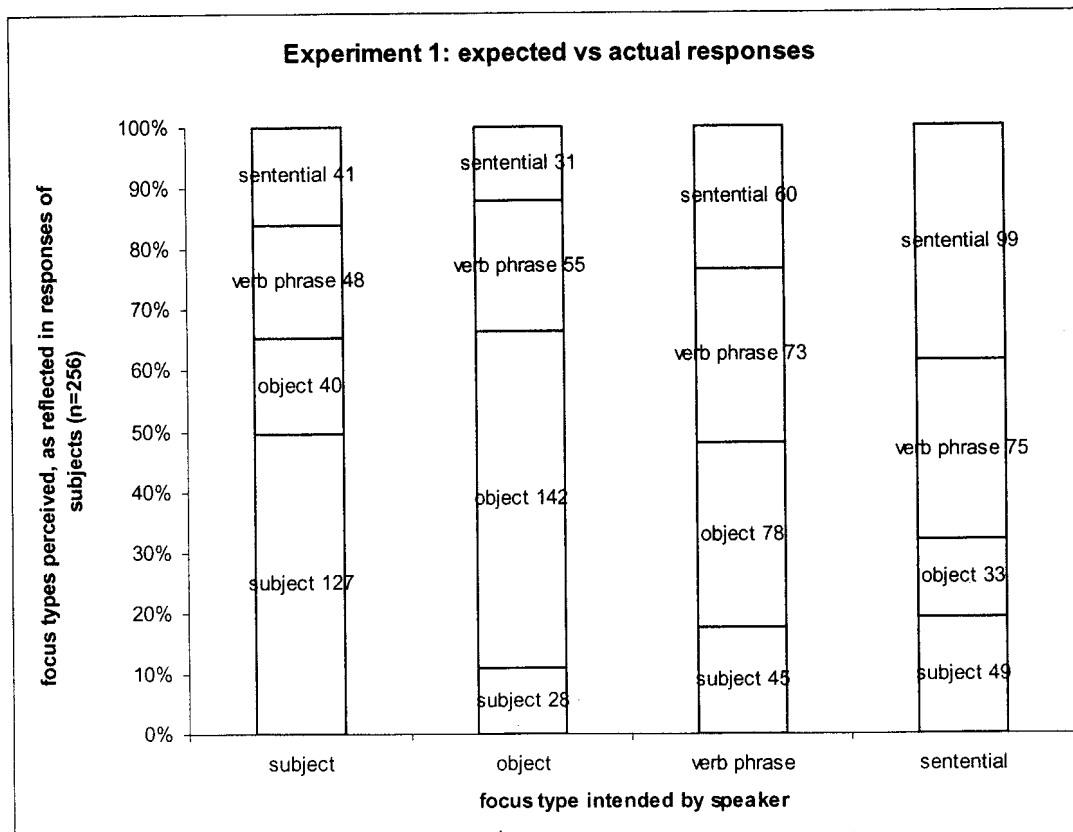
- (69) % of tokens perceived correctly by all subjects, ranked by subject
Mean = 49.34%



Perception Experiment 1

The results of Perception Experiment 1 are set out below in (70); the data in (70) is expressed in percentages in (71).

(70) Judgements of focus type in sentence (54) categorised by intended focus of stimulus in Perception Experiment 1



(71) Perception Experiment 1		intended focus in stimulus			
		subject focus	object focus	VP focus	sentential focus
% of tokens (n=256) perceived as each focus type, rounded to whole integers (* = correct judgement)	sentential	16%	12%	23%	*39%
	VP focus	19%	21%	*29%	29%
	object	16%	*55%	30%	13%
	subject	*50%	11%	18%	19%

Observations

The results above indicate that the type of focus which was correctly perceived most easily from the acoustic signal was object focus: subjects labelled this category correctly in 55% of cases, more than twice as often as might have been judged correctly by pure chance. When sentences with object focus (i.e. answers to questions eliciting the object as new information) were not perceived correctly by subjects, the latter most commonly mistook these sentences for sentences with VP focus (i.e. answers to questions eliciting both the object and the verb as new information). This corroborates the findings made in the production experiments that the phonetic correlates of stressing objects as foci are observed to a degree on the verb as well, so that the verb often appears to be given additional stress in instances of simple object focus. Hearers then seem to rather naturally

mistake certain cases of simple object focus for instances of VP focus where both verb and object have increased stress.

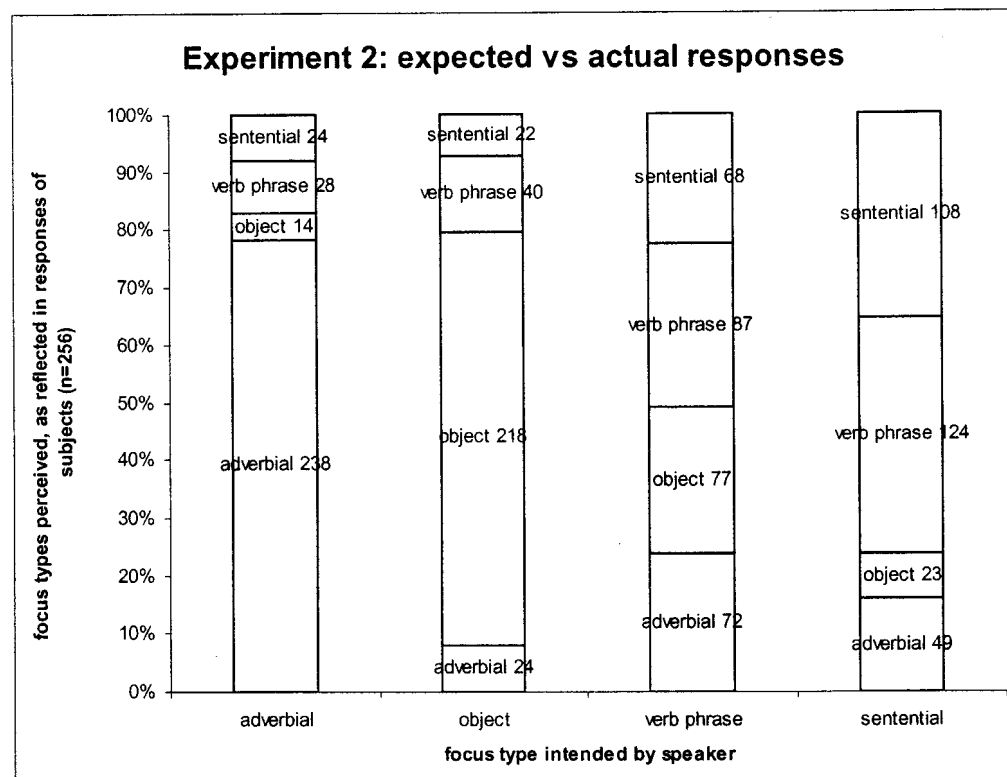
The next easiest focus type for subjects to identify correctly was subject focus: 50% of sentences with intended subject focus were perceived without error. As with object focus, this again indicates that there is often sufficient prosodic information in the production of focus sentences for hearers to disambiguate the intended meaning of the sentence without additional, contextual clues. When instances of subject focus were not correctly identified, however, it was found that subjects were likely to hear any of the other focus types with roughly equal probability, suggesting that the percept of subject focus is not readily confused with – and perhaps not acoustically similar to – other focus types.

Broad sentential focus was found to be somewhat more difficult for subjects to judge correctly: 39% of stimuli produced with intended sentential focus were correctly categorised, significantly more than chance. Nearly half the errors made here were labelled as VP focus, further evidence of the acoustic similarity between VP and sentential focus.

Finally, subjects found VP focus the hardest to identify correctly, and this was judged correctly only slightly more often than might be expected by chance. In addition to this, it was found that when mistakes were made, subjects mistook VP focus for any of the other categories of focus with more or less equal probability.

Perception Experiment 2

- (72) Profile of judgements of focus type in sentence (55) categorised by intended focus of stimulus in Perception Experiment 2.



The data in (72) are expressed in percentages in (73):

(73) Perception Experiment 2		intended focus in stimulus			
		adverbial focus	object focus	VP focus	sentential focus
% of tokens (n=256) perceived as each focus type, rounded to whole integers (* = correct judgement)	sentential	8%	7%	22%	*36%
	VP focus	9%	13%	*29%	40%
	object	5%	*72%	25%	8%
	adverbial	*78%	8%	24%	16%

The results of Perception Experiment 2 corroborate the findings from Perception Experiment 1, and lead to some firm conclusions. In common with Experiment 1, VP focus was not readily discernible for subjects. The responses are evenly distributed across all four categories. Sentential focus was identified moderately well, and was most often mistaken for VP focus. Both adverbial phrase focus and object phrase focus are identified with considerable accuracy — 78% and 72%, respectively. As in Experiment 1, object focus is slightly more likely to be mistaken for VP focus than either broad or VP focus.

5 General conclusions

Having detailed the findings of the individual production and perception experiments, we are now in a position to highlight certain broad conclusions resulting from the production/perception experiments and the syntactic investigation of word order in focus constructions. Quite generally, the results of the production/perception experiments confirm that stress is most definitely employed in the signaling of new information focus in Burmese, and was observed in the production experiment in the form of increased f_0 (higher pitch), increased amplitude (loudness) and longer duration of syllables/words in focus. In the perception experiments it was found that the presence of stress on constituents in focus is also well perceived by hearers, and most clearly so when there is narrow focus on an argument (subject, object) or adverbial.

If such observations are now combined with the conclusion of the syntactic investigation that elements in focus are most naturally positioned in pre-verbal position, as in a range of other verb-final languages (e.g. Turkish, Hindi), it can be seen that the stress associated with new information focus will characteristically be realised and occur towards the end of a sentence, in pre-verbal position. This is an observation which has been made for a significant number of languages, both verb-final languages and verb-medial languages (such as, for example, English), and has often been attributed to the workings of a rule of 'nuclear stress' applying in various languages. It is suggested (e.g. Cinque 1993) that the syntactically most deeply-embedded position in a sentence is where a regular 'nuclear stress' is pronounced, and where syntactic constituents occur in such a position, they will be naturally highlighted and focalised by the stress which is regularly generated there. In such a view, stress is an automatic feature of a sentence's most deeply-embedded position, and the requirement that focused elements be highlighted by stress is seen to attract such elements to this position. A natural question in the light of what has been observed in the course of the present chapter is therefore whether the situating of focal elements in pre-verbal position in Burmese should be assumed to be the result of a similar nuclear-stress rule operating in Burmese? We believe that this would actually *not* be an

appropriate characterisation for Burmese, and that the relation of focus to intonation and stress is rather different in Burmese, as will be suggested below.

A first reason to be doubtful that a nuclear stress rule is responsible for attracting new information foci to pre-verbal position in Burmese is that pre-verbal (nuclear) stress does not seem to be obviously present in other sentences in Burmese which are not specifically responses to questions asking for new information. In an add-on to the major production and perception experiments, informants were asked to read passages of Burmese text in which sentences similar to (54) and (55) were embedded, and where the elements present in such sentences could naturally be interpreted as constituting new information. Measurement of the intonation patterns used in the reading of such texts showed very little of the regular application of stress which occurred when the same informants produced similar sentences as the responses to direct questions (though informants also did not pronounce the sentences in the text with any special, flat, 'reading' intonation). Studies of nuclear stress in other languages have observed that the occurrence of sentence-final nuclear stress is, by way of contrast, generally automatic and present in all sentence-types, and is not restricted just to the answer-forms provided to questions. The apparent absence of clear pre-verbal stress patterns in Burmese sentences which are not the answers to questions therefore seems to suggest that automatic nuclear stress is not a characteristic property of Burmese. Secondly, the syntactic investigation of focus in Burmese showed that it is not only new information focus that occurs in the special pre-verbal position, but also contrastive and corrective focus, and speakers commonly resist the placement of contrastive focus in other non-pre-verbal positions. Nuclear stress is, however, assumed to be a rule which regulates only the placement of new information focus in a language, and does not enforce the placement of contrastive foci in any similar, sentence-final position. Hence whereas new information foci are restricted to the sentence-final position of nuclear stress in languages such as Italian and German (Zubizarreta 1998), contrastive foci are free to occur stressed in any position within a sentence. In Burmese this is not so, and both new information foci and contrastive foci are found to naturally target the same pre-verbal position. The fact that elements in contrastive focus are also drawn to the pre-verbal position suggests that it is not the occurrence of nuclear stress which marks out this position as special, as nuclear stress would only be expected to attract elements instantiating new information focus (and not contrastive foci, which would be anticipated to occur stressed in other positions within a sentence).

Consequently, a more accurate characterisation of focus and the occurrence of stress in Burmese would seem to be that there is a more primitive notion of sentential prominence associated with the pre-verbal position in Burmese (i.e. more primitive than simple association with a nuclear stress), and this naturally attracts all elements which have a focal role within a sentence, both new information foci and elements in contrastive focus. Highlighted thus *primarily* via a positional strategy, it can be suggested that a *secondary* reflex of focal prominence is the addition of stress to an element located in the pre-verbal position. The use of stress on focal elements can therefore be suggested to function as an *ancillary* encoding of sentential prominence, which is more basically communicated by structural means², and foci are located in the pre-verbal position not explicitly to acquire

² Prominence can also be encoded via focus-related particles in certain instances. The use of focus particles has not been made part of the present study, for simple reasons of space, and is intended to be the subject of extensions of the current work.

the stress which may be assigned to such a position (as might be assumed under a nuclear stress type approach), but to acquire the more basic positional prominence naturally associated with sentence-final positioning before the verb. In other words, the occurrence of stress on elements in focus can be viewed as a common natural side-effect of such elements being made prominent via other (structural) means, and not as a primitive force driving focal elements to the pre-verbal position.

A second general finding of the production experiments discussed in section 4 was the occurrence of *de-accenting* of certain non-focal material in sentences with new information focus. Critically this was seen to occur in certain instances where the constituent in focus actually did *not* occur in the canonical pre-verbal focus position. Such a situation was noted (in section 3.3) to occur in the special circumstances where a subject or an adverb is the element in focus, and the object of the verb is both indefinite and non-specific. Due to its non-topic-like informational status, there is a strong resistance to positioning the object before a focused subject or adverbial, and it therefore regularly occurs between the focus and the verb, resulting in sequences such as (74):

- (74) a. Subject_{FOCUS} Object V
b. Subject Adverb_{FOCUS} Object V

Because of the unavailability/unnaturalness of positioning a non-specific indefinite object before the subject or adverb in a sentence, focus sentences containing non-specific indefinite objects are potentially ambiguous, and in principle allow for hearers to assume that the focus is either the indefinite object itself, or the subject/adverb which precedes it. Because there are no natural alternative ways to arrange the constituents of the sentence, the identity of the focus of the sentence can in such cases *not* be determined from word order alone, and it cannot be concluded that the element in immediately pre-verbal position is necessarily the intended focus of the sentence. Here, therefore, intonation and stress potentially do have important roles to play, and can function to disambiguate the intended meaning of a sentence. In the production experiment, two effects of this were noted to occur. The first of these was that stress occurred on the element in focus.³ The second effect, when the focus did not immediately precede the verb (i.e. cases of subject or adverbial focus), was that the intervening indefinite object was observed to undergo de-accenting and a clear reduction in f0, duration and amplitude. Such prosodic attenuation of the object seems to function to make it less 'visible' in pre-verbal position and allow for a preceding focus to be perceived as having sentence-final prominence, even though not immediately adjacent to the verb. Consequently, in certain instances, the dominant positional encoding of focus in Burmese can be found to be well assisted by the availability of stress and its intonational converse, the de-accenting of sentence constituents.

Finally, it should be remembered and emphasised that the production and perception experiments carried out in the present study have restricted themselves to lexical items which have exclusively low (level) tone. It will be an important question for future research projects to establish whether the results generated here with regard to the occurrence and manifestation of stress may carry over in the same or different ways to

³ Stress occurred in particular on focused adverbs and objects. Focused subjects showed increased duration, but no clear increase in pitch, as sentence-initial elements regularly occur with a high level of pitch.

lexical items with other tones in Burmese. We also feel that it will be instructive to compare the type and level of stress present in contrastive and corrective focus with that of new information focus, something which we were not able to undertake in this pilot exploration of prosody and focus. Hopefully, the present study will serve as a useful baseline reference for careful future investigations of this type.