Information Structure and Intonation in Hijazi Arabic

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Abstract

There is irrefutable evidence that many languages use intonation to express the aspects of the information structure of an utterance. Recently evidence has emerged that languages differ in how information structure (IS) is marked intonationally. This thesis presents experimental work on the prosodic encoding of Information Focus and Contrastive Focus (aspects of IS, that is, concepts relating to the distribution of 'new' and 'contrast' information) in Hijazi Arabic (an under-researched language). It provides both a phonetic and a phonological analysis of the experimental data, the latter couched in Autosegmental-Metrical Approach. It aims to (i) provide an analysis of the word order in Hijazi Arabic (HA) and how it is used to express IS, and (ii) provide an in-depth and systematic analysis of the ways that intonation is used both phonologically and phonetically to encode neutral focus, information focus, in-situ contrastive focus and ex-situ contrastive focus in four focus structures: sentence-focus, predicate-focus, argument-focus and focus-preposing structure.

Based on insights from recent research, we propose two categories of Focus: information focus and contrastive focus. We show how these categories are reflected in HA word order and in intonation.

The results show that intonation and not word order is crucial and useful in identifying the focus of the HA utterance. They show that focus has local and global effects on the utterance. Focus attracts the nuclear pitch accent, and compresses the pitch accent(s) of the following word(s). Excursion size and the maximum F_0 are found to be the two main acoustic correlates of prosodic focus in HA. Focused words have significantly expanded excursion size, post-focus words have significantly lowered F_0, but pre-focus words lack systematic changes.

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List of Abbreviations

The glossing of the HA data is morphological. It reflects the morphosyntactic description of this dialect. The transliteration followed in this thesis is DIN 31635. It is arranged according to Arabic alphabets.

DIN 31635	IPA	**DIN 31635**	IPA	**DIN 31635**	IPA
ʾ	ʔ	z	z	f	f
b	b	s	s	q	q
t	t	š	ʃ	k	k
ṯ	θ	ṣ	$s^ʕ$	l	l
ǧ	ʒ	ḍ	$d^ʕ$	m	m
ḥ	ħ	ṭ	$t^ʕ$	n	n
ḫ	χ	ẓ	$z^ʕ$	h	h
d	d	ʿ	ʕ	ā	æ
ḏ	ð	ġ	ɣ		
r	r				

For examples in Arabic taken from other sources, the glosses and the transliteration have been adjusted to the best of my knowledge to provide consistency.

Word length= 85133

Table 1: **List of Abbreviations**

1	1st person
2	2nd person
3	3rd person
ACC	accusative
CF	contrastive focus
F	Information Focus
IPFV	imperfective
IS	information structure
Neg	negation
NOM	nominative
PFC	post-focus compression
PFV	perfective
SG	singular
T	topic

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Chapter 1

Introduction

The subject matter of this thesis is the relation between Information Structure (henceforth IS) and intonation in Hijazi Arabic (a lesser-studied Arabic dialect spoken on the west of Saudi Arabia). It is a quest for evidence for the prosodic effects of IS in this dialect. The next chapter will introduce IS and intonation as two separate components of grammar in detail. In this introduction, however, we briefly define how IS and intonation are to be understood in this thesis.

We take IS to describe broadly the way information conveyed in the discourse is structured in a declarative sentence. Following Lambrecht (1994), we consider IS to be a separate and an independent component of grammar that has its own constructs. This thesis is mainly about two categories of IS: Information Focus and Contrastive Focus, and their relation with intonation in Hijazi Arabic (HA henceforth). These two components of IS will be discussed in detail in the next chapter. (1) defines them briefly.

(1) a. **Information Focus**: refers to an item(s) in a declarative sentence carrying new information that is triggered by a question word.

b. **Contrastive Focus**: refers to an item in a declarative sentence that carries new information and also stands in a contrastive relation with another entity at the time of discourse.

Although Lambrecht (1994) does not consider Contrastive Focus to be a category of IS, this thesis takes contrastive Focus to be a separate and independent category of IS for reasons that will become clear later in chapters two, three and four.

Following Ladd (2008), we take intonation to describe 'the use of *suprasegmental* phonetic features [including fundamental frequency (F_0), intensity, and duration] to convey 'postlexical' or *sentence-level* pragmatic meanings in a *linguistically structured* way' (ibid., P. 4). The use of intonation and syntax, for example in the form of word order, to add pragmatic meanings to a declarative sentence has been a prominent topic in recent years. As Lambrecht (1994) puts it, '[i]nformation structure is formally manifested in aspects of prosody [. . .], in the position and ordering of such constituents in the sentence, in the form of complex grammatical constructions [and among others]' (ibid., P. 6). Empirical results from studies on IS-intonation interface generally support a positive relation between categories of IS (1) and intonation (Pierrehumbert and Hirschberg 1990, Büring 1997, von Heusinger 1999, Steedman 1991b, 2000, Selkirk 1984, 2002, Frota 2000, Wang and Xu 2006, Xu and Xu 2005, Büring 2009, Ladd 1996, 2008). Crosslinguistically, it has been claimed that categories of IS are expressed variously by a default pitch accent, peak alignment, dephrasing, pitch range and/or vowel duration (Selkirk 2007). Empirical studies, however, show that the prosodic effects of categories of IS are language specific and not universal (Ladd 2008, Zerbian et al. 2010, Xu 2011).

Though Arabic has a large variety of living spoken dialects alongside Modern Standard Arabic (MSA) including Egyptian, Lebanese, Moroccan, Najdi and Hijazi, little research has been carried out on the interaction between IS and intonation, compared with Romance languages. Recent empirical studies on Lebanese Arabic (Chahal 2001) and Cairene Arabic (Hellmuth 2006, 2010, 2011) are notable exceptions. As will be reviewed in Chapter three, these studies support a positive relation between IS, in particular information/contrastive focus, and intonation.

Their empirical results, however, suggest that the prosodic effects of IS are not the same across Arabic dialects. Empirical evidence on the prosodic effects of IS in HA is meagre. Therefore, it is the goal of my thesis to describe how categories of IS defined in (1) above are expressed by phonological and phonetic means in this dialect.

1.1 Hypotheses

This thesis explores four hypotheses. First, I hypothesize that intonation and not word order is crucial for expressing the categories of IS in HA declarative sentences. As will be discussed in Chapter three and four, this is hypothesized because some studies on Arabic assume that IS is encoded in the form of word order (Sieny 1978, Moutaouakil 1989, Ouhalla 1999a). This, I believe, is attributable to the fact that existing studies on IS-intonation interface in Arabic in general are scarce and thus the role of intonation in expressing categories of IS has not been fully understood. In this thesis, I will provide a phonological and phonetic analysis of the prosodic effects of IS in HA. This is to provide empirical evidence for the crucial role played by intonation in HA grammar.

Second, I hypothesize that the prosodic effects of categories of IS in HA are complex. Existing studies on IS-intonation interface in Arabic are small-scale and only focus on various aspects of prosodic marking of focus (Chahal 2001, Hellmuth 2006). Moreover, these studies do not investigate the prosodic effects of IS in its entirety. In this thesis, I will mainly focus on the prosodic effects of categories of IS defined in (1) above to provide a thorough and systematic investigation of their prosodic effects in HA.

Third, I hypothesize that the noncanonical syntactic option such as focus preposing (used by HA speakers to express a particular IS category) is associated with a particular intonational tune. This is hypothesized to show empirically that HA speakers not only employ syntax but also employ intonation to express IS[1].

[1] As will be discussed in Chapter four, HA is a spoken dialect and not a written dialect.

Fourth, I hypothesize that examining the categories of IS from the pragmatic, phonological and phonetic perspective is necessary to fully define the categories of IS in HA grammar. IS is fast-growing area that receives much attention for the last thirty years. Due to that, many categories of IS have been proposed, some of which are theory driven and not based on empirical data (this will be discussed in Chapter 2). This thesis adopts Lambrecht's (1994) relative theory-neutral framework, which has been applied successfully to many languages. Based on Lambrecht's (1994) pragmatic framework and insights from recent research, we will determine what categories of IS are and how they play a concrete role in HA sentence grammar. Once the categories of IS are defined accurately, investigating the relation between the categories of IS and intonation becomes possible. In order to examine the phonological effects of categories of IS, we adopt a version of Autosegmental-Metrical model (henceforth AM) developed by Pierrehumbert (1980). This model has been applied to different languages including Lebanese (Chahal 2001) and Egyptian Arabic (Hellmuth 2006). Adopting this model leads us to understand not only the phonological effects of categories of IS but also the intonational system of HA. Phonological description of the prosodic effects of IS alone is not adequate. Therefore, I will acoustically investigate the prosodic effects of categories of IS. This is to determine which acoustic features correlate most reliably with the categories of IS in HA. This acoustic analysis is useful to describe the global intonational patterns of the HA sentences in an acoustic sense and thus we can easily and accurately detect the prosodic effects of categories of IS in the entire sentence.

1.2 Scope of the Thesis

This thesis is confined to declarative sentences with and without single information/contrastive focus of simple constituent with basic word order and with focus preposing as a noncanonical syntactic option in which one constituent is syntactically realized at the left periphery of the clause (i.e. ex-situ) rather than in its canonical position. For reasons of space, Predicate Contrastive Focus, sentence Contrastive Focus and Topic of any kind are beyond the scope of this thesis.

1.3 Overview

The structure of the thesis is as follows. Chapter 2 introduces the concept of IS and related terminology. We focus on Lambrecht's (1994) pragmatic framework and show how this framework is useful in determining and defining the categories of IS in HA. We also introduce four focus structures: sentence-focus, predicate-focus, argument-focus (with single information/contrastive focus) and focus-preposing structures. These focus structures underlie our empirical study. In this chapter, we also introduce intonation and the terminology used on intonation literature. We present the AM model proposed to describe intonation. In addition, we present how Focus is prosodically marked cross-linguistically.

Chapter 3 will review and evaluate the previous studies on the IS-intonation interface in a number of Arabic dialects. In Chapter 4, we discuss various aspects of HA including where it is spoken, word order variations and the role of IS. We will employ the heuristic of the question-answer paradigm to evoke the categories of IS in HA and show how these categories play a role in HA sentence grammar. This chapter also introduces two phonological aspects in HA: syllable structure and stress, which will play a crucial role in the remaining chapters.

Chapter 5 describes the data collection process in terms of methods, research questions, materials, the correlates of lexical stress of the target words used in the test materials, speakers, recording procedures and analysis. It also describes the way in which the data was coded for the analysis and also the phonetic measurements taken and the statistical analysis that was carried out.

Chapter 6 presents results from the empirical study of how sentence-focus, predicate-focus, argument-focus structure (with single information/contrastive focus of the simple constituent in sentence-initial and -penultimate position) and focus-preposing structure in the four-word declarative sentence are expressed intonationally. This chapter first presents a phonological analysis of the data, and then reports results from the statistical analysis of phonetic measurements.

Chapter 7 presents results from the empirical study of how sentence-focus, argument-focus (with single information/contrastive focus of the simple constituent in sentence-initial and -final position), and focus-preposing structure in the two-word declarative sentence are expressed intonationally. This chapter starts with the phonological analysis of the data, and then reporting results from the statistical analysis of phonetic measurements.

Chapter 8 discusses the results reported in Chapter 6 and 7 in a cross-linguistic perspective. Possible consequences and implications of the results are provided in this chapter. Based on the empirical results, this chapter will place HA in relation to other languages with respect to the prosodic features of HA and, even more importantly, with respect to the prosodic effects of the categories of IS.

Chapter 9 concludes the thesis. The research questions are revisited, the results are summarised, and finally proposals for further study are put forward.

Chapter 2

Information Structure and Intonation

During the past 38 years much more information has become available on the relation between IS and intonation. This chapter presents the definition of IS adopted in this thesis, outlines what the categories of Focus are, how these categories are evoked in sentence grammar, and finally how the prosodic effects of these categories are described intonationally.

In this chapter, we first define the concept of IS and related terminology. We present the theoretical approach which underlies our empirical study, which is that of Lambrecht (1994). Based on Lambrecht's (1994) insight and recent research, we introduce the categories of Focus used in this thesis. We show how these categories are claimed to be expressed syntactically and intonationally, with examples mainly from English and other languages. Finally, we present the 'intonation' framework AM in which the HA data are described in this thesis.

This chapter is organized as follows. Section 2.1 defines the concept of IS and the related terminology. Section 2.1.1 gives a brief overview of Lambrecht's (1994) discourse-pragmatic framework. Based on Lambrecht's (1994) framework and recent research, Section 2.2 introduces the categories of IS used in this thesis. Section 2.3 defines what we mean by intonation in this thesis and other related terminology. Section 2.4 gives a general overview of the models proposed to describe intonation. Section 2.4.1 presents the basic machinery namely the AM model and illustrates how it describe the intonational patterns of the declarative sentences, with examples mainly from English. Section 2.5 defines the prosodic markings of focus and gives examples from different languages. Section 2.6 concludes.

2.1 Information Structure

There is a considerable recent literature on IS. This section is not meant to give a comprehensive overview of the field but rather to give some examples of different views of IS.

Propositional content can be expressed in a variety of morphosyntactic and prosodic ways in a given language. For example, a speaker of English is offered two ways to structure the information conveyed in the discourse shown in (1) below. We use SMALL CAPITALS to indicate prosodic prominence throughout the thesis.

(1) a. Peter carried John.

b. Peter carried JOHN. phonologically-marked sentence

c. John, Peter carried. syntactically-marked sentence[1]

The sentence /Peter carried John/ in (1) is expressed in three different ways. All the three structures in (1) express the same semantic meaning: there is a certain individual whose name is Peter, and this individual has the property of carrying another individual whose name is John. However, they differ from each other in respect of IS. Before discussing the differences across the three structures, we first define the concept of IS .

IS as a term was first introduced by the Prague school linguist Halliday (1967b, P. 200). He uses this term to refer not to the information itself conveyed in the

[1]Note that, this construction might be associated with a particular tune and thus it is not necessarily exclusively syntactic. See Ward and Birner (1998) for the intonational pattern associated with this non-canonical syntactic structure.

discourse but rather to the ways in which information is structured. He defines IS as:

> '[a]ny text in spoken English is organized into what may be called 'information units' [...] this is not determined [...] by constituent structure. Rather could it be said that the distribution of information specifies a distinct structure on a different plan' (ibid., P. 200).

Three points illustrate Halliday's (1967b) view. First, he views a clause structure as an organized group of information units which are independent of syntactic constituency. That is, a meaningful information unit in a clause does not necessarily form a constituent in the syntax. An example illustrating this point is in (2) below. The square brackets indicate a single 'information unit'.

(2) a. Where are my books?

b. [[Peter took] [them].]

It is clear from (2) that [Peter took] in (2b) forms one information unit in the discourse but it does not form a constituent in the syntax. This is so because [Peter took] is made up of a noun phrase and a verb. [NP V] does not form a constituent in the syntax. This shows that the information unit is independent of syntactic constituency.

Second, although the information unit does not necessarily form a constituent in the syntax, it forms one tone group in the phonology.[2] As Halliday puts it,

> '[t]he distribution into information units represents the speaker's blocking out of the message into quanta of information, or message blocks. Each information unit is realized as one tone group, in the sense that the information structure specifies the boundaries of the tone group to within certain limits' (ibid., P. 202).

Third, Halliday represents IS at a separate structural level called 'Theme'. Hence, the discourse organization of information units in a clause structure is represented in a different component of grammar. Halliday's grammar contains three

[2] Tone group is 'a meaningful unit in its right' (Halliday 1970, p. 3). Halliday's view of tone group is discussed in §2.4. Tone group is often correlated with one Intonational Phrase (IP) in Autosegmental-Metrical model (see §2.4.1).

different components: Transitivity (mainly the study of syntax and semantic), Mood (the study of illocutionary force) and Theme (the study of information structure). This is explicitly stated in the quotation below.

> 'Theme is concerned with the information structure of the clause; with the status of the elements not as participants in extralinguistic processes but as components of a message; with the relation of what is being said to what has gone before in the discourse, and its internal organization into an act of communication [...] Given the clause as domain, transitivity is the grammar of experience, mood is the grammar of speech functions, theme is the grammar of discourse' (ibid., P. 199).

Within Halliday's Theme structure, a clause is structured into theme and rheme. Structurally, the theme occurs at the initial position in the clause, followed by the rheme which is the remaining elements. Functionally, theme is what the predication of a clause is about; it is 'the point of departure for the clause as a message' (ibid., P. 212) whereas rheme refers to the predication part in the clause which is the most informative part (cf. Firbas 1964, 1971). By applying Halliday's model of IS, the sentence in (1) is structured as in (3) below.

(3) Peter carried John.
Theme Rheme

Halliday departs from the Prague school linguists' view that equates his notion of theme with given information and rheme with new information, as quoted below.[3]

> 'Given + New and Theme + Rheme are not the same thing. The Theme is what I, the speaker, choose to take as my point of departure. The Given is what you, the listener, already know about or have accessible to you. Theme + Rheme is speaker-oriented, whereas Given + New is listener-oriented' (Halliday and Matthiessen 2004, P. 93).

[3]Halliday's approach is primarily proposed to account for the information structuring of an English clause and hence he does not assume it to be applicable to all languages. This is clearly spelt out in Halliday (1970, 1985), Halliday and Matthiessen (2004). As has been stated clearly, '[w]e may assume that in all languages the clause has the character of a message: it has some form of organization whereby it fits in with, and contributes to, the flow of discourse. But there are different ways in which this may be achieved. In English, [...] the clause is organized as a message by having a distinct status assigned to the one part of it. One part of the clause is enunciated as the theme; this then combines with the remainder so that the two parts together constitute a message' (Halliday and Matthiessen 2004, P. 64). Although his view of IS, in general, adds much valuable information to the literature on IS, his approach has not escaped criticism (see Downing 1991).

The majorities of approaches to IS are based to some extent on Halliday's dichotomy: theme-rheme/given-new. For example, Halliday's theme-rheme dichotomy was re-interpreted as topic-comment dichotomy by Gundel (1974), Dahl (1974), Kuno (1980), Reinhart (1981) among others. The main assumption underpinning this dichotomy is that 'the speaker announces a topic [Topic] and then says something about it [Comment]' (Hockett 1958, P. 201). This is exemplified in (4) below.

(4) a. What did Peter do?

b. [Peter]$_{\text{Topic}}$ [carried JOHN]$_{\text{Comment}}$.

A similar dichotomy has been used by Arab grammarians since the two major Arab grammarian schools of Basra and Kufa (late 700s). It has been used to describe nominal sentences called جملة إسمية /ǧumlah ʔismiyah/ 'nominal sentence'. Nominal sentences are the ones that start with a 'definite' NP termed مبتدأ 'mubtada' (Topic) followed by خبر 'ẖabar' (Comment), as exemplified below

(5) Muḥammad-un nāma.
Muhammad.NOM slept
MUBTADA ẖABAR
'Muhammad slept' Al-Sweel (1983, P. 24)

The terms مبتدأ 'mubtada' (Topic) and خبر 'ẖabar' (Comment) in the traditional Arabic grammar are syntactic categories, represented in the syntax.[4]

Halliday's given-new dichotomy was re-interpreted as a presupposition-focus dichotomy by Chomsky (1972). Following Halliday (1967b), Chomsky (1972) associates the sentence-stress, as he calls it 'intonation stress', with focus in an utterance. Unlike Halliday (1967b), Chomsky (1972, P. 205) suggests that presupposition and focus notion are embedded into the semantic domain of a clause, as stated explicitly in the quotation below.

> 'The notions 'focus', 'presupposition', and 'shared presupposition' [...] must be determinable from the semantic interpretation of sentences,

[4] The notion of مبتدأ 'mubtada' (Topic) and خبر 'ẖabar' (Comment) in the traditional Arabic grammar will be discussed further in §3.1.

> if we are to be able to explain how discourse is constructed and, in general, how language is used' (ibid., P. 205).

The Chomskyan view was then developed by Jackendoff (1972) who defines presupposition as 'the information in the sentence that is assumed by the speaker to be shared by him and the hearer' (ibid., P. 230) and focus to describe an item that carries new information added to the addressee's knowledge mind at the time of discourse. On Jackendoff's (1972) semantic model, the focused item is associated with the F-feature in the syntax. This feature gets interpreted at the semantic level as being pragmatically prominent and at the phonological level as being associated with 'the intonation center' (Chomsky 1972, P. 205).[5]

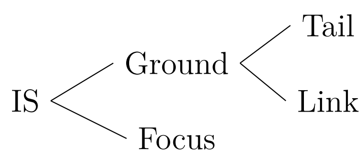
Using Kamp and Reyle's (1993) Discourse Representation theory, Vallduví (1993) proposes an approach for IS that is defined as:

> '[a] small set of instructions with which the hearer is instructed by the speaker to retrieve the information carried by the sentence and enters it into her/his knowledge-store' (ibid., P. 66).

Vallduví considers the process of conveying the information from the speaker to the hearer to be a cognitive-instruction process. Following Dretske (1981, P. 44), he uses the term 'information' to refer to 'that commodity capable of yielding knowledge, and what information a signal carries is what we can learn from it' (Vallduví 1993, P. 14).

Vallduví partitions a clause into focus and ground. In addition, ground is partitioned into link and tail. Due to that, this approach is referred to as 'Trinomial Hierarchical Articulation'. His informational primitives are schematized in (6) below.

(6)



[5] See Jackendoff (1972, Ch. 6) for more details. For new insight on the treatment of information structure in Chomsky's recent Minimalism Program, see López (2009) and references therein.

Like Halliday (1967b) and Chomsky (1972), Vallduví (1993) views focus to be the most informative part in the clause. He assumes that the focused part is invariably intonationally prominent. As for ground, it is the complement of focus and it is equivalent in coverage to the presupposition (cf. Jackendoff 1972). Functionally, the role of ground is to guarantee an appropriate entry of information into the hearer's knowledge-store; signalling to the hearer where and how the information must be entered. The ground does not make any contribution to the hearer's knowledge-store. Link is analogous to the sentence-initial topiclike, found in the theme-rheme and topic-comment dichotomy. Like Halliday's view of theme, link is structurally associated with sentence-initial position. This approach considers that link is not necessarily expressed in a clause. If it is expressed in the clause, then it is to guarantee a 'successful' retrieval of the information encoded in the sentence. As for tail, it is the complement of the link within the ground. Applying Vallduví's approach to the sentence in (1), the resulting structure is in (7) below.

(7) a. Whom did Peter carry?

b. $[_{\text{link}}$Peter$]$ $[_{\text{tail}}$ carried$]$ $[_{\text{focus}}$ JOHN$]$

Using Heim's (1983) file-card metaphor, /Peter/ in (7b) is link by virtue of being what the predication of (7b) is about. This link is considered to be an existing file card in the addressee's mind. The item /John/ is focus by virtue of being what the question in (7a) asks for. The informational unit /carried/ is tail which is part of the ground by virtue of being given in (7a). This tail plays a particular discourse role which is to indicate how the new information /John/ is added to the existing file card /Peter/. To put it differently, the new information expressed in (7b) is added to the existing file card /Peter/ in the addressee's mind under the relation 'carried'.[6]

[6]The notion of Vallduví's link and tail have been proposed partially to account for the word order in languages like Catalan. In this language, tail refers to item(s) in the sentence that carries additional background information and thus they are syntactically required to be right-dislocated (Vallduví 1993, Vallduví and Engdahl 1996, Bott 2007). So if the sentence in (7b) is translated into Catalan, the verb /carried/ would be right-dislocated.

Chafe (1976) treats Halliday's given-new dichotomy from a purely cognitive perspective. For Chafe, information conveyed at the time of discourse is **packaged** in accordance with what the speaker assesses as 'background' or new 'focus' information with regard to the hearer. He uses the term 'information packaging' defined below to refer to Halliday's IS.

> 'Language functions effectively only if the speaker takes account of such states in the mind of the person he is talking to. It is only, for example, when the speaker adjusts what he says to what he assumes the addressee is thinking of at the moment that his message will be readily assimilated by the addressee [...] I have been using the term packaging to refer to this kind of phenomena at issue here' (Chafe 1976, PP. 27–28).

Within Chafe's (1976) cognitive model, the ordering of the items in an utterance depends on the message transmitted from the speaker to the listener taking into account the listener's state of mind: what information is assumed to be shared between a speaker and listener and what information is new to the listener. Therefore, this approach is characterized in terms of the status of the information transmitted and the 'mental relation' among the interlocutors at the time of the discourse. This view was later developed by Prince (1981b).[7]

Research has consistently shown that the theme-rheme, the topic-comment and the focus-presuposition dichotomy do not adequately describe the information structuring of a clause. For example, theme-rheme and topic-comment approaches fail to account for a topic item that is located in a non-sentence-initial position (will be discussed further in §1.2.3). The presupposition-focus approach proposed by Chomsky (1972) and Jackendoff (1972) cannot be taken here. This is because their approach to IS is theory driven. In this thesis, we adopt Lambrecht's (1994) neutral framework to determine and define the categories of IS in HA for two reasons. Firstly, Lambrecht's (1994) framework is not theory driven. This leads

[7] Prince (1981b) defines IS as 'the tailoring of an utterance by a sender to meet the particular assumed needs of the intended receiver. That is, information packaging in natural languages reflects the sender's hypotheses about the receiver's assumptions and believes and strategies' (ibid., P. 224). Prince's (1981b) approach to IS is, to a large extent, formulated in a hearer-oriented perspective. Since the present study presents a production experiment and not a perception experiment, Prince's (1981b) approach to IS is not discussed here.

this framework to be easily and accurately integrated into analyses of information structure within linguistic theories including Lexical-Functional Grammar (LFG) (O'Connor 2006, Dalrymple and Nikolaeva 2011). Secondly, this framework adopts the view that IS should be represented at a distinct level with its own concepts and rules that can interact with other levels of structure including intonation and syntax. Analyses that adopts this view include Engdahl and Vallduví (1996), Choi (1999b), King and Zaenen (2004), O'Connor (2006), Mycock (2006) and Dalrymple and Nikolaeva (2011). This is further supported by Kuno's (1972) argument, that is 'just as there are no sentences without morphosyntax and phonological structure, there are no sentences without information structure' (ibid., P. 16). For these reasons, Lambrecht's (1994) discourse-pragmatic framework plays a crucial role in the rest of the thesis. The following section briefly presents this framework.

2.1.1 Lambrecht's (1994) Framework

Lambrecht's (1994) framework is characterized in terms of both the mental representation of discourse referents and the existing states of affairs in the interlocutor's mind. He defines IS as:

> '[t]hat component of sentence grammar in which propositions as conceptual representations of states of affairs are paired with lexicogrammatical structures in accordance with the mental states of interlocutors who use and interpret these structures as units of information in given discourse contexts' (ibid., P. 5).

The crucial point is that IS is the conceptual representation of the existing states of affairs in the interlocutors' mind that is coupled with the lexicogrammatically evoked items in a clause. This representation of the states of affairs is represented at a distinct level of structure called 'information structure' (IS). Take our English sentences in (1) repeated in (8) below as examples:

(8) a. Peter carried John.

b. Peter carried JOHN. phonologically-marked sentence

c. John, Peter carried. syntactically-marked sentence

The sentences in (8) are termed 'allosentences' by Lambrecht (1994). That is, sentences that 'are semantically equivalent but formally divergent sentence pairs' (ibid., P. 6). Let us assume that the structure in (8a) is the answer to the broad question '*what happened*?' and hence it is pragmatically neutral by virtue of being embedded in this neutral context. As a result, the structure in (8a) is predicted to produce the default intonational contour and the default syntactic structure. Compared with (8a), the information-structuring of (8b) and (8c) are different. That is, /John/ in (8b) is prosodically prominent and hence it would be predicted to be pragmatically prominent. Since /John/ is prosodically and pragmatically prominent, the intonation and the interpretation of (8b) are predicted to be not as same as the intonational contour and the interpretation of (8a). In the same vein, the interpretation and also the syntactic realization of (8c) is not identical to both (8a) and (8b). This is because /John/ in (8c) is left-dislocated in the syntax. Since /John/ is left dislocated in the syntax, the status of this word is predicted to be prominent in discourse.[8] As a result, the discourse interpretation of (8c) is different from (8a).

A sentence within Lambrecht's (1994) approach is pragmatically structured into pragmatic presupposition (9a) and pragmatic assertion (9b).

(9) a. Pragmatic Presupposition

the set of propositions lexicographically evoked in a sentence which the speaker assumes the hearer already knows or is ready to take for granted at the time the sentence is uttered

b. Pragmatic Assertion

the proposition expressed by a sentence which the hearer is expected to

[8]The construction wherein the word is realized at the left periphery of the clause rather than in a canonical clause-internal position as in (8c) above is conventionally called 'topicalization' in literature (Prince 1981a, 1984). In this thesis, we call this construction 'focus preposing' following Aoun et al. (2009) to avoid possible confusion.

know or take for granted as a result of hearing the sentence uttered (ibid., P. 52)

The definitions of the two concepts in (9) raise two crucial points. First, the two concepts are **pragmatic** in nature. That is, they involve a relation 'between a person and proposition' (Stalnaker 1973, P. 447). Second, pragmatic presupposition referring to information shared between the speaker and the hearer is represented at information-structural level if and only if it is evoked lexico-grammatically in the sentence (Lambrecht 1994, P. 77). This indicates that an utterance has to express pragmatic assertion (9b); however, pragmatic presupposition is not necessarily expressed. Based on the two concepts defined in (9), we define the categories of IS used in this thesis in the following section.

2.2 Categories of IS used in the thesis

The preceding section shows generally that the number of categories of IS depends on how the clause structure is divided in respect of IS. For example, in the topic-comment dichotomy, there are two categories of IS: topic, and comment. In the given-new dichotomy, there are also two categories of IS: given and new information. To date there still has not been a consensus on what the categories of IS are.

Based on Lambrecht's (1994) framework and insights from Moutaouakil (1989), Ouhalla (1997), Kiss (1998) and the requirements of HA, we assume that the categories of Focus are information focus and contrastive focus.[9] As will be shown, each of these categories exhibits syntactic and prosodic characteristics. The following two sections define these two categories of Focus respectively, and also illustrate them with examples.

[9] In Chapter 4, we will discuss how the categories of Focus used in this thesis are evoked in the HA sentences.

2.2.1 Information Focus

Generally, focus is a term that refers to the item in the structure that carries unpredictable and non-recoverable information at the time of the discourse and also is associated with the prosodic prominence (Halliday 1967b, Chafe 1976, Chomsky 1972). Halliday (1967b) defines focus as:

> 'one kind of emphasis, that whereby the speaker marks out a part (which may be the whole) of a message block as that which he wishes to be interpreted as informative. What is focal is "new" information; not in the sense that it cannot have been previously mentioned, although it is often the case that it has not been, but in the sense that the speaker presents it as not being recoverable from the preceding discourse' (ibid., P. 204).

The preceding section summarizes three ways in which focus is approached. First, focus has been seen as a phonological reflex by virtue of being correlated with 'the intonation center of surface structure' (Chomsky 1972, P. 201). Second, focus has been seen as a syntactic feature by virtue being associated with the F feature in the syntax that later gets interpreted at phonology and semantics (Jackendoff 1972). Finally, focus has been seen as a semantic/pragmatic category (Lambrecht 1994).

Since focus as a term is used ambiguously in the literature, it is necessary to clarify what we mean by it in this thesis. Following Lambrecht (1994), we take focus to be a semantic/pragmatic category that has a prosodic property. In this thesis, there are two different types of focus: information focus and contrastive focus. In this section, we only discuss what we mean by information focus and in §2.2.2 we will discuss contrastive focus.

Following Lambrecht (1994), we take information focus to be:[10]

[10] As will be noted in §2.2.2, Lambrecht (1994) does not consider contrastive focus to be an independent and a separate category of IS. He assumes that there is only one focus category. However, in this thesis we provide empirical evidence that contrastive focus is associated with syntactic characteristics at least in Arabic language that supports the claim that this category should be treated as an independent and a separate category of IS represented in Arabic grammar. In the definition of information focus, Lambrecht (1994) does not call it information focus but rather he calls 'focus'; however, we take the definition stated here to refer to information focus.

(10) The focus of the proposition expressed by a sentence in a given utterance context, is seen as the element of information whereby the presupposition and the assertion DIFFER from each other. The focus is that portion of a proposition which cannot be taken for granted at the time of speech. It is the UNPREDICATABLE or pragmatically NON-RECOVERABLE element in an utterance. The focus is what makes an utterance into an assertion. (ibid., P. 207)

Also: FOCUS: The semantic component of a pragmatically structured proposition whereby the assertion differs from the presupposition. (ibid., P. 213)

The notion of focus in (10) is 'relational'. That is, whether a denotatum is focused depends on its relation to the proposition as a whole and not on its own pragmatic status. Consider example (11) below from Lambrecht (1994, P. 209).

(11) a. Where did you go last night?

b. I went to the MOVIES.

c. **Pragmatic Representation of (11b)**:

Sentence:	I went to the MOVIES.
Presupposition:	"I went to x"
Assertion:	"x=the movies"
Focus:	"the movies"

Lambrecht (1994) analyses the utterance in (11b) as follows. The proposition conveyed in (11b) is 'the place I went to last night was *the movies*'. Therefore, what is expressed in (11b) is the abstract proposition in (11c) and not only the informational unit 'the movies'. The abstract proposition in (11b) is composed of the pragmatic presupposition 'I went to x' and the pragmatic assertion 'the movies'. The difference between the abstract proposition and the presupposition is the information unit 'the movies'. As a result, the informational unit /the movies/ is the focus expression. That is, the denotatum of /the movies/ is focus as represented in (11b) by virtue of being 'in a pragmatically construed relation to the proposition such that its addition makes the utterance of the sentence a piece of new information' (ibid., P. 210).

Lambrecht (1994, PP. 221–238) recognizes three types of focus structure that are assumed to exist cross-linguistically. They are (a) predicate-focus structure, (b) argument-focus structure and (c) sentence-focus structure. Predicate-focus structure refers to those structures where the predicate (i.e. verb and its complement(s)) is within the focus domain, as in (12) below.

(12) a. What happened to your car?

b. Sentence: My car/It broke DOWN.

Presupposition: "speaker's car is a topic for comment x"

Assertion: "x=broke down"

Focus: "broke down"

Focus domain: VP (ibid., P. 226)

In (12b), the predicate /broke down/ has a focus relation to the entire proposition 'My car broke down'. Since the predicate is focused, this structure is termed 'predicate-focus structure'. As indicated in (12b) through using SMALL CAPITALS, the predicate is marked intonationally by virtue of carrying the pitch accent of the sentence. The rightmost element in the predicate part /down/ carries the the pitch accent of the sentence and hence this prosodic means is linguistically evoked in this type of focus structure. It is often assumed that predicate-focus structure is pragmatically unmarked (ibid., P. 228).

The second type of focus structure is argument-focus structure. This structure is characterized by the focusing of a single constituent. In this respect, it differs from the predicate-focus structure. Consider the following example.

(13) a. Context: I heard your motorcycle broke down?

b. Sentence: My CAR broke down.

Presupposition: "speaker's x broke down"

Assertion: "x=car"

Focus: "car"

Focus domain: NP (Lambrecht 1994, PP. 223 and 228)

The presupposition in (13b) is an open proposition 'speaker's x broke down'. The assertion is 'car'. /car/ in (13b) has a focus relation to the entire proposition 'My car broke down'. This item is realized phonologically with a prosodic prominence by SMALL CAPITALS and hence the sentence-stress is placed on this item.

As Lambrecht (1994) shows, argument focus is expressed in various ways cross-linguistically. For examples, in Italian it is expressed either through argument inversion (14c) or through the use of the cleft construction (14d) while in French, it is expressed through the cleft construction (14e).

(14) a. Context: I heard your motorcyle broke down? (ibid., P. 223)

b. My CAR broke down.

c. Si è rotta la mia MACCHINA. Italian

d. E la mia MACCHINA che si è rotta. Italian

e. C'est ma VOITURE qui est en panne. French

The final focus structure is sentence-focus structure. In this structure, the entire clause is within the focus domain. Equivalent terms are 'thetic structure' (Kuroda 1972, Sasse 1987), 'neutral description' (Kuno 1972, P. 298) and 'broad-focus/all-focus/all-new/out-of-the blue' structure (Féry 2007). An example exhibiting sentence-focus structure is (15) below.

(15) a. What happened?

b. Sentence: My CAR broke down.

Presupposition: -

Assertion: "speaker's car broke down"

Focus: "speaker's car broke down"

Focus domain: S (Lambrecht 1994, P. 233)

The utterance in (15b) lacks pragmatic presupposition. It expresses only pragmatic assertion as represented in (15b). The entire clause /My car broke down/ is focus. The focus domain is the entire sentence S.

Following Gussenhoven (1984), Hayes and Lahiri (1991), Féry (1993), Selkirk (1995), Ladd (1996, 2008), we assume that the sentence-focus structure produces neutral intonation and thus it represents the default intonational pattern.

2.2.2 Contrastive Focus

Following much previous research (Chafe 1976, Dik et al. 1981, Kiss 1998, Choi 1999b, Neeleman et al. 2009), contrastive focus (also known as 'identificational focus' and 'corrective focus') describes an information unit that carries unpredictable information that stands in a contrastive relationship with other informational units. More precisely, we define contrastive focus following Kiss (1998) as:[11]

(16) **Contrastive Focus**: 'represents a subset of the set of contextually or situationally given elements for which the predicate phrase can potentially hold; it is identified as the exhaustive subset of this set for which the predicate phrase actually holds' (ibid., P. 245).

A typical context that requires a contrastive focus is in 'correction' cases, as exemplified in (17) below. We use the subscript CF to indicate 'contrastive focus' throughout the thesis.

(17) a. Whom did Mary marry? Peter?

b. Mary married [JOHN]$_{\mathrm{CF}}$, not Peter.

In (17b), the pragmatic presupposition is /Mary married X/ while the pragmatic assertion is /John/. The item /John/ carries unpredictable information that

[11]Kiss (1998) uses the term 'indentificational focus' to refer to contrastive focus referred here. Since the term 'contrastive focus' is widely used, we keep it.

stands in a contrastive relationship with other individual(s) including /Peter/. That is, by uttering (17b), the speaker of (17b) asserts that the alternative proposition expressed by the speaker of (17a) 'Mary married Peter' is false.

Linguists disagree as to whether contrastive focus constitutes an independent category of IS distinct from information focus (Bolinger 1961, Chafe 1976, Gussenhoven 1983a, Lambrecht 1994, Kiss 1998, O'Connor 2006). For example, Lambrecht (1994) assumes that 'the impression of contrastiveness [...] arises from particular inferences which we draw on the basis of given conversational contexts. [...] Contrastiveness [...] is not a category of grammar but the result of the general cognitive processes referred to as 'conversational implicature' (ibid., PP. 290–291). That is, in Lambrecht's (1994) view contrastivity only results from contextual inferences and hence it is not evoked lexicogrammatically. However, research shows that contrastive focus has syntactic and also prosodic characteristics and thus it forms an independent category of IS in languages including English (Katz and Selkirk 2011), German (Choi 1999b), Russian (King 1993), Italian, Hungarian (Kiss 1998), MSA (Moutaouakil 1989, Ouhalla 1997) among others. In these languages, contrastive focus is evoked lexicogrammatically. For example, Kiss (1998) shows that in Hungarian contrastive focus is realized preverbally in the syntax as in (18a) whereas information focus is realized postverbally in the syntax (18b).

(18) a. [**Olaszországban**]$_{CF}$ Jártam.
italy.to went.I
'It was **Italy** where I went.' Hungarian

b. Jártam [OLASZORSZÁGBAN]$_{F}$.
went.I Italy.to
'I went TO ITALY [among other places].' Hungarian

(ibid., P. 250)

Kiss (1998) argues for the presence of contrastive focus as a separate and independent category of IS different from information focus (2.2.1). This is because Contrastive Focus may have linguistic features that are not shared with

Information Focus. For example, in MSA Contrastive Focus is obligatorily realized syntactically at the left periphery of the clause (Moutaouakil 1989). As will be demonstrated in Chapter four, Contrastive Focus in HA is optionally realized at the left periphery of the clause whereas Information Focus is obligatorily realized in-situ in syntax. These will be discussed further in §3.1.1.2 and 4.3.2.

2.3 Intonation

The relation between the categories of IS (§2.2) and intonation is one of the most significant current discussions in the literature. How intonation contributes to the 'discourse' meaning has been investigated for a number of languages including English (Pierrehumbert and Hirschberg 1990), Japanese (Pierrehumbert and Beckman 1988), Italian (D'Imperio 2002, Avesani and Vayra 2003, Bocci forthcoming, 2008, Bocci and Avesani 2008), Spanish (Face 2002), Mandarin (Liu and Xu 2005, Wang and Xu 2006), Lebanese Arabic (Chahal 2001) and Egyptian Arabic (Hellmuth 2006). These studies show that the categories of IS have effects on intonation.[12] These studies, however, show that there are cross-linguistic variations in the way categories of IS are encoded intonationally.

We take intonation to be:

(19) **Intonation**: 'the use of suprasegmental phonetic features to convey 'postlexical' or *sentence-level* pragmatic meanings in a *linguistically structured way*' (Ladd 2008, P. 4).

Two related points, mentioned in Ladd's (2008) definition of intonation (19), are as follows. Firstly, suprasegmental features including fundamental frequency (F_0), intensity, and duration can express IS. Secondly, the intonation of the sentence is phonologically organized. In the following three sections, we define the

[12] Intonation is a term which is often used in the literature interchangeably with the term *prosody*. Hirst and Di Cristo (1998) defines prosody 'in its most general sense to cover both the abstract cognitive systems and the physical parameters onto which these systems are mapped. On the abstract, phonological level, prosody consists of number of lexical systems (tone, stress and quantity) and one non-lexical system: intonation' (ibid., P. 7). In this thesis, we use the two terms interchangeably unless if it is stated otherwise.

three suprasegmental features and show how they are claimed to express the categories of IS. As for the second point, it will be clear when we discuss the tree format in Figure 2.2 in §2.4.1.

Since we are concerned with information structure in the sense discussed in the preceding section, we take these three suprasegmental features fundamental frequency (F_0), intensity, and duration in the present thesis to be linguistic functions of intonation. These features are discussed briefly in the subsequent sections.

2.3.1 Pitch

Pitch is '[t]he auditory property of a sound that enables a listener to place it on a scale going from low to high, without considering the acoustic properties, such as the frequency of the sound' (Ladefoged 2006, P. 23). It is physiologically produced by the vibration of the vocal cords. The acoustic correlate of the rate of vibration of the vocal cords is called fundamental frequency (F_0), that is 'the number of complete repetitions (cycles) of variations in air pressure occurring in a second' (ibid., P. 23). The F_0 is measured in hertz (Hz).

The use of pitch differs in languages. For example, tone languages such as Mandarin use pitch to distinguish words and hence the produced tones are called lexical tone (Yip 2002). For languages including English and Arabic, pitch is used to express sentence-level meanings. That is, 'an intonation meaning modifies the lexical meaning of a sentence by adding to it the speaker's attitude toward the contents of that sentence (or an indication of the attitude with which the speaker expects the hearer to react)' (Pike 1972, P. 55). In these languages, the produced intonation meaning is not part of the lexicon but rather it is a result of its discourse status (Halliday 1967b, Terken and Hirschberg 1994, Cruttenden 2006a, Ladd 2008). For example, as noted in §2.2.1 focused item in English is associated with the sentence-stress (Halliday 1967b, Chafe 1976). That is, the main prosodic prominence is placed on the item that carries focus discourse function. This view is what has been called by Ladd (1996, 2008) the 'highlighted -based' view (Halliday

1967b, 1970, Chafe 1976, Bolinger 1972).[13] As shown in the preceding section, any item that receives focus discourse function is always associated with the sentence stress (i.e. the main prosodic prominence). Take the following example from Féry and Krifka (2008, P. 123):

(20) a. What did you see on the road?

b. We saw a TIGER on the road

c. # We saw a tiger on the ROAD

What is shown in the examples (20) is that the question (20a) asks for information about what was seen on the road, so this makes the answer in (20b) the perfect answer to the question in (20a). This is so because the item /tiger/ is focused by virtue of being triggered by the wh-question word and thus it correctly receives the main prosodic prominence of the sentence termed as 'the nuclear pitch accent' within the AM model (will be discussed further in §2.4). As for (20c), it is pragmatically ruled out. This is because the nuclear pitch accent is wrongly placed on /road/ which does not corresponds to the wh-question in (20a). To put it differently, in argument-focus structure such as (20a) only the focused item carries the nuclear pitch accent of the sentence. This nuclear pitch accent is defined as the last pitch accent in the intonational phrase (Ladd 2008).[14]

[13]In another different view, sentence stress is assigned to the item based on the phonological rules in a given language and not based on the informational status of the item (Gussenhoven 1983a, Selkirk 1984). This approach has been called the 'structure-based' approach by Ladd (1996) and also called the 'Focus-to-accent' approach by Gussenhoven (1983a). As pointed out by Ladd (2008), '[t]his approach built on explorations of the notion of 'focus' in the context of generative work on syntax and semantics (beginning with Chomsky 1972 Jackendoff 1972)' (ibid., P. 217). As pointed out by Bolinger (1972), the main weakness of this approach is that the placement of 'sentence stress' is based on which item in the sentence is selected by the speaker to emphasize, and not based on the grammatical rules of the sentence as assumed within the structure-based approaches (Focus-to-Accent).

[14]In the British school of intonation such in Halliday and Matthiessen (2004) nuclear pitch accent is referred to as the 'tonic syllable' (ibid., P. 89). As discussed in the preceding section, Jackendoff (1972, P. 230) uses the term 'main stress' to refer to the nuclear pitch accent.

2.3.2 Length

It is useful to distinguish between the phonetic and phonological notions of length. From a phonetic perspective, length refers to the duration of a linguistic unit, which can be measured on either a spectrogram or a waveform. By length, we could refer either to the duration of the unit a speaker produces or a listener hears. From a phonological perspective, length refers to the *relative* duration of the linguistic unit. As noted by Cruttenden (1997), this feature represents both simple and complex aspects. This is illustrated further in the quotation below.

> '[i]f, for example, we wish to measure the duration of particular syllables in order to judge whether carrying degrees of accent involve varying degrees of lengthening, we will initially have to make some decisions about syllable boundaries which are to some extent arbitrary [...] [t]he relevance of length as a prosodic feature is also difficult to assess because there are often many different influences on the absolute duration of a segment or syllable' (ibid., P. 2).

As a suprasegmental feature, length has been found to be one of the prosodic cues to the categories of IS including focus and topic in languages including English (Cooper et al. 1985, Eady and Cooper 1986, Eady et al. 1986), Swedish (Allwood 1974), German (Baumann et al. 2006, Féry and Kügler 2008), and Korean (Jun and Kim 2007). For example, Kügler (2008) shows that in German the duration of the items carrying given information is shorter than their counterparts carrying new information at the time of discourse.

2.3.3 Loudness

Loudness refers to the breath-force used by the speaker to produce the linguistic unit. Phonetically, the acoustic correlate of loudness is called intensity and it 'refers to the amount of acoustic energy in a sound' (Ladefoged 2006, p. 293). Intensity is measured in decibels (dB). It is based on the size of the vibration of the vocal cords as a result of variations in the pressure of air coming from the lungs.

As stated by Cruttenden (1997, p. 3), loudness/intensity is an emphatic device that is used by the speaker to add prominence to the lexical meaning of the linguistic unit. For example, Chen and Wang (2009) found that in Taiwanese, Taiwan Mandarin and Beijing Mandarin the focused item is louder: that is higher in intensity than its un-focused counterpart. Seven dialects of British and Irish English have been investigated by Kochanski et al. (2005) who also found that intensity alongside duration are the prosodic cues to focus.

2.4 Frameworks for Intonation Description

A considerable amount of literature has been published on how intonation should best be described (Pike 1945, Wells 1945, Halliday 1967a, Pierrehumbert 1980, Beckman and Hirschberg 1994, Brazil 1997, Xu 2004a). In this thesis, we only consider the autosegmental-Metrical Model (AM) developed by Pierrehumbert (1980) to describe the prosodic effects of the categories of IS in HA. The reasons to adopt this model will become clear when we discuss it in detail over the next section.

Before we discuss the AM model, we first provide some background about two different schools: British School of Intonation, and American Structuralists, because their thoughts are still of significance to the current frameworks for intonation description.

The British school model of intonation known as the *nuclear tone approach* was developed in Britain and hence this name is given to it (Palmer 1922, Kingdon 1958, Crystal 1969, Halliday 1967a, O'Connor and Arnold 1973). Proponents describe intonation from purely configurational perspective. That is, the description is based on pitch/F_0 movement (§2.3.1). The intonational contour of a sentence, termed the' tone group' or 'intonation group' (Halliday 1967a), is described configurationally by using a system that contains five simple tone groups (falling, high rising/falling-rising (pointed), low rising, falling-rising (rounded), rising-falling (rounded)) and two compound tone group (falling+low rising, rising-falling (rounded)+low rising) (Halliday 1970, PP. 10–12). The intonation group/tone group is made up of four elements: prehead, head, nucleus and tail. The most important element where the main accent of the sentence occurs is the nuclear element (i.e. nuclear pitch accent) that is aligned with the lexically stressed syllable termed 'tonic syllable', as illustrated further in the following quotation.

> '[t]he tonic syllable carries the main burden of the pitch movement in the tone group, and it does this in one of the two ways. Usually this means that it covers the *widest pitch range*: so if, for example, the tone group is on a falling tone that tonic syllable will have a greater falling movement than any of the other syllables-it will fall more steeply, and over a wider range. The alternative possibility is for it to occur *immediately following a pitch jump*, where instead of a continuous rising or falling movement there is a jump up or down (a musical interval) between syllables' (ibid., P. 4).

The location of the head, head, nucleus and tail are represented in the following representation adopted from (Barry 2007, P. 21).

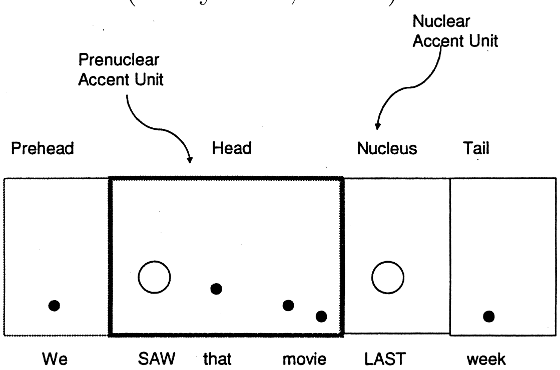


Figure 2.1: Schematic representation of /we saw that movie last week/. Large circles represent stressed syllables and small filled circle represent unstressed syllable (Barry 2007, P. 21).

American Structuralists, on the other hand, describe intonation as pitch-level targets (Pike 1945, Wells 1945, Trager and Henry Lee Smith 1957). They describe intonation with four pitch levels: extra-high, high, mid and low (termed pitch phonemes). These four pitch phonemes are numbered 1, 2, 3, and 4 respectively. The determinations of pitch level are not absolute but rather they are relative. In other words, the pitch level is determined by its height relative to one another. Furthermore, these pitch phonemes do not carry meaning but rather '[i]t is the intonation contour as a whole carries the meaning while the pitch levels contribute end points, beginning points, or direction-change points to the contours [. . .] and so such are basic building blocks which contribute to the contours and hence contribute to the meaning' (Pike 1945, P. 26). In a sentence, the stressed syllable is the carrier of **beginning point** of a *primary contour* and hence it is marked as '°'. These four pitch phonemes are proposed to describe all the permissible contours in English (Wells 1945, P. 27). The following example from Pike (1945) illustrates further.

(21) He bought it?
3- °4- -1

The contour of the intonational question in (21) is made up of three pitch-level targets: mid, followed by low and then finally extra-high. Since the contour starts from mid pitch-level target to extra-high pitch-level target, this contour represents 'intonational question'. American Structuralist approaches in general gave insights to Pierrehumbert's (1980) AM approach which will be presented in detail in the next section.

2.4.1 Autosegmental-Metrical Model (AM)

The AM model developed by Pierrehumbert (1980) has undergone through three developmental stages. The first developmental stage started with the Pierrehumbert's (1980) seminal dissertation. The second developmental stage started with Pierrehumbert and Hirschberg (1990) who establish the relationship between intonation and its communicative functions including categories of IS. As for the third developmental stage, it started with the development of a standardised system for transcribing intonation called Tones and Break Indices (ToBI, henceforth). In this section, we briefly present how intonation is described phonologically within AM.

In her seminal dissertation, Pierrehumbert (1980) proposes a model labelled Autosegmental-Metrical approach first by Ladd (1996) which was later associated with the term 'intonational theory' to describe the intonation system of American English. Both the AM model and the American Structuralist model describe intonation as pitch-level targets. In contrast to American Structuralists, Pierrehumbert (1980) posits only two tonal levels: H(igh) and L(ow) tone. By doing so, Pierrehumbert's (1980) approach is more economical than the American Structuralist approach (i.e. the four-level approach) described in the preceding section. The height of the pitch-level targets [H] and [L] are relative rather than absolute. These targets are determined based on auditory impression (Wightman 2002).

The AM model is called *autosegmental* because it describes intonation as a sequence of 'independent' pitch-level targets represented at an autonomous tier.[15] It is metrical because it is based on the principles of Metrical Phonology (Liberman 1975, Liberman and Prince 1977). That is, the tone is associated with lexically stressed syllables that are metrically stronger than unstressed syllable. The following example from Gussenhoven (2004, P. 123) illustrates further.

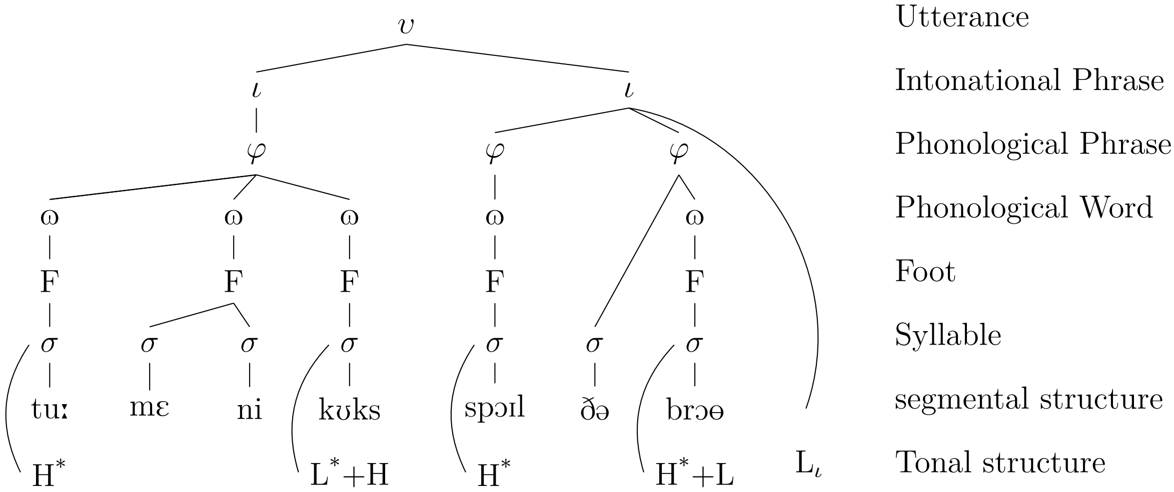


Figure 2.2: The hierarchical Representation of the phonological structure of /two many cooks spoil the broth/.

It is clear from the example above that the phonological structure of the sentence is organized hierarchically as represented in the tree format (i.e. 'in a linguistically structured way' (19)). The pitch-level targets H(igh) and L(low) are represented at a separate structure called tonal structure in the example. Although the tones are represented in an autonomous tier that is separate, they are associated with other phonological units in the structure such as 'Syllable', as

[15]For a brief summary of Autosegmental Phonology, see Kenstowicz (1993, Ch. 7).

shown in the figure.

From Pierrehumbert's (1980) perspective, intonation is compositional. That is, an intonational contour of a sentence is composed of three components: pitch accent, phrase accent and boundary tone. These components form a finite set which can be combined in an infinite number of meaningful ways to produce an infinite number of permissible contours in American English. Based on this insight, she proposes a grammar for the intonation of American English formulated in FSA (i.e. Finite State Automata) terms. In this FSA grammar, the three components of intonation share one start state. That is, 'for any given target tone, the implementation was held to depend only on the identity and prosodic position of the tone itself, and on the identity and phonetic realization of the preceding tone' (Pierrehumbert 2000, P. 29). This view leads AM to be linear in nature. Figure 2.3 displays the content of a typical American English contour.

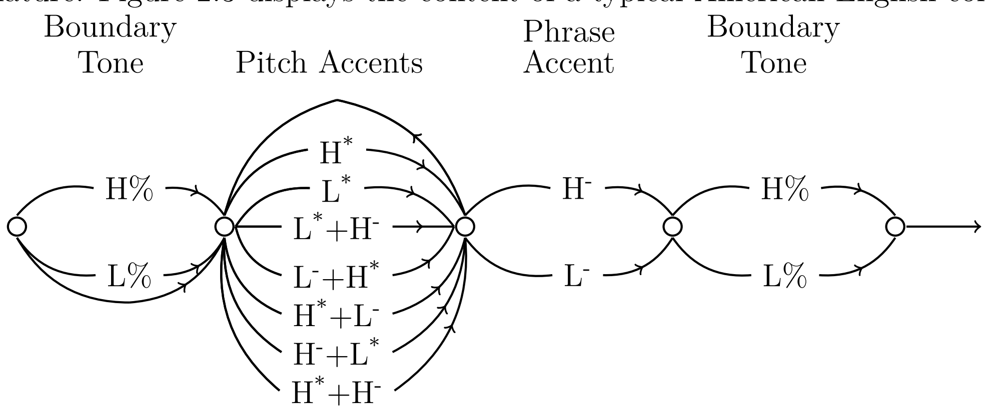


Figure 2.3: Finite-State grammar for generating tunes of English intonation (Pierrehumbert 1980, P. 29).

The FSA grammar in (2.3) starts with a boundary tone indicating whether a sentence starts from high [H%] or low [L%] pitch level.[16] This (starting) boundary tone is followed by a pitch accent which is either a simple pitch accent [H*] or [L*] or bitonal pitch accents including [L*+H], [L+H*], [H*+L], [H+L*] and [H*+H]. The superscript star '*' indicates that the tone is associated with the lexically stressed syllable at syllable structure. A pitch accent is followed by a phrase

[16]'The starting' Boundary tone is not represented any more in the current studies conducted within the AM model.

accent which is either [H-] or [L-] tone. Finally, the intonation phrase (IP) ends with a boundary tone which is either high tone [H%] or low tone [L%]. The FSA grammar in (2.3) is proposed by Pierrehumbert (1980) to capture the permissible contours in American English.

Ladd (2008, P. 44) summarizes the principles which the AM model is based on as follows.

- Sequential tonal structure

  'Tonal structure consists of a string of local *events* associated with certain points in the segmental string. Between such events the pitch contour is phonologically unspecified and can be described in terms of *transitions* form one event to the next. In languages like English, the most important events of the tonal string are *pitch accents*, which are associated with prominent syllables in the segmental string, and *edge tones*, which are associated with the edges of intonational tunes at major prosodic boundaries.'

- Distinction between pitch accent and stress

  'Pitch accents, in languages that have them, serve as concrete perceptual cues to stress or prominence. However, they are in the first instance *intonational* features, which are *associated with* certain syllables in accordance with various principles of prosodic organization. The perceived prominence of accented syllables is, at least in some languages, a matter of *metrical strength* and/or *dynamic stress*, which can be distinguished from pitch accent.'

- Analysis of pitch accents in terms of level tones

  'Pitch accents and edge tones in intonational languages can be analysed as consisting of primitive *level tones* or pitch targets, High (H) and Low (L).'

- Local sources of global trends

  'The phonetic realization or scaling of any given H or L tone depends on a variety of factors (degree of emphasis, position in utterance, etc.) that are essentially orthogonal to its identity as H or L. Overall trends in pitch contours (e.g. gradual lowering of overall range) mostly reflect the operation of *localised* but *iterated* changes in scaling factors.'

(Ladd 2008, P. 44)

Having presented the basic assumptions and principles on which the AM model is based on, we turn our discussion to the second developmental period of this model, that of Pierrehumbert and Hirschberg (1990).

Pierrehumbert and Hirschberg (1990) modify Pierrehumbert's (1980) AM model so that it is possible to establish a relationship between a tone and a communicative function at the time of discourse. That is, the meaning of a contour is assigned once the tones (i.e. forms) are established. Since the intonation is compositional in nature, the meaning of the contour is compositional. That is, each of the three components of intonation: pitch accent, phrase accent and boundary tone, has a communicative function. For Pierrehumbert and Hirschberg (1990), a pitch accent conveys information about the communicative function of an item. For example, Pierrehumbert and Hirschberg (1990) show that in American English the form [H*] (pitch accent) is associated with an item that carries information focus as its discourse function, as in (22b) below. In addition, the bitonal pitch accent [L+H*] is associated with a contrastive-focused item, as in (23) below. Items carrying old information are associated with [L*] form, as in (24).

(22) a. What about Anna? who did she come with?

b. Anna came with MANNY (Pierrehumbert 1980, P. 266)
H* %

(23) It's even warm for December. (Pierrehumbert and Hirschberg 1990,
L+H* L H%
P. 296)

(24) Well, I'd like a Pavoni ... (Pierrehumbert 1980, P. 291)
L* L* L* L H%

This leads Pierrehumbert and Hirschberg (1990) to associate focused item in American English with a 'default' pitch accent. That is, if an item carries information focus, this item is 'automatically' produced with [H*]. In the same vein, if the item is contrastive-focused, then it is 'automatically' produced with [L+H*] (cf. Selkirk 2002)[17].

As for the phrase accent, it conveys *relational* information about the intermediate phrase and whether the intermediate phrase is part of a large interpretive unit. For example, Pierrehumbert and Hirschberg (1990, P. 304) point out that a H phrase accent [H-] conveys that the interpretation of the current intermediate phrase (ip) is related to/part of the subsequent phrase(s), as in (25) below.

(25) George ate chicken soup and got sick
H* H* H* H- H* H* L L%

(ibid., P. 304)

As interpreted by Pierrehumbert and Hirschberg (1990, P. 304), the utterance in (25) is interpreted as follows: the intermediate phrase [George ate chicken] ends with H phrase accent which leads this utterance to be a part of the subsequent phrase [and got sick].

As for the meaning attached to the boundary tones, Pierrehumbert and Hirschberg (1990, P. 305) point out that the boundary tones [H%] and [L%] carry *directionality* in the process of interpretation of an utterance. In other words, [H%] conveys that '[speaker] wishes [hearer] to interpret an utterance with particular attention to subsequent utterance'. However, the boundary tone [L%] does not convey the pragmatic aspect of 'forward-looking' directionality (ibid., P. 305). The following examples illustrate.

(26) a. My new car manual is almost unreadable
L H%

b. It's quite annoying
L L%

c. I spent two hours figuring out how to use the jack (ibid., P. 305)
L L%

[17]Many linguists have challenged Pierrehumbert and Hirschberg's (1990) claim, this will be discussed further in Chapter eight.

The boundary tone [H%] in (26a) leads this utterance to be interpreted with respect to the subsequent utterance in (26b). This leads the pronoun /it/ in (26b) to refer to /My new car/ in (26a) (Pierrehumbert and Hirschberg 1990, P. 305). As for the boundary tone [L%] in (26c), it leads this intonational phrase to be interpreted separately.

The third developmental period that the AM model has gone through is developing Tones and Break indices (ToBI) system for transcribing intonation. This system developed between 1991 and 1994[18]. It basically combines the Pierrehumbert's (1980) tonal annotations of intonation with slight modifications with break indices: that is, intonational junctures (Silverman et al. 1992, Beckman and Hirschberg 1994, Beckman et al. 2005). It was first used for labelling intonation of spoken American English. However, It has been widely used for labelling intonation of other languages including German (Grice et al. 2005), Dutch (Gussenhoven et al. 2002), Japanese (Venditti 2005), Serbo-Croatian (Godjevac 2005a) and among other languages.[19]

ToBI is a tier-based system which represents phonological information on at least four parallel tiers: (a) the orthographic tier containing the orthographic transcript of an utterance, (b) a break-index tier where the intonation of an utterance is analysed in terms of prosodic constituency from the level of the word to the level of intonational phrase (i.e. numbered from 0 (clitic) to 4 (intonational phrase)), (c) a tone tier where the intonation of an utterance is decomposed into pitch accents and phrasing, and (d) a miscellaneous tier where various relevant information is represented including hesitation and laughter (e.g. 'laughter can overlay the articulation of an otherwise well-formed intonational phrase' (Silverman et al. 1992, P. 868)). The following is an example from Beckman et al. (2005, P. 21) where ToBI is adopted to analyse the intonation of /The Pentagon reports fighting in six southern Iraqi cities/.

[18]ToBI system is still developing through insights from studies on different languages.
[19]see `http://www.ling.ohio-state.edu/~tobi/` for information on languages that have the ToBI system.

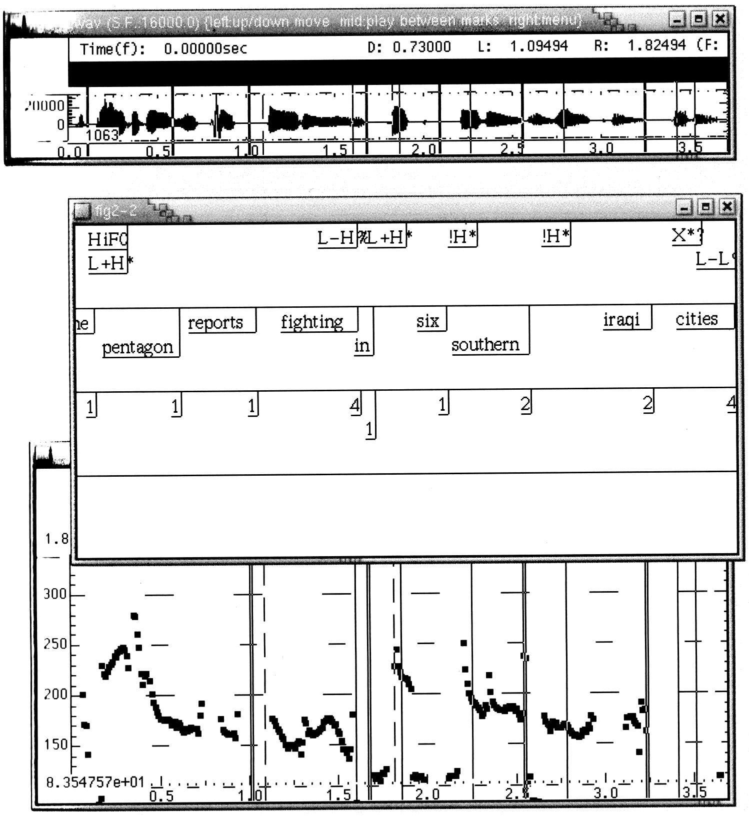


Figure 2.4: Audi waveform, F_0 contour, and MAE_ToBI label windows for utterance *The Pentagon reports fighting in six southern Iraqi cities.* This figure is from Beckman et al. (2005, P. 21).

Figure (2.4) above contains three windows. The first window at the top represents the spectrograph of the utterance. The second window (in the middle) represents the tiers where the first tier represents the tonal tier, the second tier represents the orthographic tier, the third tier represents the break indices tier, and the fourth tier represents the miscellaneous tier. As for the third window at the bottom, it represents the F_0 contour of the utterance.

The difference between AM and ToBI is slight. That is, the bitonal pitch accent [L+H*] proposed by Pierrehumbert (1980) shown in Figure 2.3 above is not present in the ToBI transcription for American English. This is so because as shown by Ladd and Schepman (2003) the monotonal pitch accent [H*], represented within AM as a distinct pitch accent, can be preceded by the [L] target in English. Since there is a difficulty in distinguishing [L+H*] from [H*], [L+H*] is deleted and assumed to be not present in the English grammar of intonation (for more discussion on this, see Ladd and Schepman 2003, Dilley et al. 2005 and references therein). In fact, it is not entirely clear whether the confusion between these two phonological categories is language-specific or universal. For example, Chahal's (2001) intonational analysis of Lebanese Arabic and Hellmuth's (2006) intonational analysis of Egyptian Arabic and other studies on Arabic intonation, as will be reviewed in §3.2 and Chapter eight, show that the two phonological categories [H*+L] and [H*] are distinguishable and they exist in these Arabic dialects.[20] In this thesis, we take the debate about [H*] and [L+H*] to be language-specific. For more discussion on the proposed inventory of pitch accents in English, see Beckman and Hirschberg (1994).

AM as a phonological model has been applied to describe intonation in a number of different languages. For example, it has been applied to describe the intonation system of Japanese (Pierrehumbert and Beckman 1988), Bengali (Hayes and Lahiri 1991), German (Féry 1993), French (Jun and Fougeron 2000), Spanish (Face 2002), Lebanese Arabic (Chahal 2001) and Egyptian Arabic (Hellmuth 2006). In this thesis, we adopt the AM model for two reasons. First, AM describes intonation from the purely phonological perspective and thus it is useful to explore the phonological structure of the HA declarative sentences and determine whether the categories of IS affect the intonational structure of the entire sentence. Second, many recent studies including two Arabic dialects Lebanese and Egyptian Arabic, adopt this mode. So, in order to make successful comparisons between the phenomena described for HA and those of other languages including Lebanese and Egyptian Arabic, we adopt this framework.[21]

[20]As will be reviewed in detail in §3.2 and Chapter eight, Chahal (2001) shows that [H*+L] and [H*] are part of the pitch accents found on Lebanese Arabic. Hellmuth (2006) shows that Egyptian Arabic has only the bitonal pitch accent [H*+L].

[21]As Jun (2005a) puts it, '[f]inding similarities and differences of prosodic features across languages would make sense only if these languages were described in the same framework in terms of the same prosodic categories' (ibid., P. 430).

2.5 Prosodic Marking of Focus

Prosodic marking of focus can vary depending on various factors including focus type (e.g. information focus, contrastive focus) and intonational phonology of language. Therefore, it is language-specific. Crosslinguistically, Selkirk (2007, P. 215) states that focus is marked prosodically by (i) 'default' pitch-accent assignment, (ii) tonal-morpheme assignment/peak alignment, (iii) dephrasing, (iv) pitch range expansion, and finally (v) duration.

Languages including Dutch (Gussenhoven 1983a), English (Pierrehumbert and Hirschberg 1990, Selkirk 2002) and German (Féry 1993, Selkirk 1984, Röhr and Baumann 2010) assign a default pitch accent to the word in focus. For example, information focus and contrastive focus in American English are marked by [H^*] and [$L+H^*$], respectively (Pierrehumbert and Hirschberg 1990, Selkirk 2002). However, Bartels and Kingston (1994) show empirically that listeners failed to associated word produced with [$L+H^*$] with contrastive-focus interpretation in English. This indicates Pierrehumbert and Hirschberg's (1990) and Selkirk's (2002) default pitch accent for contrastive focus in English is not perceived by listeners and thus it does not contribute to the utterance comprehension. Based on spontaneous speech, Hedberg and Sosa (2007) show empirically that both information focus and contrastive focus in English can be produced with either [$L+H^*$] or [H^*].[22] This leads them to conclude that 'we deny that there is any prosodic category as distinctive as a 'topic accent' as opposed to a 'focus accent" (ibid., P. 119).

It has been reported in the literature that focus is marked by assigning a tonal morpheme that differs from its counterpart in broad focus in some languages. For example, in European Portuguese Frota (2000) points out that contrastive-focused item is marked by [H^*+L] whereas its counterpart in broad focus is marked with [$H+L^*$]. Therefore, contrastive focus differs from its counterpart in broad focus in this language in terms of peak alignment. Another language is Zagreb which

[22]Hedberg and Sosa's (2007) test materials are natural data collected from six half-hour episodes of political discussion on TV interview.

according to Gussenhoven (2004, P. 61) distinguishes contrastive focus from its counterpart in broad focus by a difference in peak alignment, for more details see Gussenhoven (2004, PP. 86–87). In Bengali, Hayes and Lahiri (1991) associate the edge of the phonological phrase where the focused item occurs with [H] tone.

In Japanese, for example, Pierrehumbert and Beckman (1988) show that when the item is focused, all the following items exhibit a marked reduction in F_0 movement (i.e. low plateau) (cf. Maekawa 1994). Therefore, the post-focus item(s) loses its own phrase and is incorporated into the same phrase as the preceding item. This is called '**dephrasing**'. In Chichewa, for example, Kanerva (1990) boundary tone precedes and follows focus by virtue of the presence of focus (see also Downing and Pompino-Marschall 2004). This is called '**rephrasing**'.

Focus can be marked by lengthening. For example, Lee and Xu (2010) show that contrastive focus in Korean is acoustically marked by 'longer' duration. In Turkish, Ipek (2011) shows that focus is realized with longer duration that its counterpart in broad focus. Furthermore, Chahal (2001) shows that 'information' focus in Lebanese Arabic is produced with longer duration, compared with its counterpart in broad focus.

Recent studies conducted within the Parallel Encoding and Target Approximation model (PENTA)[23] yields interesting results concerning the pitch range as a prosodic cue to focus. One of the most significant findings is that pitch range is one of the most important acoustic correlates to focus in some languages such as English (Cooper et al. 1985, Xu and Xu 2005), Swedish (Bruce 1982), Mandarin (Xu 1999), German (Röhr and Baumann 2010) as well as other languages. As Xu (2011) puts it, '[o]ne of the most important acoustic correlates of prosodic focus is post-focus compression (PFC)- the reduction of pitch range and amplitude of

[23]PENTA is developed by Xu (2004a, 2005). This model is based on the assumption that the conveyance of meanings in speech is done by an articulatory system containing physiological mechanisms. Within this model, the intonational analysis of a sentence is conducted on a syllable-by-syllable basis. It describes the global intonational pattern of the utterance in an acoustic sense. Discussing PENTA is outside the scope of the thesis, for more information on this model see Xu (1999), Xu and Wang (2001), Xu and Sun (2002), Xu (2004a,b), Xu and Xu (2005) Xu (2005).

all post-focus components in an utterance' (ibid., 152). **Post-focus compression** is relative to sentences with the same structure. That is, the compression of pitch range is in comparison between different utterances rather than within the same sentence (Eady and Cooper 1986, Liu et al. 2013). Xu (2011) divides languages into two main groups: languages that have PFC and languages which do not have. Languages that have PFC includes English (Cooper et al. 1985, Xu and Xu 2005), Swedish (Bruce 1982), and Mandarin (Xu 1999). In these languages, the pitch range of the focused item is more expanded and its F_0 is higher than its unfocused counterpart, and that the F_0 in the post-focus items are more compressed/reduced than their counterpart in un-focus condition. PFC has been found to be perceptually useful for speakers of PFC languages (Mixdorff 2004, Rump and Collier 1996, Botinis et al. 1999, Ipek 2011). For example, In Turkish Ipek (2011) finds '[l]isteners identified initial focus correctly with the highest rate and this shows the importance of post-focus compression of focus' (ibid. P. 140).

However, recent research shows that there are languages which do not have PFC such as Wolof (Rialland and Robert 2001), Taiwanese Pan (2007), Chichewa and Hausa and Northern Sotho , (Zerbian et al. 2010), Cantonese (Wu and Xu 2010) as well as other languages (see Xu 2011 and references therein).

This short overview shows that prosodic marking of focus is language-specific. As noted above, how focus is marked prosodically is based on the types of focus and the intonational system of the language itself.

2.6 Conclusion

The goal of this chapter was to define (a) the concept of IS, (b) the categories of IS used in this thesis, (c) how intonation is described in general and within the AM model in particular and finally (d) how focus is prosodically marked cross-linguistically.

Based on Lambrecht's (1994) framework, Section 2.1 defined the concept of IS. We assume that there are two categories of focus: information focus and contrastive focus. We defined them and showed how they are evoked in the sentence grammar.

In §2.3, we defined what we mean by intonation in this thesis. We defined suprasegmental features including pitch, intensity and duration and showed how they are claimed to express the categories of IS. We presented the AM model that is used in this thesis to describe the prosodic effects of the categories of IS in the language under investigation, HA. We showed how this model describes the prosodic effects of the categories of IS with examples mainly from English. We also outlined the reasons that justify adopting this models in this present study. Finally, we presented how focus is prosodically marked cross-linguistically.

The next chapter will give an overview of the previous studies on the relation between the categories of IS, word order and intonation in Arabic dialects.

Chapter 3

Information Structure: Arabic

Although the role of IS in Arabic grammar has been acknowledged since at least the seminal work *Dalāʔil ʔal-ʔiᶜǧāz* 'Intimations of Inimitability' of the eleventh-century grammarian Abd al-Qahir Al-Jurjani (n.d.), little empirical research has been carried out on how IS is expressed in word order and in intonation. This chapter aims to present an overview of prior work on i) the role of IS in Arabic grammar, ii) IS categories which are claimed to be evoked linguistically, and iii) how these categories are claimed to be signalled intonationally. This chapter will end by identifying the strengths and the knowledge gaps of the previous studies that motivate the research questions addressed by the thesis and direct future research.

This chapter is structured as follows. Section 3.1 presents an overview of the role of IS in Arabic grammar suggested in the literature, and the categories of IS found to be relevant crosslinguistically. Section 3.1.1 briefly looks at Moutaouakil (1989)'s functional analysis of IS in MSA. Section 3.1.2 and 3.1.3 review prior work on the role of IS in Bahrain and Najdi Arabic, respectively. Section 3.2 gives an overview of the findings of previous experimental studies on the prosodic effects of various aspects of the categories of IS in various Arabic dialects. Section 3.3 concludes.

3.1 Information Structure in Arabic

Before Abd al-Qahir Al-Jurjani (n.d.), the role of IS was scarcely mentioned in the traditional analyses advanced by medieval Arab grammarians including the eighth-century grammarian Sibawayh who is the founder of Arabic grammar, well known today for his influential book *ʔal-kitāb* 'the book'. The notable exception is the notion of مبتدأ /mubtada/ 'Topic'. The notion of Topic in Arabic grammar was and still is used by some syntacticians to describe the initial element in a nominal sentence. There has been and still is disagreement and confusion about the nature and the role of this notion mainly in Arabic syntax (see Al-Sweel 1983, PP. 21–29 for discussion).[1] Another notion used in the traditional analyses is عناية /ᶜinayah/ 'emphasis'. This notion was used vaguely by medieval Arab grammarians including Sibawayh to give an oversimplified account of why an item in a clause is dislocated in the syntax. This is probably because Sibawayh and others at their time aimed to 'preserve the classical language rather than [...] [analyse] it' (Al-Sweel 1983, P. 24).

[1]The notion of مبتدأ 'mubtada' (Topic) in traditional grammar advanced by medieval Arab grammarians is used to associate it with the sentence-initial NP in the nominal sentences. According to them, a NP cannot occupy the sentence-initial position in MSA unless it has the property of definiteness. However, approaches of this kind carry with them various well known limitations. For example, Fassi-Fehri (1993, ff. 27) gives two examples of nominal sentences from MSA, shown below, where he shows that the initial NP is not necessarily definite and thus it cannot be interpreted as topic.

(i) a. baqarat-un takallam-at
cow-NOM.INDEF spoke.3SGF
'A cow has spoken'

b. jāsūs-un ʔaqbal-a ᶜalay-nā
spy-NOM.INDEF came.3SGM on-us
'A spy has appeared to us'

In the above examples, the NP /baqarat-un/ 'a cow' in (i(a)) and /jāsūs-un/ 'a spy' (i(b)) occupy the sentence-initial position; however, they are not definite. Note that, definite NP in MSA is marked by the definite article ʔa 'the' whereas indefinite NP is marked by the suffix *-n* termed in Arabic grammar /tanween/ 'nunation' (Fassi–Fehri 1989, Kremers 2003). Approaches like مبتدأ 'mubtada' (Topic) followed by خبر 'ẖabar' (Comment) advanced by medieval Arab grammarians fail to capture the word order of these two nominal sentences (i(a) and (b)). This is so because under this approach the NP in (i) occupying the sentence-initial position would be wrongly predicted to carry given information by virtue of be associated with topic notion. This topic has been under debate for a quite long time and raise many interesting approaches to avoid problems with the medieval Arab grammarians' approach, for more discussion see Al-Sweel (1983, Ch. 1 and 2) and Fassi-Fehri (1993).

Without going into detail, the centrality of syntax and the vague usage of the term عناية /ᶜinayah/ ‘emphasis’ are the leading causes that drove Abd al-Qahir Al-Jurjani to revolutionize the grammar of Arabic assumed by Sibawayh and others at that time. He proposes نظرية النظم /*naẓariat ʔal-nuẓm*/ ‘Theory of Discourse Organisation’. This theory is based on three principles summarized by Owens (2010): ‘the centrality of grammar to language, the importance of context and meaning, and the role of speaker intention in planning and executing sentence production’ (ibid., PP. 5–6). One of Abd al-Qahir Al-Jurjani’s major contributions ‘was to develop in an explicit way an analysis of information structure in language’ Owens (2010, P. 5). Consider the following examples from Abd al-Qahir Al-Jurjani (n.d.).

(1) a. ḍaraba ᶜamr-an Zayd-un
hit.PAST.3SG Omer-ACC Zayd-NOM
verb object subject
‘Zayd hit Omer.’

b. ḍaraba Zayd-un ᶜamr-an
hit.PAST.3SG Zayd-NOM Omer-ACC
verb subject object
‘Zayd hit Omer.’

Abd al-Qahir Al-Jurjani (n.d.) analyses the word-order variations in (1) as follows. The sentence in (1a) is a felicitous answer to the question ‘what happened to Omer?’ but not to ‘what happened to Zayd?’. As for (1b), it is a felicitous answer to the question ‘what happened to Zayd?’ but not to ‘what happened to Omer?’. Based on Abd al-Qahir Al-Jurjani (n.d.)’s analysis, Classical Arabic (CA) requires the topic item to be realized first syntactically (i.e. before any other argument(s)).[2]

Word-order variation is one of the major theoretical issues that has dominated the field of Arabic linguistics, mainly syntax, for many years (see Li and Thompson 1976, Parkinson 1981, El-Yasin 1985, Fassi-Fehri 1993, Holes 1995, Dahlgren 1998,

[2]For an an exhaustive overview of Abd al-Qahir Al-Jurjani (n.d.)’s Theory of Discourse Organization, see El-Hakkouni (1989).

Brustad 2000, Hewitt 2006 and among others). Holes (1995) suggests explicitly that an argument carrying old information in the discourse come first in the syntax in CA and MSA. This indicates that IS is expressed via word order choice.

> ‘there is a normal word order for MSA which is determined primarily by a principle of information organisation : what is already ‘known’ from the previous text or context (and is usually grammatically definite) precedes what is ‘new’ (and is usually indefinite), regardless of whether what is known/definite is the grammatical subject or object [...] In cases where both subject and object are known, or both are new, the subject, all things being equal, precedes the object. In MSA (and for that matter CLA [Classical Arabic]), these basic principles account for word order in the vast majority of sentences in prose texts, but may be overridden in cases of contrastive emphasis or topicalisation [...] But by no means does the fact of grammatical case marking in itself explain anything about the observable patterns of word order’ (ibid., PP. 203–204).

In order to capture Holes’s (1995) and others’ claims, Dahlgren (1998) proposes the ‘old-first principle’ in Arabic grammar (ibid., P. 216).

Generally, research to date has tended to look at the relationship between syntax (notably word order) and IS (Parkinson 1981, Al-Sweel 1983, Bolotin 1995, Al-Shorafat 1998, Brustad 2000, Owens et al. 2009, Edwards 2010, Owens et al. 2010, 2013) rather than on the relationship between IS and intonation; Moutaouakil (1989) and the edited collection Owens and Elgibali (2010) being notable exceptions.

Moutaouakil (1989) was, to my knowledge, the first and the only one to thoroughly investigate and identify the categories of IS in MSA and their relation with word order. The edited collection Owens and Elgibali (2010) is another work which provides an engrossing description of a wide spectrum of information structure in Spoken Arabic. It provides an interdisciplinary coverage of information structure phenomena in a number of Spoken Arabic dialects including but not exclusively Bahraini, Bedouin Najdi and Egyptian Arabic. Although this edited collection consists of eleven articles which create a heterogeneous but, at the same time, harmonious description of information structure, only two articles are most directly related to the main focus of this section, which of Holes (2005), and Ingham (2010).

In §3.1.1, we review Moutaouakil's (1989) study. Section 3.1.2 gives an overview of Holes's (2005) study on the role of IS in the word-order variations in Bahraini Arabic. Section 3.1.3 gives an overview of Ingham's (2010) study on the role of IS in Najdi Arabic.

3.1.1 Information Structure in MSA

Moutaouakil (1989) identifies and discusses at length the categories of IS and how they are expressed via MSA word order[3]. He provides an analysis to capture the relation between the categories of IS and word order within Functional Grammar (FG) (Dik 1997).

Since his study is more comprehensive and more relevant to the focus of the thesis, it is reviewed in this section. The focus of this section is not on the detail of the framework which Moutaouakil (1989) uses (Dik's (1997) FG) but rather on the set of categories of IS which he proposes.[4]

As a first step towards an analysis on information structure, Moutaouakil (1989, PP. 10–11) starts from the premise that the basic word order in MSA is VS(O). He then proposes six categories of information structure which he claims are evoked linguistically in MSA. They are a) new focus, b) contrastive focus, c) topic. d) theme, e) tail and f) vocative. New focus, contrastive focus, topic, theme and tail are relevant to the focus of our study and thus we present them in

[3]Moutaouakil's (1989) analysis is based on self-generated data.

[4]'The fundamental methodological principles of [Functional Grammar] are: a) [t]he basic function of language is that of an instrument of communication; b) [t]he purpose of linguistics is the description of the speaker's 'communicative competence'; [and] c) [l]inguistic description should achieve pragmatic, psychological and typological adequacy' (Moutaouakil 1989, P. 3). Since the focus of this section is to identify the categories of IS proposed by Moutaouakil (1989) and how they are expressed in the MSA sentence grammar rather than how they are analysed within a particular theoretic framework, his analysis formulated within Functional Grammar is not presented here.

this section.[5]

3.1.1.1 New Focus

Moutaouakil's (1989) notion of New Focus (which we call Information Focus §2.2.1) refers to an item that carries new information in the discourse. To evoke this discourse function, Moutaouakil (1989) uses the question-answer context. He claims that information focus is only realized in-situ in the syntax in MSA. This indicates that item(s) carrying information focus cannot be syntactically dislocated. The example (2) illustrates.

(2) a. /māḏa ʔakalta?/
what ate-2S
'What did you eat?'

b. /ʔakaltu [ṯarīd-an]$_F$/
ate-1SG tharid-ACC
'I ate tharid.' (ibid., P. 22)

c. *[ṯarīd-an]$_F$ ʔakaltu.
tharid-ACC ate.1SG
'It was tharid that I ate.' (ibid., P. 23)

Based on question-answer congruency (2), Moutaouakil (1989) shows that (2b) is felicitous to the question (2a). This is because the information focused item *ṯarīdan* 'tharid' in (2a) is syntactically realized in-situ. As for the answer in (2c), it is infelicitous to the question (2a) because the information-focused item *ṯarīdan* 'tharid' is realized ex-situ in the syntax. This suggest that MSA restricts information-focused item to be in-situ in the syntax.

[5] Vocative as a discourse function is referred to 'the entity addressed in a given discourse setting' (Moutaouakil 1989, P. 140). It is exemplified below

ii *[Zaydu]$_{Voc}$*, nāwilni ʔl-milḥa/
Zayd.NOM give-1SA the-salt.ACC
'Zayd, give me the salt'

Since the current thesis does not discuss vocative, how Moutaouakil (1989) analyzes vocative is left untouched here. The interested reader can consult Moutaouakil (1989, P. 139–152).

3.1.1.2 Contrastive Focus

Moutaouakil (1989) uses contrastive focus in the sense defined in §2.2.2. That is, a contrastive-focused item carries new information that stands in a contrastive relationship to another item. He claims that the contrastive-focused item is only realized at the left periphery of the clause in MSA. The example in (4) illustrates.

(3) a. ʔa Zayd-an ṣāfaḥta ʔam ᶜamr-an?
Q Zayd-ACC greeted-2SG or Amr-ACC
'Was it Zayd you greeted or Amr?' (ibid., P. 25)

b. /[Zayd-an]$_{CF}$ ṣafaḥtu/
Zayd-ACC greeted-1S
'It was Zayd that I greeted' (ibid., P. 24)

In (3b), *Zaydan* is contrastive focus by virtue of being embedded in the discourse context (4a) wherein the speaker of (3b) asserts to addressee that the only one he greeted is 'Zayd' and not 'Amr'. Since *Zaydan* is contrastive focus, it is realized at the left periphery of the clause.

Moutaouakil (1989) claims that there are three focus structures used in MSA to express contrastive focus. They are a) focus preposing, as in (3b) above, b) pseudo-clefting as in (4b) and c) 'negative-restrictive' construction as in (4c and 4d). .

(4) a. ʔa Zayd-an ṣāfaḥta ʔam ᶜamr-an?
Q Zayd-ACC greeted-2SG or Amr-ACC
'Was it Zayd you greeted or Amr?' (ibid., P. 25)

b. ʔal-laḏī ṣafaḥ-tu-hu [Zayd-an]$_{CF}$
the-one greeted1SG-him.3SM Zayd-ACC
'It was Zayd that I greeted.' (ibid., P. 24)

c. mā ṣafaḥ-tu ʔillā [Zayd-an]$_{CF}$
not greeted1SG but Zayd-ACC
'I greeted only Zayd.' (ibid., P. 24)

d. ʔinnamā ṣafaḥ-tu [Zayd-an]$_{CF}$
only greeted1SG Zayd-ACC
'I greeted only Zayd.' (ibid., P. 25)

Some of these focus structures recognized by Moutaouakil (1989) have been analysed syntactically by Ouhalla (1999b), Aoun et al. (2009) among others.

To sum up, contrastive focus forms an independent IS category in MSA. This is so because contrastive focus, unlike information focus (§3.1.1.1), is required to be realized either ex-situ in the syntax or to be expressed in one of the syntactic constructions in (4) above. However, it can never be realized in situ as discussed above.

3.1.1.3 Topic

Moutaouakil (1989) uses topic to refer to the entity about which the predication is made. He uses a question-answer context to evoke topic. The example in (5) illustrates.

(5) a. /matā raja^{c}a Zayd-un?/
when returned Zayd-NOM
'When did Zayd return?'

b. /raja^{c}a [Zayd-un]$_{T}$ ʔl-bāriḥata/.
returned Zayd-NOM yesterday.ACC
'Zayd returned yesterday.' (ibid., P. 69)

The item *Zaydun* is the topic of (5b) by virtue of being what the predication is about. Furthermore, he suggests that given information in MSA can be expressed by left dislocation[6] (i.e an item carrying given information is realized syntactically at the left periphery of a clause, and there is a pronoun realized internally in the clause referring back to the left-dislocated item). The example in (6) illustrates.

(6) [Zayd-an]$_{T}$ qābal-t-uh
Zayd-NOM met-1SG-him.3SM
'I have met Zayd.' (ibid., P. 78)

In (6), *Zayd* is the object of the predicate 'meet' and hence it is realized with an accusative marker (-an). This item is left-dislocated and the pronoun attached to the verb refers back to it.[7]

[6]This left-dislocation construction was first observed and drawn attention in literature by Ross (1967, PP. 422–451). Aoun et al. (2009, Ch. 8) uses the term 'Clitic-Left Dislocation Construction' to refer to left dislocation.

[7]It is not entirely clear whether *Zayd* is given information in (6). This is so because Mouta-

3.1.1.4 Theme

Moutaouakil (1989) uses theme to refer to the entity that 'specifies the universe of discourse with respect to which the subsequent predication is presented as relevant' (ibid., P. 102). He claims that theme in MSA is realized at the left-periphery of a clause and is morphologically associated with nominative-case marker[8] regardless of its syntactic/semantic function in the clause. Consider the following example.

(7) [Zayd-un]$_{\text{theme}}$, qabal-ta-uh.
Zayd-NOM met-1S-him.3SM
'Zayd, I met him.' (ibid., P. 105)

In (7), the theme *Zayd-un* is morphologically marked with nominative case although its syntactic/semantic function in the clause is patient. This 'theme' entity is realized at the left periphery of the clause, and there is a resumptive pronoun attached to the verb 'meet' referring back to it. He interprets this pronoun 'as an aspect of the relation of relevance which co-determines the choice of Predication rather than as a pronominal trace left behind by a Theme constituent moved to sentence-initial position' (ibid., P. 109). In this respect, the pronoun in (7) differs from the one realized in left dislocation as in (6) above.

In fact, Moutaouakil's (1989) analysis of theme is not at all clearly set out. Unfortunately, he does not provide us with a clear-cut evidence that this discourse function is evoked lexicogrammatically differently from, for example, a topic occurring in the left dislocation that functions as the agent of the predicate and hence would be marked morphologically with nominative case marker. Nevertheless, he is open about this problem of distinguishing topic from theme in some syntactic cases. He clearly states that 'the two functions [topic and theme] are often confused with each other' (ibid., P. 115).

ouakil (1989) does not, unfortunately, provide us with the context in which this structure could be embedded in so we can see clearly the contextual circumstances that lead item carrying given information in the discourse to be realized at the left-periphery of the clause with the presence of the pronoun realized internally in the structure referring back to it.

[8]Nominative-case marker (-un) indicates the agent of a predicate and hence it is not a discourse marker. Arabic in general does not have discourse marker used to indicate discourse functions such focus and topic as in some languages including Korean, Japanese and among others.

3.1.1.5 Tail

Moutaouakil (1989) uses tail to describe the entity that 'presents, as an 'afterthought' to the predication, information meant to clarify or modify it' (ibid., P. 124). He claims that tail is realized at the right periphery of the clause. In addition, there is a pronoun in the clause referring to it. Consider the following example.

(8) qaraʔtu kitābahu, [Zayd-un]$_{\text{Tail}}$
read-1S book.ACC-2SG Zayd.NOM
'I read his book, Zayd's that is.' (ibid., P. 123)

In (8), the tail *Zaydun* is realized sentence-finally; that is at the right periphery of the clause. The pronoun attached to the predicated 'read' refers to the tail item. Since the pronoun precedes its referent, the relation between the tail and the pronoun referring to it is cataphoric. In this respect, tail differs from theme (§3.1.1.4).

Unfortunately, Moutaouakil (1989) does not provide us with the context in which tail is clearly evoked, nor does he give a clear explanation why this item is realized at the right periphery of the clause if it is evoked in order to 'modify' the predication. Therefore, it is difficult to judge whether tail forms an independent IS category in Arabic in general.

3.1.2 Information Structure in Bahraini Arabic

Holes (2010) studies the relationship between IS and word order in Bahraini Arabic. His study is based on the data of Holes (2005) which consists of stories narrated by a Bahraini speaker who talked freely describing events taken place between the late 1920s to the 1970s.

Holes (2010) uses the notion of given vs. new information (§2.1). Through detailed examination of the data, he finds that new information can be expressed by prosodic prominence as in (9a), by focus preposing as in (9b) and by a pseudo clefting as in (9c). We use subscript NF to indicate new information.

(9) a. ḥmal-at-ni [ʔAL-ᶜABDA]$_{NF}$
carried-3FG-1SG the-black woman
'The black woman carried me.' (ibid., P. 63)

b. [isfar]$_{NF}$ nās yi-ẖayyit-ūn
mats people 3-sew-PL
'Some people sewed eating mats.' (ibid., P. 67)

c. illi i-yii [ᶜamm-i]$_{NF}$
REL 3M-comes uncle-GEN.1SG
'The one who came was my uncle.' (ibid., P. 71)

Furthermore, Holes (2010) finds that old information can be expressed by left dislocation as in (10a) and right dislocation as in (10b). We use the subscript GF to indicate given information.

(10) a. haay [kill-əh]$_{GF}$ akal-oo-h ʔal-ᶜaṣaafiir
DEM all-3MS ate-3PL-3MG the-birds
'The birds ate of all of this.' (ibid., P. 71)

b. heek-hi li-lḥiin mawjuud, [il-ġaafṣa]$_{GF}$
DEM-she until-now alive the-trickster
'She's still alive, the old trickster' (ibid., P. 70)

The main weakness of Holes's (2010) study is the use of given vs. new information. It is not clear whether he uses new information to refer to one or both of information focus (§2.2.1) and contrastive focus (§2.2.2).

3.1.3 Information Structure in Bedouin Najdi Arabic

Ingham (1982, 1986, 1994, 1995, 2010) studies many aspects of Najdi Arabic spoken in the centre of Saudi Arabia by the North Arabian Bedouin tribe *Rwalah*. In a recent study, Ingham (2010) investigates how IS is broadly expressed in this vernacular. His study is based on taped text published in Ingham (1995). He uses the notion of given vs. new information (§2.1).

Ingham (2010) finds that old information can be expressed by left dislocation as in (11a) and by right dislocation as in (11b).

(11) a. ḥinna [(a)baa^{c}ir-na]$_{GF}$ ma^{c}ağğil-iina-ha ṯalaaṯ ayyaam
we camels-1PL hobble.AP-PL-3.FS three days
'We will hobble our camels for three days.' (ibid., P. 79)

b. u hum ya-kisr-uun-hum, [aal m^{c}abhil]$_{GF}$
and 3PL 3-defeat-PL-3PL Aal M^{c}abhil
'And they defeated them, the Aal Mu^{c}abhil,'

i.e. 'The Mu^{c}abhil defeated the others.' (ibid., P. 78)

He also suggests that new information can be expressed by focus preposing . However, he does not provide a clear example.[9]

Like Holes's (2010) study, a major problem with Ingham's (2010) study is his use of notions of old vs. new information. It remains unclear whether new information mean information and/or contrastive focus.

3.1.4 Conclusion

This section gave an overview of how IS is expressed in word order in MSA, Bahraini, and Najdi Arabic. While the studies reviewed in this section did not give a clear picture of how IS is expressed in word order in Arabic, they partially

[9]He claims that focus preposing in Najdi Arabic can be with a referential pronoun as in (iii) below or without a referential pronoun. It is not entirely clear why and in which context this construction exhibits this syntactic property in this vernacular.

iii čaan-ih kill [ğeeš]$_{\imath NF}$ ẖwiyaa-k yi-ddii-h$_{\imath}$ ya-^{c}ṭii-ha hal-ih
was-3MS all camels companions-2SG 3MS-give-3MS 3MS-give-2FS owners-3MS
'(Even) if he gives back all the camels of your companions, gives them back to their owners.' (ibid., P. 81)

Furthermore, Ingham (2010) finds a syntactic construction in Najdi Arabic involving what he calls 'cognate topic', as exemplified in (9) below. He describes this construction as follow:

> '[it] occurs in which the topic is the verbal noun of verb occurring in the comment. In this structure the topic is in effect new information but is treated as though it is not, probably by the logic that the topic refers to something which would be expected in the context. It corresponds to such English structures as "as far as [...] ing is concerned". In this structure the fronted item is not definite and is not referred to in the comment by a referential pronoun. These structures are common in ordinary speech, but less common in narratives' (ibid., P. 80).

iv hawaaš haawaš-t-ih, kalaam kallam-t-ih
rebuking rebuke-1S-3MS speaking spoke-1S-3SM
'As far as rebuking is concerned, I have rebuked him; as far as speaking is concerned, I have spoken to him.' (Ingham 2010, P. 80).

substantiate the idea that an item carrying new information can be expressed by focus preposing or by a pseudo clefting whereas given information can be expressed by left dislocation or by right dislocation.

Moutaouakil's (1989) study showed that information focus and contrastive focus in MSA are distinguishable syntactically. That is, information focus is obligatorily realized in-situ whereas contrastive is realized ex-situ or by noncanonical syntactic constructions (4). This provides an evidence that contrastive focus is an independent and distinct IS category differing from information focus.

Since Holes's (2010) and Ingham's (2010) study use the notion of given vs. new information to analyse how IS is expressed in Bahraini and Najdi Arabic respectively, further work needs to be done to test whether contrastive focus is evoked differently from information focus. This would provide evidence that either confirms information focus and contrastive focus are distinguishable in these dialects or not.

The next section will outline previous studies on the prosodic effects of various aspects of categories of IS in various Arabic dialects.

3.2 Information Structure and Intonation: Arabic

Since about the middle of the twentieth century, an increasing amount of literature has suggested that intonation in Arabic contributes to the meaning of an utterance. The twentieth-century grammarian Ibrahim Anees[10] was the first Arab linguist to introduce 'intonation' to Modern Arabic Linguistics. He calls it موسيقى الكلام /musīqa al-kallām/ defined as:

> أن الإنسان حين ينطق بلغته لا يتبع درجة صوتية واحدة في النطق بجميع الأصوات ، فالأصوات التي يتكون منها المقطع الواحد ، تختلف في درجة الصوت وكذلك الكلمات قد تختلف فيها [. . .] ويمكن أن نسمي نظام توالي درجات الصوت

[10]He is well known today for his book titled *Al-Aswāt Al-lagawiah* 'The Sounds of Linguistics'.

بالنغمة الموسيقية

(Ibrahim Anees n.d., P. 103)

When a person utters a sentence from their own language, they do not utter it in a flat contour. A word that consists of one syllable may differ in its pitch and hence it may lead to different meanings. The change of the pitch is called ʔan-naġmah ʔal-musīqiyah 'musical tune' [my translation].

In his definition, Ibrahim Anees (n.d., PP. 142–143) explicitly suggests that a difference in pitch leads to a difference in discourse meaning in Arabic. Unfortunately, he does not provide either an analysis or a system to describe the Arabic intonational system.

Based on Ibrahim Anees's (n.d.) insight, the twentieth-century grammarian Tammam Hassān (1990, P. 164–170)[11] enriched the field of modern Arabic linguistics. He develops a description of the intonational system of *Fuṣha* 'Classical Arabic'. He describes intonation configurationally by using a system that contains four tones: high tone, low tone, invariant tone associated with stressed syllable and invariant tone associated with unstressed syllable. His description of intonation broadly follows the basic assumptions behind British School discussed in §2.4.[12] Although he proposes a system for describing *Fuṣha* intonation, he does not show empirically how this system describes the permissible contours in this languages.

Recently, Rifaat (2005) carried out a preliminary investigation of the intonational system of MSA. He analysed a limited number of sentences extracted from a 15-hour recording from two local radios which use MSA in their programmes. Based on his auditory impression, he finds that 'MSA has a simple intonation system, a system that is seemingly confined to the basic aspects of intonation: tendency of pitch accents to be accentuated, a basic declined trend line tune, as-

[11]He is well known today for his book titled *Manāhij Al-baḥṯ fī Alluġah* 'Language Research Methods'.

[12]Tammam Hassān conducted his MA and PhD on Phonetics at University of College London (1949, 1952). He was more likely to be influenced by the British School model of intonation.

sociation of non-final or continuation tunes with rising trend line or rising pitch accents, and a limited use of pitch accents span to denote 'focus" (ibid., P. 57). His study is revealing, but limited by the relatively small and non-representative nature of the data examined. In addition, his methodology for gathering MSA data is not clearly set out. Nevertheless he is open about this and presents objections to his methodology and analysis, as well as answers to them.

Having discussed Ibrahim Anees's (n.d.) insight, Tammam Hassān's (1990) system of intonation and Rifaat's (2005) experiment on MSA, I will now move on to present at length an overview of previous empirical experiments on the prosodic effects of various aspects of the categories of IS in various Arabic dialects.[13]

Relatively little work has investigated the prosodic effects of the categories of IS in Arabic dialects. Notable exceptions are the work of Chahal (2001), Hellmuth (2006), Phillips-Bourass (2012) and Yeou et al. (2007). However, these studies are small-scale and limited in terms of test materials used, speakers involved in the experiment and the number of categories of IS investigated. They provide interesting findings which partially support the relation between the categories of IS and intonation in Arabic. In this section, we give a brief overview of their methodology and their findings.

This section is structured as follows. Section 3.2.1 gives an overview of the study of Norlin (1989), Hellmuth (2005), and Hellmuth (2006) on various aspects of focus in Egyptian Arabic. Section 3.2.2 gives an overview of Chahal's (2001) study on the prosodic effects of focus in Lebanese Arabic. Section 3.2.3 gives an overview of Benkirane's (2000) and Phillips-Bourass's (2012) study on the prosodic effects of focus in Moroccan Arabic. Section 3.2.4 reviews a co-authored study on the prosodic encoding of contrastive focus in three Arabic dialects: Moroccan, Kuwaiti, and Yemeni. Section 3.2.5 concludes the section.

[13]There has been a growing interest in studying spoken varieties of Arabic, mainly because the data gathered from native speakers of these dialects are more reliable.

3.2.1 Egyptian Arabic

In this section, we review four empirical studies investigating whether and how information structure is expressed intonationally in Egyptian Arabic.

Norlin (1989) conducted a controlled experiment to investigate how focus in three different sentential positions, namely initial, medial, and final, differs prosodically from its counterpart in sentence-focus structure (i.e. neutral sentence). He used one target sentence made of five words, shown in (12) below. One native speaker of Cairo Arabic participated in the experiment whose task was to read the target sentence six times in each focus condition: with focus on the entire sentence, with focus on subject, with focus on verb, and with focus on object.[14]

(12) mu'ni:r il'marin 'rama lla'mu:n il'murr.
munir the-nimble threw the-lemon the-bitter
'the nimble Munir threw the bitter lemons'

He finds that the pitch range of the focused item is expanded, its F_0 is higher, the pitch range of the postfocus item(s), if any, is compressed, and the pitch range and the F_0 of the prefocus item(s), if any, remain neutral. These findings, while preliminary, suggest that focus is expressed intonationally in this vernacular. One major drawback of Norlin's (1989) study is that he does not define focus nor does he provide us with test materials (context) used for this IS category to be defined by the reader (cf. Hellmuth 2005, 2006)

Hellmuth (2005) conducted an experiment to investigate whether given information is deaccented in Cairene Arabic (cf. Cruttenden 2006b). She conducted production and perception experiments. She takes as a basis the work of Swerts et al. (2002) on Italian and Dutch, applying it to Cairene Arabic. Her test materials consist of two-word phrases and three-word sentences embedded in the contexts which evoke given information. In the production experiment, two male and four female native speakers of Cairene Arabic living temporarily in London participated. Results from the production experiment show that items carrying given

[14]Only the last five recordings from each focus condition were used in the analysis.

information are not deaccented. Results from the perception experiment confirm that the participants (one male and three female native speakers of Cairene Arabic) were unable to retrieve the discourse status of the test materials based on prosody. This leads Hellmuth (2005) to conclude that given information in Cairene Arabic is not signalled intonationally.

The third experiment was conducted by Hellmuth (2006) to investigate whether the notions of 'givenness' and 'contrast' are prosodically encoded in Cairene Arabic. She uses the notion of 'givenness' to distinguish between given information and new information in the discourse, and the notion of 'contrast' to distinguish between contrastive 'new' information (i.e. contrastive focus) and 'plain' new information (i.e. information focus). She used two lexically distinct SVO target sentences (13b) and (13a) embedded in short paragraphs. The target words are in boldface.

(13) a. **mama** bitnayyim **in-nounou** bil-layl.
mum put-to-bed the-baby at night
'Mum puts the baby to bed at night.'

b. **mama** bitit^{c}allim **yunaani** bil-layl.
mum learning Greek in-evening
'Mum is learning Greek in the evenings.'

In each focus condition, two key words (in boldface) in the target sentence (13b) and (13a) carry a discourse function (information/contrastive focus on subject and new/given information on object). Each paragraph was read three times by six participants.[15] She found that female participants expanded the pitch range of the contrastive focus and suppressed the postfocus item. However, taken male and female subjects together, she found that there was no statistically significant difference between the contrastive-focused item and its information-focused counterpart at sentence-initial position. Furthermore, she found that new/given-information status placed on object do not show any acoustic differences. Figure

[15]Hellmuth (2006) is reproduced as an article in Hellmuth (2010). Six participants (3 female and 3 males) participated in Hellmuth's experiment.

(3.1), (3.2), (3.3) and (3.4) from Hellmuth (2006, PP. 278–279) show F_0 contours below produced by a female subject across the four focus conditions. In the four figures, the subscript +F indicates contrastive focus, -F indicates information focus, +f indicates new information, and -f indicates given information.

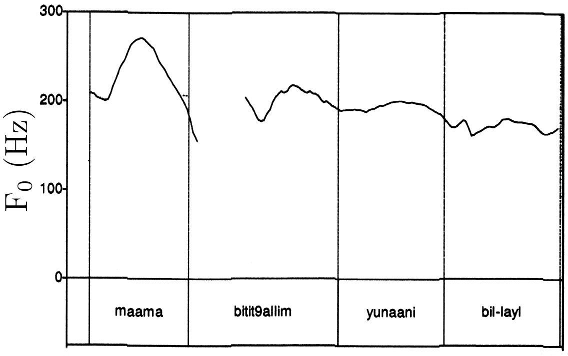


Figure 3.1: /[mama]$_{+F}$ bitit^{c}allim [yunaani]$_{+f}$ bil-layl/

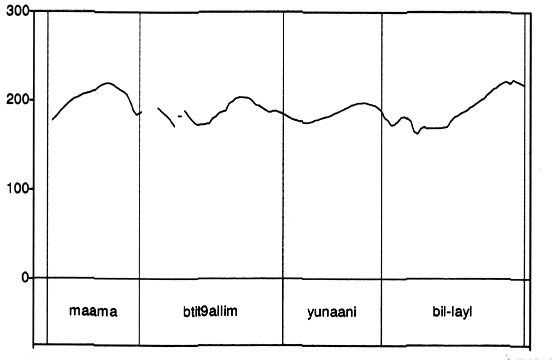


Figure 3.2: /[mama]$_{-F}$ bitit^{c}allim [yunaani]$_{+f}$ bil-layl/

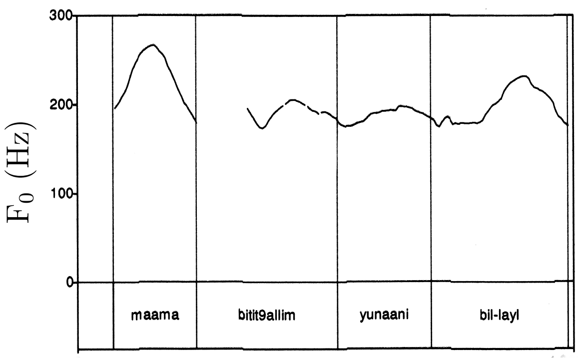


Figure 3.3: /[mama]$_{+F}$ bitit^{c}allim [yunaani]$_{-f}$ bil-layl/

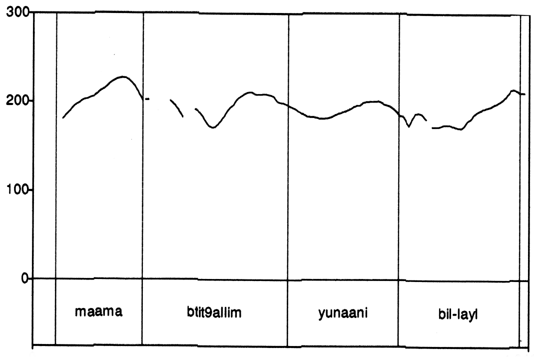


Figure 3.4: /[mama]$_{-F}$ bitit^{c}allim [yunaani]$_{-f}$ bil-layl/

Three of the more significant findings to emerge from this study are that (i) the female participants expanded the pitch range of contrastive focus more than its information-focused counterpart at sentence-initial position, and (ii) the pitch range of postfocus item occurring after contrastive focus is more compressed than its counterpart after information focus. The main weakness of this study is the test materials used in the experiment. Hellmuth (2006) fails to control the length of the short paragraphs used as test materials. Hellmuth's (2006) short paragraphs have different lengths. For example, the target sentence shown in Figure (3.1) above is embedded in 24-word paragraph and the same target sentence displaying different discourse functions shown in Figure (3.2) above is embedded in 12-word paragraph.[16] Therefore, making comparisons between these two focus conditions is not acoustically reliable. This is because studies on the prosodic encoding of information structure in languages show that the length of test material may affect F_0 height (see Wang and Xu 2011 and references therein). Hellmuth's (2006) study would have been more reliable if she had used short paragraphs having the same length in each focus condition. Another potential issue within her study is that the prosodic difference between given information and new information realized on the object (i.e. the sentence-penultimate item) cannot be reliably investigated because information/contrastive focus is realized on the sentence-initial item, and hence may prosodically affect the 'post-focus' pitch accent on given/new information.

The fourth experiment was conducted by Hellmuth (2011) to investigate whether contrastive focus placed sentence-medially is prosodically different from its information-focused counterpart in Cairene Arabic. She used two five-word ditransitive sentences (14a) and (14b) embedded in different paragraphs to elicit information focus and contrastive focus on the third word (in boldface). Each paragraph was read three times by six native speakers of Cairene Arabic (three females and three males).

(14) a. huwwa bijdarris [ʕarabi]$_T$ li-l-ʔaga:nib bi-l-lajl
he teaches Arabic to-the-foreigners in-the-evening
'He teaches Arabic to foreigners in the evenings'

b. hijja bitaʕmal [zalabja]$_T$ li-wila:d-i kull jo:m
she makes cake for-children-my every day
'She makes cake for my children every day'

She found that the pitch range of the contrastive focus is more expanded than its information-focused counterpart. In addition, she found that the pitch range of postfocus items occurring after contrastive focus was more compressed than their counterparts occurring after information focus. These findings are observed in Figure (3.5) and (3.6) below.

[16]For the Arabic version of Hellmuth (2006)'s short paragraphs used in her experiment, see Hellmuth (2006, Appendix D, P. 342).

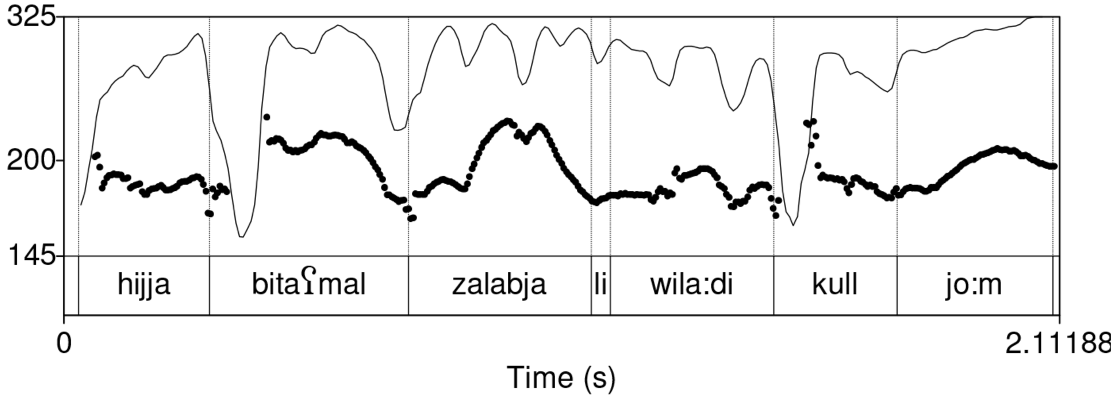


Figure 3.5: /zalabja/ is contrastive focus. Pitch trace is shown in bold and intensity curve with a thin line. (Female Participant) (Hellmuth 2011, Fig. 7)

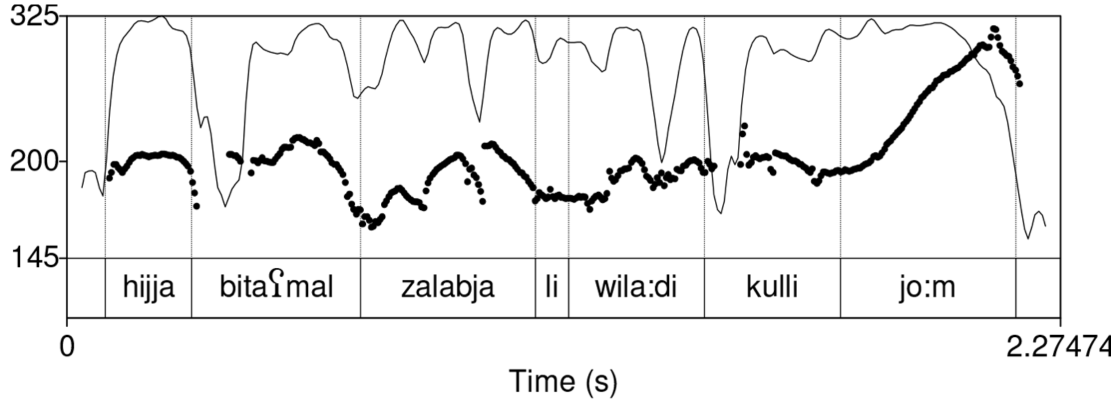


Figure 3.6: /zalabja/ is information focus. Pitch trace is shown in bold and intensity curve with a thin line. (Female Participant) (Hellmuth 2011, Fig. 8)

To sum up, this section has given an overview of previous four experimental studies Norlin (1989), Hellmuth (2005, 2006, 2011) in Cairene Arabic. The evidence from these prior studies suggests that (i) contrastive focus is realized with more expansion of pitch range, (ii) the pitch range of the postfocus item (i.e. after contrastive focus) is compressed, and (iii) given information is not de-accented but rather it is found to be realized with a pitch accent. All the studies reviewed so far, however, have a number of limitations. First, they are small scale studies. The number of participants in these experiments are relatively small. Second, the question of whether contrastive focus prosodically differs from its counterpart in the sentence-focus utterance which is assumed widely to produce neutral intonation is unanswered.

3.2.2 Lebanese Arabic

Chahal (2001) examines the prosodic encoding of information focus compared with its counterpart in sentence-focus utterance in three different sentential positions: initial, medial, and final, in Lebanese Arabic spoken in Tripoli. The test sentence used is of the form /*X hamet Y min Z*/ 'X protect Y from Z'. X, Y and Z are filled with proper names /lama/, /muna/, and /lima/.

The target sentence is embedded in four question-answer contexts to elicit sentence-focus utterance, focus on subject, focus on direct object, and focus on indirect object, as displayed in Table 3.1 below. Each answer in each focus condition was read three times in five recording sessions by three Lebanese subjects: two females and one male.

Focus Condition	**Prompt Question**	**Translation**
Broad Focus	shuu Saarel yoom ?	'What happened today?'
Narrow focus on X	miin Hama Y min Z ?	'**Who** protected Y from Z?'
Narrow focus on Y	X Hamet miin min Z ?	'X protected **whom** from Z?'
Narrow focus on Z	X Hamet Y min miin ?	'X protected Y from **whom**?'

Table 3.1: Test Materials (ibid., P. 144).

She finds that when the information-focused item is in the sentence-initial position, participants produced two different F_0 contours. First, the focused item forms its own phrase and the remaining parts of the utterance forms a separate phrase, as in Figure 3.7 below. Second, the entire utterance is realized with one intonational phrase wherein the focused item in the sentence-initial position is produced with the nuclear pitch accent, and the pitch accents of the remaining parts are deaccented, as in Figure 3.8.

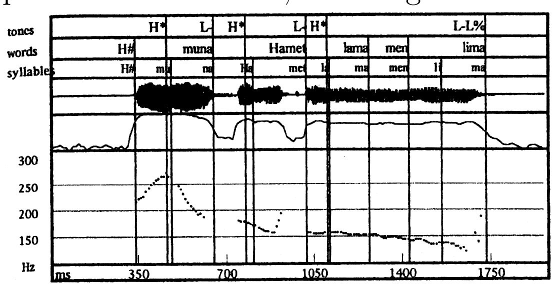


Figure 3.7: /[muna$_{\mathrm{F}}$]$_{\mathrm{IP}}$ [Hamet lama men lima]$_{\mathrm{IP}}$/

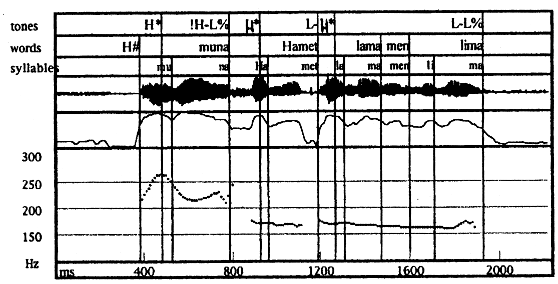


Figure 3.8: /[muna$_{\mathrm{F}}$ Hamet lama men lima]$_{\mathrm{IP}}$/

Furthermore, she finds that when the focused item is the sentence-medial position, the entire sentence was produced with one intonational phrase wherein the focused item was produced with the nuclear pitch accent, the pre-focus items were found to be optionally pitch-accented, and the post-focus items are deaccented. This is shown in Figure 3.11 and 3.10 below.

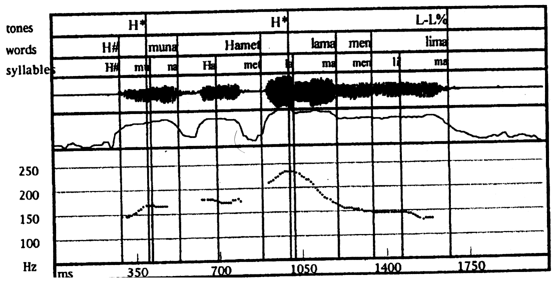


Figure 3.9: /muna Hamet lama$_{\mathrm{F}}$ men lima/: with prefocused pitch accent.

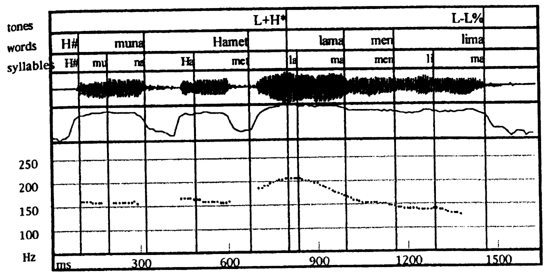


Figure 3.10: /muna Hamet lama$_{\mathrm{F}}$ men lima/: with prefocus deaccentuation.

When the focused item is in the sentence-final position, she finds that the entire sentence was produced with one intonational phrase wherein the focused item was produced with the nuclear pitch accent, and the pre-focus item were either produced with pitch accents as in Figure Figure 3.11 or with deaccentuation as in Figure 3.12 below.

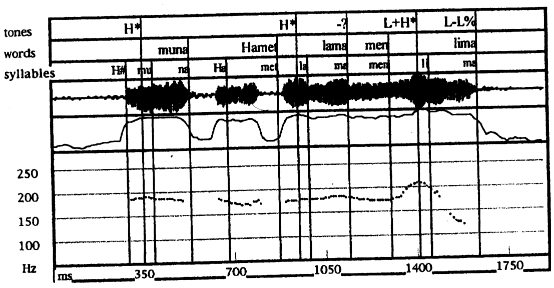


Figure 3.11: /muna Hamet lama men LIMA$_{\mathrm{F}}$ /: with prefocused pitch accent.

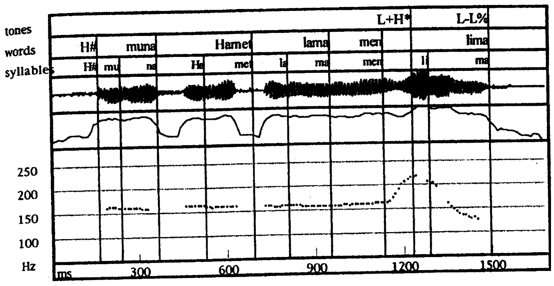


Figure 3.12: /muna Hamet lama men LIMA$_{\mathrm{F}}$/: with prefocus deaccentuation.

Chahal (2001) supports her phonological observations with a phonetic analysis.She finds that the word in focus was produced with more expanded pitch range, higher F_0 and higher intensity, compared with its counterpart in sentence-focus structure (i.e. neutral sentence). She also finds that the prefocus region, if any, and post-focus, if any, are realized with pitch range compression. She terms these phonetic findings the 'hyperarticulation' of focussed words accompanied by under-articulation of nonfocus words, following Lindblom (1990).

In short, Chahal's (2001) study has many advantages. First, she used test materials in question-answer format which make focused item clearly stand out. Another advantage is that only one item in a target sentence carries focus at a time. This leads the prosodic encoding of focus to be determined reliably. A number of possible future studies using the same experimental set up are apparent. First, it would be interesting to investigate (i) whether and how contrastive focus differs prosodically from information focus, and (ii) whether and how contrastive focus differs prosodically from its counterpart in the sentence-focus utterance.

3.2.3 Moroccan Arabic

Benkirane (2000) conducted an experiment investigating the intonational system of Moroccan. Eight native subjects participated in the experiment. Subjects were shown a card on which the target sentence is written. They were asked to memorize the written target sentence. Then, they were asked to pronounce the memorized sentence without looking at the card and without pauses, too. The main aim of Benkirane's (2000) study is to provide a preliminary account of Moroccan intonation. From the data gathered, he found that what he calls 'focalization' is realized with a higher F_0 and the postfocus items are realized with deaccentuation. Unfortunately, Benkirane (2000) does not define what he means by focalized item, nor does he provide us with the context/test materials used in the experiment to determine what this term means.

Phillips-Bourass (2012) conducted an experiment to investigate the prosodic effects of information focus realized in predicate-focus structure and argument-focus structure (with single information-focus simple constituent) in Moroccan. She used one target sentence /lgzzar drab zzarbiya/ 'The butcher hit the rug' embedded in the question-answer contexts to trigger three focus structures: sentence-focus condition (neutral sentence), predicate-focus condition, and argument-focus condition with 'single' information focus on the sentence-initial item and with 'single' information focus on the sentence-final item. Fifteen Moroccan Arabic speakers from Fez and surround areas participated in the experiment.

Phillips-Bourass (2012) found that when information focus is placed on subject at sentence-initial position, the peak of the nuclear pitch accent is realized on the immediate following verb. Furthermore, she found that the postfocus items are pitch-accented. This finding contrasts with that of Benkirane (2000) who found that Moroccan Arabic displays postfocus deaccentuation. These two observations are shown in Figure 3.13 below taken from Phillips-Bourass (2012).

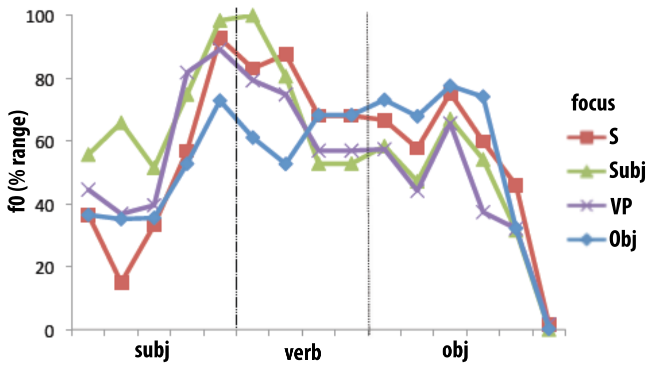


Figure 3.13: F_0 contour produced by one Moroccan speaker

Furthermore, Phillips-Bourass (2012) found that when the predicate of the clause is focused, the entire clause is realized with two boundary phrases. That is, the subject forms the first phrase boundary, and the verb with its complement forms the second phrase boundary, as shown in Figure (3.14) below. When the object is focused, she found that the whole sentence is realized with three phrase boundaries. That is, the subject forms the first phrase boundary, the verbs forms the second phrase boundary, and the focused object forms the third phrase boundary, as shown in Figure (3.15) below.

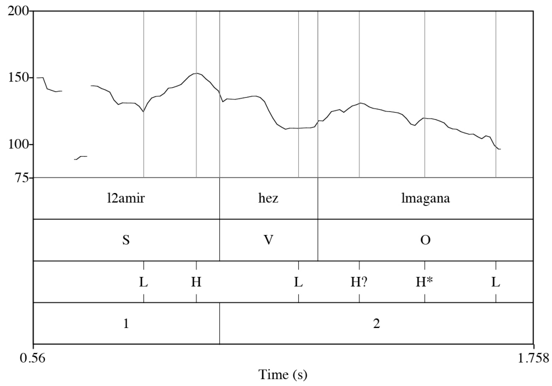


Figure 3.14: 2 phrases, VP focus (Phillips-Bourass 2012)

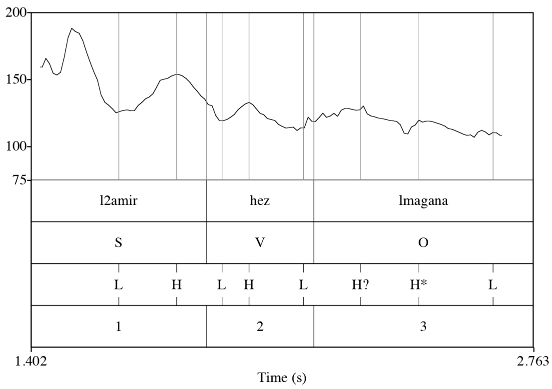


Figure 3.15: 3 phrases, Obj focus (Phillips-Bourass 2012)

Although Phillips-Bourass's (2012) study is very limited in terms of the test materials used and the number of subjects employed in the experiment, it raises interesting findings which are, to some extend, different from the findings obtained for Lebanese Arabic (§3.2.2) and Egyptian Arabic (3.2.1). First, Phillips-Bourass's (2012) finding suggests that focus in Moroccan is encoded via peak alignment, dephrasing, and possibly pitch range expansion. As she notes, when the focus item is the sentence-initial item, the peak of the accent is aligned with the immediate following item which is the case in sentence-focus structure as shown clearly in Figure 3.13 above. Furthermore, when the focus is in the sentence-final position, the phrase of the entire sentence is re-structured. The final point is that when the focus is in the sentence-final item, it is produced with more expanded pitch accent.

3.2.4 Moroccan, Yemeni and Kuwaiti Arabic

Yeou et al. (2007) conducted an experiment to investigate the prosodic effects of contrastive focus placed in the sentence-penultimate item in Moroccan, Yemeni and Kuwaiti Arabic. They use one target sentence of the form /ʒabt m(a)^{c}aha X lbarħ/mbariħ/ 'She came with her X yesterday' in which X is replaced with a proper name including /ḥali:m/, /sali:m/, /ʔami:n/, /mimu:n/, /ğali:l/, /ḥali:ma/, /sal:ma/, /ʔami:na/, /mimu:na/, and /ğali:la/. They used the question-answer context of the form 'Did she come with Mohamed yesterday?' to trigger contrastive focus on the sentence-penultimate item. Five subjects (three males and two females) from each dialect participated.

They found that contrastive focus is associated with the nuclear pitch accent of the sentence across the three dialects. It has been found that the peak of the nuclear accent is aligned with the stressed syllable of the contrastive focus as shown in the three figures below. Furthermore, they found that the prefocus items are realized with deaccentuation in Moroccan, as shown in Figure 3.16); however, the prefocus items are pitch-accented in Yemeni and Kuwaiti as shown Figure 3.17 and 3.18 respectively. Interestingly, they found that the postfocus item is deaccented across the three Arabic dialects.

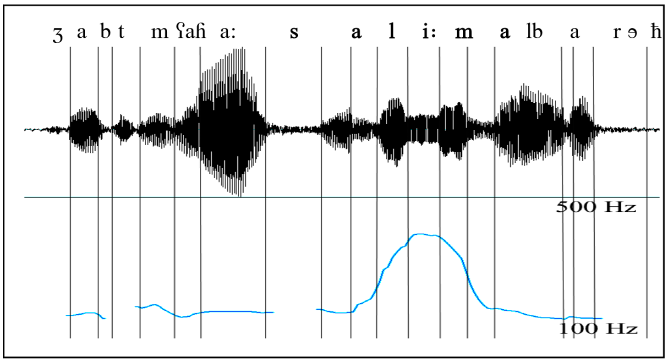


Figure 3.16: /ʒabt m(a)^{c}aha sali:ma lbarəħ/ (Moroccan).

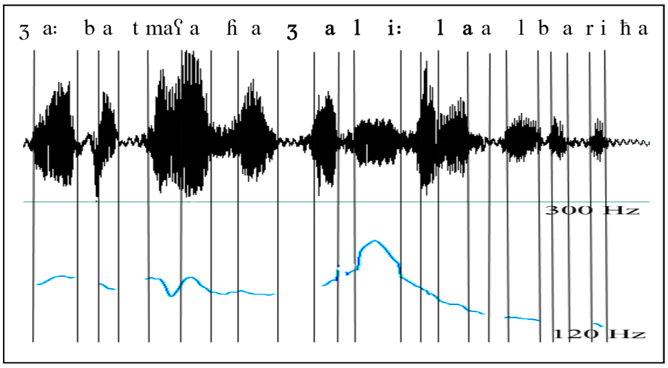


Figure 3.17: /ʒabt m(a)^{c}aha ʒali:la albariħa/ (Yemeni).

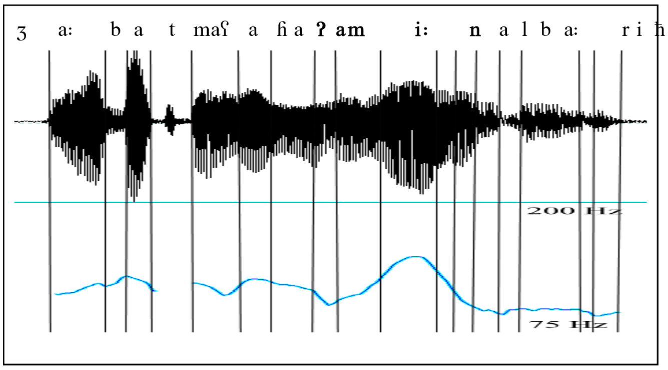


Figure 3.18: /ʒabt m(a)^{c}aha ʔami:n alba:riħ/ (Kuwaiti).

Yeou et al. (2007) support their phonological analysis with a phonetic analysis. They find that the pitch range of the contrastive focus is statistically more expanded than its counterpart in sentence-focus structure in Moroccan and Kuwaiti Arabic. However, the difference between contrastive focus and its counterpart in sentence-focus structure is not statistically significant in Yemeni. More interestingly, they find that contrastive focus is statistically significantly longer than its counterpart in all the three Arabic dialects.

Yeou et al.'s (2007) finding in Moroccan Arabic is in agreement with Benkirane's (2000) finding which shows that the postfocus item is deaccented. However, this finding contrasts with Phillips-Bourass's (2012) study which shows that the postfocus item is not deaccented. A possible explanation for this difference is that what Benkirane (2000) calls 'focalization' might refer to 'contrastive focus' and not to 'information focus' examined by Phillips-Bourass (2012).

3.2.5 Conclusion

This section gave an overview of the previous experimental work on the prosodic effects of various aspects of the categories of IS. Although these studies show differences in their results, they provide a clear evidence that the IS categories has effects on the global intonational patterns of the Arabic sentence in general. We summarize the findings as follows. Focus in Arabic dialects reviewed so far display these prosodic properties:

(15) a. appearance in a higher pitch range in Lebanese. Egyptian, Moroccan, Yemeni, and Kuwait;

b. peak is aligned with the following immediate item (in Moroccan when focus is in the sentence-initial position);

c. appearance in a longer duration (Lebanese, Moroccan, Yemeni, and Kuwait);

d. deaccenting prenuclear pitch accents when focus is in the non-initial sentential position (Lebanese and Moroccan);

e. compressing the postnuclear pitch accents when focus is in the non-final sentential position (Lebanese, Egyptian, Moroccan, Yemeni and Kuwait);

f. appearance in a higher F_0 (Lebanese); and finally

g. appearance in a higher intensity (Lebanese).

The prosodic effects of focus (15) show clearly that there is no 'default' pitch accent has been found to be produced mainly with focused item across all the dialects reviewed so far. This makes Arabic dialects to be different from, for example, English which has been claimed that information focus is produced with [H*] whereas contrastive accent is produced with [L+H*] (§2.4.1). However, the findings summarized in (15) show clearly that prosodic effects of the categories of IS across Arabic dialects are different. In Chapter six and seven, we will report our phonological and phonetic analyses of the prosodic effects of the categories of IS information focus, contrastive focus and topic, which will show the prosodic effects of the categories of IS in HA and then we make comparisons with the phenomena described for this dialect and those of the Arabic dialects reviewed in this section. The next section concludes the chapter.

3.3 Conclusion

This chapter gave an overview of how IS is expressed in word order and also in intonation in various Arabic dialects including MSA. In §3.1.1, contrastive focus in MSA has been showed to display particular syntactic characteristics which distinguish it from information focus. This provides evidence that information focus and contrastive focus are separate and independent categories of IS in MSA. This chapter also showed that across Arabic dialects reviewed so far *a*) new information can be expressed by focus preposing and *b*) old information can be expressed by left dislocation.

Section 3.2 gave an overview of prior work on the empirical investigation of prosodic effects of various aspects of the categories of IS, in particular focus. As had been noted, all the previous studies focused, to some extent, on the prosodic effects of focus. The studies reviewed so far show clearly that the prosodic effects are not identical across Arabic dialects. The findings had been summarized in the preceding section which show that focus has not only effects on the word in focus, but also on pre-focused item(s) and post-focus item(s). This suggests that the global intonational patterns of an Arabic sentence is affected when there is an item carrying the focus discourse function.

The next chapter will provide an analysis of the interaction between IS and word order in HA. Furthermore, it will identify the categories of IS and show they are evoked in HA sentence grammar. In the next chapter, comparisons will be made between the phenomena described for HA and those of Arabic dialects reviewed in this chapter. This is to identify the similarities and also the differences between HA on the one hand and the Arabic dialects reviewed so far on the other.

Chapter 4

Hijazi Arabic

Information Structure (IS) plays an important role in the grammar of HA. Sieny (1978), which is to my knowledge the only study on HA, studies the grammar of HA within the Tagmemics framework (Cook 1969). He suggests that IS plays a key role in determining word orders. However, far too little attention has been paid to HA grammar in general and the role of IS in this dialect in particular. This thesis aims to investigate whether and how the categories of IS interact with intonation in HA. In this chapter, we will provide a systematic overview, description and investigation of what the categories of IS are in HA declarative sentences and show how these categories are expressed by adapting methodology that allows cross-linguistic comparison of the data. But before that, we need to introduce briefly some characteristics of HA. This is to familiarize the reader with some basic facts about HA which will be needed for the rest of this thesis.

Section 4.1 briefly introduces the locality where HA is spoken. Section 4.2 provides a brief discussion of what seems to determine word order in HA declarative sentences. Section 4.3 first identifies the categories of Focus proposed in HA and then demonstrates how they play a role in the grammar of HA. Section 4.4 introduces two phonological aspects in HA including syllable structures, and lexical-stress system that will be crucial for the remaining part of our thesis. Section 4.5 concludes the chapter.

4.1 Locality

HA is one of the major dialects spoken in Saudi Arabia[1] (Omar 1975, P. v). Hijazi is a geographical term denoting the area occupying the west and north-west of Saudi Arabia, as shown in the map of Saudi Arabia in Figure 4.1 below.

Figure 4.1: Saudi Arabia. Hijazi Region is highlighted in white.

HA has two main dialects: Bedouin and Urban HA. Bedouin HA is spoken by those who live in the countryside. Broadly, urban HA is spoken in the cities of Makkah, Madinah, Jeddah and Taif.

HA grammar has received little attention in the literature. There are a few studies investigating some linguistic aspects in this dialect. For example, Sieny (1978) studies the syntax of basic constructions in HA within the Tagmemics framework (Cook 1969). Other studies including Al-Mozainy (1981), Jarrah (1993) and Abaalkhail (1998) investigate phonological aspects related to lexical phenomena such as vowel alternation and syllabification. As far as I am aware, no studies have yet investigated how IS is expressed in one or both of word order or intonation in this dialect.

Since there is no 'lingua franca' of HA, this thesis studies the urban HA variant that is spoken in Taif city. When I describe or claim something for HA in this thesis, I refer to Urban Hijazi Arabic spoken in Taif. Before proceeding to

[1]The other two major dialects are Najdi spoken in the centre of Saudi Arabia, and Sharqi spoken in the west of Saudi Arabia.

examine what determines word order in HA, it will be necessary to describe the methodology adopted to elicit the categories of IS in HA declarative sentences.

Following much previous research (Steedman 1991a, 2000, Rooth 1992, 1996, Vallduví 1993, Lambrecht 1994, Choi 1999b, Büring 1999, Kiss 1998, Schwarzschild 1999, Kadmon 2000, Krifka 2007), we employ the heuristic of question-answer congruence to evoke the categories of IS in HA. Jelinek and Carnie (2003) explicitly point out that '[t]he question/answer context is very revealing about Information Structure across languages' (ibid., P. 285). Adapting this method to elicit and study the categories of IS in this dialect allows cross-linguistic comparison. The grammaticality judgements of the data provided in this thesis were tested by informants of both sexes (ages range from 25 to 35 years old) who are native speakers of urban HA spoken in Taif.

4.2 Word Order

Like other Arabic varieties, HA is a null-subject language in which *subject* can be omitted under some information-structural conditions[2]. This section aims to investigate what determines word order in HA.[3] In order to fulfil this aim, we need to find answers to the following research questions: (i) Is word order in HA declarative sentence determined by grammatical functions and/or by thematic roles?, and (ii) What is the basic word order in a HA declarative sentence?

We find that word order in HA declarative sentences is not determined by

[2]When the grammatical function Subject plays a topic role in the discourse (i.e. referring to an entity which the predication is about (cf. Lambrecht 1994)), it can be deleted phonologically as shown below.

(i) a. A: waš ʔaḫbār ᶜali?
How news Ali
'How is Ali??'

b. B: mabsūṭ.
fine
'Ali is fine.'

[3]As was pointed out in Chapter 1, we are only concerned with declarative sentences, leaving the word order in HA questions to be aside. How a HA question is formed, to my knowledge, has not be studied yet. The issue of question formation in HA is an intriguing one which could be usefully explored in future research.

grammatical functions or by thematic roles. It is triggered by pragmatic factors. A piece of evidence that confirms our finding is that HA manifests VO, VSO, SVO and VOS word order as shown respectively in (1).[4]

(1) a.

	ʔakal	ʔat-tufāḥa.
	eat.PFV.3SGM	the-apple
	Verb	*Object*

‘He ate the apple.’

b.

ʔakal	ʔali	ʔat-tufāḥa.
eat.PFV.3SGM	Ali	the-apple
Verb	*Subject*	*Object*

‘Ali ate the apple.’

c.

ʔali	ʔakal	ʔat-tufāḥa.
Ali	eat.PFV.3SGM	the-apple
Subject	*Verb*	*Object*

‘Al ate the apple.’

d.

ʔakal	ʔat-tufāḥa	ʔali.
eat.PFV.3SGM	the-apple	Ali
Verb	*Object*	*Subject*

‘Ali ate the apple.’

These word order variations shown above are common in HA. Other word orders such as OVS and OSV are also possible and common. The verbs in the examples in (2a) and (3a) host a pronominal clitic (in boldface) referring back to the element realized in initial position. As for the verb in (2b) and (3b), it does not host a pronominal clitic referring back to the left-realized item.

(2) a.

ʔat-tufāḥa	ʔakal-**ha**	ʔali.
the-apple	ate.3SGM-it.SGM	Ali
Object	*Verb*	*Subject*

‘The apple, Ali ate it.’

[4]In HA, they are three tenses: past, present and future expressed by two different stem forms: perfective (PFV) and imperfective (IPFV). In the perfective (PFV) form, the verb displays agreement morphology as suffixes, whereas in the imperfective form the verb displays agreement as both prefixes and suffixes (Sieny 1978). In this dialect, there is a progressive aspect marker *bi-* attached to the verb as a prefix (see Sieny 1978, Alzaidi 2010, for examples and more discussion on various aspects of HA syntax).

b.

ʔat-tufāḥa	ʔakal	ʔali.
the-apple	ate.3SGM	Ali
Object	*Verb*	*Subject*

'The apple, Ali ate.'

(3) a.

ʔat-tufāḥa	ʔali	ʔakal-**ha**.
the-apple	Ali	ate.3SGM-it.SGM
Object	*Subject*	*Verb*

'The apple, Ali ate it.'

b.

ʔat-tufāḥa	ʔali	ʔakal.
the-apple	Ali	ate.3SGM
Object	*Subject*	*Verb*

'The apple, Ali ate.'

I have chosen to show these word order variations in order to show that word order in this dialect is not determined by grammatical functions or by thematic roles. However, these variations in word order serve pragmatic functions. This is not surprising indeed because Li and Thompson (1976) classify Arabic in general among with other languages including Chinese to be a topic-oriented language in which grammatical functions plays a very little role in determining word order.

Like HA, MSA manifests VO, VSO, SVO and VOS word order. These are shown respectively in (4) below.

(4) a.

zāra	ᶜamr-an.
visited.3SGM	Omer-ACC
Verb	*object*

'He visited Omer.'

b.

zāra	ʔali-un	ᶜamr-an.
visited.3SGM	Ali-NOM	Omer-ACC
Verb	*Subject*	*Object*

'Ali visited Omer.'

c.

ʔali-un	zāra	ᶜamr-an.
Ali.NOM	visited.3SGM	Omer-ACC
Subject	*Verb*	*object*

'Ali visited Omer.'

d.

zāra	ᶜamr-an	ʔali-un.
visited.3SGM	Omer.ACC	Ali.NOM
Verb	*Object*	*Subject*

'Ali visited Omer.'

In addition, OVS and OSV word order are permissible in MSA. The verb in (5) host a clitic (in boldface) referring back to the left-realized object. As for the verb in (6), it does not host a clitic referring back to the left-realized object.

(5) a.

ʔali-an	qābala-**hu**	ʔamr-un.
Ali.ACC	met.3SGM-him.3SGM	Omer-NOM
Object	*Verb*	*Subject*

'Ali, Omer met him.'

b.

ʔali-an	ʔamr-un	qābala-**hu**.
Ali-ACC	Omer-NOM	met.3SGM-him.3SGM
Object	*Subject*	*Verb*

'Ali, Omer met him.'

(6) a.

ʔali-an	qābala	ʔamr-un.
Ali-ACC	met.3SGM	Omer-NOM
Object	*Verb*	*Subject*

'Ali, Omer met.'

b.

ʔali-an	ʔamr-un	qābala.
Zayd-ACC	OmerNOM	met.3SGM
Object	*Subject*	*Verb*

'Ali, Omer met.'

Variations in word order shown above indicate that word orders in HA and MSA are not determined by grammatical functions or by thematic roles.[5] However, HA and MSA differ in a number of respects. One of the differences that is relevant to our discussion here is that HA does not use case markers indicating, for example, nominative or accusative whereas MSA shows morphological patterns of case marking including nominative (-un) and accusative (-an), as shown in examples (4, 5 and 6). Overt case endings used in MSA help listeners to process examples like (4d, 5 and 6). In contrast, HA has lost some of the inflectional features including case markers and hence HA listeners face cognitive difficulties to process examples like (7) below without appropriate discourse contexts.[6] This is

[5] Word order in MSA has been investigated by Moutaouakil (1989) and presented briefly in §3.1.1.

[6] The example in (7) above raises an interesting question: Does intonation help to differentiate thematic roles in cases like in (7) in HA? It would be interesting to investigate this, but this is beyond the score of this thesis, and I leave it for future research.

so because examples exhibiting these word orders OSV, OVS would be ambiguous between two readings: SVO or OVS, as shown in (7) below.

(7)

ḫālid	Zayd	qābal.
Khaled	Zayd	meet.3SGM
Subject/Object	*Subject/Object*	*Verb*

'Zayd met Khaled' or 'Khaled met Zayd'

As regards basic word order, HA, like other Arabic varieties, shows both VSO and SVO as typically common word orders (Sieny 1978). Determining whether SVO or VSO should be considered the basic word order in HA is complex. This is because little research has been conducted to investigate word order in this dialect. In his analysis of HA syntax, Sieny (1978) assumes SV(O) to be the basic word order. In this brief introduction to HA word order, it is not an easy task to test whether SV(O) is a basic word order in HA. A large and growing body of literature has investigated how basic word order is determined in a given language. For example, McCawley (1970) and Hawkins (1983) assume that the basic word order in a language is the the one that permits the simplest overall syntactic description including the least morphological marking. This criterion cannot be used to determined the basic word order in HA. This is because HA, for example, shows full subject-verb agreement in both VSO and SVO word order, as shown in (8) below. Therefore, whether SVO or VSO is a basic word order in HA cannot be determined based on 'least-morphological-marking criteria'.

(8) a.

ʔaḥmad	rāḥ.
Ahmad	go.3SM-PFV
Subject	*Verb*

'Ahmad went.'

b.

rāḥ	ʔaḥmad.
go.3SM-PFV	Ahmad
Verb	*Subject*

'Ahmad went.'

c.

Līna	rāḥ-at.
Lina	go-3SF-PFV
Subject	*Verb*

'Lina went.'

d. rāḥ-at Līna.
go-3SF-PFV Lina
Verb *Subject*
'Lina went.'

Another criterion proposed by Haspelmath (2006) to identify a basic word order in a language is called 'Distributional-markedness', defined in (9) below.

(9) **Distributional markedness**: 'If a word order A occurs in restricted environments, and a word order B occurs elsewhere, word order B is unmarked. Word order B is the default word order' (ibid., P. 36).

This criterion basically states that the basic word order in a language is the one that occurs in most numbers of syntactic constructions. This criterion has been used by Comrie (1989) to determine what the basic word order in French dialects. He shows that SVO word order occurs in main, subordinate and relative clause whereas VSO occurs only in question. Since SVO has the widest distribution in French dialects, he takes it to be the basic word order. There has been little agreement on how basic word order in a language is determined (Mithun 1992). Unfortunately, determining whether SVO or VSO is a basic word order in HA is outside the scope of this thesis, but it would be an interesting topic for future research.

In order to avoid discussing syntactically what the basic word in HA is, we, following Vallduví (1993), Choi (1999a), Kirk (2012), among others, in assuming that a sentence-focus structure is the neutral clause. That is, a declarative sentence that can be pragmatically felicitous to be a broad question such as 'what-happened?' question is neutral and hence it is predicted to exhibit neutral word order and neutral intonation, too (Gussenhoven 1984, Hayes and Lahiri 1991, Féry 1993, Selkirk 1995, Ladd 1996, 2008). We also, following Sieny (1978), assume that this neutral sentence is in SV(O) word order.[7] However, what makes this

[7]Sieny (1978) investigates several aspects of syntactic phenomena in HA and assumes that the basic word order is SV(O). It would be interesting if Sieny's (1978) assumption is tested to determine whether SV(O) can occur in the greatest number of different syntactic constructions. But this is beyond the scope of this thesis, and I leave this topic for future research.

sentence neutral in this thesis is its pragmatically *neutral* interpretation and not only its word-order realization.[8] This is in contrast with that of Sieny (1978) who assumes SV(O) to be the basic word order based on his syntactic assumptions. More precisely, we define a neutral declarative sentence as:

(10) **Neutral Declarative Sentence**: A declarative sentence $\mathscr{S}$ is neutral iff it is in SVO word order and it is pragmatically felicitous as an answer to a broad question $\mathscr{Q}$.

To summarize, this section showed that HA word order is not rigid and in addition is not determined by grammatical functions or by thematic roles. HA word orders vary to convey pragmatic functions. Based on this claim , we will investigate what the categories of IS are and how they are evoked in HA in the next section.

4.3 Information Structure in HA

This section will identify and define the categories of IS in HA, based on Lambrecht's (1994) framework (§2.1.1). As explained, this framework is neutral in its assumptions and widely accepted. As presented in §2.1.1 in detail, Lambrecht's (1994) framework is based on two concepts defined in (11) below.[9]

[8]Taking the neutral declarative statement to be in SVO word order does not present a challenge to the analysis of HA information structure. This is because SVO is considered as pointed out to be a typical common word order in HA (Sieny 1978). In his recent study, Holes (2010) who broadly studies word order in Gulf Arabic (i.e. those Arabic dialects that are spoken in Arabian Peninsula including Saudi dialects) points out that VSO and SVO word order are commonly used. The Sixth Language Universal principle proposed by Greenberg (1963) states explicitly '[a]ll languages with dominant VSO have SVO as an alternative or as the only alternative basic order' (ibid., P. 79). Based on the corpus data, Brustad (2000) points out that SVO and VSO word orders are both considered to be basic word order in Syrian, Egyptian, Moroccan and Kuwaiti Arabic. However, there are studies on word order on Arabic dialects assuming that the basic word order is SVO word order. Such an assumption is proposed by El-Yasin (1985) who assumes SVO to be the basic word order in Jordanian Arabic. More broadly, Kaye (1990) considers Arabic dialects to be basically SVO languages. These studies and others provide a supporting argument that assuming SVO word order to be exhibited in a neutral declarative statement in the subject language HA is not problematic for our analysis of information structure.

[9]These concepts have been discussed in detail in §2.1.1, therefore, they are not re-discussed here for space limit.

(11) a. Pragmatic Presupposition

'the set of propositions lexicographically evoked in a sentence which the speaker assumes the hearer already knows or is ready to take for granted at the time the sentence is uttered'

b. Pragmatic Assertion

'the proposition expressed by a sentence which the hearer is expected to know or take for granted as a result of hearing the sentence uttered' (ibid., P. 52)

Based on these two concepts, we propose and define two categories of Focus: information focus (F) and contrastive focus (CF). They are defined in the following three sections respectively.[10]

4.3.1 Information Focus

As discussed in detail in §2.2.1, information focus is often taken in the literature to correspond to the unpredictable and most informative part of a proposition (Firbas 1964, 1971, Halliday 1967b, Lambrecht 1994, Kiss 1998). Since information focus corresponds to an unpredictable/most informative unit in the proposition; that is part of 'pragmatic assertion' (11b), it must be evoked linguistically. Otherwise, the proposition would not be informative.

Information focus in HA is evoked linguistically in three focus structures: (i) argument-focus structure, (ii) predicate-focus structure, and (iii) sentence-focus structures. Argument-focus structure is evoked when one argument in the structure corresponds to the question word. Consider the following example.

(12) a. A: man Rāmi mar ʔams?
who Rami visited yesterday
'Whom did Rami visit yesterday?'

b. B: Rāmi mar $[\text{L}\bar{\text{i}}\text{na}]_{\text{F}}$ ʔams.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

[10]Throughout the thesis, we use the subscript F and CF to indicate to information focus and contrastive focus, respectively.

In (12b), /Līna/ is the only argument in (12b) that corresponds to the question word /man/ in (12a). By virtue of fulfilling the addressee's knowledge gap, this item /Līna/ carries information focus. This is represented in the following information-structural representation.

(13) **Information-Structural Representation of (12b)**:

Sentence:	Rāmi mar Līna ʔams
Presupposition:	"Rāmi mar x ʔams"
Assertion:	"x=Līna"
Focus:	"Līna"

Predicate-focus structure, on the other hand, is evoked linguistically when a question asks for predicate information about one individual. This is exemplified in (14) below.

(14) a. A: waš sawwa Rāmi?
what did Rami
'What did Rami do?'

b. B: Rāmi [mar Līna ʔams]$_{\mathrm{F}}$.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

The predicate /mar Līna ʔams/ in (14b) corresponds to the question in (14). The informational unit /mar līna ʔams/ is part of the pragmatic assertion (15) and hence it carries 'information focus' discourse function as represented in(15) below.

(15) **Information-Structural Representation of (14b)**:

Sentence:	Rāmi mar Līna ʔams
Presupposition:	"Rami is a topic for comment x"
Assertion:	"x=mar Līna ʔams"
Focus:	"mar Līna ʔams"

Finally, the third focus structure is sentence-focus structure. This structure is considered to be evoked linguistically when the entire proposition is within focus domain. An example of this type is (16) below.

(16) a. A: waš ṣār?
what happened
'What happened?'

b. B: [Rāmi mar Līna ʔams]$_{F}$.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

The entire proposition in (16b) is within focus domain by virtue of being an answer to broad-focus question 'what happened?'. Since the whole utterance in (16b) is an answer to the question (16a), this utterance lacks pragmatic presuppostion (11a), as shown in (17) below.[11]

(17) **Information-Structural Representation of (16b)**:

Sentence: Rāmi mar Līna ʔams

Presupposition: -

Assertion: "Rāmi mar Līna ʔams"

Focus: "Rāmi mar Līna ʔams"

Turning now to the characteristics of information focus in HA, there are four linguistic characteristics associated with this IS category. First, information focus cannot be expressed by left dislocation as in (18c), right dislocation as in (18d), focus preposing as in (18e), or a pseudo clefting as in (18f).[12] We use '#' symbol to indicate pragmatic oddness of sentences throughout the thesis.

(18) a. A: man Rāmi mar ʔams?
who Rami visited yesterday
'Whom did Rami visit yesterday?'

b. B1: Rāmi mar [Līna]$_{F}$ ʔams.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

[11] As pointed out in §2.2.1, sentence-focus structure is given the following terms in the literature: 'thetic structure' (Kuroda 1972, Sasse 1987), 'stage topic' (Gundel 1974, 1988, Erteschik-Shir 1997, 2007), 'neutral description' (Kuno 1972, P. 298), and 'broad-focus/all-focus/all-new/out-of-blue structure' (Féry 2007). In this thesis, we follow Lambrecht (1994) in using 'sentence-focus' term throughout this thesis to refer to this type of focus structure.

[12] Using terms including 'left-dislocation', 'right-dislocation', 'focus preposing' and 'pseudo clefting' in this thesis do not indicate the type of approach I am supporting. Rather, these terms are used for explanatory purposes only. Describing the syntactic properties of these constructions is outside the scope of the thesis and left for future research.

c. B2: #[Līna]$_F$ Rāmi mar-aha ʔams. Left Dislocation
Lina Rami visited.3SGM-her.3SGF yesterday
'Lina, Rami visited her yesterday.'

d. B3: #Rāmi mar-aha ʔams [Līna]$_F$. Right Dislocation
Rami visited.3SGM-her.3SGF yesterday Lina
'Rami visited her yesterday, Lina.'

e. B4: #[Līna]$_F$ Rāmi mar ʔams. Focus Preposing
Lina Rami visited.3SGM yesterday
'Lina, Rami visited yesterday.'

f. B5: #ʔilli Rāmi mar ʔams [Līna]$_F$. Pseudo Clefting
the-one Rami visited.3SGM yesterday Lina
'The one Rami visited yesterday is Lina'

The sentences in (18c), (18d), (18e), and (18f) are pragmatically odd as answers the question given in (18b).

It is not only HA that displays this distinctive feature associated with information focus, it is also observed to be the case in MSA. Moutaouakil (1989) and Ouhalla (1999a) show that information focus in MSA declaratives must be realized in-situ in the syntax, as noted in §3.1.1.

This syntactic property of information focus observed in HA and MSA is also observed in the topic-oriented languages Hungarian and Serbo-Croatian. In Hungarian, Kiss (1998) shows that information focus occurs postverbally as in (19b). If it is realized preverbally as in (19c), it would not be interpreted as information focus but as contrastive focus, as noted in §2.2.1.

(19) a. Hol jártál a nyàron?
where went.you the summer.in
'Where did you go in the summer?

b. Jártam [olaszországban]$_F$.
went.I Italy.to
'I went to italy [among other places].'

c. [Olaszországban]$_{CF}$ Jártam.
italy.to went.I
'It was Italy where I went.' (ibid., PP. 249–250)

In Serbo-Croatian, O'Connor (2006) shows that information focus occurs at the right periphery of the clause as in (20b).

(20) a. Što čita Petar?
what read Petar
'What is Peter reading?'

b. Petar čita [knjigu]$_F$.
PetarNOM read.3.SG.PRES book.ACC
'Petar is reading a/the book.'

c. *Čita [knjigu]$_F$ Petar.
read.3.SG.PRES book.ACC PetarNOM
'Petar is reading a/the book.'

d. *[knjigu]$_F$ Petar čita .
book.ACC PetarNOM read.3.SG.PRES
'Petar is reading a/the book.' (ibid., PP. 61 and 62)

Although Hungarian, Serbo-Croatian, and Arabic including HA variant are classified as topic-oriented languages (Li and Thompson 1976, Kiss 1995), HA differs from Hungarian, Serbo-Croatian and discourse-configurational languages in general in terms of the syntactic behaviour of information focus.[13] Information focus in HA is not defined based on its specific syntactic position as in discourse-configurational languages such as Hungarian and Serbo-Croatian. Information focused item in HA can occupy any 'in-situ' syntactic positions. An example supporting this claim is (21) below.

(21) a. A: man mar Lı̄na ʔams?
who visited lina yesterday
'Who visited Lina yesterday?'

[13]Discourse-configurational languages are those that show word order to be determined by discourse and not by grammatical functions or thematic roles (e.g. Basque, Catalan, Hungarian, Russian, Greek, Finnish, Hindi, Somali, Chinese and among others). In other words, the syntactic position of the item determines its discourse function. This leads Kiss (1995) and others to define a discourse function in terms of a syntactic position. For example, Kiss (1995) describe focus in these languages in terms of its syntactic position as the entity that 'is realized through a particular structural relation (that is, by movement into a particular structural position)' (ibid., P. 6). For how information structure is expressed in discourse-configurational languages, see Kiss (1995) and the references therein.

b. B1: [Rāmi]$_F$ mar Lı̄na ʔams.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

In (21b), the subject /Rāmi/ is information focus and it is realized at sentence-initial position (i.e. its canonical position). This shows that HA information focus does not require the assumed default word order SVO to change. This is in contrast with information focus in discourse-configurational languages (see Kiss 1995).

The second characteristic is that information focus in HA does not obey syntactic constituency, as illustrated in (22) below.

(22) a. A: wein ʔal-ʔqlām?
where the-pens
'Where are the pens?'

b. B: [ᶜali ʔaẖad̠]$_F$-hum.
Ali took.3SM-them.3PL
NP VP-PRON.CLITIC
'Ali took them.'

In (22b), the information unit /ᶜali ʔaẖad̠/ carrying information focus is not a constituent. This is so because this unit is made up of NP followed by V, and hence this sequence of [NP V] does not form a constituent in the syntax (see §2.1).

The third characteristic is that information focus in HA is not compatible with negation, as illustrated below.

(23) a. A: /man rāmi mar ʔams?/
who Rami visited yesterday
'Whom did Rami visit yesterday?'

b. B1: #/lā, rāmi mar [lı̄na]$_F$ ʔams/.
No, Rami visited Lina yesterday
'No, Rami visited Lina yesterday.'

The example (23b) shows that the negation is not compatible with information focus reading. A similar pattern has been observed in MSA by Moutaouakil (1989) as in (24b) and also in languages including Hungarian as in (25).

(24) a. mā\underline{d}a ʔakalta?
what ate.2SGM
'What did you eat?'

b. *mā ʔakaltu ʔillā [\underline{t}arīdan]$_F$.
not ate.1SG but tharid.ACC
'I only ate tharid.'

(25) #Nem, [egy kabátot]$_F$ is ki nézett.
no, a coat too out picked
'No, she picked a coat, too.' (Kiss 1998, P. 251)

The final characteristic is that clause in HA can contain maximally two information foci, as exemplified below.

(26) a. man zār man?
who visited who
'Who visited who?'

b. [^{c}ali]$_F$ zar [ḫālid]$_F$.
Ali visited.3SM Khaled
'Ali visited Khaled.'

In (26a), there are two question words that trigger two information focus in (26b): /^{c}ali/ 'Ali' and /ḫālid/ 'Khaled'.

The possibility for a clause to contain multiple foci is observed in MSA as in (27b), in English as in (28b), Northern Sotho as in (29b), Mandarin Chinese as in (30b), as well as other languages.

(27) a. man qābala man?
who met who
'Who visited who?'

b. qābala Zayd-un ḫālid-an.
met.3SGM Amr.NOM Khaled.ACC
'Zayd met Khaled.' (Moutaouakil 1989, P. 47)

(28) a. Who did you introduce to who?

b. I introduced [Bill]$_F$ to [Sue]$_F$ (Kadmon 2000, P. 252)

(29) a. Mang o fa mma eng? Northern Sotho
who CL1 give CL1.mother what
'who gives mother what?

b. [Malome]$_F$ o fa mma [mpho]$_F$.
CL1.uncle CL1 give CL1.mother CL9.gift
'The uncle gives mother a gift.' (Zerbian 2006, P. 186)

(30) a. Shéi tōu shéi de wō? Mandarin Chinese
who steal whose nest
'Who steals whose nest?'

b. [Māomī]$_F$ tōu [wūyā]$_F$ wō
a Kitty steal a raven nest
'A kitty steals a raven nest.' (Kabagema-Bilan et al. 2011, P. 1903)

A related important point is how many foci a clause can contain. In MSA, for example, Moutaouakil (1989) shows that a clause can contain three foci maximally as in (31b) below.

(31) a. man ʔaḫbara man bimāḏa?
who informed who with-what
'Who informed whom of what?'

b. ʔaḫbara Zayd-un ḫālid-an bi-nağāḥ-ih-i.
informed.3SGM Zayd.NOM Khalid.ACC with-success-his-GEN
'Zayd informed Khalid of his success.' (ibid., P. 47)

However, HA declaratives embedded in question-answer context cannot contain more than two foci. This is so because the question containing three or more question words is difficult to form and also to be processed cognitively by HA listener.[14] A possible explanation for why an HA clause cannot take three foci maximally as same as MSA might be due to morphology. As noted in §4.2, MSA, unlike HA, is morphologically rich and hence MSA speakers and listeners can form and process a clause containing three focus easily.[15]

[14]Krifka (1991) and Wold (1998) show that in languages including English a clause cannot take more than two foci.

[15]For more information on MSA morphology, see Benmamoun (2000), Brustad (2000), Ryding (2005), Aoun et al. (2009).

To sum up, this section analysed how IS in HA is evoked linguistically in three focus structures: argument-focus, predicate-focus and sentence-focus structure. This section showed that information focus in HA has three characteristics: (i) it cannot be expressed by left dislocation, by right dislocation, by focus preposing, or by a pseudo clefting, (ii) it is not necessarily a constituent in syntax, (iii) a clause can maximally contain multiple foci, and finally (iv) information-focus reading is not compatible with negation. The next section will discuss how contrastive focus is evoked linguistically in HA and how it differs from information focus.

4.3.2 Contrastive Focus

As discussed in §2.2.2, we take contrastive focus to refer to an entity that carries new information in the discourse and which stands in a contrastive relationship with other entities. A typical situation triggering contrastive focus is a corrective situation, as exemplified in (32) below.

(32) a. A: man Rāmi mar ʔamsʔ Rana?
who Rami visited yesterday? Rana
'Whom did Rami visit yesterday?Rana?'

b. B: Rāmi mar [Līna]$_{CF}$ ʔams.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

In (32), speaker A asks if the one whom Rami visited yesterday is Rana. The answer in (32b) corrected the information conveyed in the question by stating that the one whom Rami visited is Lina and not Rana. Being so, /Līna/ in (32b) is contrastive focus by virtue of carrying new information which stands in a contrastive relationship with other elements in the discourse including /Rana/. The question in (32a) can be substituted by yes-no question as 'Did Rami visit Rana yesterday?' to evoke contrastive focus.

There are two characteristics associated with contrastive focus in HA. First, it can be expressed in-situ in the syntax as in (33b), by focus preposing as in (33c), or by pseudo clefting as in (33d). However, it cannot be expressed by left dislocation as in (33e), or by right dislocation as in (33f).

(33) a. A: man Rāmi mar ʔams? Rana?
who Rami visited yesterday? Rana
'Whom did Rami visit yesterday?Rana?'

b. B: /Rāmi mar [Līna]$_{\text{CF}}$ ʔams/.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

c. B: /[Līna]$_{\text{CF}}$ Rāmi mar ʔams/.
Lina Rami visited.3SM yesterday
'Lina, Rami visited yesterday.'

d. B5: /ʔilli Rāmi mar ʔams [Līna]$_{\text{CF}}$/.
the-one Rami visited.3SGM yesterday Lina
'The one Rami visited yesterday Lina'

e. B2: #/[Līna]$_{\text{CF}}$ Rāmi mar-aha ʔams/.
Lina Rami visited.3SGM-her.3SGF yesterday
'Lina, Rami visited her yesterday.'

f. B3: #/Rāmi mar-aha ʔams [Līna]$_{\text{CF}}$/.
Rami visited.3SGM-her.3SGF yesterday was Lina
'Rami visited her yesterday, Lina.'

Unlike HA, contrastive focus in MSA cannot be expressed in-situ as in (34b), as noted in §3.1.1. However, like HA, it can be expressed (i) by focus preposing as in (34c), or (ii) by pseudo clefting as in (34d) (Moutaouakil 1989 and Ouhalla 1999c).[16]

(34) a. ʔa Zayd-an ṣāfaḥta ʔam ᶜamr-an?
Q Zayd.ACC greeted.2SG or Amr.ACC
'Was it Zayd you greeted or Amr?' (ibid., P. 25)

b. *ṣāfaḥtau [Zayd-an]$_{\text{CF}}$.
Zayd.ACC greeted.1SG
'I greeted Zayd.'

c. /[Zayd-an]$_{\text{CF}}$ ṣafaḥtu/
Zayd-ACC greeted-1S
'It was Zayd that I greeted' (ibid., P. 24)

[16]see the discussion on MSA in §3.1.1.

d. ʔal-laḏī ṣafaḥ-tu-hu [Zayd-an]$_{CF}$
the-one greeted1SG-him.3SM Zayd-ACC
'It was Zayd that I greeted.' (ibid., P. 24)

Like HA, it is observed in some languages including Spanish (Domínguez 2004) and Serbo-Croatian (O'Connor 2006) that contrastive focus can occur at any position in the syntax. For example, O'Connor (2006) points out that in Serbo-Croatian contrastive focus can occupy any syntactic positions in syntax, as in (35) below.

(35) a. Petar čita [knjigu]$_{CF}$.
PetarNOM read.3.SG.PRES book.ACC
'Petar is reading a/the book.'

b. Čita [knjigu]$_{CF}$ Petar.
read.3.SG.PRES book.ACC PetarNOM
'Petar is reading a/the book.'

c. [knjigu]$_{CF}$ Petar čita .
book.ACC PetarNOM read.3.SG.PRES
'Petar is reading a/the book.' (ibid., PP.61–62)

However, contrastive focus in some languages including Hungarian and Russian is required to occur in a specific syntactic position. For example, King (1995) shows that contrastive focus occurs at the left periphery of the clause, as in (36) below. As for Hungarian, contrastive focus is required to be realized preverbally, as in (37) below.

(36) Ja [k anne]$_{CF}$ prišel.
I to Anna arrived
'I visited Anna-C FOC.' (King 1995, P. 209)

(37) [Olaszországban]$_{CF}$ jártam.
italy.to went.I
'It was Italy where I went.' (Kiss 1998, P. 250)

The second characteristic is that contrastive-focus reading is compatible with negation, as shown in (38b) below.

(38) a. A: man Rāmi marʔamsʔ Rana?
who Rami visited yesterday? Rana
'Whom did Rami visit yesterday?Rana?'

b. B1: /Lā, Rāmi mar [Līna]$_{CF}$ ʔams/.
No, Rami visited Lina yesterday
'No, Rami visited Lina yesterday.'

Example (38b) shows that contrastive focus behaves differently from information focus (§4.3.1) in this respect. Information focus as shown in (23) cannot be located within a negated proposition whereas contrastive can be. A similar pattern in MSA is observed by Moutaouakil (1989), as illustrated in (39b) below.

(39) a. ʔa Zayd-an ṣāfaḥta ʔam ᶜamr-an?
Q Zayd-ACC greeted-2SG or Amr-ACC
'Was it Zayd you greeted or Amr?' (ibid., P. 25)

b. mā ṣafaḥ-tu ʔillā [Zayd-an]$_{CF}$
not greeted1SG but Zayd-ACC
'I greeted only Zayd.' (ibid., P. 24)

To sum up, we conclude that contrastive focus can be expressed in-situ, by focus preposing or by a pseudo-cleft construction. In addition, contrastive-focus reading is compatible with negation. These characteristics make contrastive focus different from information focus §4.3.1. As a result, contrastive focus forms an independent IS category that cannot be subsumed under information focus (cf. Lambrecht 1994).

4.3.3 Conclusion

In this section, we examined a broad range of declarative sentences in HA. We demonstrated that variations in word order in HA are not determined by grammatical functions or by thematic roles. Based on empirical data, we showed that variations in word order serve pragmatic functions. We showed empirically that there are two categories of Focus: information focus and contrastive focus. These categories are shown to be evoked linguistically in HA grammar. Each of these categories exhibits a number of characteristics that need to be taken into account. For example, information focus in HA (§4.3.1) only occurs only in-situ. Unlike information focus, contrastive focus (§4.3.2) can be expressed by focus preposing, by pseudo clefting or in-situ. In addition, contrastive-focus reading is compatible with negation whereas information focus is not. The analysis of HA data showed clearly that contrastive focus in HA forms an independent and separate IS category that cannot be subsumed within another IS category including information focus.

In this chapter, we made comparisons between the phenomena described for HA and those of other languages including the Arabic vernaculars reviewed in §3.1. Since we employed the heuristic of the question-answer congruence to evoke the two categories of Focus, comparisons were made successfully between the phenomena described for HA and those of other languages including Hungarian, Serbo-Croatian, Northern Sotho, Mandarin Chinese and Russian. We showed the similarities and the differences between those languages and HA.

The following section will introduce two phonological aspects in HA: the syllable structure and the lexical-stress system. These aspects will play a crucial role in the rest of the current study.

4.4 Intonation in HA

To my knowledge, no study has examined the intonational system of HA. The current study is not intended to describe the intonational system of this dialect, as this is not the focus of our experimental work. This thesis aims to investigate the relation between the categories of IS discussed above and intonation in this dialect. Before we presents our experiment, we need to introduce two phonological aspects: syllable structure and lexical-stress system. This is because the lexically stressed syllables in Arabic in general (§3.2) and HA (Chapter six and seven) in particular are the docking sites for pitch accents. Therefore, the first task in our intonational analysis is to determine where lexical stress occurs, which will be fulfilled in this section.

Stress and accent are terms used interchangeably in the literature (Bolinger 1958, 1961, Cruttenden 1997). Since Arabic places a pitch accent on lexically stressed syllables (Ibrahim Anees n.d., Tammam Hassān 1990, Al-Harbi 1991, Benkirane 1998, Chahal 2001, Hellmuth 2006, Blodgett et al. 2007), a distinction between these two terms needs to be made explicit in this thesis. In the current thesis, the term stress is used to describe word stress and hence it is a lexical feature whereas the term accent/pitch accent is used to describe the pitch/fundamental frequency movement that conveys pragmatic functions and hence it is a post-lexical feature.

Beckman (1986) classifies languages into two types: stress-accent and non-stress accent languages. Stress-accent languages including English are those languages in which stressed syllable is acoustically distinguishable from unstressed one whereas non-stress accent languages including Japanese use pitch to distinguish between syllables.[17] Within Beckman's (1986) classification, Arabic is a stress-accent language in which stress is acoustically manifested (Jun 2005b). Studies including De Jong and Zawaydeh (1999), Chahal (2001), De Jong and Zawaydeh (2002) and Hellmuth (2006) investigate the acoustic correlates of stress in different Arabic dialects including Jordanian, Lebanese, Egyptian, as well as others. It has been found that acoustic features including F_0, intensity and vowel duration distinguish between stressed and unstressed syllable in Arabic (see Chahal 2001, Ch. 3 and Hellmuth 2006, Ch. 4 for more details).

Abaalkhail (1998) investigates thoroughly the stress and syllable structures in urban HA. He shows that syllable weight and syllable position determine where stress is located in HA. This is what Watson (2011) states briefly that '[a]ll Arabic dialects exhibit word stress; however, the socially and geographically diverse area over which Arabic is spoken leads to differences in the mechanics of word stress

[17] It is debatable whether Beckman's (1986) classification is well-supported cross-linguistically. For example, Nagano-Madsen and Bruce (1998) argue that Swedish, classified by Beckman's (1986) as a non-stress accent language, is not purely a non-stress accent language, rather it is both a stress-accent and pitch-accent language.

assignment [. . .] [i]n all cases stress location is a function of both syllable weight and syllable position, but dialects differ in the distribution of syllable types, the leftmost extent of stress (third or fourth syllable from the right)' (ibid., P. 2990).

Beginning with syllable weight, Abaalkhail (1998) shows that HA, like Arabic in general, distinguishes three types of syllable weight: light (CV), heavy (CVV, CVC), and superheavy (CVVC, CVCC). These three types are illustrated with examples in Table 4.1 below from Abaalkhail (1998).

Syllable Weight		**Segmentation**	**HA Examples**	**Position**
Light	*open*	CV	/**ša**.**ğa**.ri/ 'my trees'	-
Heavy	*open*	CVV	/**kā**.sāt/ 'glasses'	-
	closed	CVC	/**mak**.tūb/ 'a letter'	-
Superheavy	*closed*	CVVC	/fā.**nūs**/ 'a lantern'	final
	doubley closed	CVCC	/ʔa.**kalt**/ 'I ate'	final

Table 4.1: HA Syllable weight. Syllable of each type is in boldface (Abaalkhail 1998).

As Abaalkhail (1998) points out, light and heavy syllables are unrestricted in terms of their lexical position whereas superheavy syllables are restricted to be realized at lexical-final position, as exemplified above. Based on syllable weight, he proposes four rules determining the position of HA stress. They are as follows:

(40) a. Stress a final superheavy syllable

b. Otherwise, stress a heavy penult,

c. Otherwise, stress a heavy antepenult,

d. Otherwise, stress the penult or the antepenult, whichever is separated from the first preceding heavy syllable or (if there is none) from the beginning of the word by an even number of syllables.

These four rules are applied to determine the stress position in the examples in Table 4.2 below taken from Abaalkhail (1998).

Based on Abaalkhail's (1998) study, we adopt the rules in (40a) to locate the stress in the target items used in our test declarative sentences. The correlates of

Syllable Weight	Stress Position	HA Examples
Light	*penult*	/**sa**.ma/ 'sky'
	antepunult	/**ka**.ta.bu/ 'they wrote'
Heavy	*penult*	/si.**miᶜ**.ti/ 'you SG.FM. heard'
	antepunult	/ʔak.**kal**.ta.ha/ 'I/you.SG.MS. fed her'
Superheavy	*final*	/ka.**tabt**/ 'I/you SG.MS. wrote'

Table 4.2: Stressed syllable is in bold in the examples (Abaalkhail 1998).

the lexical stress in acoustic and auditory terms will be presented in §5.3.3. The next section concludes the current chapter.

4.5 Conclusion

This chapter showed that variations in word order in HA are not determined by grammatical functions or by thematic functions. Rather, they are to serve pragmatic functions. Based Lambrecht's (1994) framework and the requirement of the subject language HA, we proposed and defined two categories of Focus: information focus and contrastive focus. We showed how these categories are evoked lexicogrammatically. Furthermore, we identified their characteristics. That is, information focus must occur in-situ whereas contrastive focus can be expressed in-situ, by focus preposing or by pseudo clefting. We compared the phenomena described for HA with those of other languages including Arabic dialects reviewed so far.

Based on Abaalkhail (1998), §4.4 gave an overview of the position of HA lexical stress: (i) stress a final superheavy syllable; (ii) otherwise, stress a heavy penult; (iii) otherwise, stress a heavy antepenult; (iv) otherwise, stress the penult or the antepenult, whichever is separated from the first preceding heavy syllable or (if there is none) from the beginning of the word by an even number of syllables.

The next chapter will outline the methodology adopted in this thesis to investigate the prosodic effects of the categories of IS identified so far in HA.

Chapter 5

Data Collection and Analytical Procedures

The preceding chapter shows that there is no obligatorily syntactic marking of information focus and contrastive focus in HA. Specific syntactic constructions are optionally available for HA speakers to use to express pragmatic meanings, such as focus preposing[1] to express contrastive focus (§4.3.2). These findings raise two interesting questions: in light of the lack of syntactic means of information focus and in-situ contrastive focus, how are these IS categories realized prosodically different from each other and from their counterpart in neutral sentence (i.e. in sentence-focus structure)?[2] and when a HA speaker uses focus preposing as a noncanonical syntactic option to express contrastive focus, do they also use prosody to express ex-situ contrastive focus? Answering the first question leads to find out whether information focus and in-situ contrastive focus have prosodic effects in HA intonation in light of the lack of syntactic means of information/in-situ contrastive focus. Answering the second question leads to find out whether HA speakers use one means (syntax) or two means (syntax and prosody) at a time to express 'ex-situ' contrastive focus.

[1]Recall that, focus preposing is a syntactic construction (noncanonical syntactic option) wherein the item carrying contrastive focus as a discourse function is syntactically realized at the left periphery of the clause rather than in a canonical clause-internal position (§4.3.2).

[2]As noted in §2.3, the term 'prosody' and 'intonation' are used interchangeable in the literature. I am using the term 'prosody' throughout the thesis to refer to 'intonation' in particular.

To provide answers to these two empirical questions, this thesis performs a full and systematic analysis of whether and how information focus and in-situ contrastive focus are expressed phonologically and phonetically in HA, and how ex-situ contrastive focus (and focus preposing as a noncanonical syntactic option in general) is expressed phonologically in HA.

This chapter describes the research design and methodology for the data collection and analytical procedures used to investigate these questions.

5.1 Research Questions

The three preceding chapters have demonstrated the need for more extensive and rigorous research on the relationship between intonation and the categories of IS under investigation in HA. First, it is necessary to examine the intonational contours in HA visually and auditorily. This is to identify the phonological structure of HA contours in general and to detect the phonological effects of information/contrastive focus in HA in particular. Second, it is necessary to examine HA contours from phonetic/acoustic perspective. This is to identify and understand the functions of intonation in HA and to identify which acoustic features that correlate most reliably with information/contrastive focus in HA. To address these issues, we will examine intonational contours of short declarative sentences in HA (four-word declarative sentences and two-word declarative sentences) said with information/contrastive focus at different sentential positions and without information/contrastive focus. The aim is to find answers to the following research questions:

(1) a. Does information focus differ phonologically and phonetically from its counterpart in the neutral sentence?[3] If so, how?

b. Do(es) item(s) occurring before information focus (i.e. pre-focus item(s)) differ phonologically and phonetically from its/their counterpart(s) neut-

[3]As noted in several places in the preceding chapters, we take sentence-focus structure to be the sentence that produces the neutral intonation, see §4.2 for more discussion.

ral sentence? If so, how?

c. Do(es) item(s) occurring after information focus (i.e. post-focus item(s)) differ phonologically and phonetically from its/their counterpart(s) in neutral sentence? If so, how?

d. Does ‘in-situ’ contrastive focus differ phonologically and phonetically from its counterpart in neutral sentence? If so, how?

e. Do(es) item(s) occurring before (in-situ) contrastive focus (i.e. pre-focus item(s)) differ phonologically and phonetically from its/their counterpart(s) in neutral sentence? If so, how?

f. Do(es) item(s) occurring after (in-situ) contrastive focus (i.e. post-focus item(s)) differ phonologically and phonetically from its/their counterpart(s) in neutral sentence? If so, how?

g. Does information focus differ phonologically and phonetically from its contrastive-focused counterpart in sentences that are identical? If so, how?

h. Do(es) item(s) occurring before information focus (i.e. pre-focus item(s)) differ phonologically and phonetically from its/their counterpart(s) occurring before (in-situ) contrastive focus in sentences that are identical? If so, how?

i. Do(es) item(s) occurring after information focus (i.e. post-focus item(s)) differ phonologically and phonetically from its/their counterpart(s) occurring after (in-situ) contrastive focus in sentences that are identical?

j. Is focus preposing, as a noncanonical syntactic option for marking ex-situ contrastive focus, associated with a specific intonational contour? If so, what is it?

k. Does predicate-focus structure (wherein the verb and its complements are within the focus domain) phonologically and phonetically differ from its neutral counterpart? If so, how?

5.2 Method

To find answers to the research questions in (1), the present study aims to perform a very detailed phonological and acoustic analysis of F_0 contours in HA. The main strategy of this study is to make comparisons between the categories of IS under investigation. Since the analyses to be performed in this thesis are very detailed, we restricted our study to only four-word declarative sentences (transitive structures) and two-word declarative sentences (intransitive structures). Otherwise, the amount of data would be too massive and then we would not be able to report the results given the limitations of space.

We use the question-answer paradigm to investigate the aforementioned research questions. Each target sentence was preceded by a prompt question that triggers different types of focus on a specific word. In order to create background contexts in the subject's mind so that the answer produced is as natural as possible, we prepared short anecdotes made up of four to nine short sentences that are designed to resemble the way a native speaker speaks. One anecdote was projected on the wall at a time for the subject to read silently. Once the subjects finished reading the short anecdote, the subjects were asked to read a target sentence as an answer to prompt question (about one point in the read anecdote) asked by the researcher (native speaker of HA). Subject and researcher sat side-by-side. The prompt question and its answer were projected on the wall and seen by both participants.

This method has a number of attractive features. Firstly, this method helps to 'make observations by manipulating the factors under investigation while keeping other factors constant' (Xu 2010, P. 334). To put it differently, this method helps to elicit information focus or contrastive focus on a specific word occurring in a specific sentential position in each target sentence. This leads each target sentence to be produced either with single (information/contrastive) focus of simple constituents or without focus. By doing so, we avoid 'impenetrable obstacles to true understanding' (ibid., P. 334). Secondly, many previous studies on the prosodic encoding of categories of IS in many languages including Lebanese Arabic, Moroccan Arabic, Bangla, Cantonese, Dutch, English, French, German, Hungarian, Korean, Mandarin and Northern Sotho have used this method successfully (Gussenhoven 1983b, Cooper et al. 1985, Birch and Clifton 1995, Schwarzschild 1999, Xu 1999, Chahal 2001, Xu and Xu 2005, Baumann et al. 2006, Zerbian 2006, Hanssen et al. 2008, Beyssade et al. 2009, Chen and Wang 2009, Lee and Xu 2010, Wu and Xu 2010, Wang et al. 2011, Choudhury and Kaiser 2012, Phillips-Bourass 2012, Xu and Chen 2012, among others). Since these studies and others employed this method, cross-linguistic comparisons can be made accurately and reliably between the phenomena described for HA and those of other languages.

5.3 Materials

The target declarative sentences are made up mostly with sonorant sounds. This is to obtain clear F_0 contours (Himmelmann and Ladd 2008). The target sentences differ in two dimensions. First, they differ in terms of focus structures: sentence-focus (i.e. neutral sentence)), predicate-focus, argument-focus (with information-focused item, and with in-situ contrastive-focused item), and focus preposing structure. This variation is to check whether a difference in focus structure leads to a difference in prosodic structure. As noted in §3.2, previous research on focus prosody in Arabic mainly focused on sentence-focus structure and argument-focus structure, with notable exception Phillips-Bourass's (2012) study which includes predicate-focus structure. Therefore, the present study aims to enlarge the test materials to include these four different types of focus structure to provide a comprehensive analysis of focus in HA.

The second variation concerns the type of structures under investigation. The target answers are four-word declarative sentences (transitive structures), and two-word declarative sentences (intransitive structures). This variation is to check whether a difference in the length of the target sentence and the type of structures under investigation leads to a difference in focus prosody. As noted in §3.2, previous research on focus prosody in Arabic mainly focused on transitive structures made up of four words. Therefore, our study aims to enlarge the investigation to include not only four-word sentences but also two-word sentences. This is to investigate whether a type of sentence and length of the sentence affects HA focus prosodically.

Each subject (8 male + 8 female subjects = total 16 subjects) recorded each target sentence in each focus condition five times on three different occasions. The total number of tokens examined in Chapters six and seven are 2640 tokens.

Target sentence	
four-word sentences	3 sentences x 7 foci x 5 repetitions x 16 speakers = 1680 sentences
two-word sentences	2 sentences x 6 foci x 5 repetitions x 16 speakers = 960 sentences
TOTAL	2640 sentences

The following two sections present the reading materials with their English translation.

5.3.1 Stimuli: four-word declarative sentences

The number of four-word declarative sentences used in the present study are three. The target sentence is in (2), (3) and (4) with the prompt questions that elicit a focus category under investigation. Syllables are separated by a dot and the stressed syllables are in boldface. The subscript F and CF indicate information focus and contrastive focus, respectively.[4]

(2) **Rā**.mi **mar** **Lī**.na ʔ**ams**.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

[4]The full test materials including the short anecdotes used to create background context in the speakers' mind are in Appendix A.1.

Prompt Question	**Target Answer**
waš ṣār? 'What happened?'	[Rāmi mar Līna ʔams.]$_{\text{F}}$ 'Rami visited Lina yesterday.'
man mar Līna ʔams? 'Who visited Lina yesterday?'	[**Rāmi**]$_{\text{F}}$ mar Līna ʔams. 'Rami visited Lina yesterday.'
man mar Līna ʔams? Marwān? 'Who visited Lina yesterday? Marwan?'	[**Rāmi**]$_{\text{CF}}$ mar Līna ʔams. 'Rami visited Lina yesterday.'
waš sawwa Rāmi? 'What did Rami do?'	Rāmi [**mar Līna ʔams**]$_{\text{F}}$. 'Rami visited Lina yesterday.'
man Rāmi mar ʔams? 'Who did Rami visit yesterday?'	Rāmi mar [**Līna**]$_{\text{F}}$ ʔams. 'Rami visited Lina yesterday.'
man Rāmi mar ʔams? Rāna? 'Who did Rami visit yesterday? Rana?'	Rāmi mar [**Līna**]$_{\text{CF}}$ ʔams. 'Rami visited Lina yesterday.'
man Rāmi mar ʔams? Rāna? 'Who did Rami visit yesterday? Rana?'	[**Līna**]$_{\text{CF}}$ Rāmi mar ʔams. 'Lina, Rami visited yesterday.'

Table 5.1: Target Sentences with their translation.

(3) **Ra**.na **saw**.wat mar.**yūl** li-Ma.**nāl**.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

Prompt	**Target**
waš al-mawḍū^{c}? 'What is the topic?'	[Rana sawwat maryūl li-Manāl.]$_{\text{F}}$ 'Rana made a school dress for Manal.'
man sawwat maryūl li-Manāl? 'Who made a school dress for Manal?'	[**Rana**]$_{\text{F}}$ sawwat maryūl li-Manāl. 'Rana made a school dress for Manal.'
man sawwat maryūl li-Manāl? Nawāl? 'Who made a school dress for Manal? Nawal?'	[**Rana**]$_{\text{CF}}$ sawwat maryūl li-Manāl. 'Rana made a school dress for Manal.'
waš ʔāḫir ʔ^{c}māl Rana? 'What did Rana do last?'	Rana [**sawwat maryūl li-Manāl**]$_{\text{F}}$. 'Rana made a school dress for Manal.'
waš sawwat Rana li-Manāl? 'What did Rana make for Manal?'	Rana sawwat [**maryūl**]$_{\text{F}}$ li-Manāl. 'Rana made a school dress for Manal.'
waš sawwat Rana li-Manāl? miryalah? 'What did Rana make for Manal? an apron?'	Rana sawwat [**maryūl**]$_{\text{CF}}$ li-Manāl. 'Rana made a school dress for Manal.'
waš sawwat Rana li-Manāl? miryalah? 'What did Rana make for Manal? an apron?'	[**maryūl**]$_{\text{CF}}$ Rana sawwat li-Manāl. 'A school dress, Rana made for Manal.'

Table 5.2: Target Sentences with their translation.

(4) **Rā**.mi **hā**.jar li-**lan**.dan al-**bā**.riḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

Prompt	**Target**
waš ṣār? 'What happened?'	[Rāmi hājar *li-landan* al-bariḥ.]$_{\mathrm{F}}$ 'Rami emigrated to London yesterday'.
man hājar li-landan al-bāriḥ? 'Who emigrated to London yesterday?'	[**Rāmi**]$_{\mathrm{F}}$ hājar *li-landan* al-bariḥ. 'Rami emigrated to London yesterday'.
man hājar li-landan al-bāriḥ? Marwān? 'Who emigrated to London yesterday? Marwan?'	[**Rāmi**]$_{\mathrm{CF}}$ hājar *li-landan* al-bariḥ. 'Rami emigrated to London yesterday'.
waš ṣār ^{c}ala Rāmi? 'What happened to Rami?'	Rāmi [**hājar li-landan al-bariḥ**]$_{\mathrm{F}}$. 'Rami emigrated to London yesterday'.
wein hājar Rāmi al-bāriḥ? 'Where did Rami emigrate to?'	Rāmi hājar [**li-landan**]$_{\mathrm{F}}$ al-bariḥ. 'Rami emigrated to London yesterday'.
wein hājar Rāmi al-bāriḥ? li-as-su^{c}ūdiah? 'Where did Rami emigrate to? to Saudi?'	Rāmi hājar [**li-landan**]$_{\mathrm{CF}}$ al-bariḥ. 'Rami emigrated to London yesterday'.
wein hājar Rāmi al-bāriḥ? li-as-su^{c}ūdiah? 'Where did Rami emigrate to? to Saudi?'	[**li-landan**]$_{\mathrm{CF}}$ Rāmi hājar al-bariḥ. 'To London, Rami emigrated yesterday'.

Table 5.3: Target Sentences with their translation.

5.3.2 Stimuli: two-word declarative sentences

The number of four-word declarative sentences used in the present study are two. The target sentence is in (5) and (6) with the prompt questions that elicit a focus category under investigation. The stressed syllables are in boldface. The subscript F and CF indicate information focus and contrastive focus, respectively.[5]

(5) Mar.**wān māt**.
Marwan died
'Marwan died'

[5]The full test materials including the short anecdotes used to create background context in the speakers' mind are in Appendix A.2.

Prompt	Target
waš ṣār? 'What happened?'	[Marwān māt.]$_{F}$ 'Marwan died.'
man māt? 'Who died?'	[**Marwān**]$_{F}$ māt. 'Marwan died.'
man māt? Rāmi? 'Who died? Rami?'	[**Marwān**]$_{CF}$ māt. 'Marwan died.'
waš ṣār li-Marwān? 'What happened to Marwan?'	Marwān [**māt**]$_{F}$. 'Marwan died.'
waš ṣār li-Marwān? ti-šāfa? 'What happened to Marwan? recovered'	Marwān [**māt**]$_{CF}$. 'Marwan died.'
waš ṣār li-Marwān? ti-šāfa? 'What happened to Marwan? recovered'	[**māt**]$_{CF}$ Marwān. 'died, Marwan.'

Table 5.4: Target Sentences with their translation.

(6) **Rā**.mi **šay**.yab.
Rami get-old
'Rami is getting old'

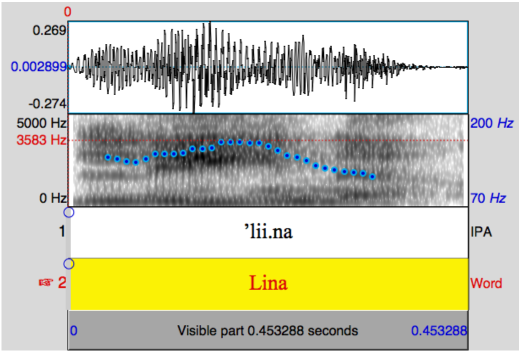
Prompt	Target
waš al-qiṣah? 'What happened?'	[Rāmi šayyab.]$_{F}$ 'Rami is getting old.'
man šayyab? 'Who is getting old?'	[**Rāmi**]$_{F}$ šayyab. 'Rami is getting old.'
man šayyab? Marwān? 'Who is getting old? Marwan?'	[**Rāmi**]$_{CF}$ šayyab. 'Rami is getting old.'
waš ʔaḫbār rāmi? 'What is the news about Rami?'	Rāmi [**šayyab**]$_{F}$. 'Rami is getting old.'
waš ʔaḫbār rāmi? šabāb? 'What is the news about Rami? young?'	Rāmi [**šayyab**]$_{CF}$. 'Rami is getting old.'
waš ʔaḫbār rāmi? šabāb? 'What is the news about Rami? young?'	[**šayyab**]$_{CF}$ Rāmi. 'getting old, Rami.'

Table 5.5: Target Sentences with their translation.

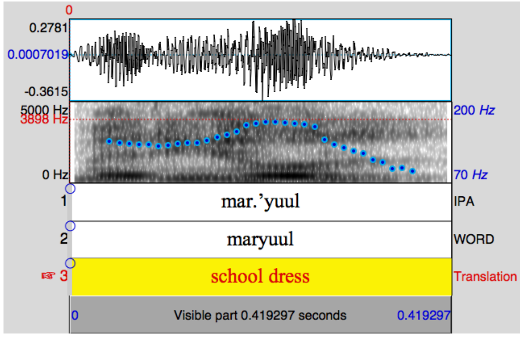
5.3.3 Target Words

In this section, we show the correlates to the lexical stress of the target words used in the target sentences. The following pitch tracks belong to the target words uttered out of context[6].

[6]The target words are produced as isolated words (out of context) by a native speaker of HA.



(a)



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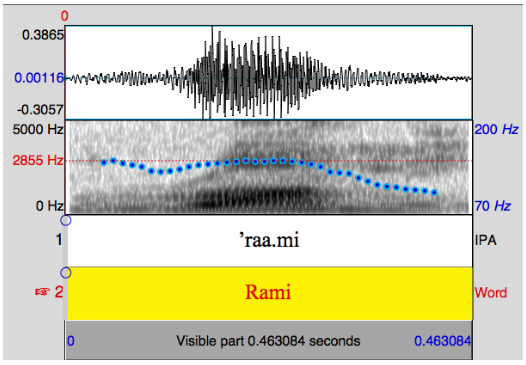

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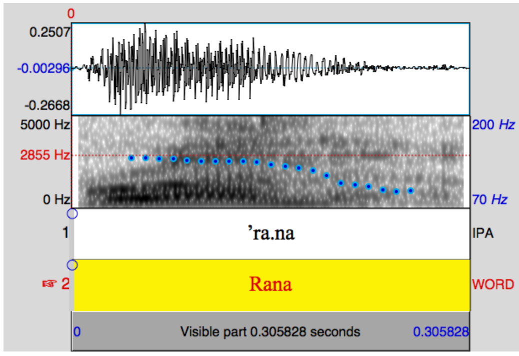

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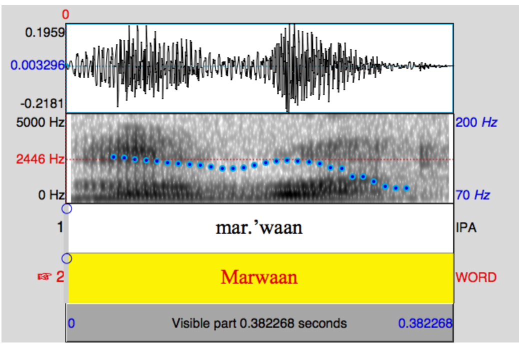

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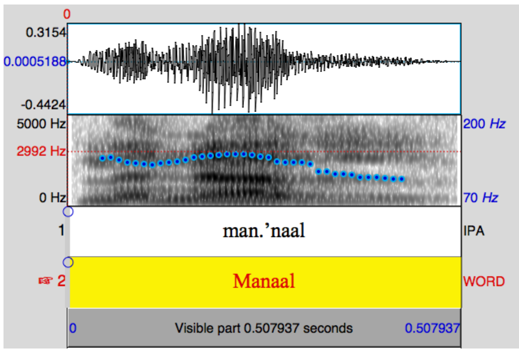

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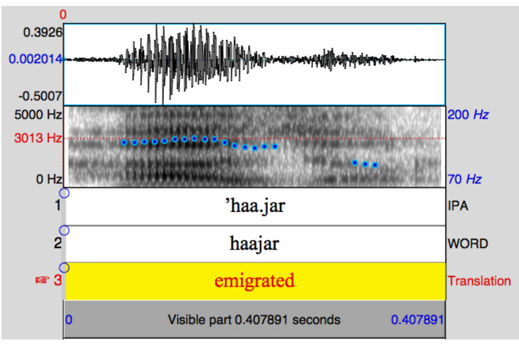
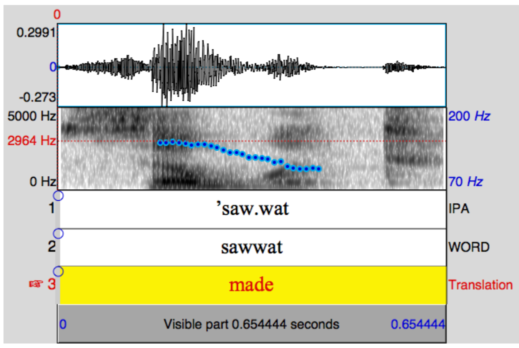


(g)



(h)

Figure 5.1: Pitch Tracks

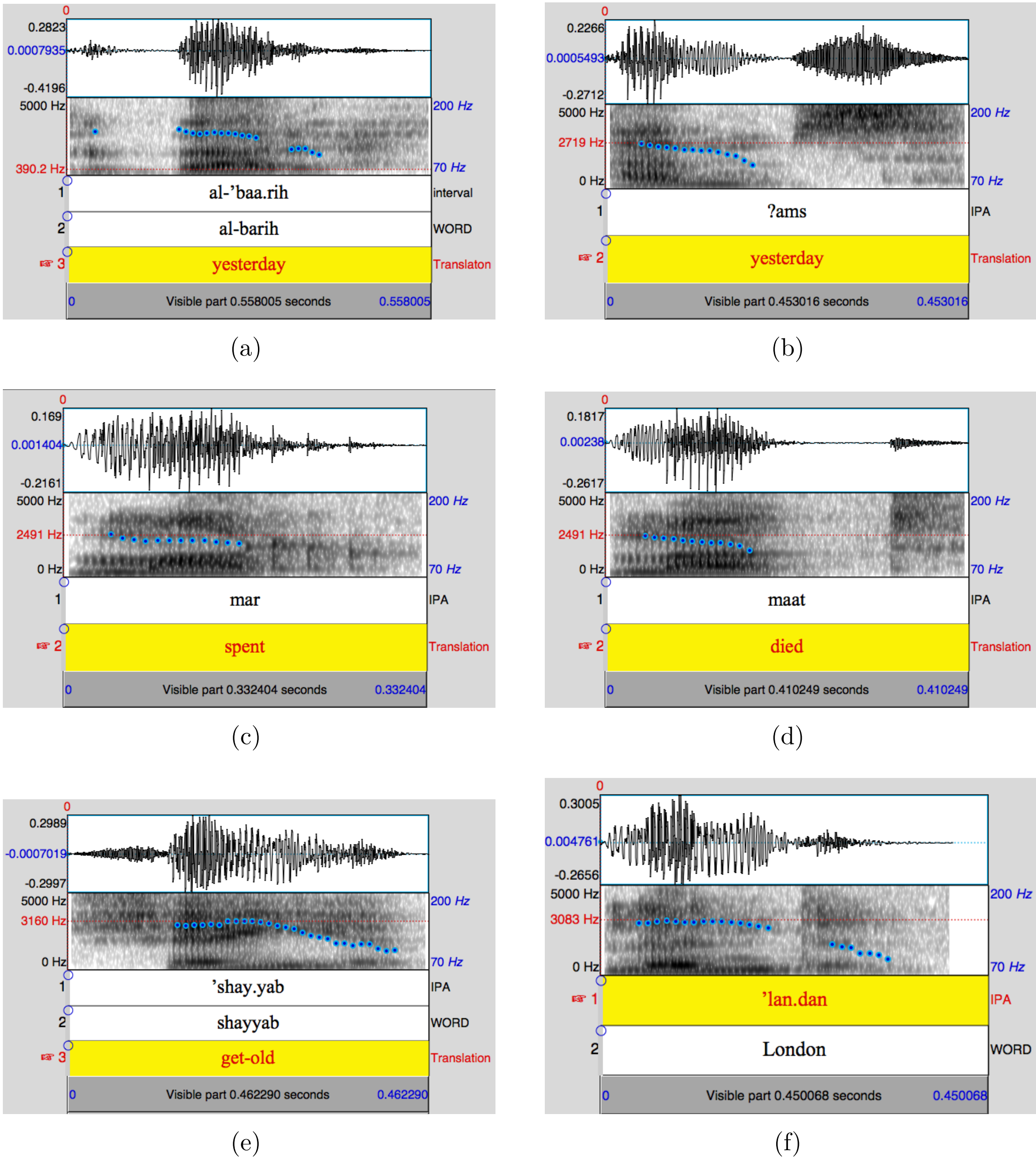


Figure 5.2: Pitch Tracks

5.4 Subjects

Eight female and eight male native speakers of urban Hijazi Arabc (Taif dialect), aged 23-35 (total= 16), participated in the experiment. All the 16 participants are from the researcher’s family tribe ‘Alzaidi’. There was a number of reasons why participants from the Alzaidi tribe were recorded. The first was due to the researcher’s informal relations with them. Since the participants are from the researcher’s family tribe and they are very close relatives to the researcher, this enabled the participants to be more relaxed in the experimental environment. The second reason for recording participants from Alzaidi tribe was due to accessibility. Because I was interested to include female participants as well as male participants, it was easy to recruit and record female participants. The third reason for making this choice concerned their linguistic background. The participants recruited in this experiment are monolingual in a sense that they do not speak any language apart from their own dialect.[7] This is to avoid the possibility of 'horizontal spreading, i.e., borrowed into the language through contact' (Xu 2011, P. 154).

All sixteen participants attended all the recording sessions (i.e. three recording sessions on three different occasions) and participated in the experiment. They were born, raised and educated in Taif city. They had not had self-reported speech or hearing disorders. To achieve pertinent information, certain inclusion criterion was imposed. The participants qualified for sample selection must be a native speaker of urban Hijazi Arabic. This qualification ensured that the participants are native speakers of HA. In order to conduct the experiment, the researcher defined the population first, listed down all the members of the population. For the purpose of coding, one random alphabet and one random number were assigned for each participant.

5.5 Recording Procedures

Before recoding subjects in Taif, the subjects gave permission under the University of Essex Ethical Procedures. Anonymity was ensured by not disclosing the participant's name on the research report and detaching the written consent. Confidentiality was maintained by keeping the collected sound files confidential and not revealing the subjects' identities when reporting or publishing the study. The sound files were only numbered after data was collected. The ethical principle

[7] They reported that they studied the grammar of Modern Standard Arabic (MSA) in their school years. This does not affect the idea of being monolingual taken into account in the experiment.

of self-determination was also maintained. Subjects were treated as autonomous agents by informing them about the study and allowing them to voluntarily choose to participate or not.

The participants were recording individually in a quiet room. Since there is no recording laboratory in Taif, the recording was performed in each of the subject's home which led to provide a relaxing and familiar atmosphere for the subjects. All answers were recorded using the Zoom H2 Recorder[8] with a built-in microphone and Mac-Book Pro laptop, placed in front of the subject. All the recording files were saved directly into a MacBook Pro as wav files. During each trial, one short anecdote at a time was projected to the wall using a Samsung Projector. After reading silently the short anecdote, one powerpoint slide which shows one question about one point in the anecdote and its answer was projected on the wall. Moving from one projected powerpoint slide to another was done by the researcher using a separate Dell Computer. During each trial, the experimenter asked the subject whether the projected material is readable while they were sitting in order for the experimenter to make sure that the subject was able to see the projected material clearly while they were sitting comfortably. The subject was asked to say the projected material in a natural way at normal speech rate. The subject was asked not to pause in the middle of a sentence. The subject was instructed to repeat the reading of the material if they made a mistake. Each subject went through a number of practice trials until they were familiar with the procedure. Each subject was recorded six times in three different sessions, with a 24-hour break in between. Within each session, the order of the test material was randomized, and only one question-answer pair was projected at a time. There was a 3-minute break in between five question-answer pairs. Within these three minutes, the subject was given a task that was not related to the research. There was a fifteen minute break between each of ten question-answer pairs. Within these fifteen minutes, an unrelated task was given to the subject. Only the last five recordings were

[8]For an overview of this recorder and its capability in using it for recording speech for scientific research, see `http://www.hrelp.org/archive/reviews/zoom_h2_review.html`.

taken for the analyses. Two different experiments were run at once: one on topic (excluded from the thesis for the space limit) and one on focus. The stimuli from one experiment acted as distractors for the other stimuli sets. The distractors included different question-answer pairs evoking different types of sentences such as gapping, coordinate structures, left-dislocation and right-dislocation sentences.

5.6 The Phonological Analysis

Based on the AM approach to intonational analysis (§2.4.1), tones are first identified by ear and when necessary by examining the fundamental frequency (F_0) in PRAAT (Boersma and Weenink 1992–2011).[9] Then, the stressed syllables in the target sentence were determined in order to locate the placement of the pitch accents (i.e. tones). If the target tone occurs within the accented syllable, it was associated with a star, following the AM convention. As for the phrase accent, it is represented with (-)[10] whereas the boundary tone is represented with (%). Based on the survey of the HA data presented in the present study, we propose the following inventory of phonological pitch accents, phrase accents and boundary tones.

[9]This way of identifying tones by ear and secondarily by fundamental frequency has been widely adopted in the AM research (Chahal 2001, Wightman 2002, Hellmuth 2006, Barry 2007, and among others).

[10]The prosodic cues to intonational phrase and intermediate phrase are very often pauses, final syllable lengthening and pitch resetting (Ladd 2008).

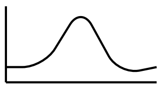
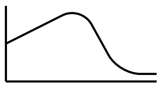
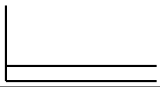
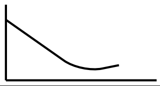
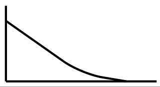
	Tones	Schematic	Description
Pitch Accent	[L+H*]		It starts from a low point in the speaker's range to the high
	[H*]		It starts from a mid point in the speaker's range to a high peak (slight rise)
	[L*]		Mainly low pitch accent
Phrase Accent	L-		Low phrase accent
Boundary Tone	L%		Low boundary tone

Table 5.6: Schematization of tones in HA data.

[L+H*] This pitch accent is the most common type of pitch accent in the data produced by HA speakers. This bitonal pitch accent starts from a low point in the speaker's range to the high point. The peak of this accent is always realized within the lexically stressed syllable (about in the middle). This pitch accent has been observed by Chahal (2001) and Hellmuth (2006) to be the most common pitch accent used by Lebanese speakers and Egyptian speakers, respectively.

[H*] This pitch accent is the second most common type of pitch accent in the data produced by HA speakers. This monotonal pitch accent starts relatively high in the speaker's range and continues to rise even higher. In Lebanese Arabic, Chahal (2001) recognizes this pitch accent as a most common pitch accent in this Arabic dialect. This pitch accent is not observed in Egyptian Arabic (Hellmuth 2006).

[L*] This pitch accent is mainly low pitch accent. In Lebanese Arabic, Chahal (2001) finds this pitch accent as 'a nuclear pitch accent in yes/no question [. . .] [and] also occurs with other tune types, as well as in prenuclear position'[11]

[11]Prenuclear position refers to the position where the stressed syllables occurring before the nuclear pitch accent occurs. It is termed as Head in British model of intonation (see §2.4 for more details).

(ibid., P. 65).

[L-] This phrase accent indicates that this accent is realized low in the speaker's range, following the AM approach. This pitch accent marks the end of the intermediate phrase.[12]

[L%] This tone indicates a low boundary tone. All the declarative sentences examined in this thesis end with this tone.

5.7 Analysis in PRAAT

PRAAT was the main software tool used for both phonological analysis and phonetic analysis. Each target sentence was extracted and saved as wav file using PRAAT. To extract the continuous F_0 contour, the vocal cycles were marked by Praat and then hand checked for errors. Segmentation labels were also added to mark word boundaries to be used. Based on the AM model (§2.4.1), PRAAT textgrids were developed using five tiers. The first tier was labelled 'Syllables'. The second tier was labelled *WORDS* and was the orthographic tier. The third tier was labelled *TONES* and was the broad description of contour use the AM-tones label presented and schematized in Table (5.6) above. The fourth tier was labelled 'Translation' and was the translation of the sentence in English. The final tier was the *MISC* tier and was used to add any extra information about the contour or the speaker. Figure 5.3 is a schematic representation of the measurements taken.

[12] The phrase accent [H-] is not observed in our data.

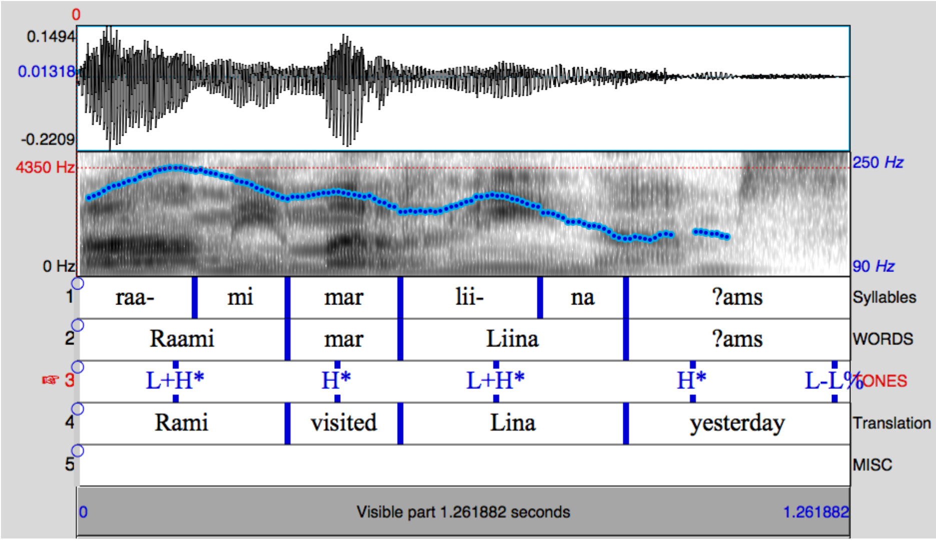


Figure 5.3: Example of a coded PRAAT textgrid.

5.8 Acoustic Measurements and Phonetic Analyses

The ProsodyPro Praat script developed by Xu (2005–2012) was the main PRAAT script used to take F_0, mean intensity and duration measurement from the target sentences (Xu 2013). Much previous research successfully uses this script (Wu and Xu 2010, Wang and Xu 2011, Ambrazaitis and Frid 2012, Choudhury and Kaiser 2012, Liu 2010).[13] This script was used to 'perform systematic analysis of large amounts of data and generates a rich set of output, including both continuous data like time-normalized F_0 contours and F_0 velocity profiles suitable for graphical analysis, and discrete measurements suitable for statistical analysis' and also to '[maximize] efficiency by automating tasks that do not require human judgment, and saving analysis output in formats that are ready for further graphical and statistical analysis' (Xu 2013, P. 7).

It is observed in Chapters six and seven that the most F_0 movement occurs on the stressed syllable of an item in the target sentences. Therefore, the stressed syllable of an item is the domain taken to receive the acoustic analysis.[14]

[13]For more information about this PRAAT script, see `http://www.phon.ucl.ac.uk/home/yi/ProsodyPro/`.

[14]There are empirical studies which use the syllable rather than the entire lexical item to be the domain which receives an acoustic analysis, this is 'based on evidence that speakers produce

Acoustically, we take the syllable to start with the beginning of consonant closure (i.e. syllable onset) and end with the end of the release of the coda or when there is no coda, it ends with the end of vowel (i.e. the syllable offset). Using PRAAT, segmentation labels were added to mark syllable boundaries to be used for acoustic analysis that involves a very detailed acoustic analysis. Xu (2005–2012)'s script ProsodyPro then computed the highest F_0, mean F_0, excursion size taken as an indicator to pitch range, the mean intensity, and the mean duration of each syllable in the target sentence. They are defined as follows.

(7) a. **Max $\mathbf{F_0}$ (Hz):** highest f_0 in Hertz within each labelled interval

b. **Mean $\mathbf{F_0}$ (Hz):** the mean F_0 in Hertz within each labelled interval

c. **Excursion Size (st.):** the F_0 distance in semitone between the lowest pitch and the highest pitch within each labelled interval

d. **Intensity (dB):** the intensity within each labelled interval

e. **Duration (ms):** the duration in millisecond within each labelled interval

The F_0 plots used throughout the study were generated by a Praat script(Xu 2005–2012), with ten points taken from each word at equal proportional intervals. For each point, the F_0 values were averaged across the 80 repetitions by 16 speakers so that the contribution of different speakers, especially males and females were equally weighted (Xu 2005). Figure 5.4 is a schematic representation of the F_0 plot.

syllable-sized contours consistently' (Xu 2013, P. 8).

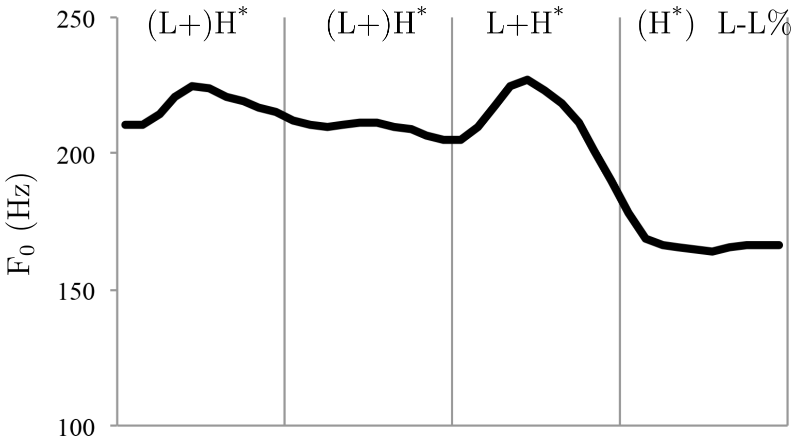


Figure 5.4: Example of Time-normalized mean F_0 of the target sentence /Rāmi mar L̄ina ʔams/. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries.

Using the time-normalized F_0 of the target sentences as schematized in Figure 5.4 'facilitate a direct comparison of continuous F_0 contours, while at the same time generate multiple measurements from non-time-normalized data suitable for statistical analysis' (Xu 2013, P. 7). '[T]ime-normalization allows averaging across repetitions as well speakers, a process that also smoothes out random variations unintended by the speaker, as well as individual differences, leaving only consistent variations due to tone and contextual tonal variations' (Xu 2013, P. 8).

In the present study, we associated the AM tones presented in Table 5.6 with the averaged F_0 curved (i.e. F_0 plot) from 80 repetitions by 16 subjects, as illustrated in Figure (5.4) above. By doing so, the transcription of the tones shown on F_0 plots as in Figure 5.4 above represent the tone shapes displayed on Time-normalized mean F_0 generated by ProsodyPro script. However, tones which are determined by ear are the ones that will be discussed and presented in a separate table and discussed in the relevant chapters. These tables display a summary (in percentage) of the distributions of the pitch accents in the sentences produced by all the HA speakers. All the 2640 sentences produced by the 16 speakers were transcribed using the tones in Table 5.6 and displayed in the Appendix related to the relevant sections.

5.9 Statistical Analysis

SPSS (the last updated software version 19) was the main statistical software used for acoustic analysis. Since the nature of our data is repeated and each subject was exposed to three focus conditions (sentence-focus, information focus and in-situ contrastive focus), Repeated Measures ANOVA test was selected (Vogt 1999, Hinkle et al. 2003). Much previous study on the prosodic encoding of categories of information structure used this test successfully (Chahal 2001, Xu and Xu 2005, Hellmuth 2006, Barry 2007, Hanssen et al. 2008, Wang et al. 2011, Xu and Chen 2012). The dependent variables which are the variables that are being measured in the experiment are Max F_0 (7a), Mean F_0 (7b), excursion size (7c), intensity (7d), and duration (7e). The independent variables are focus and gender. Focus independent variable includes:

(8) a. **sentence-focus condition**: This is the base line where other focus conditions are compared with phonologically and phonetically.[15]

b. **information-focus condition**: This is where item(s) in the target sentence carry information focus based on the analysis provided in Chapter 4 Section 4.3.1.

c. **in-situ contrastive-focus condition**: This is where an item in the target sentence carries contrastive focus that is syntactically realized in-situ and hence it is compatible to be reliably compared with sentence-focus condition and information-focus condition phonologically and phonetically.

In order to assess the differences across the focus conditions in (8), Repeated Measures ANOVAs were used. Repeated Measures ANOVAs were selected to answer the following research questions (9). Mean values for each speaker were

[15] As was pointed out in §1.3, sentence-focus condition, information focus condition and in-situ contrastive focus condition all are realized in structurally identical sentences. Therefore, it is reliable to compare between them phonologically and acoustically to detect the prosodic effects of focus in HA.

taken for the statistical analyses. A mean was calculated for each speaker who had five values of each dependent variables (7) taken from five repetitions for each condition.

(9) a. Does the excursion size of the stressed syllable of the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?

b. Does the Max F_0 of the stressed syllable of the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?

c. Does the Mean F_0 of the stressed syllable of the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?

d. Does the mean duration of the stressed syllable of the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?

e. Does the mean intensity of the stressed syllable of the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?

f. Does the excursion size of the post-focus item(s) occurring after the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?[16]

g. Does the Max F_0 of the post-focus item(s) occurring after the word in information/in-situ contrastive focus differ across sentence-focus condi-

[16]The entire post-focus item (the one that shows the most significant F_0 movement) is taken to receive the acoustic analysis. This is based on the claim that if there is a post-focus effect due to focus, it affects all the materials following focused item and not the stressed syllables only. However, as noted the greatest F_0 movement is realized on the stressed syllable of the item regardless of its position in syntax. Based on our observation, F_0 peaks of the stressed syllables show the greatest difference and hence this is virtually the same as using the Max F_0 of the entire word, since the unstressed syllables do not have higher F_0 than stressed syllables.

tion, information-focus condition, and in-situ contrastive-focus condition?

h. Does the Mean F_0 of the post-focus item(s) occurring after the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?

i. Does the mean duration of the post-focus item(s) occurring after the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?

j. Does the mean intensity of the post-focus item(s) occurring after the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?

k. Does the excursion size of the pre-focus item(s) occurring before the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?[17]

l. Does the Max F_0 of the pre-focus item(s) occurring before the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?

m. Does the Mean F_0 of the pre-focus item(s) occurring before the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?

n. Does the mean duration of the pre-focus item(s) occurring before the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?

[17] The entire pre-focus item (the one that shows the most significant F_0 movement) is taken to receive the acoustic analysis. This is based on the claim that if there is a pre-focus effect due to focus, it affects all the materials occurring before focused item and not only the stressed syllables only. However, as noted the greatest F_0 movement is realized on the stressed syllable of the item regardless of its position in syntax. Based on our observation, F_0 peaks of the stressed syllables show the greatest difference and hence this is virtually the same as using the Max F_0 of the entire word, since the unstressed syllables do not have higher F_0 than stressed syllables.

o. Does the mean intensity of the pre-focus item(s) occurring before the word in information/in-situ contrastive focus differ across sentence-focus condition, information-focus condition, and in-situ contrastive-focus condition?

Note that ex-situ contrastive focus triggered in focus preposing construction was excluded from acoustic analyses. This is because the resulting structure is not syntactically identical to the sentence-focus and argument-focus structures with information focus and with in-situ contrastive focus. They differ in terms of syntax (i.e. syntactic construction) and hence it is statistically impractical for focus-preposing structure to be compared with other focus structures including argument-focus and sentence-focus structure.

Furthermore, the predicate-focus structure (wherein the verb and its compliments are within focus domain) is only acoustically compared with its neutral sentence and not with their argument-focus structures. This is so because predicate-focus structure differs from the argument-focus structure in terms of the focus domain. The focus domain in argument-focus structure (one focused argument in the structure) is shorter than the focus domain in the predicate-focus structure, so it is not statistically practical to compare these focus structures with each other because the focus effect in predicate-focus structure is predicted to span the entire predicate phrase and hence it is different from the prosodic effect of focus in the argument-focus structures. However, we will compare the predicate-focus structures with the argument-focus structures from phonological perspective only and not from phonetic perspective.

All the 16 subjects participated in all the experimental sessions and thus we had no missing data. Before using Repeated Measures ANOVAs, Kolmogorov-Simrnov tests of normality were performed for all the data under investigation. All the data passed Kolmogorov-Simrnov tests of normality for being not statistically significant ($p>.05$). Therefore, the data is suitable for repeated-measures ANOVAs to be conducted. Repeated-measures ANOVAs were then conducted to test whether there are differences between variables, and also, whether gender contributes towards significant effects. If Repeated Measures ANOVA showed statistical significance, then Bonferroni post hoc tests were performed to observe where the significant differences lie.

Regarding the sphericity assumption, it was not significant in most cases. There are few cases where sphericity was significant. However, the updated version of SPSS (version 19) used in this experiment gives the Greenhouse-Geisser correction which is widely held to deal with that to adjust the figure, and hence, Greenhouse-Geisser correction as an alternative was used in these cases.

Chapter 6

Prosodic encoding of focus in a four-word declarative sentence

The aim of this chapter is twofold. First, it aims to investigate the intonation of the sentence-focus structures (neutral sentences).[1] This will serve as a baseline for comparisons. Second, it aims to make phonological and acoustic comparisons in three separate regions (on-focus, pre-focus (if any) and post-focus region) between

- information focus in the sentence-initial position and its neutral counterpart,
- in-situ contrastive focus in the sentence-initial position and its neutral counterpart,[2]
- information focus and in-situ contrastive focus in the sentence-initial position,
- predicate focus and their counterparts in neutral sentence,
- information focus in the sentence-penultimate position and its neutral counterpart,

[1]Throughout the remaining chapters, I use the term 'sentence-focus', 'neutral focus' and 'neutral-sentence' interchangeably.

[2]Throughout the remaining chapters, I use the term 'contrastive focus' to refer to 'in-situ contrastive focus' unless otherwise stated. In addition, when I use the bare term 'focus' I refer to both types of focus: information focus and in-situ contrastive focus unless otherwise is stated.

- in-situ contrastive focus in the sentence-penultimate position and its neutral counterpart,
- predicate focus and argument-focus structure with single information/contrastive focus,
- information focus and in-situ contrastive focus in the sentence-penultimate position,
- ex-situ contrastive focus and neutral intonation patterns.

By making comparisons, we aim to answer the research questions stated in detail in §5.1. The methodology adopted in the present study was presented in detail in Chapter five. The three target sentences examined in this chapter are in (1) below.[3]

(1) a. **Rā**.mi **mar** **Lī**.na ʔ**ams**.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

b. **Ra**.na **saw**.wat mar.**yūl** li-Ma.**nāl**.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

c. **Rā**.mi **hā**.jar li-**lan**.dan al-**bā**.riḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

This chapter is organized as follows. Section 6.1 investigates the global intonational patterns of the three sentences in (1) under neutral focus. Section 6.2 investigates the prosodic effects of information focus and in-situ contrastive focus in the sentence-initial position, compared with each other and with their neutral counterparts. Section 6.3 investigates the prosodic effects of the information focus and in-situ contrastive focus in the sentence-penultimate position, compared with each other and with their neutral counterparts. In addition, this section investigates the intonation of predicate-focus structures and focus preposing, compared

[3]In the target sentences, syllables are divided by a dot, and the stress syllable is in boldface. The stimuli used in this chapter are in §5.3.1.

with their neutral counterparts and also with their argument-focus structures with single information/contrastive focus constituent. Section 6.4 summarizes the results and concludes.

6.1 Sentence-Focus Structure: Base Line

This section aims to investigate the intonation of the three target sentences in (1) embedded in the question-answer contexts in (2a), (3a) and (4a) below to evoke neutral focus.[4] This is necessary to establish a baseline with which to compare the intonation of information focus, contrastive focus and ex-situ contrastive focus. This is to identify those features which are mostly significantly co-occur with focus, and those features that co-occur with focus and also with unfocused constituents.

(2) a. What happened?

b. **Rā**.mi **mar** **Lī**.na ʔ**ams**.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

(3) a. What is the topic?

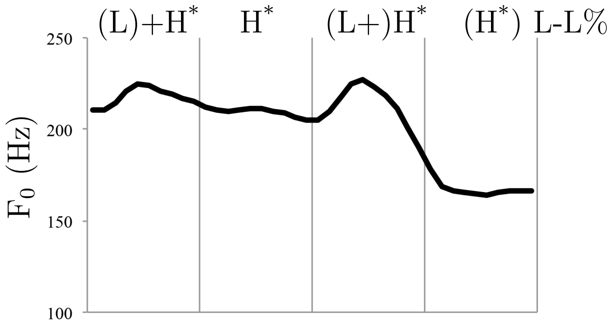
b. **Ra**.na **saw**.wat mar.**yūl** li-Ma.**nāl**.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

(4) a. What happened?

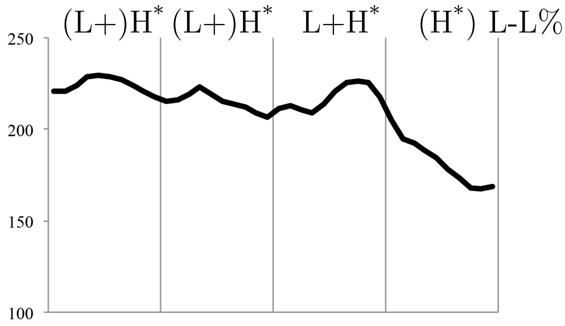
b. **Rā**.mi **hā**.jar li-**lan**.dan al-**bā**.riḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

Figure 6.1 displays the mean F_0 contours of all the sentences produced at normal rate by all the speakers, separated for sentence (2b), sentence (3b) and (4b). Each curve is an average of 80 repetitions by 16 speakers.

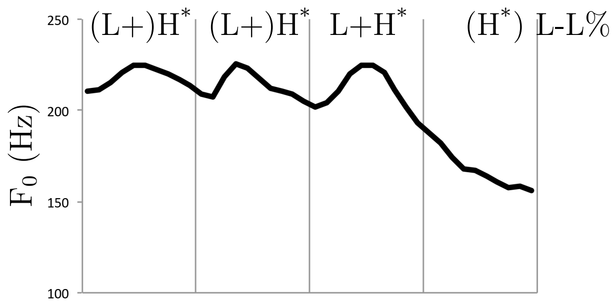
[4] As noted earlier, 'neutral focus' as a term used here to refer to 'sentence-focus structure'.



(a) /**Rā**.mi **mar Lī**.na ʔ**ams**/



(b) /**Ra**.na **saw**.wat mar.**yūl** li-Ma.n**nāl**/



(c) /**Rā**.mi **hā**.jar li-**lan**.dan al-**bā**.riḥ/

Figure 6.1: Time-normalized mean F_0 contours: Sentence-Focus Contours. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. Stressed syllables are in boldface. The Tone displayed on each word in the structure is based on the visual averaged F_0.

Figure 6.1 displays clearly the main global intonational patterns of the neutral sentence in HA. From the graphs in Figure 6.1, we observe the following.

1. Every word in the neutral sentence has local F_0 maxima, apart from the sentence-final word. This is visually observed in every graph in Figure 6.1. The F_0 of the sentence-final word is not entirely visible in the graphs above. The local F_0 maxima of the verb /mār/ 'visited' in Figure 6.1(a) is lower, compared with the F_0 in the nouns /Rāmi/ and /Līna/ in the same graph. There are two possible factors that might contribute to this. Firstly, verbs are widely known to be realized with lower F_0 than nouns (Hoskins 1996, Shih 2000). Secondly, this verb is monosyllabic [CVC] and hence it is short. These factors might explain why the verb /mar/ was produced with lower local F_0 maxima, compared with those of the surrounding words.

2. The F_0 peak is placed within the lexically stressed syllable. This is visible in every graph in Figure 6.1. The F_0 peak of /Rāmi/, /Līna/, /Rana/, /sawwat/, and /hājar/, whose stressed syllables are the first, occurs within the first syllable. For example, the F_0 of the verb /hā.jar/ visually starts raising from the onset of the stressed syllable (first syllable) to reach the highest point within the stressed syllable, and then starts lowering from the stressed syllable till the end of the prosodic word. The local F_0 peak of /maryūl/ starts from around the onset of the stressed syllable (final syllable) to reach the highest point, and then starts lowering till the end of the prosodic word and then another F_0 movement takes place on the following prosodic word.

3. The domain of the pitch accent (local F_0 maxima) is very local. That is, it starts rising from the onset of the stressed syllable to reach the highest point, and then starts lowering till the end of the stressed syllable and thus it does not span across the entire prosodic word.

4. The F_0 of the sentence-penultimate word is the most expanded/prominent[5], compare with those of the surrounding words in the same structure. This is clearly visible in all the graphs in Figure 6.1.

5. The entire F_0 of the sentences ends low. This is clearly seen in all the graphs in Figure 6.1.

Based on the auditory impression, we analysed all the neutral contours produced by all the speakers (16 speakers). The summary of the results is in Table 6.1.[6]

[5]Throughout the thesis, we use 'prominent/Most prominent' to refer to the expansion of the pitch range of the word (not a pitch accent type) in comparison with its counterpart in another 'identical' structure.

[6]See Appendix B.1 for full transcription results.

Sentence (2b)	*Rāmi*	*mar*	*Līna*	*ʔams*
	L+H* (37.5%) H* (62.5%)	H* (100%)	L+H* (72.5%) H* (27.5%)	H* (100%)
Sentence (3b)	*Rana*	*sawwat*	*maryūl*	*li-manāl*
	L+H* (30%) H* (70%)	L+H* (12.5%) H* (87.5%)	L+H* (83.75%) H* (16.25%)	H* (100%)
Sentence (4b)	*Rāmi*	*hājar*	*li-landan*	*al-bāriḥ*
	L+H* (30%) H* (70%)	L+H* (23.75%) H* (76.25%)	L+H* (83.75%) H* (16.25%)	H* (100%)

Table 6.1: The frequency in percentage of the pitch accent distributions in the neutral sentence. The percentage number between parenthesis indicates the percentage of the tokens (i.e. 80 repetitions) produced by 16 speakers. All the sentences end with the low boundary tone L%.

Table 6.1 shows the distribution of the pitch accents in the neutral sentences. This table is quite revealing in several ways. First, there are two common pitch-accent types observed. They are the bitonal pitch accent [L+H*] and the monotonal pitch accent [H*].[7] Second, HA speakers placed a pitch accent on every content word. This indicates that the local F_0 maxima observed in every word in the sentence in Figure 6.1 represents a pitch accent. Third, the peak of the pitch accent always occurs within the stressed syllable and thus the H target is associated with a star in Table 6.1, following the AM convention §2.4.1. Fourth, the domain of the pitch accent is very local in the sense that it occurs within the lexically stressed syllable. That is, the rise of the pitch accent starts from the onset of the stressed syllable till it reaches the highest point within the stressed syllable, then the tone falls steadily across the following unstressed syllable(s). This indicates that the pitch accent does not span across the entire prosodic word. Finally, all the declarative sentences end with the low boundary tone L%.

These findings are significant in at least two respects. First, HA is found to have a small number of pitch accents: [H*] and [L+H*], based on the intonation of the four-word declarative sentences under neutral focus. Second, HA speakers place a pitch accent on almost every content word. These two findings are clearly visible in Figure 6.1 and in Table 6.1 above.

[7]See §5.6, the schematization of these tones and their shape.

The typical pitch tracks in Figure 6.2, 6.3 and 6.4 were produced by the same speaker coded A4 (male speaker).[8] These pitch tracks display all the visual and auditory observations pointed out so far. They show (i) almost every lexically stressed syllable in the sentence is pitch-accented, (ii) the peak of the pitch accent (i.e. the H(igh) target) always occurs within the stressed syllable, (iii) the domain of pitch accent is very local (i.e. it is realized within the stressed syllable), (iv) all the sentences end with the low boundary tone L%.

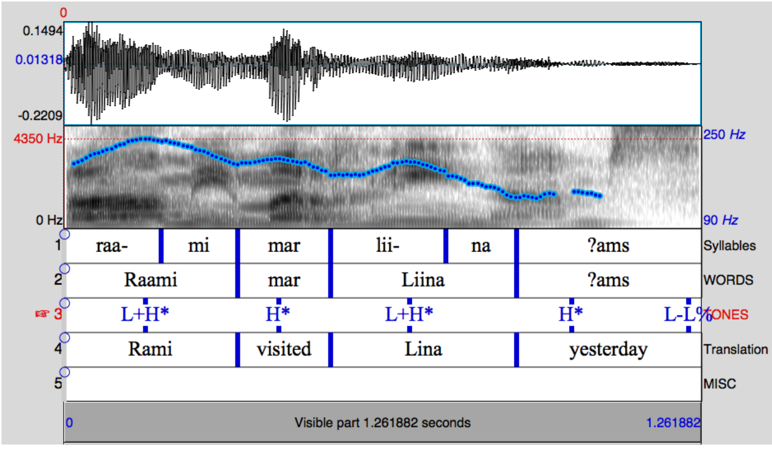


Figure 6.2: Male Speaker (Coded A4).

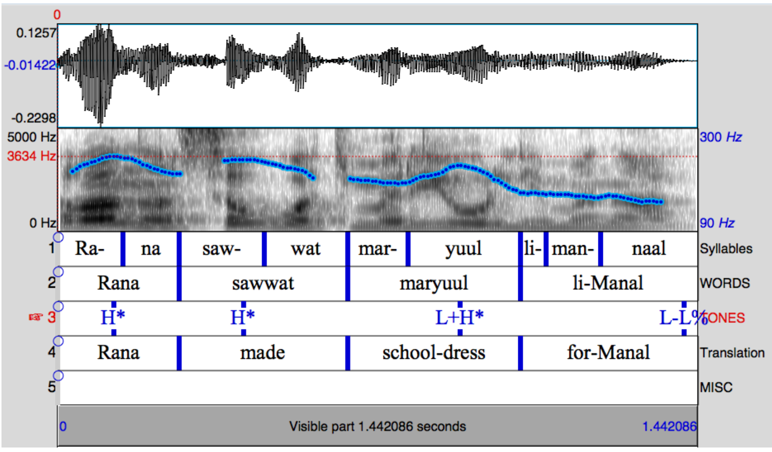


Figure 6.3: Male Speaker (Coded A4).

[8]He is 32 years old, educated and monolingual.

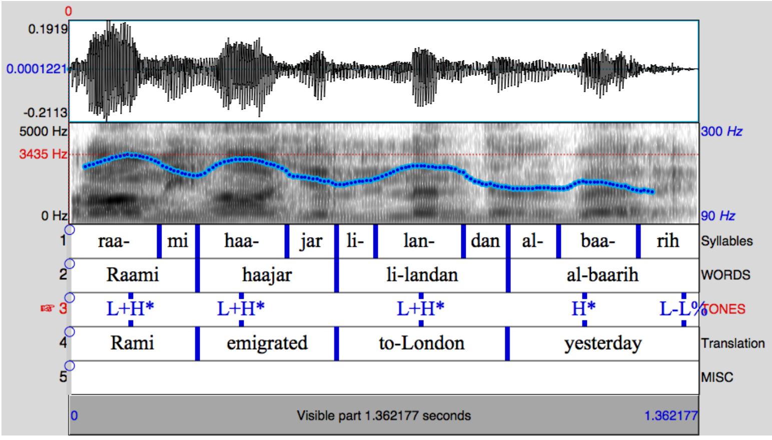


Figure 6.4: Male Speaker (Coded A4).

The above pitch tracks display three predominant intonational patterns. First, there is a large number of neutral sentences produced with gradual declination in the height of the pitch peaks, as shown clearly in all the three pitch tracks above. **Declination** is a general tendency for F_0 to decline over the course of any utterance. It is first of all a phonetic observation. As such it is widely found in many languages (Cohen et al. 1982, Gussenhoven and Rietveld 1988, Hellmuth 2006). Second, the majorities of the neutral sentences examined in this section were produced with the nuclear pitch accent [L+H*] placed on the stressed syllable of the sentence-penultimate word, as in Figure 6.3. Third, it is interesting to note that HA speakers can produce the same pitch accent on every lexically stressed syllable in the sentence, apart from the sentence-final word which seems to be affected by 'final-lowering effect'. This is seen in Figure 6.4.

In summary, the findings reported in this section are significant in at least five respects. First, every word in a sentence is pitch-accented. Second, the peak of the pitch accent (i.e. H target) occurs within the stressed syllable. Third, HA neutral sentences are produced with only two types of pitch accents: [L+H*] and [H*]. Fourth, the domain of pitch accent is very local. Fifth, the pitch accent on the sentence-penultimate word is mostly associated with more expanded pitch accent, compared with the surrounding pitch accents in the structure.

The following sections investigate the prosodic effects of information/contrastive focus. To detect the prosodic effects of focus, comparisons will be made, as noted in the introduction to this chapter.

6.2 Focus in Sentence-Initial Position

6.2.1 Information Focus vs. Sentence Focus

This section aims to answer the following research questions: (a) Does the information-focused word in the sentence-initial position differ phonologically from its neutral counterpart in the sentence focus structures? If so, how? (b) Do the post-focus words (in the post-focus region) occurring after the information focus differ phonologically from their neutral counterparts in the sentence-focus structures? If so, how? This is to identify clearly the prosodic effects of the information focus occurring in the sentence-initial position.

The three target sentences (1) were embedded in the question-answers context in (5a), (6a) and (7a) below to evoke information focus on the sentence-initial word.

(5) a. Who visited Lina yesterday?

b. [**Rā**.mi]$_F$ **mar** **Lī**.na ʔ**ams**.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

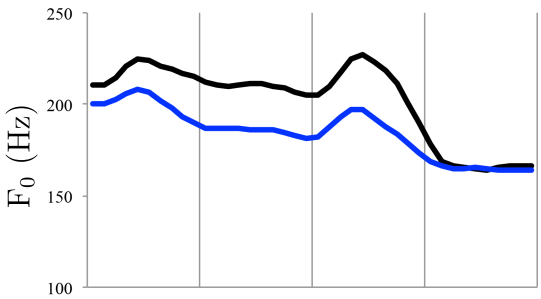
(6) a. Who made a school-dress for Manal?

b. [**Ra**.na]$_F$ **saw**.wat mar.**yūl** li-Ma.**nāl**.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

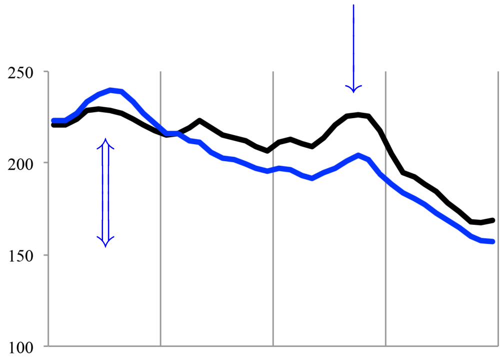
(7) a. Who emigrated to London yesterday?

b. [**Rā**.mi]$_F$ **hā**.jar li-**lan**.dan al-**bā**.riḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

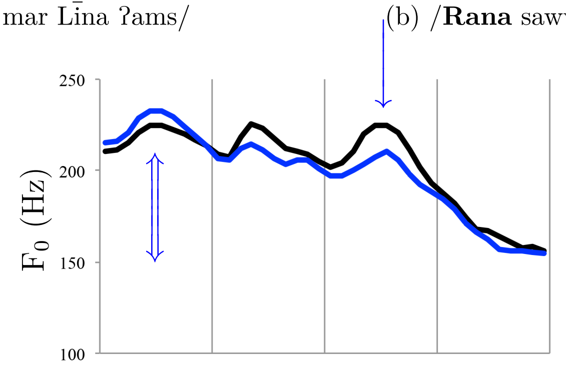
The mean F_0 contours of the three target sentences uttered with and without information focus are presented in Figure 6.5, averaged across all the speakers' repetitions. Through visual inspection of Figure 6.5, the main prosodic effects of the information focus occurring in the sentence-initial position become visually clear.



(a) /**Rāmi** mar Līna ʔams/



(b) /**Rana** sawwat maryūl li-Manāl/



(c) /**Rāmi** hājar li-landan al-bāriḥ/

Figure 6.5: Time-normalized mean F_0 Contour: Sentence-initial word (in boldface) is the key word. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The black contour is sentence-focus structure and the blue contour is argument-focus structure wherein the sentence-initial word is information-focused. ⇕ indicates expansion of pitch range, and ↓ indicates pitch-accent compression.

Figure 6.5(a) displays that the level of the entire F_0 of the argument-focus structure in the blue contour with information-focused word in the sentence-initial position is, contrary to expectations, lower than the level of the entire F_0 of its neutral counterpart. This figure differs from the other two figures shown in Figure 6.5. The reason for this is not clear and hence it is unexplained. Nevertheless, the prosodic effects of information focus are shown clearly in Figure 6.5(b) and 6.5(c).[9] From these two graphs, we observe the following.

[9] Although the level of the F_0 of the argument-focus structure (in the blue contour) is lower than the level of the F_0 of the neutral sentence in graph 6.5(a), the prosodic effect of the

1. The F_0 peak of the information-focused word in the blue contour is higher than the F_0 peak of the same word in the sentence-focus structure in the black contour (i.e. neutral sentence). This is clearly seen in Figure 6.5(b) and

2. The F_0 peaks of all the post-focus words occurring after the information-focused word are lower than those of the same words in the neutral sentence (in the black contour). This indicates that the information-focused word has prosodic effects on the post-focus words. This is seen clearly in Figure 6.5(b) and 6.5(c).

3. The location of the F_0 peaks of all the words are the same with or without information focus. This is visible in all the graphs in Figure 6.5. This indicates that the information-focused word does not have a prosodic effect on the peak alignment of the pitch accents.

4. The domain of the pitch accent (local F_0 maxima) on the stressed syllables are very local with or without information focus. This is clearly seen in the graphs above. This indicates that the information-focused word does not affect the domain of its own pitch accent. That is, the pitch accent on the information-focused word does not span across the entire prosodic word.

Based on the auditory analyses, Table 6.2 displays a summary of the distribution of the pitch accents in the target sentence (5b), (6b) and (7b).[10]

information-focused word in the sentence-initial position is visible. That is, the pitch range of the F_0 of the information-focused word /Rāmi/ in Figure 6.5(a) (M=2.66, SD=1.83) is, to some extent, higher than the excursion size of the same word under neutral focus (M=1.88, SD=1.25) (The acoustic analyses will be provided in §6.2.4.1.

[10]See Appendix B.2.1 for the full transcription results.

Focus Region	**On-Focus**	**Post-Focus**		
Sentence (5b)	*Rāmi*	*mar*	*Līna*	*ʔams*
	L+H* (62.5%) H* (37.5%)	L+H* (8.75%) H* (91.25%)	L+H* (48.75%) H* (51.25%)	H* (100%)
Sentence (6b)	*Rana*	*sawwat*	*maryūl*	*li-manāl*
	L+H* (77.5%) H* (22.5%)	H* (100%)	L+H* (11.25%) H* (88.75%)	H* (100%)
Sentence (7b)	*Rāmi*	*hājar*	*li-landan*	*al-bāriḥ*
	L+H* (77.5%) H* (22.5%)	L+H* (6.25%) H* (93.75%)	L+H* (21.25%) H* (78.75%)	H* (100%)

Table 6.2: The frequency in percentage of the pitch accent distributions in the argument-focus structure when the information focus occupies the sentence-initial word. The percentage between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

Based on the summary presented in Table 6.2, we observe the following. First, the peaks of all the pitch accents are aligned with the stressed syllables. This indicates that the location of the peaks of the pitch accents are the same with or without information focus. Second, the information-focused word occurring in the sentence-initial position is associated more with the bitonal pitch accent L+H* than any item in the structure. This is shown clearly in Table 6.3 below. Table 6.3 displays the distribution of the pitch accents produced on the information-focused word, compared with the distribution of the pitch accents produced on the same word under neutral focus.

Figure (6.5(a))		Figure (6.5(b))		Figure (6.5(b))	
Rāmi		**Rana**		**Rāmi**	
Sentence Focus	Information Focus	Sentence Focus	Information Focus	Sentence Focus	Information Focus
L+H* (37.5%) H* (62.5%)	L+H* (62.5%) H* (37.5%)	L+H* (30%) H* (70%)	L+H* (77.5%) H* (22.5%)	L+H* (30%) H* (70%)	L+H* (77.5%) H* (22.5%)

Table 6.3: The distribution of the pitch accents in percentage: information-focused item vs. its counterpart in sentence-focus structure. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

In Table 6.3, the information-focused word was produced more with [L+H*] than its neutral counterpart in the sentence-focus structure.

All the observations stated so far are shown in the typical pitch tracks produced by the same speaker coded A4 (male speaker).

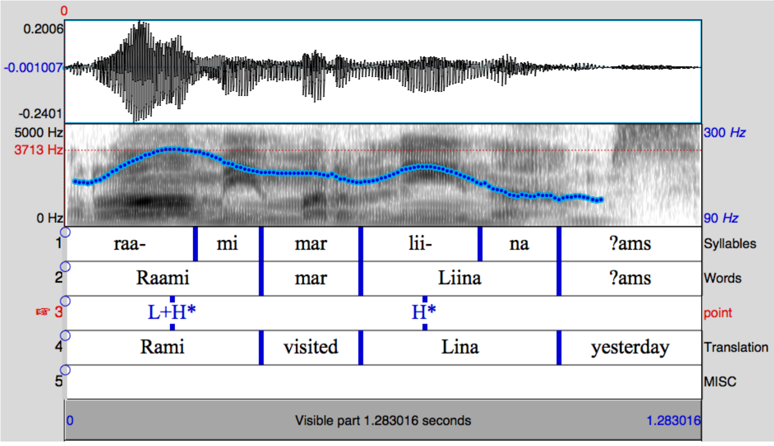


Figure 6.6: Male Speaker (Coded A4). Information focus is on the sentence-initial word.

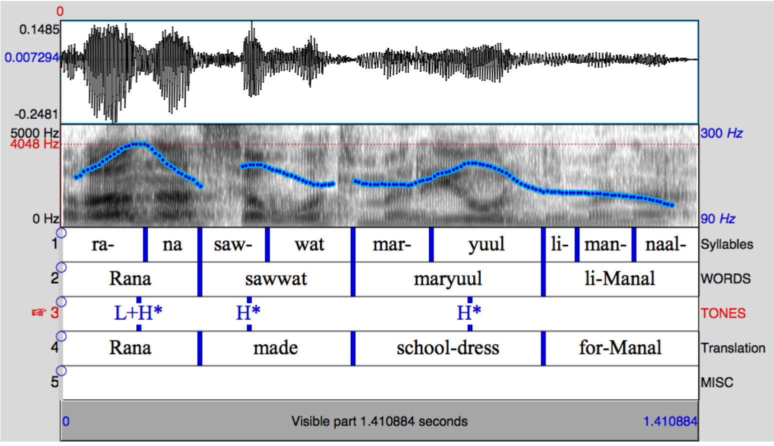


Figure 6.7: Male Speaker (Coded A4). Information focus is on the sentence-initial word.

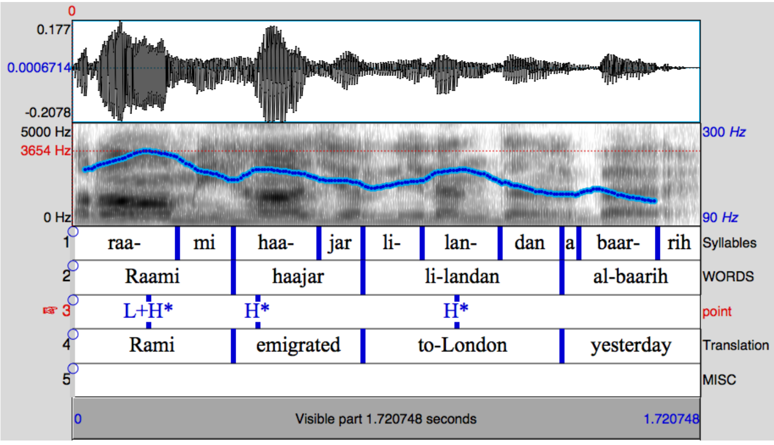


Figure 6.8: Male Speaker (Coded A4). Information focus is on the sentence-initial word.

The most typical intonational patterns for the argument-focus structure with single information focus occurring in the sentence-initial position, as represented in the typical tracks above, is characterized by placing the nuclear pitch accent (mostly [L+H*]) on the information focused word, followed by compressed pitch accents (mostly [H*]).

To sum up, the most interesting finding obtained from the visual and auditory observation was that the information-focused word was produced with more expanded pitch range, compared with its neutral counterpart. In addition, the post-focus words were compressed. This finding will be verified in the acoustic analyses presented in §6.3.8.

The following section investigates the phonological patterns of contrastive focus occurring in sentence-initial position, compared with its neutral counterpart.

6.2.2 Contrastive Focus vs. Sentence Focus

The three test sentences in (1) were embedded in the question-answer contexts in (8a), (9a) and (10a) to evoke 'in-situ' contrastive focus on the sentence-initial word. This is to answer the following research questions: (a) Does the contrastive-focused word in the sentence-initial position differ phonologically from its neutral counterpart in the sentence focus structures? If so, how? (b) Do the post-focus words (in the post-focus region) occurring after the contrastive focus differ phonologically from their neutral counterparts in the sentence-focus structures? If so, how?

(8) a. Who visited Lina yesterday? Marwan?

b. [**Rā**.mi]$_{CF}$ **mar** **Lī**.na ʔ**ams**.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

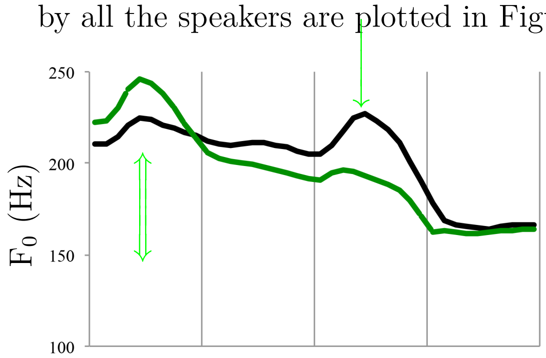
(9) a. Who made a school-dress for Manal? Nawal?

b. [**Ra**.na]$_{CF}$ **saw**.wat mar.**yūl** li-Ma.**nāl**.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

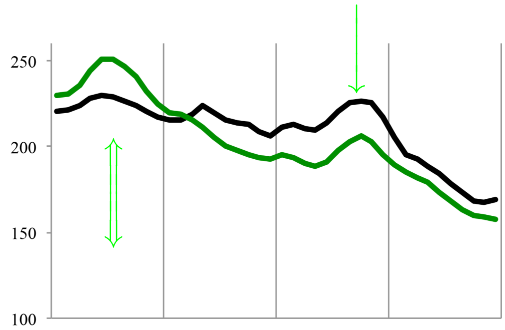
(10) a. Who emigrated to London yesterday? Marwan?

b. [**Rā**.mi]$_{CF}$ **hā**.jar li-**lan**.dan al-**bā**.riḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

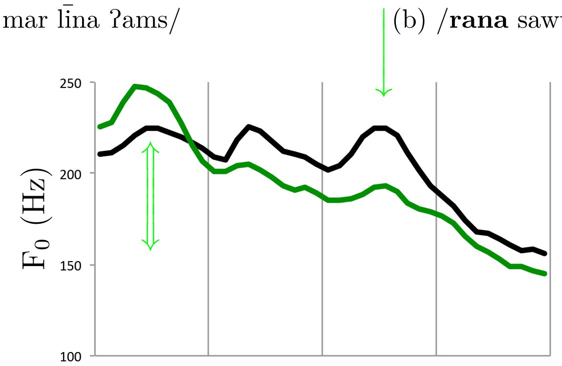
The time-normalized mean F_0 contours for all the three sentences produced by all the speakers are plotted in Figure 6.9.



(a) /**rāmi** mar līna ʔams/



(b) /**rana** sawwat maryūl li-manāl/



(c) /**Rāmi** hājar li-landan al-bāriḥ/

Figure 6.9: Time-normalized mean F_0 Contour: Sentence-initial word (in boldface) is contrastive focus. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The black contour is sentence-focus structure, and the green contour is wherein the sentence-initial word is contrastive-focused. ⇳ indicates expansion of pitch range, and ↓ indicates compressed pitch accent.

From the graphs in Figure 6.9, we observe the following.

1. The F_0 peak of the contrastive-focused word in the sentence-initial position (in the green contour) is visually higher than the F_0 peak of its neutral counterpart (in the black contour). This is seen in all the graphs in Figure 6.9.

2. The F_0 peaks of all the post-focus words occurring after the focused word are visually lower and more compressed than those of the same words in the neutral sentence. This is seen in all the graphs above.

3. The domain of the pitch accent (local F_0 maxima) on the stressed syllables are very local with or without contrastive focus.

4. The location of the F_0 peaks of all the words are the same with or without contrastive focus. This is visible in all the graphs. This indicates that contrastive focus does not have an effect on peak alignments in HA.

Table 6.4 summarizes the distribution of the pitch accents in sentence (8b), (10b) and (10b).[11]

Focus Region	**On-Focus**	**Post-Focus**		
Sentence (8b)	*Rāmi*	*mar*	*Līna*	*ʔams*
	L+H* (98.75%) H* (1.25%)	H* (100%)	L+H* (1.25%) H* (98.75%)	N/P
Sentence (9b)	*Rana*	*sawwat*	*maryūl*	*li-manāl*
	L+H* (90%) H* (10%)	H* (100%)	L+H* (13.75%) H* (86.25%)	N/P
Sentence (10b)	*Rāmi*	*hājar*	*li-landan*	*al-bāriḥ*
	L+H* (87.5 %) H* (12.5 %)	H* (100%)	H* (100%)	N/P

Table 6.4: The frequency in percentage of the pitch accent distributions in the argument-focus structure with contrastive focus occurring in the sentence-initial word.The percentage between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

From Table 6.4, we observe the following. First, the contrastive-focused word was produced more with [L+H*] than with [H*]. However, it should be noted that this does not suggest that [L+H*] is the default pitch accent for the contrastive focus in this language. A piece of evidence for this claim is that Table 6.4 reveals that there are cases in which the contrastive-focused word was produced with [H*]. Second, the sentence-penultimate word in the neutral sentence was produced more with [L+H*] than with [H*] whereas the same word when it was produced as a post-focused word, it was produced more with the monotonal pitch accent [H*] than with the bitonal pitch accent [L+H*]. Finally, the locations of all the peaks of all the words are the same with or without contrastive focus. This is indicated by the use of 'star' associated with the H target which shows that the H target is aligned with the lexically stressed syllable. This is shown in Table 6.4 above.

[11] See Appendix B.2.2 for the full transcription results.

Table 6.5 compares the distribution of the pitch accents in percentage produced on the contrastive-focused word with those produced on its neutral counterpart. The table clearly shows that [L+H*] was produced more on the contrastive-focused word than on its neutral counterpart.

Figure (6.9(a))		Figure (6.9(b))		Figure (6.9(c))	
Rāmi		**Rana**		**Rāmi**	
Sentence Focus	Contrastive Focus	Sentence Focus	Contrastive Focus	Sentence Focus	Contrastive Focus
L+H* (37.5%) H* (62.5%)	L+H* (98.75%) H* (1.25%)	L+H* (30%) H* (70%)	L+H* (90%) H* (10%)	L+H* (30%) H* (70%)	L+H* (87.5%) H* (12.5%)

Table 6.5: The distribution of the pitch accents in percentage: contrastive-focused item vs. its counterpart in sentence-focus structure. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

The typical pitch tracks in Figure 6.10, 6.11 and 6.12 were produced by the same speaker coded A4 (male speaker).

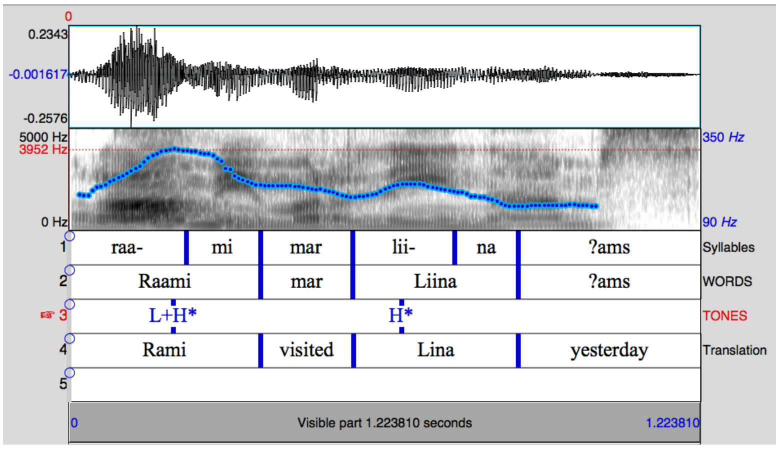


Figure 6.10: Male Speaker (Coded A4). contrastive focus is sentence-initial.

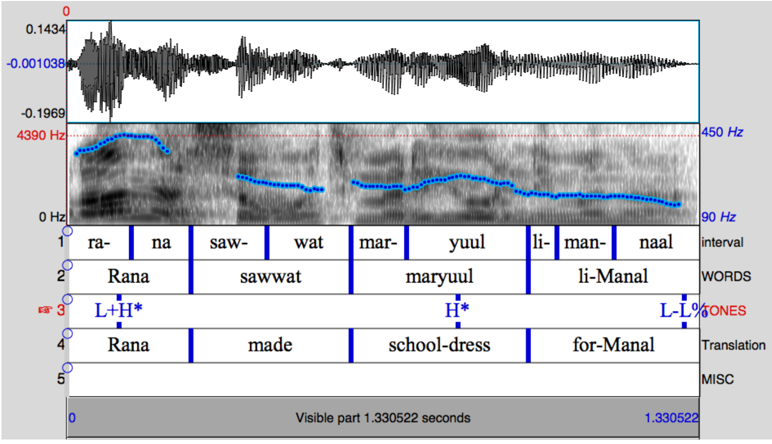


Figure 6.11: Male Speaker (Coded A4). contrastive focus is sentence-initial.

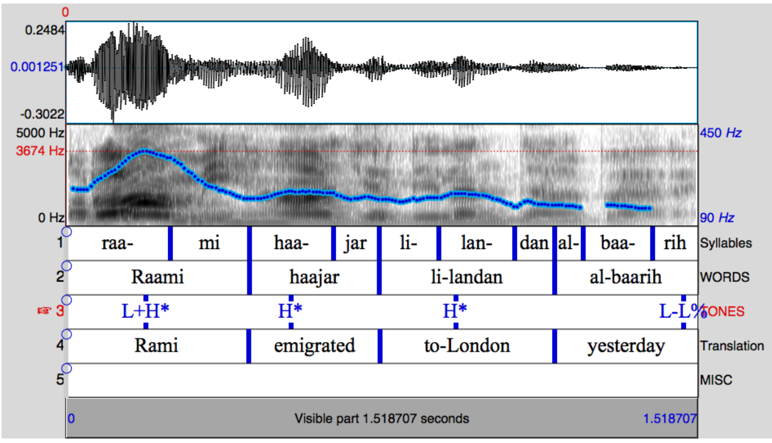


Figure 6.12: Male Speaker (Coded A4). contrastive focus is sentence-initial.

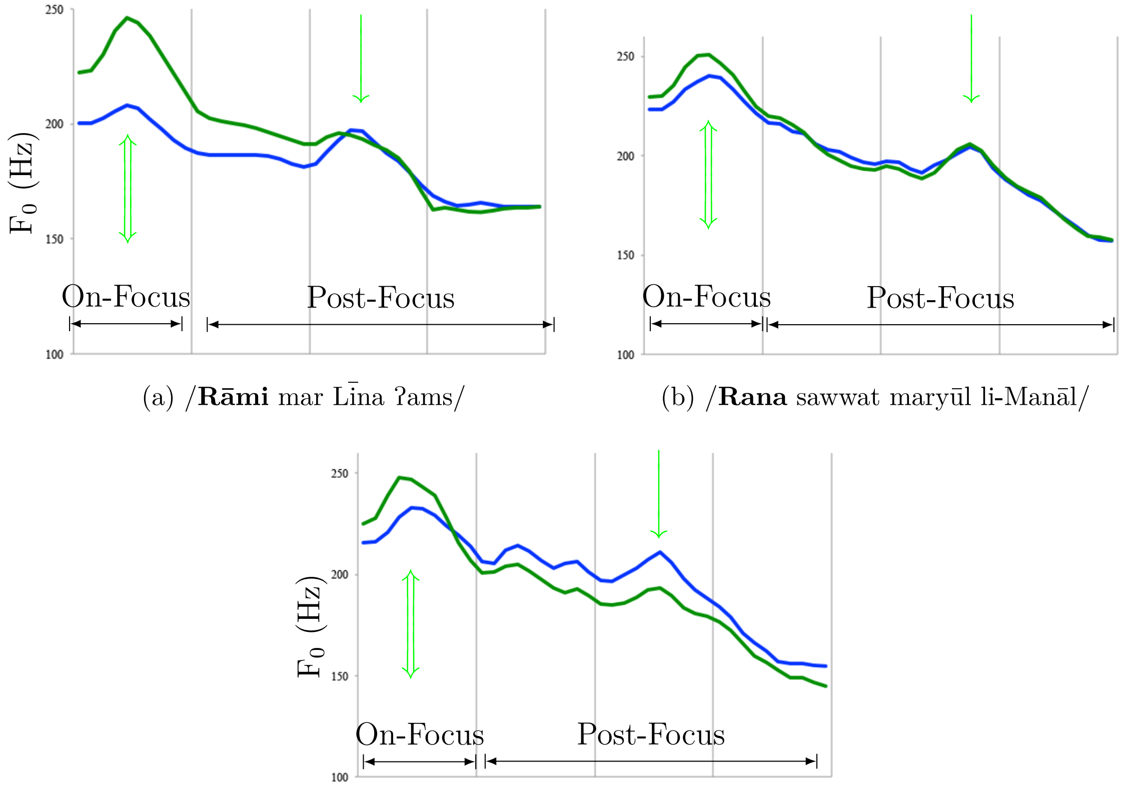
They display the typical intonation patterns produced by the majority of the speakers. They clearly show the visual and the auditory observations stated earlier in this section. In these tracks, the focused word attracts the nuclear pitch accent [L+H*]/[H*]. This nuclear pitch accent is followed by compressed pitch accents (will be verified in §6.3.8). The post-focus words were mostly produced with [H*] as shown below which is the predominant postnuclear pitch accent in the language.

In short, contrastive focus has prosodic effects on the on-focus word and also on the post-focus words. The on-focus word always attracts the nuclear pitch accent of the sentence, followed by compressed pitch accents/F_0. The following section investigates the difference in the prosodic effects between contrastive focus and its information-focused counterpart occurring in the same sentential position.

6.2.3 Information Focus vs. Contrastive Focus

This section aims to answer the following research questions: (a) Does the contrastive-focused word (in-situ) and its information-focused counterpart differ phonologically from each other? If so how?, and (b) Do the post-focus words occurring after the contrastive-focused word differ phonologically from the same words occurring after the information-focused word? If so, how?

The time-normalized mean pitch contours for all the three test sentences in the information- and contrastive-focus condition are presented in Figure 6.13, averaged across all speakers' repetitions.



(a) /**Rāmi** mar Līna ʔams/

(b) /**Rana** sawwat maryūl li-Manāl/

(c) /**Rāmi** hājar li-landan al-bāriḥ/

Figure 6.13: Time-normalized mean F_0 Contour: Sentence-initial word (in boldface) is the key word. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The blue contour is wherein sentence-initial word carries information focus whereas the green contour is wherein the sentence-initial word carries contrastive focus. ⇕ indicates expansion of pitch range, and ↓ indicates compressed pitch accent.

The graphs in Figure 6.13 show clearly the main differences between the prosodic effects of the contrastive focus and those of its information-focused counterpart. Based on the visual inspections, we list the following observations, which are shown clearly in all the graphs in Figure 6.13.

1. The F_0 peak of the contrastive-focused word (in the green contour) is higher than the F_0 peak of its information-focused counterpart (in the blue contour). This is seen in all the graphs above.

2. The F_0 peaks of all the post-focus words occurring after the contrastive-focused word are lower than those of the same words occurring after the information-focused word. This is more visible in Figure 6.13(c) than in Figure 6.13(b).

3. The domain of the pitch accent (local F_0 maxima) on the stressed syllables are very local with contrastive focus and with information focus.

4. The location of the F_0 peaks of all the words are the same with contrastive focus and with information focus. This is visible in all the graphs in Figure 6.13.

Table 6.6 displays the distribution of the pitch accents produced on the contrastive-focused word, compared with those produced on the same word under information focus.

Figure (6.13(a))		Figure (6.13(b))		Figure (6.13(c))	
Rāmi		**Rana**		**Rāmi**	
Information Focus	Contrastive Focus	Information Focus	Contrastive Focus	Information Focus	Contrastive Focus
L+H* (62.5%) H* (37.5%)	L+H* (98.75%) H* (1.25%)	L+H* (77.5%) H* (22.5%)	L+H* (90%) H* (10%)	L+H* (77.5%) H* (22.5%)	L+H* (87.5%) H* (12.5%)

Table 6.6: The distribution of the pitch accents in percentage: contrastive-focused item vs. its information-focused counterpart. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

When the distribution of the pitch accents produced on the contrastive focus is compared with those produced on the same word under information focus, the phonological difference between these categories of IS become more clear. A number of phonological observations are listed in the following, which are obtained from Table 6.6.

1. The contrastive focus was produced more with the bitonal pitch accent [L+H*] than with the monotonal pitch accent [H*]. This observation suggests that there is no default pitch accent assigned to either contrastive focus or information focus in HA. This is so because the contrastive focus can be realized with [L+H*] and also with [H*] as clearly shown in Table 6.6.

2. The location of the F_0 peaks of the contrastive focus and information focus are the same. This is evident in Table 6.6, which shows the H target is always aligned with the stressed syllable of the focus word.

In summary, the contrastive focus is produced with higher F_0 compared with the same word under information focus. There are cases including Figure 6.13(c) showing that the post-focus words occurring after contrastive focus are produced with more compressed pitch range, compared with the same words occurring after information focus. The observations reported in this section and in the preceding sections need to be verified by statistical tests, which will be the focus of the following section.

6.2.4 Phonetic Analyses

Figure 6.14 displays the time-normalized mean F_0 curves averaged across all the sixteen speakers, three sentences and five repetitions.

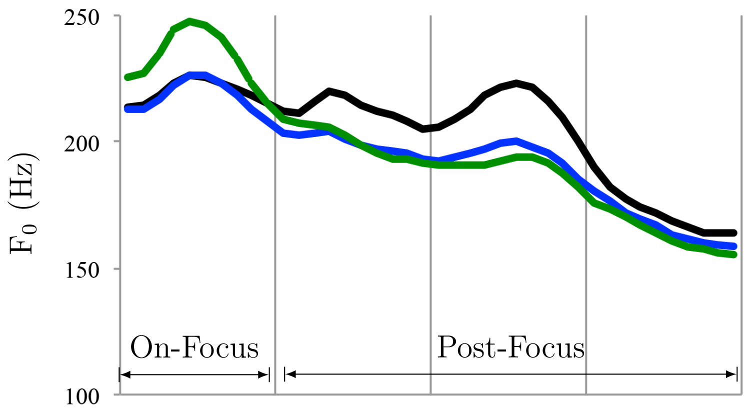


Figure 6.14: Time-normalized mean F_0 contours averaged across 16 speakers, 3 sentences and 5 repetitions. The vertical lines mark the word boundaries. The black contour is sentence-focus structure (i.e neutral sentence), the blue contour is the argument-focus structure wherein the sentence-initial word is information-focused, and the green contour is the argument-focus structure wherein the sentence-initial word is contrastive-focused.

From Figure 6.14, we can see our visual observations presented in §6.2.1, 6.2.2 and 6.2.3 in the graph in Figure 6.14 above.

For statistical tests, the post-focus domain includes only the dependent values of the sentence-penultimate word (§5.9) for the following reasons. First, the sentence-penultimate word in all the three target sentences are nouns (i.e. arguments of the verb) and thus they are rather higher in their F_0 than verbs (Hoskins 1996, Shih 2000). Second, the initial portion of f0 contours of the verb occurring immediately after the focused item is mainly a transition toward the post-focus target, and hence the carryover effect from the on-focus expansion may have masked the true post-focus target. Third, the sentence-final item is predicated be affected by the low boundary of the entire intonational phrase. To avoid these rather common measurement issues, the dependent values of the sentence-penultimate word are taken to be the representatives of the post-focus region.

This section will perform a very detailed phonetic analyses to verify the auditory and the visual observations presented in §6.2.1, 6.2.2 and 6.2.3. This section aims to answer the research questions stated in detail in §5.9. The statistical methods and procedures were presented in detail in §5.8 and 5.9.

6.2.4.1 Excursion Size (st.)

This section aims to find answers to the following research questions: (a) Does the excursion size of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so, how? and (b) Does the excursion size of the post-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so, how?

Table 6.7 describes the scores of the excursion size of the stressed syllable of the on-focus region in sentence-focus, information-focus and contrastive-focus condition. It shows descriptively that the mean score of the excursion size of the on-focus region increases across the three focus conditions. To verify this increase in the excursion size, a Repeated Measures ANOVA was performed.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	1.84	2.83	4.21
	Std. Error	0.27	0.37	0.58
Median		1.60	3.35	4.19
Std. Deviation		1.09	1.50	2.32
Statistics	Maximum	3.96	4.95	7.62
	Minimum	0.55	0.52	0.57
Range		3.42	4.42	7.05

Table 6.7: Excursion size of stressed syllable of the on-focus region (in st.).

A Repeated Measures ANOVA with Greenhouse-Geisser[12] revealed that the focus condition has a statistically significant effect on the excursion size of the on-focus region [$F(1.336, 18.706)=21.540$, $P<.001$]. The effect of gender was found to be non-significant: p=0.160. Post hoc comparison with Bonferroni adjustment[13] reveals that the excursion size of the contrastive focus (M= 4.21, SD= 2.32) is statistically significantly more expanded than its neutral counterpart (M= 1.84, SD= 1.09): $p<$ 0.001. It also reveals that the excursion size of the contrastive focus is statistically significantly more expanded than its information-focused counterpart (M= 2.83, SD= 1.50): $p<0.003$. It, in addition, reveals that the excursion size of the information focus is statistically significantly more expanded

[12]The table is in Table B.11 in Appendix B.2.3.1 on Page 392.
[13]The table is in Table B.12 in Appendix B.2.3.1 on Page 392.

than its neutral counterpart: p<0.004. Figure 6.15 shows the median differences in the excursion size across the focus conditions.

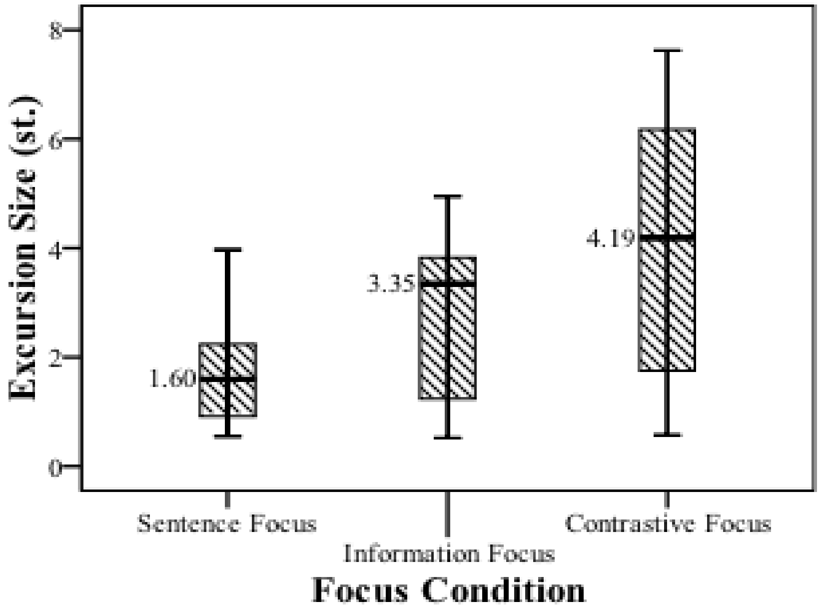


Figure 6.15: Boxplot of Excursion size of the stressed syllable of the on-focus region (in st.).

Table 6.8 presents the scores of the excursion size of the post-focus region. It shows that there is a decrease in the mean score of the excursion size of the post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this decrease, a Repeated Measures ANOVA was performed.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	6.05	5.18	3.96
	Std. Error	0.51	0.48	0.35
Median		5.59	4.79	3.77
Std. Deviation		2.06	1.92	1.39
Statistics	Maximum	8.88	9.19	7.78
	Minimum	2.53	2.65	1.78
Range		6.35	6.54	5.99

Table 6.8: Excursion size of the post-focus region (i.e.sentence-penultimate item).

A Repeated Measures ANOVA with Sphericity[14] determines that the focus has a statistically significantly effect on the excursion size of the post-focus region [$F(2, 28)$=8.353, p<0.001]. The effect of gender was not found to be sig-

[14]The table is in Table B.14 in Appendix B.2.3.1 on Page 393.

nificant: p=0.748. Post hoc comparison with Bonferroni adjustment[15] reveals that the excursion size of the post-focus region occurring after contrastive focus (M=3.96, SD=.347) is statistically significantly less expanded than the same word in neutral sentence (M=6.05, SD=.515): p<0.015. However, the test reveals that the excursion size of the post-focus region occurring after information focus (M=5.18, SD=.479) is not statistically significantly different from their counterpart in the neutral sentence (M=6.05, SD=.515): p=0.212. In addition, the difference between the post-focus region occurring after the information focus and their counterpart occurring after the contrastive focus is statistically borderline significant: p=0.05. Figure 6.16 shows the differences in the excursion size of the post-focus region across the focus conditions: sentence-focus, information-focus and contrastive-focus condition.

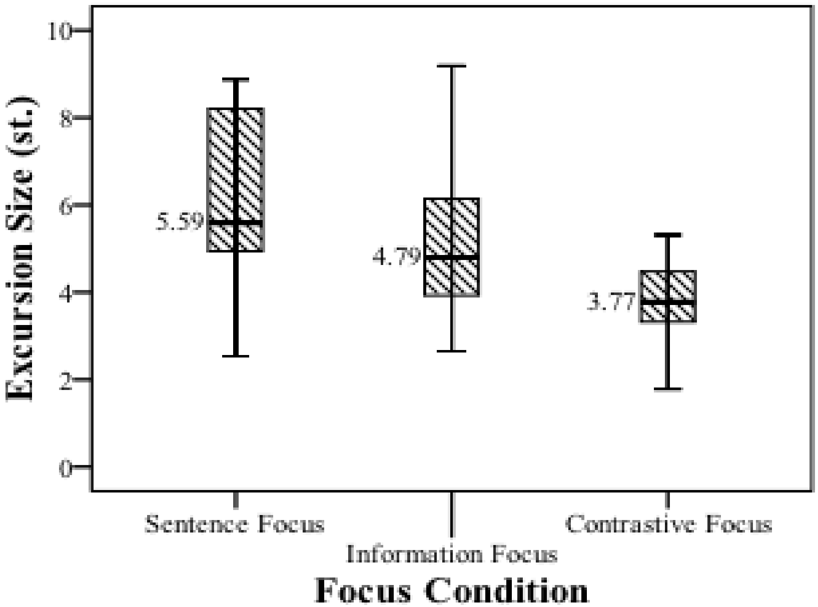


Figure 6.16: Boxplot of Excursion size of the post-focus region (in st.).

In short, this section found that the focus condition has a statistically significant effect on the on-focus region. The excursion size of the stressed syllable of the on-focus region increases statistically significantly across the three focus conditions. As for the post-focus region, this section found only that the excursion size of the post-focus region occurring after the contrastive focus is statistically

[15]The table is in Table B.15 in Appendix B.2.3.1 on Page 393.

significantly less expanded than its neutral counterpart.

6.2.4.2 Max F_0 (Hz)

This section aims to find answers to the following research questions: (a) Does the Max F_0 of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so, how? and (b) Does the Max F_0 the post-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so, how?

Table 6.9 describes the scores of the Max F_0 of the stressed syllable of the on-focus region. It shows an increase in the mean score of the Max F_0 of the on-focus region across the three focus conditions. To verify this increase, a Repeated Measures ANOVA was conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	233.38	239.79	268.38
	Std. Error	16.32	12.02	14.24
Median		234.09	244.60	273.92
Std. Deviation		65.29	48.08	56.95
Statistics	Maximum	350.81	310.60	366.70
	Minimum	147.95	169.98	187.09
Range		202.86	140.62	179.60

Table 6.9: Max F_0 of stressed syllable of the on-focus region (in Hz).

A Repeated Measures ANOVA with Greenhouse-Geisser[16] determines that the focus condition has a statistically significant effect on the Max F_0 of the on-focus region [$F(1.43, 20.05)=12.23$, $p<0.001$]. The effect of gender was found to be non-significant: $p=0.172$. Post hoc comparison with Bonferroni adjustment[17] reveals that the Max F_0 of the contrastive focus ($M=268.38$, $SD=56.95$) is statistically significantly higher than the Max F_0 of its neutral counterpart in sentence-focus structure ($M=233.38$, $SD=65.29$): $p<0.008$. It also reveals that the Max F_0 of the contrastive focus is statistically significantly higher than the Max F_0 of its information-focused counterpart ($M=239.79$, $SD=48.08$): $p<0.002$. However, the

[16]The table is in Table B.17 in Appendix B.2.3.2 on Page 394.
[17]The table is in Table B.18 in Appendix B.2.3.2 on Page 394.

difference between information focus and its neutral counterpart is not found to be statistically significant: p=0.894. The difference in the Max F_0 of the on-focus region across the three focus condition is captured in Figure 6.17 below.

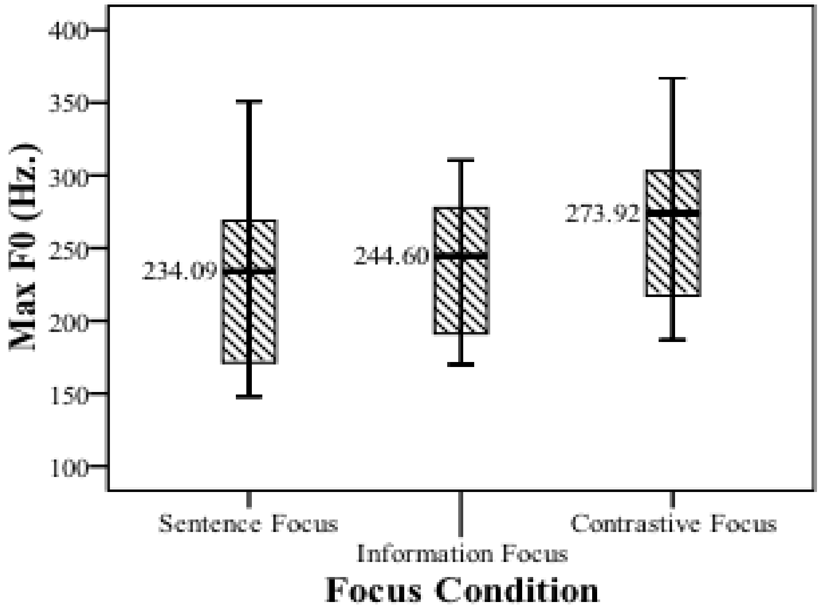


Figure 6.17: Boxplot of Max F_0 of the stressed syllable of the on-focus region (in Hz).

Table 6.10 describes the scores of the Max F_0 of the post-focus region. It shows that the Max F_0 of the post-focus decreases across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this decrease, a Repeated Measures ANOVA is performed.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	249.29	223.47	210.12
	Std. Error	19.70	17.08	17.12
Median		235.11	227.04	214.96
Std. Deviation		78.78	68.31	68.50
Statistics	Maximum	381.15	334.76	316.33
	Minimum	142.67	139.89	116.39
Range		238.48	194.87	199.94

Table 6.10: Max F_0 of the post-focus region (Hz).

Repeated Measures ANOVA with Greenhouse-Geisser[18] determines that the focus condition has a statistically significant effect on the Max F_0 of the post-focus region [$F(1.38, 19.37)$=12.134, p<0.001]. The effect of gender was found to

[18]The table is in Table B.20 in Appendix B.2.3.2 on Page 395.

be non-significant: p=0.690. Post hoc comparison with Bonferroni adjustment[19] reveals that the Max F_0 of the post-focus region occurring after the information focus (M=223.47, SD=68.31) is statistically significantly lower than the Max F_0 of its neutral counterpart in the sentence-focus structure (M=249.29, SD=78.78): p<0.044. It also reveals that the Max F_0 of the post-focus region occurring after the contrastive focus (M=210.12, SD=68.50) is statistically significantly lower than the Max F_0 of its neutral counterpart: P<0.003. The test also determines that the Max F_0 of the post-focus region occurring after the contrastive focus is statistically significantly lower than the Max F_0 of its counterpart occurring after the information focus: p<0.038. Figure 6.18 shows the difference in the Max F_0 of the post-focus region across the three focus conditions.

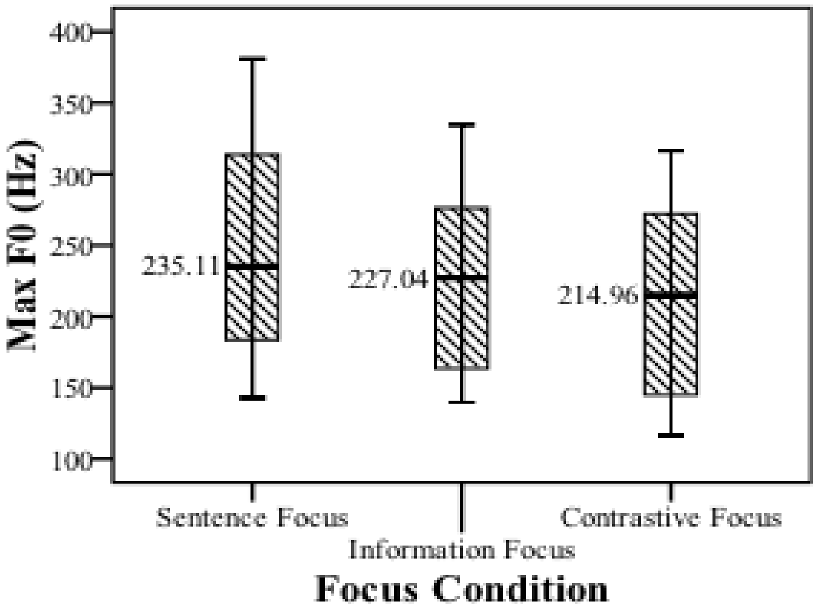


Figure 6.18: Boxplot of Max F_0 of the post-focus region (in Hz).

In short, we found that the the Max F_0 of the on-focus region does not show systemantic differences across the three focus conditions. However, we found that the focus condition has a significant effect on the Max F_0 of the post-focus region. That is, the Max F_0 of the post-focus significantly decreases across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. This indicates that the focus causes significant post-focus compression

[19]The table is in Table B.21 in Appendix B.2.3.2 on Page 395.

in the Max F_0. This post-focus lowering is clearly visible in Figure 6.14. The following section investigates the Mean F_0 of on-focus region and post-focus region across the focus conditions.

6.2.4.3 Mean F_0 (Hz)

This section aims to answer the following research questions: (a) Does the Mean F_0 of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so, how? and (b) Does the Mean F_0 of the post-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so, how?

Table 6.11 describes the scores of the Mean F_0 of the stressed syllable of the on-focus region. It shows an increase in the mean score of the Mean F_0 across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this increase, we conducted a Repeated Measures ANOVA test.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	224.26	224.96	246.44
	Std. Error	15.13	10.29	11.02
Median		222.57	229.93	251.29
Std. Deviation		60.54	41.17	44.10
Statistics	Maximum	338.44	273.84	314.61
	Minimum	142.28	162.57	181.86
Range		196.17	111.27	132.75

Table 6.11: Mean F_0 of stressed syllable of the on-focus region (in Hz).

A Repeated Measures ANOVA with Sphericity[20] determines that the focus condition has an effect on the Mean F_0 of the on-focus region across the three focus condition [$F(2, 28)=7.323$, $p<0.003$]. The effect of gender was found to be non-significant: $p=0.062$. Post hoc comparison with Bonferroni adjustment[21] reveals that the Mean F_0 of the contrastive focus ($M=246.44$, $SD=44.10$) is statistically significantly higher than its counterpart in the neutral sentence (i.e. the sentence-

[20] The table is in Table B.23 in Appendix B.2.3.3 on Page 396.
[21] The table is in Table B.24 in Appendix B.2.3.3 on Page 396.

focus structure) (M=224.26, SD=60.54): $p<0.049$. It also reveals that the Mean F_0 of the contrastive focus is statistically significantly higher than its information-focused counterpart (M=224.96, SD=41.17): $p<0.001$. However the test reveals that the difference between the Mean F_0 of the information focus and its neutral counterpart in the sentence-focus structure is not statistically significant: p=1.000. Figure 6.19 shows the difference in the Mean F_0 of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

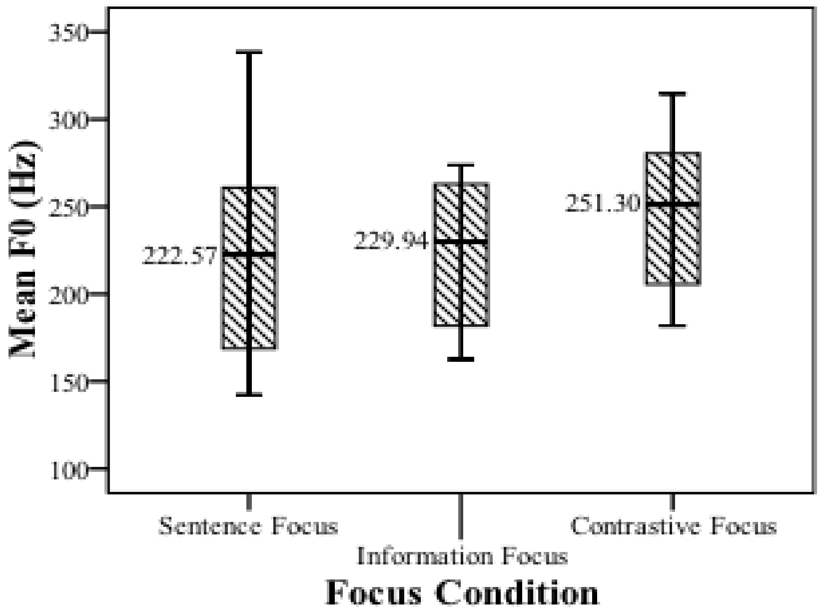


Figure 6.19: Boxplot of Mean F_0 of the stressed syllable of the on-focus region (in Hz).

Table 6.12 describes the scores of the Mean F_0 of the post-focus region. It shows that the mean scores of the Mean F_0 of the post-focus region occurring after both the contrastive focus (M=186.381, SD=57.785) and the information focus (M=186.248, SD=53.469) are lower than their neutral counterpart in the sentence-focus structure (M=202.198, SD=58.577). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	202.198	186.248	186.381
	Std. Error	14.644	13.367	14.446
Median		182.196	182.001	180.683
Std. Deviation		58.577	53.469	57.785
Statistics	Maximum	302.125	260.117	282.149
	Minimum	127.291	117.270	112.228
Range		174.834	142.847	169.920

Table 6.12: Mean F_0 of the post-focus region (in Hz).

A Repeated Measures ANOVA with Greenhouse-Geisser[22] determines that the focus condition has a statistically significant effect on the Mean F_0 of the post-focus region [$F(1.287, 18.017)=13.198$, $p<.001$]. The effect of gender was found to be non-significant: $p=0.513$. Post hoc comparison with Bonferroni adjustment[23] reveals that the Mean F_0 of the post-focus region occurring after the information focus ($M=186.248$, $SD=53.469$) is statistically significantly lower than the Mean F_0 of its neutral counterpart in the sentence-focus structure ($M=202.198$, $SD=58.577$): $p<0.009$. It also reveals that the Mean F_0 of the post-focus region occurring after the contrastive focus ($M=186.381$, $SD=57.785$) is statistically significantly lower than the Mean F_0 of its neutral counterpart in the sentence-focus structure: $p=0.003$. The test, however, does now show a statistically significant difference between the Mean F_0 of the post-focus region occurring after the contrastive focus and the Mean F_0 of their counterpart occurring after the information focus: $p=1.000$. Figure 6.20 shows the differences in the Mean F_0 across the focus conditions.

[22]The table is in Table B.26 in Appendix B.2.3.3 on Page 397.
[23]The table is in Table B.27 in Appendix B.2.3.3 on Page 397.

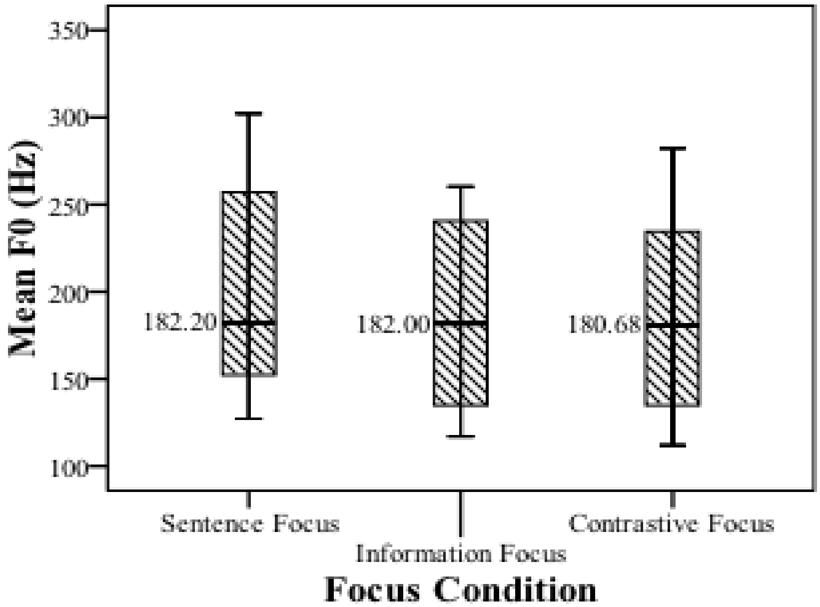


Figure 6.20: Boxplot of Mean F_0 of the post-focus region (in Hz).

In short, this section found only that the Mean F_0 of the contrastive focus is statistically significantly higher than the Mean F_0 of its neutral counterpart and its information-focused counterpart. Moreover, this section found that the focus condition has a statistically significantly effect on the Mean F_0 of the post-focus region. That is, the Mean F_0 of the post-focus region occurring after both the information focus and the contrastive focus are significantly lower than their neutral counterpart in the sentence-focus sentence. However, the Mean F_0 of the post-focus region occurring after the contrastive focus was not found to be statistically significantly different from the Mean F_0 of their counterpart occurring after the information focus. The following section investigates the Mean Intensity of the on-focus region and the post-focus region across the focus conditions.

6.2.4.4 Mean Intensity (dB)

This section aims to answer the following research questions: (a) Does the Mean Intensity of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so, how? and (b) Does the Mean Intensity of the post-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so, how?

Table 6.13 displays the scores of the Mean Intensity of the stressed syllable of the on-focus region. It shows an increase in the mean score of the Mean Intensity of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this increase, a Repeated Measures ANOVA is performed.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	66.26	66.86	68.48
	Std. Error	1.06	1.04	1.09
Median		64.89	66.43	69.00
Std. Deviation		4.24	4.18	4.36
Statistics	Maximum	76.01	75.16	76.59
	Minimum	60.98	60.82	60.97
Range		15.03	14.34	15.62

Table 6.13: Mean Intensity of stressed syllable of the on-focus region (in dB).

A Repeated Measures ANOVA with Greenhouse-Geisser[24] determines that the focus condition has a statistically significant effect on the Mean Intensify of the on-focus region [$F(1.249, 17.491)=14.966$, $p<0.001$]. The effect of gender was found to be non-significant: $p=0.649$. Post hoc comparison with Bonferroni adjustment[25] reveals that the Mean Intensity of the contrastive focus ($M= 68.48$, $SD= 4.36$) is statistically significantly higher than the Mean Intensity of its neutral counterpart in the sentence-focus structure ($M= 66.26$, $SD= 4.24$): $p<0.004$. It also reveals that the Mean Intensity of the contrastive focus is statistically significantly higher than the Mean Intensity of its information-focused counterpart ($M= 66.86$, $SD= 4.18$): $p<0.004$. However, the test reveals that the difference between the Mean Intensity of the information focus and the Mean Intensify of its neutral counterpart is not statistically significant: $p=0.103$. Figure 6.21 shows the differences in the Mean Intensity across the three focus conditions.

[24]The table is in Table B.29 in Appendix B.2.3.4 on Page 398.
[25]The table is in Table B.30 in Appendix B.2.3.4 on Page 398.

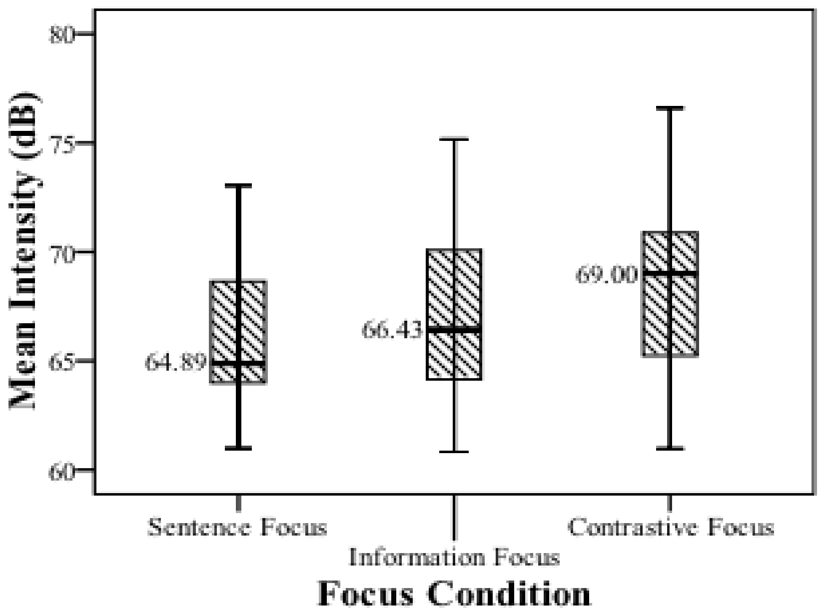


Figure 6.21: Boxplot of Mean intensity of the stressed syllable of the on-focus region (in dB).

Table 6.15 describes the scores of the Mean Intensity of the post-focus region. It shows a decrease in the Mean Intensify of the post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this decrease, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	58.33	57.13	56.87
	Std. Error	0.89	1.03	1.07
Median		57.98	56.41	56.10
Std. Deviation		3.56	4.13	4.29
Statistics	Maximum	64.87	64.28	65.01
	Minimum	53	49.25	48.05
Range		11.88	15.03	16.96

Table 6.14: Mean Intensity of the post-focus region (dB).

A Repeated Measures ANOVA with Sphericity[26] determines that the focus condition has a statistically significant effect on the Mean Intensity of the post-focus region [$F(2, 28)=12.615$, $p<0.001$]. The effect of gender was found to be non-significant: $p=0.334$. Post hoc comparison with Bonferroni adjustment[27] reveals that the Mean Intensity of the post-focus region occurring after the inform-

[26]The table is in Table B.32 in Appendix B.2.3.4 on Page 399.
[27]The table is in Table B.33 in Appendix B.2.3.4 on Page 399.

ation focus (M=57.13, SD=4.13) is statistically significantly lower than the Mean Intensity of its neutral counterpart in the sentence-focus structure (M=58.33, SD=3.56): p<0.003. It also reveals that the Mean Intensity of the post-focus region occurring after the contrastive focus (M=56.87, SD=4.29) is statistically significantly lower than its neutral counterpart in the sentence-focus structure: p<0.006. The test, however, shows that the difference between the Mean Intensity of the post-focus region occurring after the contrastive focus and the Mean Intensity of its counterpart occurring after the information focus is not statistically significant: p=0.889. Figure 6.22 shows the difference in the Mean Intensity of the post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

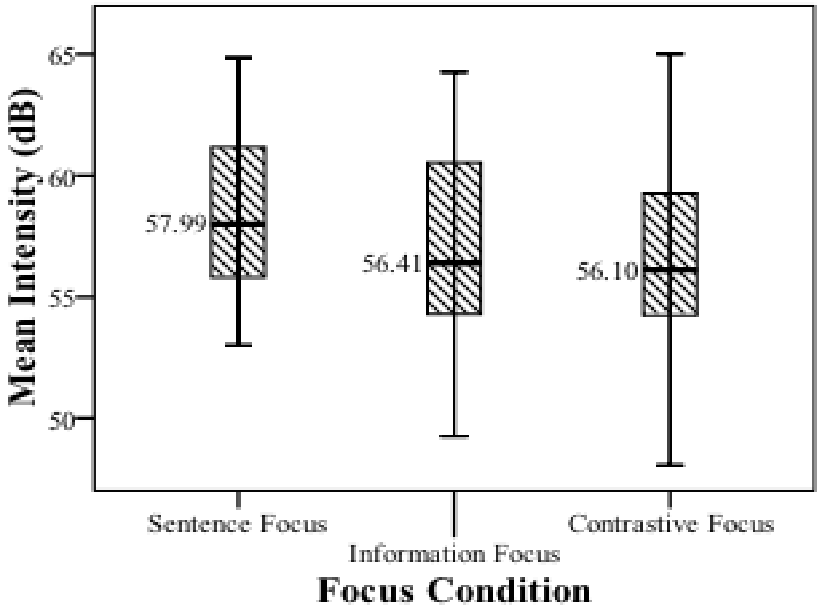


Figure 6.22: Boxplot of Mean intensity of the post-focus region (in dB).

In short, we found that the Mean Intensity of the contrastive focus is statistically significantly higher than the Mean Intensity of its neutral counterpart and its information-focused counterpart. Moreover, we found the Mean Intensity of the post-focus region occurring after both the information focus and the contrastive focus are statistically significantly lower than their neutral counterpart in the sentence-focus structure. This indicates that there is significant post-focus compression in the Mean Intensity caused by the focused word. The following section investigates the Mean Duration of the on-focus region and the post-focus region across the focus conditions.

6.2.4.5 Mean Duration (ms)

This section aims to answer the following questions: (a) Does the Mean Duration of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so, how? and (b) Does the Mean Duration of the post-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so, how? To perform reliable and accurate statistical tests to answer these research questions, we investigates the Mean Duration of each key word separately. This is because the key words in all the three target sentences in (1) differ from each other in terms of their lexical forms. To avoid the potential for a lexical form effect on the duration of the target word, we investigate the duration for each key word separately. This is done particularly to able to see clearly whether focus condition, as an only factor, has a statistically significant effect on the duration of the key word.

Table 6.15 describes the scores of the stressed syllable of the key word /Rāmi/ occurs in the on-focus region[28]. It shows an increase in the mean score across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this increase, a Repeated Measures ANOVA is conducted.

[28]The value of the mean duration of the key word /Rāmi/ in the target sentence (1a) and (1c) are averaged. Since both words have the same lexical form and both occur syntactically in the sentence-initial position and thus they are not preceded by any items in the structure, we are sure that there is only one factor (i.e. focus condition) which determines the changes, if any, in their mean duration.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	179.62	190.03	209.79
	Std. Error	7.35	6.85	6.32
Median		166.99	179.17	206.49
Std. Deviation		29.39	27.42	25.27
Statistics	Maximum	235.62	246.88	273.47
	Minimum	144.39	149.07	170.76
Range		91.23	97.81	102.71

Table 6.15: Mean duration of the stressed syllable of the key word /Rāmi/ in the on-focus region (ms).

A Repeated Measures ANOVA with Sphericity[29] determines that the focus condition has a statistically significant effect on the key word in the on-focus region [$F(2, 28)$=27.741, p<0.001]. Although the effect of gender is significant (p<0 .001), Test of Between-Subjects Effects[30] determines that the difference among gender is not statistically significant (p=0.955). Post hoc comparison with Bonferroni adjustment[31] reveals that the mean duration of the key word /Rāmi/ under contrastive focus (M= 209.79, SD= 25.27) is statistically significantly longer than the mean duration of the same word in the sentence-focus structure (M= 179.62, SD= 29.39): p<0.001. It also reveals that the mean duration of the key word /Rāmi/ under information focus (M= 190.03, SD= 27.42) is statistically significantly longer than the mean duration of the same word in the sentence-focus structure: p<0.011. Furthermore, the test reveals that the mean duration of the key word /Rāmi/ under contrastive focus is statistically significantly longer than the mean duration of the same word under information focus: p<0.001. Figure 6.23 shows the differences in the mean duration of the key word /Rāmi/ in the on-focus region across the three focus conditions.

[29]The table is in Table B.35 in Appendix B.2.3.5 on Page 400.
[30]The table is in Table B.36 in Appendix B.2.3.5 on Page 400.
[31]The table is in Table B.37 in Appendix B.2.3.5 on Page 401.

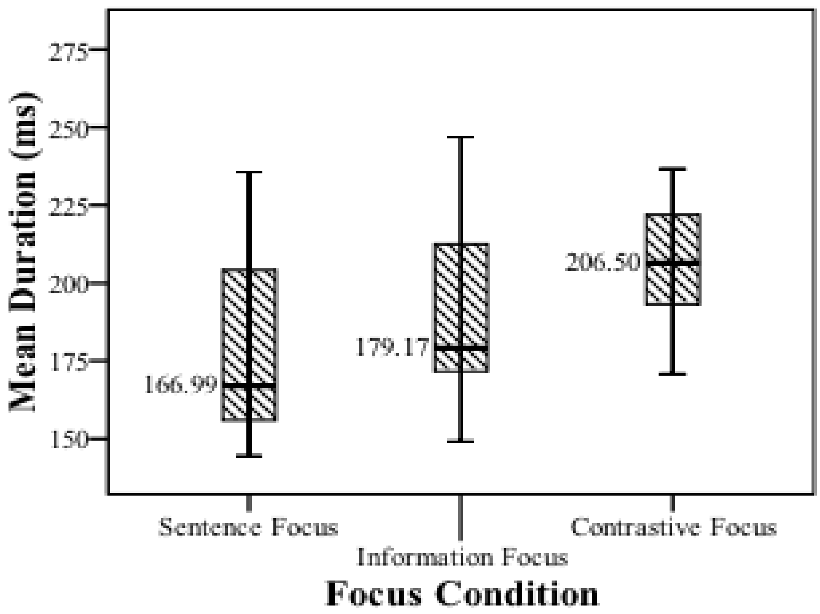


Figure 6.23: Boxplot of Mean duration of the stressed syllable of the key word /Rāmi/ in the on-focus region (ms).

Table 6.16 displays the scores of the mean duration of the stressed syllable of the key word /Rana/ in the on-focus region. It shows an increase in the mean score of the mean duration of the stressed syllable of the key word across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this increase, a Repeated Measures ANOVA is performed.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	132.90	144.23	156.45
	Std. Error	9.09	6.47	6.81
Median		125.13	144.99	155.70
Std. Deviation		36.36	25.87	27.24
Statistics	Maximum	212.18	193.00	221.14
	Minimum	85.51	110.76	111.17
Range		126.67	82.25	109.96

Table 6.16: Mean duration of the stressed syllable of the key word /Rana/ in the on-focus region (ms).

A Repeated Measures ANOVA with Sphericity[32] determines that the focus condition has a statistically significant effect on the mean duration of the key word /Rana/ in the on-focus region [$F(2, 28)= 13.533$, $p<0.001$]. Although the effect of gender is statistically significant ($p<0.001$), Tests of Between-Subjects

[32]The table is in Table B.39 in Appendix B.2.3.5 on Page 401.

Effects[33] shows that the difference among gender is not statistically significant (p=0.755). Post hoc comparison with Bonferroni adjustment[34] reveals that the mean duration of the key word /Rana/ under contrastive focus (M= 156.45, SD= 27.24) is statistically significantly longer than the same word in the sentence-focus structure (M= 132.90, SD= 36.36): $p<0.001$. It also reveals that the mean duration of the key word /Rana/ under contrastive focus is statistically significantly longer than the same word under information focus (M= 144.23, SD= 25.87): $p<0.008$. The test, however, shows that the difference between the mean duration of the key word /Rana/ under information focus and the same word in the sentence-focus structure is not statistically significant: $p<0.114$. Figure 6.24 shows the differences in the mean duration of the key word across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

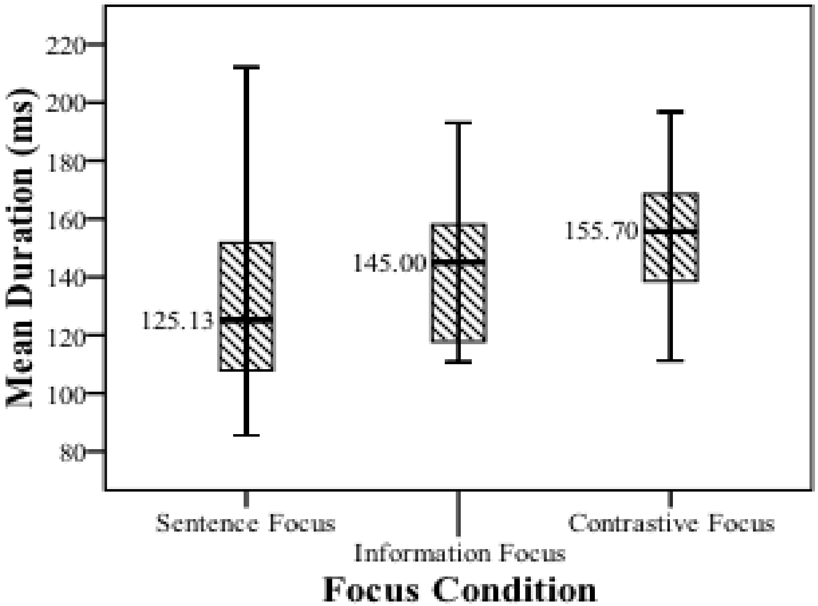


Figure 6.24: Boxplot of Mean duration of the stressed syllable of the key word /Rana/ in the on-focus region (ms).

Turning now to test whether the focus condition has a statistically significant effect on the post-focus region.

Table 6.17 displays the scores of the mean duration of the key words /mar l̄ina ʔams/ in the post-focus region in sentence (1a). The table shows that the

[33]The table is in Table B.40 in Appendix B.2.3.5 on Page 402.
[34]The table is in Table B.41 in Appendix B.2.3.5 on Page 402.

differences in the mean score of the mean duration of /mar l̄ina ʔams/ in the post-focus region are not systematic. It shows that the mean score of the mean duration of /mar l̄ina ʔams/ occurring after the information focus (M=300.02, SD=55.62) is descriptively longer than the same words in the sentence-focus structure (M=298.84, SD=54.08) and also than the same words under contrastive focus (M=294.47, SD=55.09). To verify these differences, a Repeated Measures ANOVA is performed.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	298.84	300.02	294.47
	Std. Error	13.52	13.91	13.77
Median		287.98	283.89	273.60
Std. Deviation		54.08	55.62	55.09
Statistics	Maximum	404.74	410.15	408.74
	Minimum	231.13	226.37	239.04
Range		173.60	183.78	169.70

Table 6.17: Mean Duration of the key words /mar l̄ina ʔams/ in the post-focus region (ms).

A Repeated Measures ANOVA with Sphericity[35] determines that the focus condition does not have a statistically significant effect on the duration of /mar l̄ina ʔams/ [$F(2, 28)$=1.83, p=0.180]. Figure 6.25 shows the differences in the mean duration of these words in the post-focus region across the three focus conditions.

[35] The table is in Table B.43 in Appendix B.2.3.5 on Page 403.

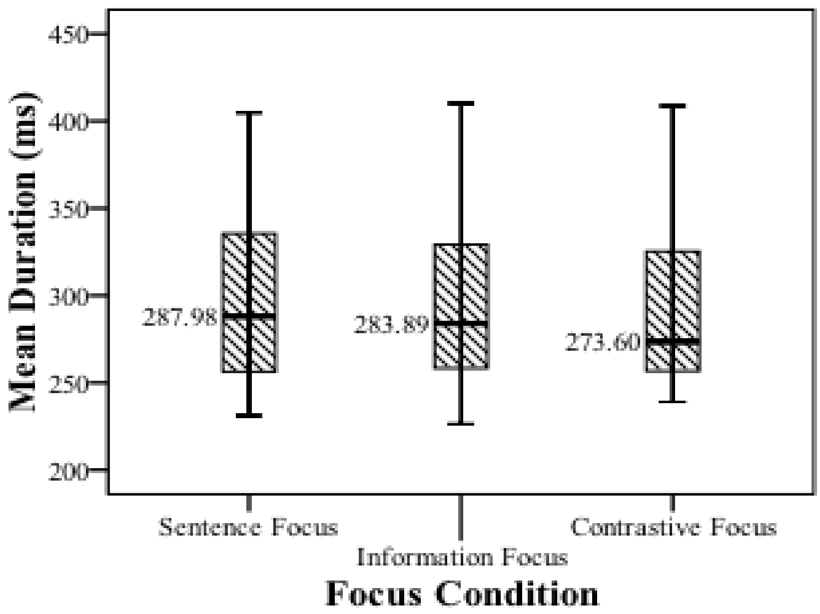


Figure 6.25: Boxplot of Mean duration of the key words /mar līna ?ams/ in the post-focus region (ms).

Table 6.18 displays the scores of the key words /sawwat maryūl li-Manāl/ in the post-focus region. It shows descriptively that the mean score of the key words /sawwat maryūl li-Manāl/ occurring after the contrastive focus (M=375.19, SD=49.68) and the mean score of the same words occurring after the information focus (M=367.89, SD=48.12) are shorter than the same words in the sentence-focus structure (M=390.49, SD=54.30). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	390.49	367.89	375.19
	Std. Error	13.57	12.03	12.42
Median		380.34	359.85	362.91
Std. Deviation		54.30	48.12	49.68
Statistics	Maximum	515.97	470.83	475.18
	Minimum	327.47	301.21	312.76
Range		188.50	169.62	162.42

Table 6.18: Mean Duration of the key words /sawwat maryūl li-Manāl/ in the post-focus region (ms).

A Repeated Measures ANOVA with Greenhouse-Geisser[36] determines that the focus condition has a statistically significant effect on the key words /sawwat maryūl li-Manāl/ in the post-focus region [$F(1.39, 19.46)=14.21$, $p<0.001$]. The effect of gender is found to be non-significant: $p=0.825$. Post hoc comparison with Bonferroni adjustment[37] reveals that the mean duration of the key words occurring after the information focus is statistically significantly shorter than the same words in the sentence-focus structure: $p<0.003$. It also reveals that the mean duration of the key words occurring after the contrastive focus is statistically significantly shorter than the same words in the sentence-focus structure: $p<0.009$. However, the difference between the mean duration of the key words occurring after the information focus and the same words occurring after the contrastive focus is not statistically significant: $p=0.071$. The differences in the mean duration of the key words /sawwat maryūl li-Manāl/ in the post-focus region are captured in Figure 6.26 below.

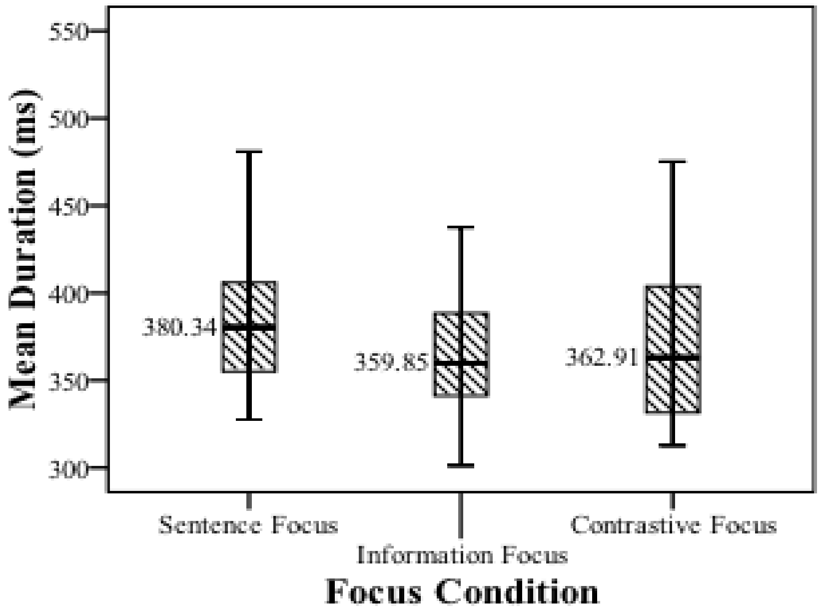


Figure 6.26: Boxplot of Mean Duration of the key words /sawwat maryūl li-Manāl/ in the post-focus region (ms).

Table 6.19 displays the scores of the key words /hājar li-landan al-bāriḥ/ in the post-focus region. It shows a decrease in the mean score of the mean duration

[36]The table is in Table B.45 in Appendix B.2.3.5 on Page 403.
[37]The table is in Table B.46 in Appendix B.2.3.5 on Page 404.

of these words in the post-focus across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this decrease, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	425.74	421.50	414.40
	Std. Error	13.75	14.55	13.87
Median		430.95	416.89	413.58
Std. Deviation		54.99	58.21	55.49
Statistics	Maximum	531.44	543.07	548.51
	Minimum	346.13	340.99	343.29
Range		185.31	202.07	205.22

Table 6.19: Mean Duration of the key words /hājar li-landan al-bāriḥ/ in the post-focus region (ms).

A Repeated Measures ANOVA with Sphericity[38] determines that the focus condition has a statistically significant effect on the mean duration of the key words /hājar li-landan al-bāriḥ/ in the post-focus region [$F(2, 28)=4.31$, $p<0.023$]. The effect of gender is found to be non-significant: $p=0.456$. Post hoc comparison with Bonferroni adjustment[39] reveals that the differences in the mean duration of these key words in the post-focus region across three focus conditions are not statistically significant. Figure 6.27 shows the differences across the focus conditions.

[38]The table is in Table B.48 in Appendix B.2.3.5 on Page 404.
[39]The table is in Table B.49 in Appendix B.2.3.5 on Page 405.

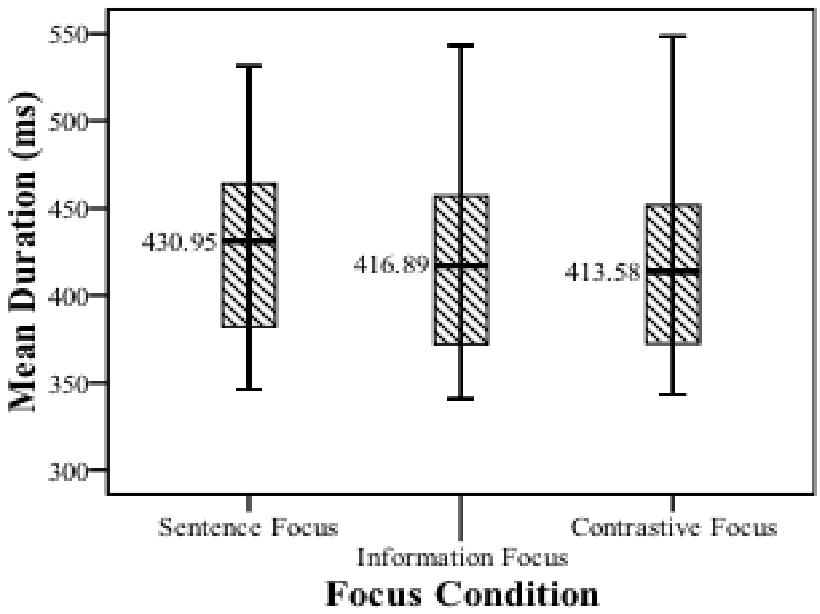


Figure 6.27: Boxplot of Mean Duration of the key words /sawwat maryūl li-Manāl/ in the post-focus region (ms).

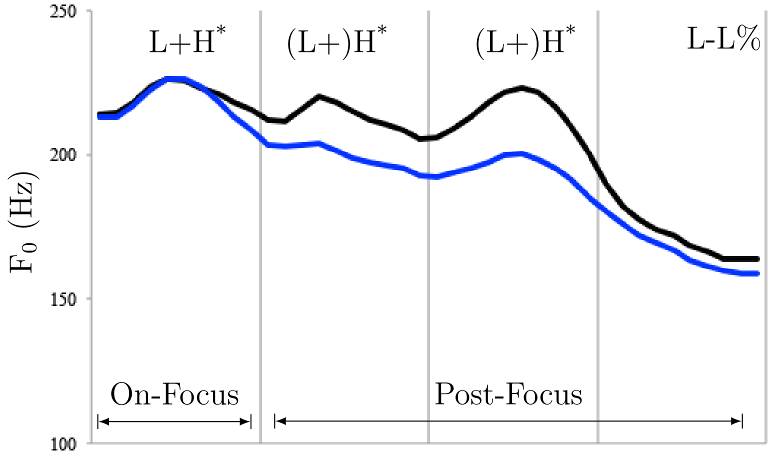
In short, this section found that the difference in the mean duration of the on-focus region and post-focus region is not systematic across the three focus conditions. This leads to conclude that the mean duration was found to be not used as prosodic cue to focus in in the data under investigation.

The following section discusses the results provided in this section and concludes the section.

6.2.5 Discussion and Conclusion

The findings of this section demonstrate that focus in the sentence-initial position was found to have local and global effects on the entire declarative tune of the four-word declarative sentences. The local effect occurs on the word in focus. That is, the excursion size of the information focus and the contrastive focus are significantly increased, compared to their neutral counterpart. Furthermore, the excursion size of the contrastive focus is significantly higher than the excursion of its information-focus counterpart. Regarding the global effect, it is clear that focus has effects on the post-focus words. The intensity and the F_0 of the post-focus words are significantly lowered, compared to the same words in the neutral sentences. Furthermore, the F_0 of the post-focus words occurring after the contrastive focus is significantly lower than the same words occurring after the contrastive focus.

Hypothetical AM representations of the surface F_0 counters of the time-normalized mean F_0 curves averaged across all the speakers, three sentences and five repetitions are in Figure 6.28, 6.29 and 6.30. $\Updownarrow_{\{X>Y\}}$`EXP` indicates that the excursion size of X is more expanded than its Y counterpart occurring in a different sentence, $\downarrow_{\{X>Y\}}$`LOW` indicates that the peak of X is lower than their Y counterpart occurring in a different sentence, and $\swarrow_{\{X>Y\}}$`WEAK` indicates that the intensity of X is weaker than its Y counterpart occurring in a different sentence. CF indicates contrastive focus, N indicates neutral focus and NF indicates information focus.



Information Focus	$\Updownarrow_{\{NF>N\}}$`EXP`	$\downarrow_{\{NF>N\}}$`LOW` $\swarrow_{\{NF>N\}}$`WEAK`

Figure 6.28: Time-normalized mean F_0 contours averaged across 16 speakers, 3 sentences and 5 repetitions. The vertical lines mark the word boundaries. The black contour is the mean F_0 contour of the sentence-focus structure (neutral declarative), and the blue contour is the mean F_0 contour of the argument-focus structure wherein the sentence-initial word is information-focused. The Tone displayed on each word in the structure is based on the visual averaged F_0.

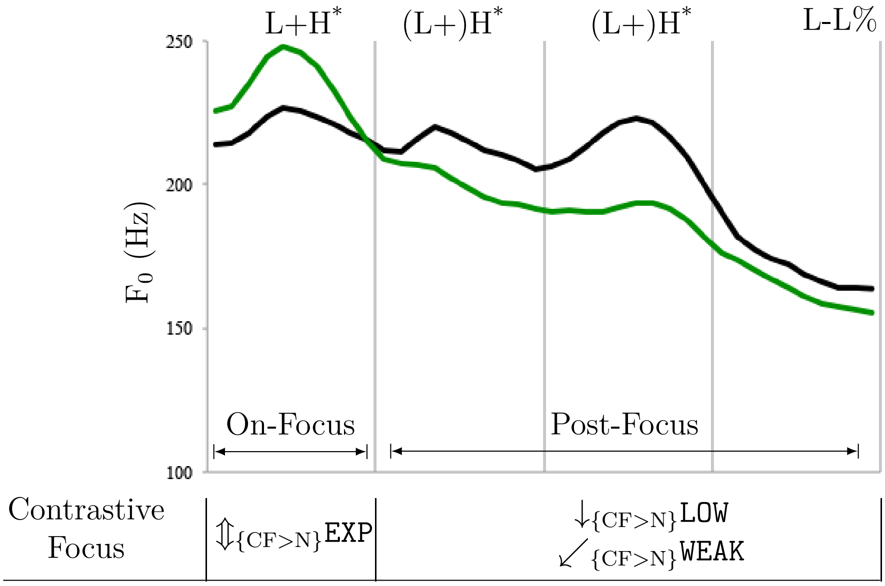


Figure 6.29: Time-normalized mean F_0 contours averaged across 16 speakers, 3 sentences and 5 repetitions. The vertical lines mark the word boundaries. The black contour is the mean F_0 contour of the sentence-focus structure (neutral declarative), and the green contour is the mean F_0 contour of the argument-focus structure wherein the sentence-initial word is contrastive-focused. The Tone displayed on each word in the structure is based on the visual averaged F_0.

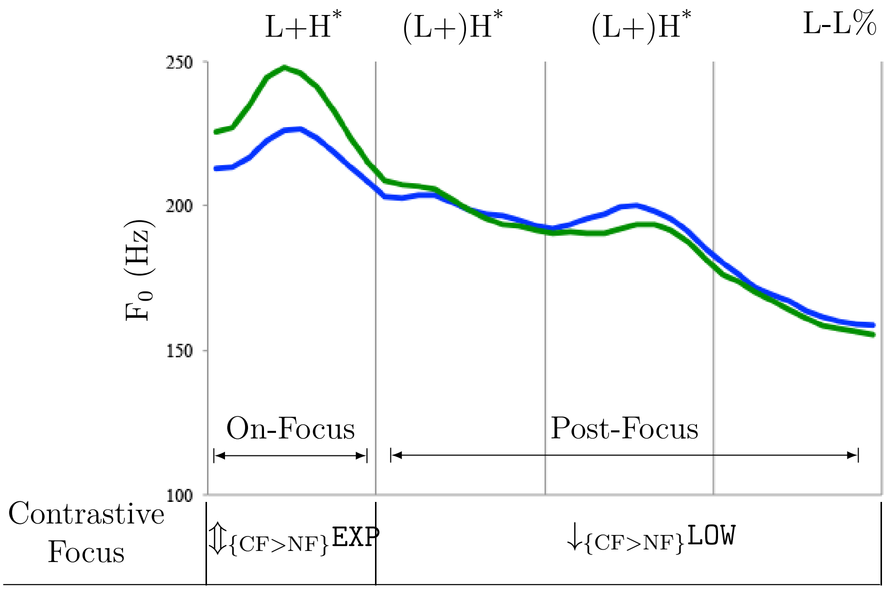


Figure 6.30: Time-normalized mean F_0 contours averaged across 16 speakers, 3 sentences and 5 repetitions. The vertical lines mark the word boundaries. The blue contour is the mean F_0 contour of the argument-focus structure wherein the sentence-initial item is information-focused, and the green contour is the mean F_0 contour of the argument-focus structure wherein the sentence-initial word is contrastive-focused. The Tone displayed on each word in the structure is based on the visual averaged F_0.

The following section investigates the phonological and the phonetic effects of the information focus and the contrastive focus occurring in the sentence-penultimate position in the four-word declarative sentences. This is to find out whether the prosodic effects of focus found in this section are as same as those when the focus is on the sentence-penultimate position. This section also investigates the intonation of the predicate-focus structures and the intonation of focus preposing in which the contrastive focus is realized ex-situ (i.e. at the left periphery of the clause).

6.3 Focus in Sentence-Penultimate Position

The goal of this section is to make systematic comparisons between different focus conditions: sentence-focus, information-focus, in-situ contrastive focus, predicate-focus and ex-situ contrastive focus conditions, in three separate focus regions: on-focus, pre-focus (if any) and post-focus region. The section was designed to address five issues. (i) Do the information focus and the in-situ contrastive focus differ phonologically and phonetically from their neutral counterparts? (ii) Does the information focus differ phonologically and phonetically from its contrastive-focused counterpart? (iii) Does the predicate-focus structure differ phonologically and phonetically from their neutral counterpart? (iv) Does the predicate focus structure differ phonologically from their argument-focus counterparts? (v) How is the focus preposing in which the ex-situ contrastive focus occurs at the left periphery of the clause realized phonologically?

In this section, we use the same three target sentences in (1) used in the preceding section: they are repeated in (11) below for convenience.

(11) a. **Rā**.mi **mar** **Lī**.na ʔ**ams**.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

b. **Ra**.na **saw**.wat mar.**yūl** li-Ma.**nāl**.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

c. **Rā**.mi **hā**.jar li-**lan**.dan al-**bā**.riḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

This section is organized as follows. Section 6.3.1 investigates the phonological difference between predicate-focus structure and its sentence-focus counterpart. Section 6.3.2 investigates the phonological difference between the information focus in the sentence-penultimate position and its neutral counterpart in sentence-focus structure. Section 6.3.3 investigates the phonological difference between the in-situ contrastive focus and its counterpart in sentence-focus structure. Section 6.3.4 investigates the phonological difference between information focus and its in-situ contrastive-focused counterpart. Section 6.3.5 investigates the phonological difference between predicate focus and its argument-focused structures with single information/contrastive focus. Section 6.3.7 investigates the phonological realization of focus preposing. Section 6.3.8 provides a very detailed phonetic analysis on the phonetic differences in excursion size, Max F_0, Mean F_0, Mean intensity and Mean duration across the three focus conditions: sentence-focus, information-focus, and in-situ contrastive-focus condition. Section 6.3.9 summarizes the results and concludes.

6.3.1 Sentence Focus vs. Predicate Focus

The section aims to answer the following research questions: (a) Does the predicate-focus structure differ phonologically and phonetically from their sentence-focus counterpart? If so how?, and (b) Does the word before predicate focus (i.e. Topic) differ phonologically and phonetically from its counterpart in the sentence-focus structure? If so how? The three sentences in (12b), (13b) and (14b) are embedded in the answer-question contexts in (12a), (13a) and (14a) respectively to evoke information focus on the predicate that includes the verb and its compliments.

(12) a. waš sawwa Rāmi?
what did Rami
'What did Rami do?'

b. **Rā**.mi [**mar** **Lī**.na ʔ**ams**]$_F$.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

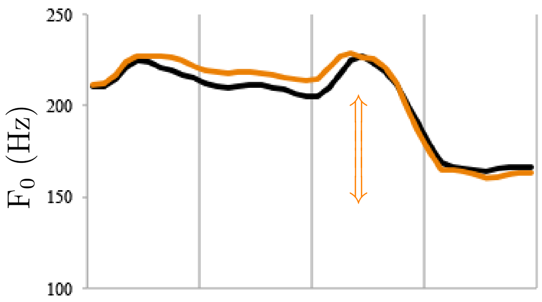
(13) a. waš ʔāẖir ʔᶜmāl Rana?
what last work Rana
'What was the last work Rana did?'

b. **Ra**.na **saw**.wat mar.**yūl** li-Ma.**nāl**]$_F$.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

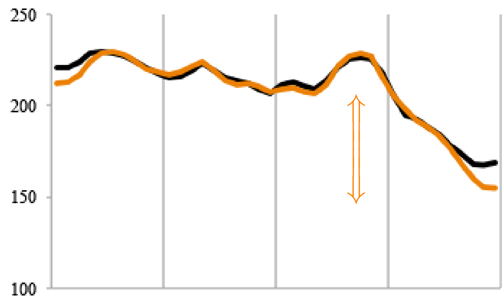
(14) a. waš ṣār ᶜala rāmi?
what happened to Rami
'What happened to Rami?'

b. **Rā**.mi [**hā**.jar li-**lan**.dan al-**bā**.riḥ]$_F$.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

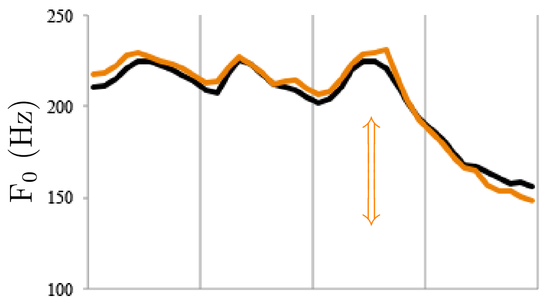
Figure 6.31 displays the time-normalized mean F_0 contours with and without predicate focus, averaged across all the speakers' repetitions.



(a) /Rāmi **mar Līna ʔams**/



(b) /Rana **sawwat maryūl li-Manāl**/



(c) /Rāmi **hājar li-landan al-bāriḥ**/

Figure 6.31: Time-normalized mean F_0 Contour: Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The black contour is sentence focus (i.e. neutral intonation) whereas the orange contour is wherein the predicate in boldface is information focus. ⇳ indicates expansion of pitch range.

From the graphs in Figure 6.31, we can see the prosodic effects of the predicate focus. From the graphs above, we observe the following.

1. The F_0 peaks of the words occurring within the predicate focus (in the orange contour) are slightly higher than the F_0 peaks of the same words under neutral focus in the sentence-focus structure (in the black contour). This is clearly visible from the F_0 peak of the sentence-penultimate words (NP) occurring within the predicate-focus domain.

2. There is a local F_0 maxima (i.e. a pitch accent) on the topic (i.e. the sentence-initial word) which is taken to be a pitch accent.

3. The domain of the pitch accent (local F_0 maxima) is very local with and without predicate focus.

4. The location of the F_0 peaks of all the words are the same with and without predicate-focus.

Table 6.20 summarizes the results from the auditory analyses of sentence (12b), (13b) and (14b).[40]

Focus Region	Pre-Focus	On-Focus		
Sentence (12b)	*Rāmi*	*mar*	*Līna*	*ʔams*
	L+H* (6.25%) H* (93.75%)	H* (100%)	L+H* (67.5%) H* (32.5%)	H* (100%)
Sentence (13b)	*Rana*	*sawwat*	*maryūl*	*li-manāl*
	H* (100%)	H* (100%)	L+H* (72.5%) H* (27.5%)	H* (100%)
Sentence (14b)	*Rāmi*	*hājar*	*li-landan*	*al-bāriḥ*
	L+H* (5%) H* (95%)	H* (100%)	L+H* (71.25%) H* (28.75%)	H* (100%)

Table 6.20: The frequency in percentage of the pitch accent distributions in the predicate-focus structures. The percentage between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

The table above shows that every word in the predicate-focus structure is pitch-accented with either [L+H*] or [H*]. The locations of the H target are within the stressed syllable and thus the predicate focus does not affect the peak alignment. Table 6.20 shows, interestingly, that the nuclear pitch accent of the predicate-focus structure is mostly placed on the sentence-penultimate word. This becomes clear if the distribution of the pitch accents in the predicate-focus structures is compared with the distribution of the pitch accents in their neutral sentences, as shown in Table 6.21 below.

[40]See Appendix B.3.1 on Page 406 for the full data transcription.

Focus Region	**Pre-Focus**		**On-Focus**	
Sentence (2b) neutral-sentence	*Rāmi* L+H* (37.5%) H* (62.5%)	*mar* H* (100%)	*Līna* L+H* (72.5%) H* (27.5%)	*ʔams* H* (100%)
Sentence (12b) predicate-focus	L+H* (6.25%) H* (93.75%)	H* (100%)	L+H* (67.5%) H* (32.5%)	H* (100%)
Sentence (3b) neutral-sentence	*Rana* L+H* (30%) H* (70%)	*sawwat* L+H* (12.5%) H* (87.5%)	*maryūl* L+H* (83.75%) H* (16.25%)	*li-manāl* H* (100%)
Sentence (13b) predicate-focus	H* (100%)	H* (100%)	L+H* (72.5%) H* (27.5%)	H* (100%)
Sentence (4b) neutral-sentence	*Rāmi* L+H* (30%) H* (70%)	*hājar* L+H* (23.75%) H* (76.25%)	*li-landan* L+H* (83.75%) H* (16.25%)	*al-bāriḥ* H* (100%)
Sentence (14b) predicate-focus	L+H* (5%) H* (95%)	H* (100%)	L+H* (71.25%) H* (28.75%)	H* (100%)

Table 6.21: The frequency in percentage of the pitch accent distributions in the predicate-focus sentences, compared with the frequency of the pitch accent distributions in their neutral counterparts. The percentage number between parenthesis indicates the percentage of the tokens (i.e. 80 repetitions) produced by 16 speakers. All the sentences end with the low boundary tone L%.

Table 6.21 shows that the sentence-penultimate word in the predicate-focus structure mostly attracts the main prosodic prominence of the clause. This is to say that the nuclear pitch accent [L+H*] is mostly produced on the sentence-penultimate word in the predicate-focus structure. The verb /sawwat/ 'made' and /hājar/ 'emigrated' were produced with the bitonal pitch accent [L+H*] and the monotonal pitch accent [H*] in the neutral sentence; however, in predicate-focus structure they were produced mainly with the monotonal pitch [H*]. This indicates that the difference between the predicate-focus structure and their neutral structure is in terms of the placement of the nuclear pitch accent. However, there are cases, as noted in §6.1, where the nuclear pitch accent of the neutral sentence is placed on the sentence-penultimate word and thus it becomes difficult to differentiate phonologically between the predicate-focus structure and their neutral structures based on the placement of the nuclear pitch accent.

The typical pitch tracks in Figure 6.32, 6.33 and 6.34 are produced with the same speaker coded A4 (male speaker).

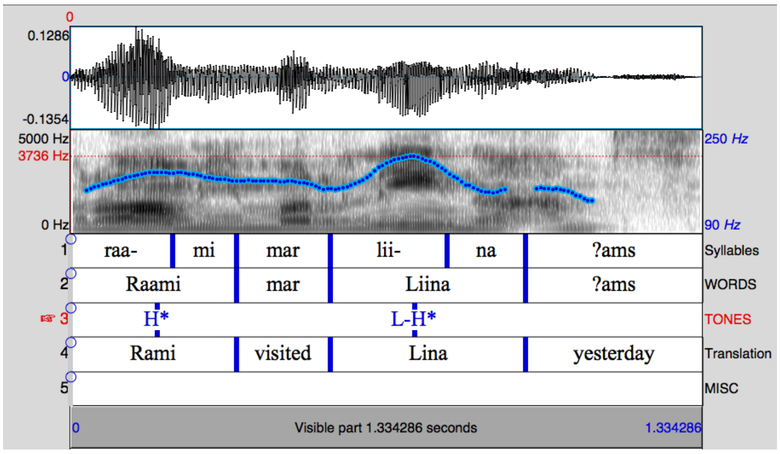


Figure 6.32: Male Speaker (Coded A4).

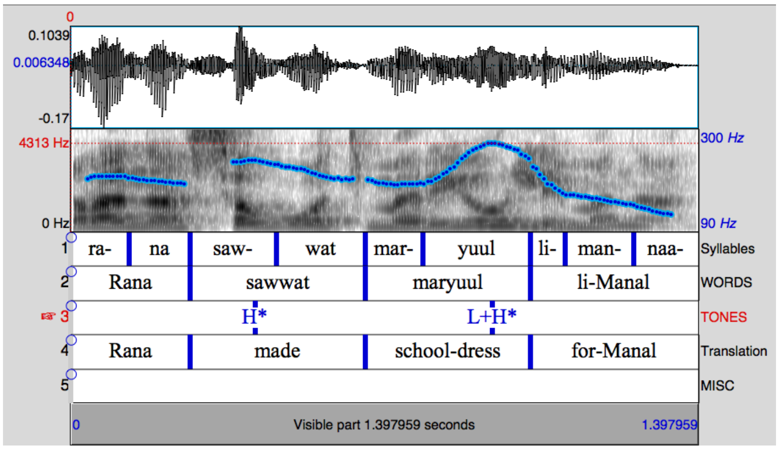


Figure 6.33: Male Speaker (Coded A4).

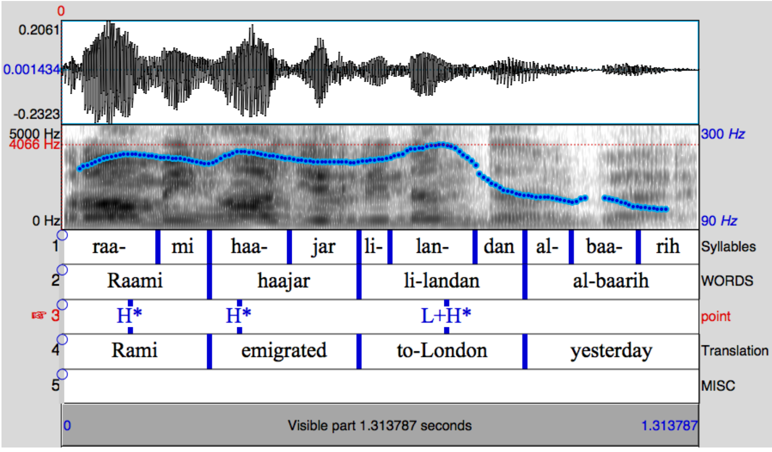


Figure 6.34: Male Speaker (Coded A4).

If we compare the typical pitch tracks above with their neutral counterparts produced by the same speaker (§6.1 on PP. 127–128), we can see clearly that the nuclear pitch accent of the predicate-focus structure is placed on the sentence-penultimate word.

To verify the slight differences pointed out in this section between the predicate-focus structures and their neutral structures, Repeated Measures ANOVA tests are conducted and the results are reported in the following section.

6.3.1.1 Phonetic Analysis

Figure 6.35 displays the time-normalized mean F_0 curves averaged across all the sixteen speakers, three sentences and five repetitions.

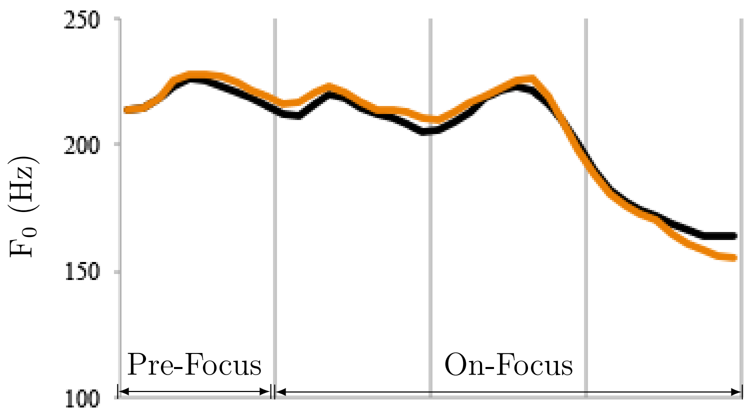


Figure 6.35: Time-normalized mean F_0 contour: Each curve is an average of 80 repetitions by 16 speakers. The vertical lines mark the word boundaries. The black contour is sentence-focus structure and the orange contour is the predicate-focus structure. The vertical lines mark the word boundaries.

The graph above shows a very slight difference between the predicate-focus structure (the orange contour) and its neutral counterpart (the black contour). That is, the F_0 level of the predicate-focus structure in the orange contour is relatively higher than the F_0 level of its neutral counterpart in the black contour. To verify this difference, we make comparisons between the predicate-focus structure and its neutral-focus structures in two separate regions: pre-focus and on-focus. The dependent variables are excursion size, Max F_0, Mean F_0, Mean Intensity and Mean Duration of each focus region. The independent variable is focus (focus, neutral). The dependent variables of the post-focus region are taken from the values of the sentence-penultimate words (NP). This is so because the F_0 of this word is the most noticeable F_0, compared with the F_0 of the surrounding words. This is clearly visible in Figure 6.35. The full methodology and the research questions were presented in detail in §5.8 and 5.9.

6.3.1.1.1 Excursion Size (st.)

This section aims to find answers to the following research questions: (a) Does the excursion size of the stressed syllable of the on-focus region (i.e. sentence-penultimate word) differ across sentence-focus and predicate-focus condition? If so how? and (b) Does the excursion size of the pre-focus region (i.e. Topic) differ across sentence-focus and predicate-focus condition? If so how?

Table 6.22 describes the scores of the excursion size of the stressed syllable of the on-focus region. It reveals that the excursion size of the stressed syllable of on-focus region in predicate-focus structure (M= 4.72, SD= 2.20) is higher than its counterpart in the sentence-focus structure (M= 4.14, SD= 1.78). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	4.14	4.72
	Std. Error	0.44	0.55
Median		4.04	4.53
Std. Deviation		1.78	2.20
Statistics	Maximum	7.62	10.23
	Minimum	1.30	1.26
Range		6.32	8.97

Table 6.22: Excursion size of stressed syllable of the on-focus region (in st.).

A Repeated Measures ANOVA with Sphericity[41] determines that the focus condition does not have a statistically significant effect on the on-focus region [$F(1, 14)= .615$, $P=0.446$]. Figure 6.36 shows the differences in the excursion size across the two focus conditions: predicate-focus and sentence-focus condition.

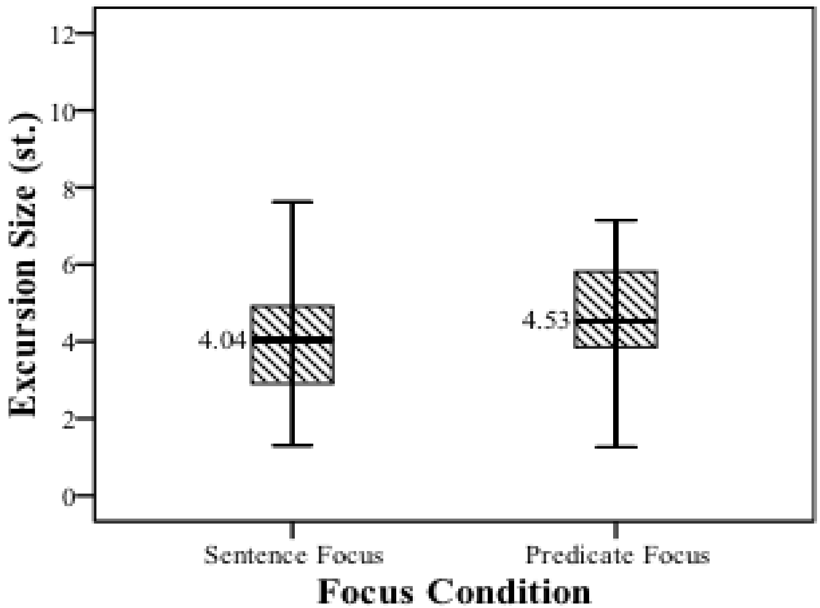


Figure 6.36: Boxplot of Excursion size of the stressed syllable of the on-focus region (st.).

Table 6.23 describes the scores of the excursion size of the post-focus region. It reveals that the excursion size of the pre-focus region (i.e. topic) in predicate-focus structure (M=2.02, SD=1.38) is more expanded than its counterpart in the sentence-focus structure (M=1.84, SD=1.09). To verify this difference, a Repeated Measures ANOVA is conducted.

[41]The table is in Table B.54 in Appendix B.3.1.1.1 on Page 409.

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	1.84	2.02
	Std. Error	0.27	0.34
Median		1.60	1.62
Std. Deviation		1.09	1.38
Statistics	Maximum	3.97	5.87
	Minimum	0.55	0.66
Range		3.42	5.21

Table 6.23: Excursion size of the pre-focus region (in st.).

A Repeated Measures ANOVA with Sphericity[42] determines that the focus condition does not have a statistically significant effect on the excursion size of the pre-focus region [$F(1, 14)$= .892, P=0.361]. Figure 6.37 shows the difference in the excursion size of the pre-focus region across the two focus conditions: sentence-focus and predicate-focus condition.

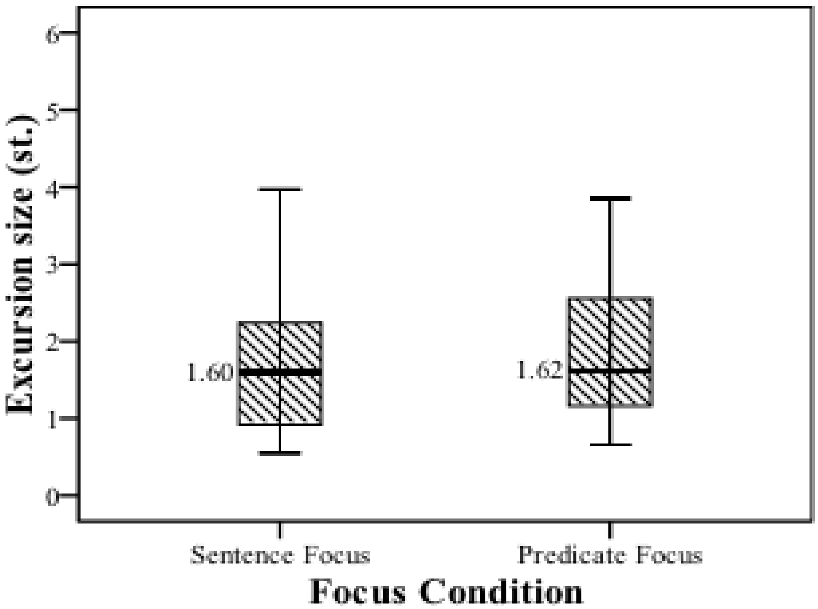


Figure 6.37: Boxplot of Excursion size of the pre-focus region (st.).

In short, this section has found that there is no statistically significant difference in terms of the excursion size between the predicate-focus structure and sentence-focus structure. The following section examines the phonetic difference in the Max F_0 across these two focus conditions.

[42]The table is in Table B.56 in Appendix B.3.1.1.1 on Page 410.

6.3.1.1.2 Max F_0 (Hz.)

This section aims to answer the following research questions: (a) Does the Max F_0 of the stressed syllable of the on-focus region (i.e. sentence-penultimate item) differ across sentence-focus and predicate-focus condition? If so how? and (b) Does the Max F_0 of the pre-focus region (Topic) differ across sentence-focus and predicate-focus condition? If so how?

Table 6.24 describes the scores of the Max F_0 of the stressed syllable of the on-focus region. It reveals that the Max F_0 of the on-focus in the predicate-focus structure (*M*= 253.93, *SD*= 74.25) is higher than its neutral counterpart in the sentence-focus structure (*M*= 246.02, *SD*= 77.82). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	246.02	253.93
	Std. Error	19.45	18.56
Median		228.87	245.52
Std. Deviation		77.82	74.25
Statistics	Maximum	378.94	382.47
	Minimum	141.41	149.87
Range		237.52	232.60

Table 6.24: Max F_0 of the stressed syllable of the on-focus region (in Hz).

A Repeated Measures ANOVA with Sphericity[43] determines the focus condition has a statistically significant effect on the Max F_0 of the on-focus region [$F(1, 14)=9.179$, $P<0.009$]. The effect of gender was found to be significant: $p<0.044$. Tests of Between-Subjects Effects[44] shows also that the difference among gender was significant: $p<0.001$).

Having split the data on the basis of gender[45], a Repeated Measures ANOVA with Sphericity[46] determines that the focus condition has a statistically significant effect on the Max F_0 of the on-focus region among male subjects [$F(1, 7)= 12.191$,

[43] The table is in B.58 in Appendix B.3.1.1.2 on Page 411.

[44] The table is in Table B.59 in Appendix B.3.1.1.2 on Page 411.

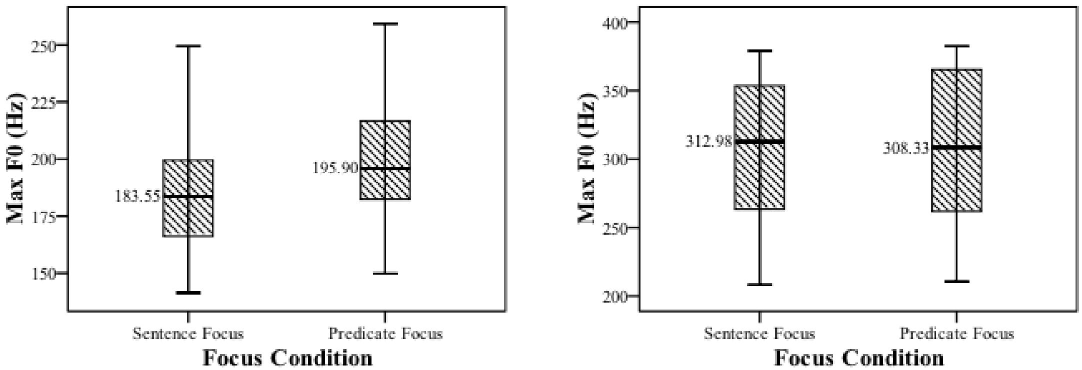
[45] The descriptive data for female and male subjects is in Table B.60 in Appendix B.3.1.1.2 on Page 412.

[46] The table is in Table B.61 in Appendix B.3.1.1.2 on Page 413.

P<0.01]. Post hoc comparison with Bonferroni adjustment[47] reveals that the Max F_0 of the on-focus region in the predicate-focus structure (M= 199.85, SD= 33.38) is statistically significantly higher than the Max F_0 of its neutral counterpart in the sentence-focus structure (M= 186.17, SD= 32.27): p<0.01.

A Repeated Measures ANOVA with Sphericity[48] determines that the focus condition does not have a statistically significant effect on the Max F_0 of the on-focus region among female subjects [F(1, 7)=0.383, P=0.55].

Figure 6.38 shows the difference in the Max F_0 of the on-focus region across the two focus conditions among the male and female subjects.



(a) Male Participants.

(b) Female Participants.

Figure 6.38: Boxplot: Median of Max F_0 of the stressed syllable of the on-focus region (Hz).

Table 6.25 describes the scores for the Max F_0 of the pre-focus region (Topic) across the two focus conditions. It shows that the mean score of the Max F_0 of the stressed syllable of the pre-focus region in the predicate-focus structure (M=241.46, SD=70.87) is higher than its neutral counterpart in the sentence-focus structure (M=236.13, SD=69.13). To verify this difference, a Repeated Measures ANOVA is conducted.

[47]The table is in Table B.62 in Appendix B.3.1.1.2 on page 413.
[48]The table is in Table B.61 in Appendix B.3.1.1.2 on Page 413.

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	236.13	241.46
	Std. Error	17.28	17.72
Median		223.48	246.35
Std. Deviation		69.13	70.87
Statistics	Maximum	370.57	386.94
	Minimum	150.12	148.88
Range		220.46	238.05

Table 6.25: Max F_0 of the pre-focus region (in Hz).

A Repeated Measures ANOVA with Sphericity[49] determines that the focus condition does not have a statistically significant effect on the Max F_0 of the pre-focus region [$F(1, 14)= 1.315$, $P=0.271$]. Figure 6.39 shows the difference in the Max F_0 of the pre-focus region across the two focus conditions.

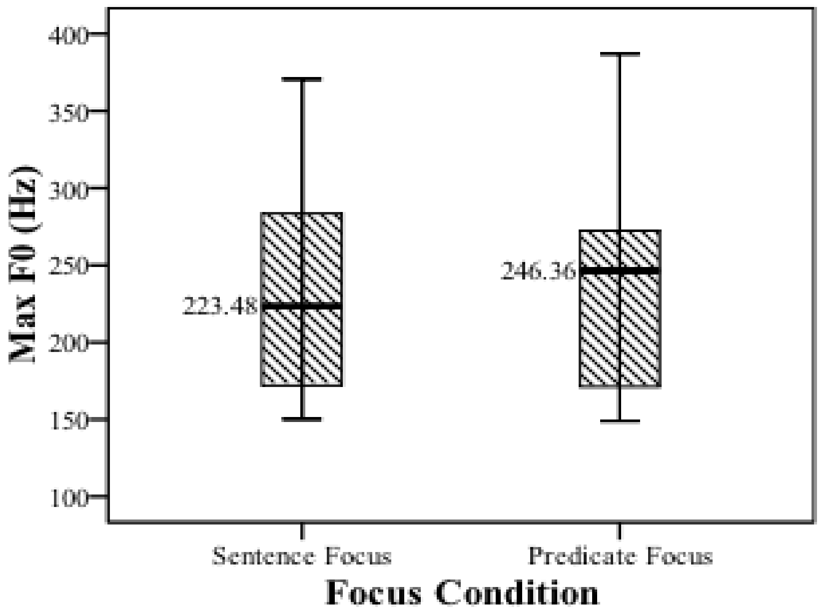


Figure 6.39: Boxplot of Max F_0 of the pre-focus region (Hz).

In short, this section found only that male speakers statistically significantly increased the F_0 of the stressed syllable of the on-focus region. Furthermore, this section found that there is no significant effect of focus condition on the Max F_0 of the pre-focus region.

The following section examines the difference between the predicate-focus structure and its neutral counterpart in the Mean F_0 in two separate focus re-

[49]The table is in B.64 in Appendix B.3.1.1.2 on Page 414.

gions: pre-focus and on-focus region.

6.3.1.1.3 Mean F_0 (Hz.)

This section aims to answer the following research questions: (a) Does the Mean F_0 of the stressed syllable of the on-focus region (i.e. sentence-penultimate item) differ across sentence-focus and predicate-focus condition? If so how? and (b) Does the Mean F_0 of the pre-focus region (Topic) differ across sentence-focus condition and predicate-focus condition? If so how?

Table 6.26 describes the scores of the Mean F_0 of the stressed syllable of the on-focus region. It shows that the mean score of the Mean F_0 of the stressed syllable of the on-focus region in the predicate-focus structure (M= 229.59, SD= 59.21) is higher than its counterpart in the sentence-focus utterance (M= 224.14, SD= 62.68). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Structure	
		Broad-Focus	Predicate-Focus
Mean	Statistics	224.14	229.59
	Std. Error	15.67	14.80
Median		213.29	224.11
Std. Deviation		62.68	59.21
Statistics	Maximum	328.07	341.19
	Minimum	134.25	140.97
Range		193.82	200.22

Table 6.26: Mean F_0 of stressed syllable of the on-focus region (Hz).

A Repeated Measures ANOVA with Sphericity[50] determines that the focus condition has a statistically significantly effect on the Mean F_0 of the on-focus region [$F(1, 14)= 7.565$, $P<0.016$]. The effect of gender was found to be significant: $p<0.028$. Tests of Between-Subjects Effects[51] determines also that the difference among gender was statistically significant: $p<0.001$.[52]

Having split the data on the basis of gender[53], a Repeated Measures ANOVA

[50] The table is in Table B.66 in Appendix B.3.1.1.3 on Page 415.

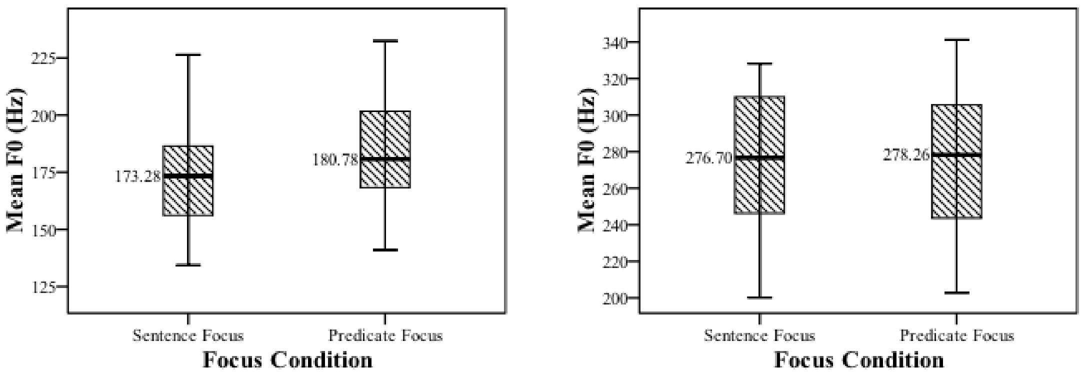
[51] The table is in Table B.67 in Appendix B.3.1.1.3 on Page 415.

[52] The reason why female and male participants show differences in encoding the Mean F_0 of the stressed syllable of the on-focus region is not know and hence it is left unexplained.

[53] The descriptive data for both gender is in Table B.68 in Appendix B.3.1.1.3 on Page 416.

with Sphericity[54] determined that he focus condition has a statistically significantly effect on the Mean F_0 of the on-focus region among male subjects [F(1, 7)= 11.158, P<0.01]. Post hoc comparison with Bonferroni adjustment[55] reveals that the Mean F_0 of the stressed syllable of the on-focus region in the predicate-focus structure (M= 184.34, SD= 28.82) was statistically significantly higher than its neutral counterpart in the sentence-focus structure (M= 174.04, SD= 27.85): p<0.01.

As for the difference in the Mean F_0 of the on-focus region among female participants, a Repeated Measures ANOVA with Sphericity[56] determines that the focus condition does not have a statistically significant effect on the Mean F_0 of the on-focus region [F(1, 7)= .058, P=.817]. Figure 6.40 shows the difference in Mean F_0 of the stressed syllable of the on-focus region across the two focus condition among female and male subjects.



(a) Male Participants.

(b) Female Participants.

Figure 6.40: Boxplot: Median of Mean F_0 of the stressed syllable of the on-focus region (Hz).

Table 6.27 describes the scores of the Mean F_0 of the pre-focus region. It shows that the mean score of the Mean F_0 of the pre-focus region in the predicate-focus structure (M=225.15, SD=62.72) is higher than its neutral counterpart in the sentence-focus structure (M=217.86, SD=61.33). To verify this difference, a Repeated Measures ANOVA is conducted.

[54]The table is in Table B.69 in Appendix B.3.1.1.3 on Page 417.
[55]The table is in Table B.70 in Appendix B.3.1.1.3 on Page 417.
[56]The table is in Table B.69 in Appendix B.3.1.1.3 on Page 417.

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	217.86	225.16
	Std. Error	15.33	15.68
Median		207.53	224.67
Std. Deviation		61.33	62.72
Statistics	Maximum	337.51	346.90
	Minimum	138.62	141.06
Range		198.90	205.83

Table 6.27: Mean F_0 of the pre-focus region (in Hz).

A Repeated Measures ANOVA with Sphericity[57] determines that the focus condition does not have a statistically significantly effect on the Mean F_0 of the pre-focus region [$F(1, 14)= 4.068$, $P=0.063$]. Figure 6.41 shows the difference in the Mean F_0 of the pre-focus region across the two focus conditions.

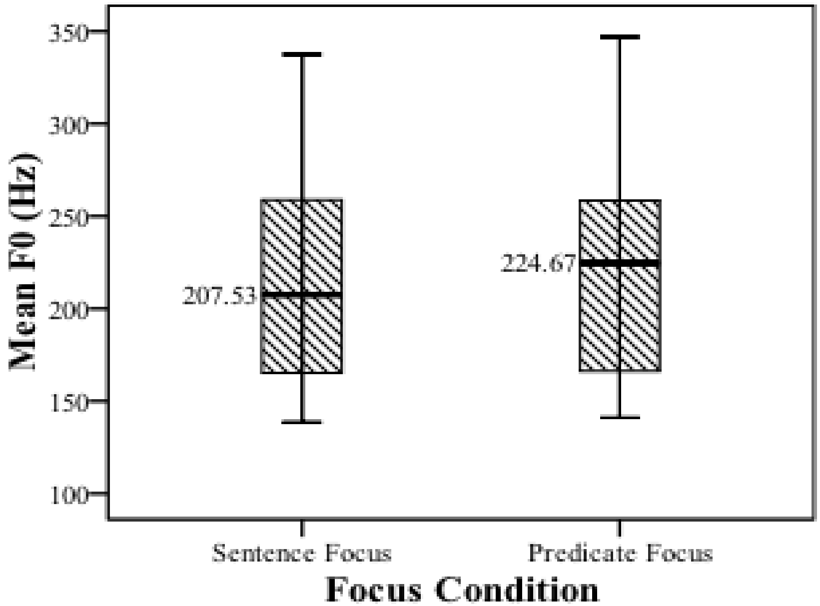


Figure 6.41: Boxplot of Mean F_0 of the pre-focus region (Hz).

In short, this section found that only male speakers statistically significantly increased the Mean F_0 of the on-focus region in the predicate-focus structure.

The following section examines the difference in the Mean intensity between the predicate-focus and its sentence-focus counterpart.

[57]The table is in Table B.72 in Appendix B.3.1.1.3 on Page 418.

6.3.1.1.4 Mean Intensity (dB)

This section aims to answer the following research questions: (a) Does the mean intensity of the stressed syllable of the on-focus region (i.e. sentence-penultimate item) differ across sentence-focus and predicate-focus condition? If so how? and (b) Does the mean intensity of the pre-focus region differ across sentence-focus condition and predicate-focus condition? If so how?

Table 6.28 describes the scores of the mean intensity of the stressed syllable of the on-focus region. It shows that the mean score of the mean intensity of the on-focus region in the predicate-focus structure (*M*=60.87, *SD*=4.47) is higher than its counterpart in the sentence-focus structure (*M*=60.29, *SD*=4.11).

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	60.29	60.87
	Std. Error	1.03	1.12
Median		60.88	61.37
Std. Deviation		4.11	4.47
Statistics	Maximum	66.15	67.19
	Minimum	54.85	54.44
Range		11.30	12.75

Table 6.28: Mean Intensity of stressed syllable of the on-focus region (in dB).

A Repeated Measures ANOVA with Sphericity[58] determines that the focus condition has a statistically significant effect on the mean intensity of the on-focus region [$F(1, 14)= 13.641$, $P=0.002$]. The effect of gender was found to be non-significant: $p=0.074$. Post hoc comparison with Bonferroni adjustment[59] reveals that the mean intensity of the on-focus region in the predicate-focus structure (*M*=60.87, *SD*=4.47) is statistically significantly higher than its neutral counterpart (*M*=60.29, *SD*=4.11): $p<0.002$. Figure 6.42 shows the difference across the two focus conditions in the mean intensity of the on-focus region.

[58]The table is in Table B.74 in Appendix B.3.1.1.4 on Page 419.
[59]The table is in Table B.75 in Appendix B.3.1.1.4 on Page 419.

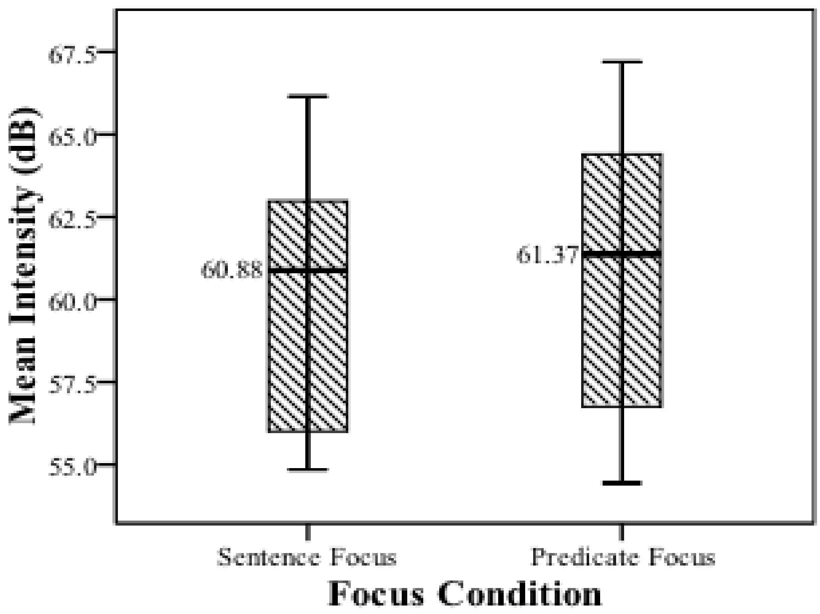


Figure 6.42: Boxplot of Mean Intensity of the stressed syllable of the on-focus region (dB).

Table 6.29 describes the mean intensity of the pre-focus region. It reveals that the mean score of the mean intensity of the pre-focus region in predicate-focus structure (M=64.55, SD=4.76) was higher than its neutral counterpart in the sentence-focus structure (M=62.37, SD=4.00).

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	62.37	64.55
	Std. Error	1.00	1.19
Median		61.75	63.70
Std. Deviation		4.00	4.76
Statistics	Maximum	71.14	75.44
	Minimum	57.35	58.68
Range		13.79	16.76

Table 6.29: Mean Intensity of the pre-focus region (in Hz).

A Repeated Measures ANOVA with Sphericity[60] determines that the focus condition has a statistically significant effect on the mean intensity of the pre-focus region [F(1, 14)= 53.562, P=0.001]. The effect of gender was found to be non-significant: p=0.892. Post hoc comparison with Bonferroni adjustment[61] reveals that the mean intensity of the pre-focus in the predicate-focus structure

[60] The table is in Table B.77 in Appendix B.3.1.1.4 on Page 420.
[61] The table is in Table B.78 in Appendix B.3.1.1.4 on Page 420.

(M=64.55, SD=4.76) was statistically significantly higher than its counterpart in the sentence-focus structure (M=62.37, SD=4.00): $p<0.001$. Figure 6.43 shows the difference across the two focus conditions.

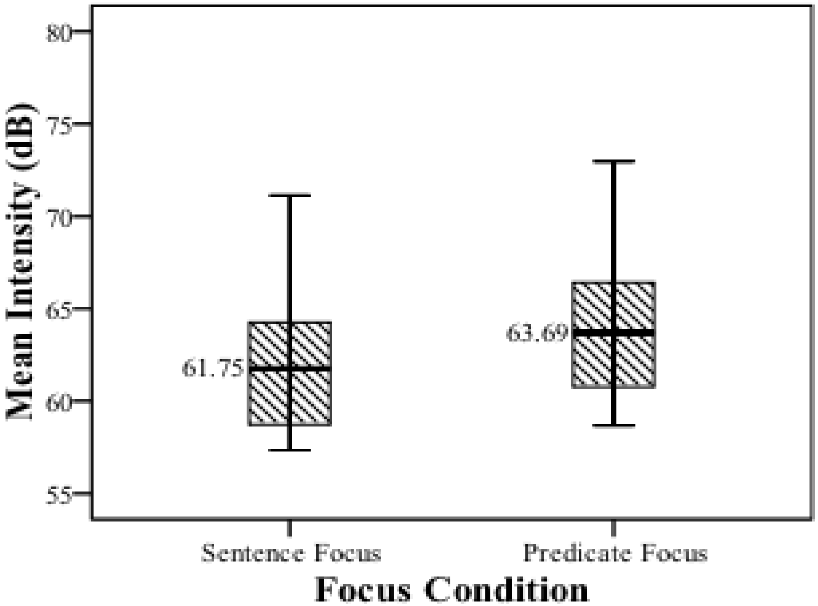


Figure 6.43: Boxplot of Mean Intensity of the pre-focus region (Hz).

In short, this section has found that the intensity of the stressed syllable of the on focus region in predicate-focus structure was higher than its counterpart in sentence-focus structure. As for the pre-focus region (i.e. Topic), it has been found that the intensity of the pre-focus region in predicate-focus structure was higher than its counterpart in sentence-focus structure.

The next section examines the difference in the mean duration between the predicate-focus structure and sentence-focus structure.

6.3.1.1.5 Mean Duration (ms)

The aim of this section is to find answers to the following research questions: (a) Does the Mean duration of the stressed syllable of the on-focus region differ across sentence-focus and predicate-focus condition? If so how? and (b) Does the Mean duration of the pre-focus region (i.e Topic) differ across sentence-focus and predicate-focus condition? If so how? Since the key words in the three target sentences in (11) differ from each other in terms of the lexical form, we investigate the duration of each key word separately. This is to avoid the potential for a lexical form effect on the duration of the target word.

Table 6.30 describes the scores of the mean duration of the stressed syllable of the on-focus key word /Līna/ in /**Rā**.mi **mar Lī**.na ʔ**ams**/. The table shows that the mean score of the mean duration of the stressed syllable of on-focus key word /Līna/ in the predicate-focus structure (M=185.94, SD=32.67) is higher than its counterpart in the sentence-focus structure (M=184.43, SD=32.61). To verify the difference, a Repeated Measures ANOVA is conducted.

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	184.43	185.94
	Std. Error	8.15	8.17
Median		174.80	185.85
Std. Deviation		32.61	32.67
Statistics	Maximum	259.22	258.23
	Minimum	151.69	140.87
Range		107.52	117.35

Table 6.30: Mean Duration of stressed syllable of the on-focus key word /Līna/ (in ms).

A Repeated Measures ANOVA with Sphericity[62] determines that the focus condition does not have a statistically significant effect on the mean duration of the on-focus key word /Līna/ [$F(1, 14)$= .095, P=0.763]. Figure 6.44 shows the difference across the two focus conditions.

[62] The table is in Table B.80 in Appendix B.3.1.1.5 on Page 421.

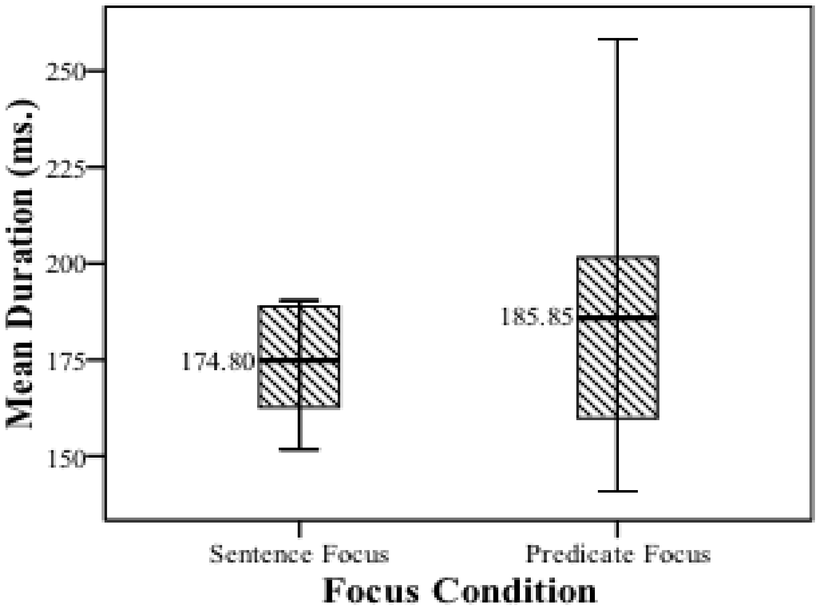


Figure 6.44: Boxplot of Mean Duration of the stressed syllable of the on -focus key word /Līna/ (ms).

Table 6.31 describes the scores of the stressed syllable of the on-focus key word /maryūl/ in /**Ra**.na **saw**.wat mar.**yūl** li-Ma.**nāl**/. The table shows that the mean score of the mean duration of the stressed syllable of the on-focus key word /maryūl/ in the predicate-focus structure (M=201.05, SD=26.29) is higher than its counterpart in the sentence-focus structure (M=187.41, SD=22.33). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	187.41	201.05
	Std. Error	5.58	6.57
Median		179.60	194.87
Std. Deviation		22.33	26.29
Statistics	Maximum	225.17	249.58
	Minimum	150.20	158.11
Range		74.97	91.47

Table 6.31: Mean Duration of stressed syllable of the on-focus key word /maryūl/ (in ms).

A Repeated Measures ANOVA with Sphericity[63] determined that the focus condition has a statistically significant effect on the mean duration of the on-focus key word /maryūl/ [$F(1, 14)$= 10.698, P<0.006]. The effect of the gender was

[63]The table is in Table B.82 in Appendix B.3.1.1.5 on Page 422.

found to be non-significant: p=0.981. Post hoc comparison with Bonferroni adjustment[64] reveals that the mean duration of the stressed syllable of the on-focus key word /maryūl/ in the predicate-focus structure (M=201.05, SD=26.29) is statistically significantly higher than its counterpart in the sentence-focus structure (M=187.41, SD=22.33): p<0.006. Figure 6.45 shows the difference across the two focus conditions.

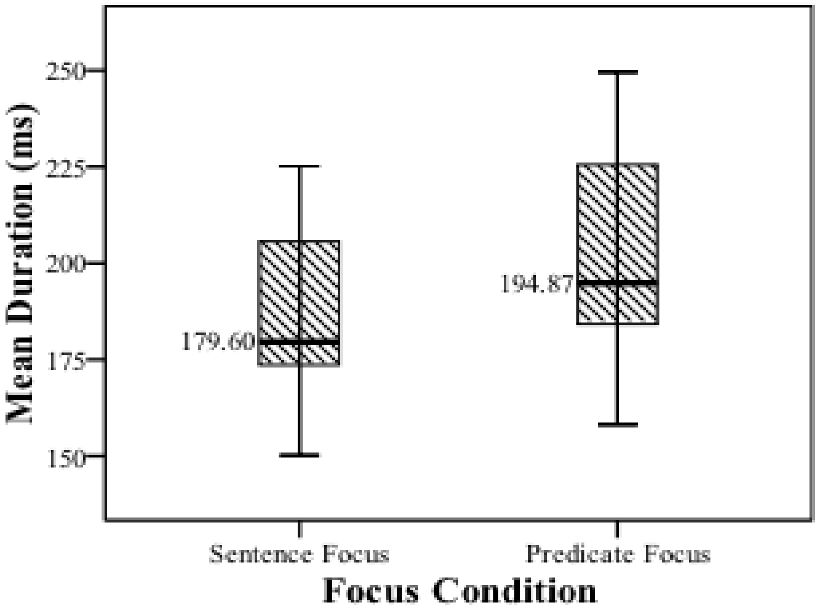


Figure 6.45: Boxplot of Mean Duration of the stressed syllable of the on -focus key word /maryūl/ (ms).

Table 6.32 describes the scores of the mean duration of the stressed syllable of the on-focus region /li-landan/ in /**Rā**.mi **hā**.jar li-**lan**.dan al-**bā**.riḥ/. The table shows that the mean score for the stressed syllable of the on-focus key word /landan/ in the predicate-focus structure (M=148.05, SD=17.60) is lower than its counterpart in the sentence-focus structure (M=163.05, SD=17.82). To verify this difference, a Repeated Measures ANOVA is conducted.

[64]The table is in Table B.83 in Appendix B.3.1.1.5 on Page 422.

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	163.05	148.05
	Std. Error	4.45	4.40
Median		159.78	149.41
Std. Deviation		17.82	17.60
Statistics	Maximum	198.62	180.26
	Minimum	140.77	108.55
Range		57.85	71.71

Table 6.32: Mean Duration of stressed syllable of the on-focus key word /li-landan/ (in ms).

A Repeated Measures ANOVA with Sphericity[65] determines that the focus condition has a statistically significant effect on the mean duration of the on-focus region [$F(1,\ 14) = 27.366$, $P<0.001$]. The effect of gender was found to be non-significant: p=0.077. Post hoc comparison with Bonferroni adjustment[66] reveals that the mean duration of the on-focus key word /li-landan/ in the predicate-focus structure (M=148.05, SD=17.60) was statistically significantly lower than its counterpart in the sentence-focus structure (M=163.05, SD=17.82): p<0=.001. Figure 6.46 shows the difference across the two focus conditions.

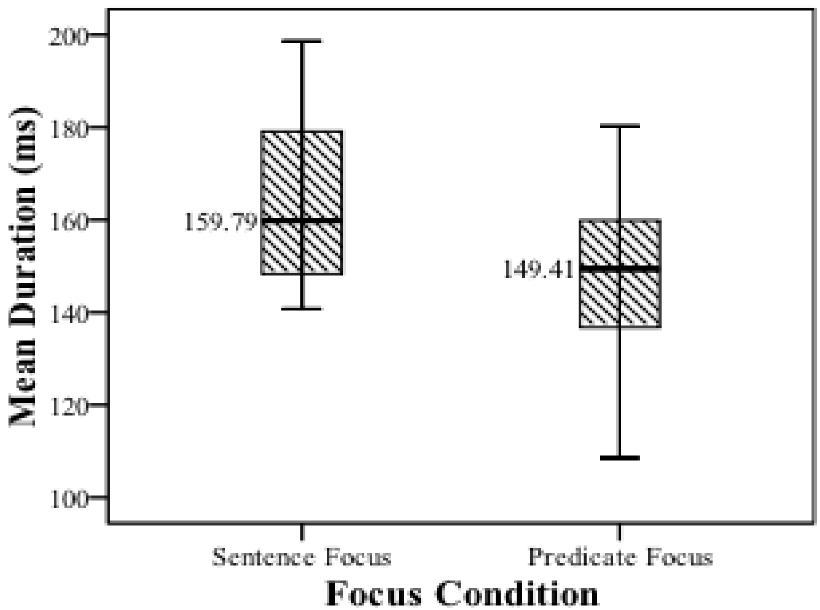


Figure 6.46: Boxplot of Mean Duration of the stressed syllable of the on-focus key word /landan/ (ms).

[65]The table is in Table B.85 in Appendix B.3.1.1.5 on Page 423.
[66]The table is in Table B.86 in Appendix B.3.1.1.5 on Page 423.

In short, we found the difference in the mean duration of the on-focus key words was not shown to be systematic across the two focus conditions. In the following paragraphs, the duration of the pre-focus region is investigated across the two focus conditions to assess whether pre-focus region (i.e Topic) differs across the two focus conditions.

Table 6.33 describes the scores of the mean duration of the pre-focus word /Rāmi/ in /**Rā**.mi **mar Lī**.na ʔ**ams**/. It shows that the mean score of the mean duration of the pre-focus word /Rāmi/ in the predicate-focus structure (*M*=331.95, *SD*=58.17) is higher than its counterpart in the sentence-focus structure (*M*=270.43, *SD*=46.59). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	270.43	331.95
	Std. Error	11.65	14.54
Median		256.54	333.28
Std. Deviation		46.59	58.17
Statistics	Maximum	347.18	457.40
	Minimum	209.49	259.73
Range		137.69	197.67

Table 6.33: Mean Duration of the pre-focus Item /Rāmi/ (in ms).

A Repeated Measures ANOVA with Sphericity[67] determines that the focus condition has a statistically significant effect on the mean duration of the pre-focus word /Rāmi/ [$F(1, 14)= 27.366$, $P<0.001$]. The effect of gender was found to be non-significant: $p<0.997$. Post hoc comparison with Bonferroni adjustment[68] reveals that the mean duration of the pre-focus item /Rāmi/ in the predicate-focus structure (*M*=331.95, *SD*=58.17) is statistically significantly higher than its counterpart in the sentence-focus structure (*M*=270.43, *SD*=46.59): $p<0=.001$. Figure 6.47 shows the difference across the two focus conditions.

[67] The table is in Table B.88 in Appendix B.3.1.1.5 on Page 424.
[68] The table is in Table B.89 in Appendix B.3.1.1.5 on Page 424.

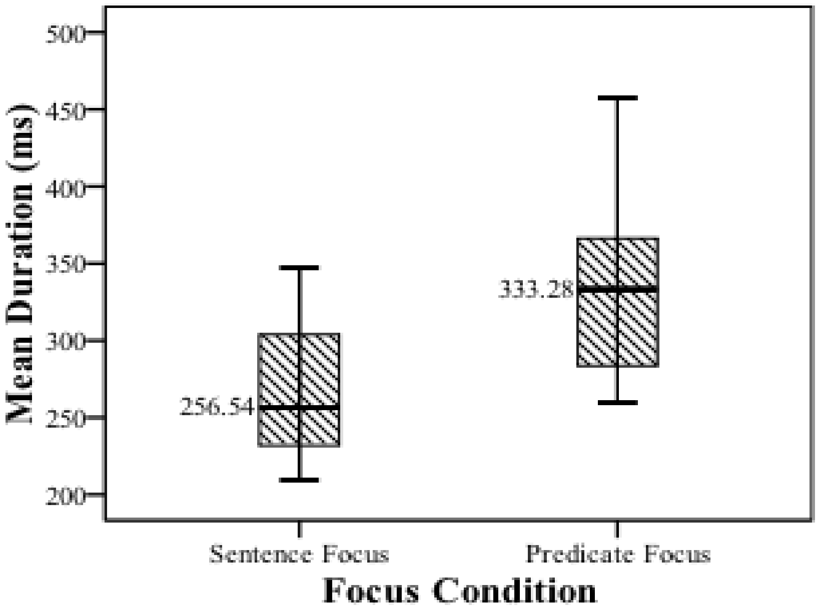


Figure 6.47: Boxplot of Mean Duration of the pre-focus key word /Rāmi/ (ms).

Table 6.34 describes scores of the mean duration of the pre-focus word /Rana/ in /**Ra**.na **saw**.wat mar.**yūl** li-Ma.**nāl**/. The table shows that the mean score of the mean duration of the pre-focus word /Rana/ in the predicate-focus structure (*M*=316.31, *SD*=61.34) is higher than its counterpart in the sentence-focus structure (*M*=308.65, *SD*=59.31). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	308.65	316.31
	Std. Error	14.83	15.33
Median		294.59	301.20
Std. Deviation		59.31	61.34
Statistics	Maximum	430.45	453.55
	Minimum	233	241.72
Range		197.45	211.84

Table 6.34: Mean Duration of the pre-focus Item /Rana/ (in ms),

A Repeated Measures ANOVA with Sphericity[69] determines that the focus condition has a statistically significant effect on the mean duration of the pre-focus key word /Rana/ [$F(1, 14)= 4.735$, $P=.047$]. Th effect of gender was found to

[69] The table is in Table B.91 in Appendix B.3.1.1.5 on Page 425.

be non-significant: p=0.869. Post hoc comparison with Bonferroni adjustment[70] reveals that the mean duration of the pre-focus region in the predicate-focus condition (M=316.31, SD=61.34) is statistically significantly longer its counterpart in the sentence-focus structure (M=308.65, SD=59.31): p<0.047. Figure 6.48 shows the difference across the two focus conditions.

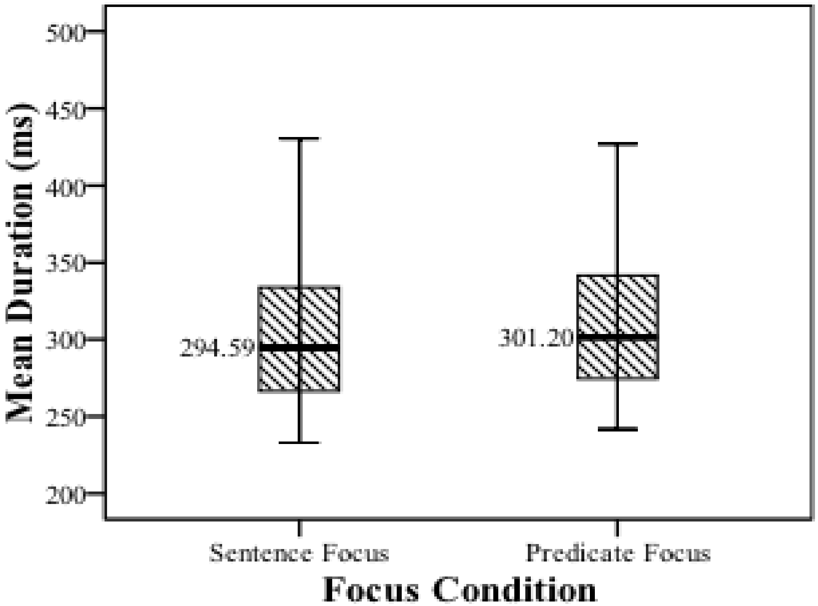


Figure 6.48: Boxplot of Mean Duration of the pre-focus key word /Rana/ (ms).

Table 6.35 describes the scores of the mean duration of the pre-focus word /Rāmi/ in /**Rā**.mi **hā**.jar li-**lan**.dan al-**bā**.riḥ/. It shows that the mean score of the mean duration of the pre-focused word /Rāmi/ in the predicate-focus structure (M=312.89, SD=50.87) is shorter than its counterpart in the sentence-focus structure (M=338.62, SD=53.28). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Condition	
		Sentence-Focus	Predicate-Focus
Mean	Statistics	338.62	312.89
	Std. Error	13.32	12.72
Median		340.57	305.34
Std. Deviation		53.28	50.87
Statistics	Maximum	428.37	424.39
	Minimum	255.09	249.34
Range		173.27	175.06

Table 6.35: Mean Duration of the pre-focus word /Rāmi/ (in ms.)

[70]The table is in Table B.92 in Appendix B.3.1.1.5 on Page 425.

A Repeated Measures ANOVA with Sphericity[71] determines that the focus condition has a statistically significant effect on the mean duration of the pre-focus word /Rāmi/ [$F(1, 14)= 20.967$, $P<0.001$]. The effect of gender was found to be non-significant: $p=0.5$. Post hoc comparison with Bonferroni adjustment[72] reveals that the mean duration of the pre-focus word in the predicate-focus condition ($M=312.89$, $SD=50.87$) is statistically significantly lower its counterpart in the sentence-focus structure ($M=338.62$, $SD=53.28$): $p<0.001$. Figure 6.49 shows the difference across the two focus conditions.

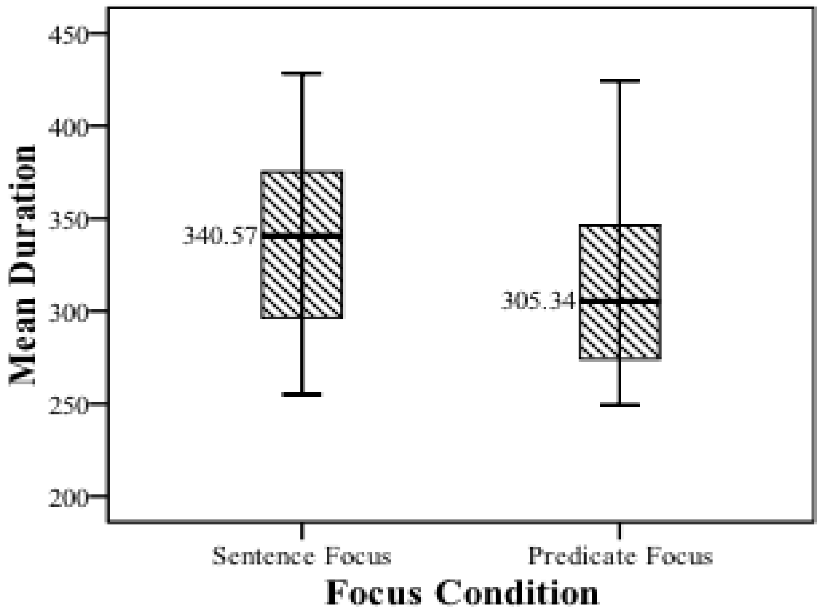


Figure 6.49: Boxplot of Mean Duration of the pre-focus key word /Rāmi/ (ms).

In short, this section investigated the mean duration of the on-focus region and the pre-focus region. It has been found that the difference in the mean duration is not systematic across the two focus conditions: sentence-focus and predicate-focus structure.

6.3.2 Sentence Focus vs. Information Focus

This section aims to answer the following research questions: (a) Does the information focus differ phonologically from its neutral counterpart in the sentence-focus sentence ? If so how? (b) Do the words occurring before the information

[71]The table is in Table B.93 in Appendix B.3.1.1.5 on Page 426.
[72]The table is in Table B.95 in Appendix B.3.1.1.5 on Page 426.

focus (i.e. pre-focus region) differ phonologically from their neutral counterparts in the sentence-focus sentence? If so how? and (c) Does the word occurring after the information focus (i.e. post-focus region) differ phonologically from its neutral counterpart in the sentence-focus sentence? If so how? The three target sentences in (15b), (16b) and (17b) are embedded in the question-answer context (15a), (16a) and (17a) respectively to evoke information focus on the sentence-penultimate word. In this section, we make systematic comparisons between focus and its neutral counterpart in three separate focus regions: pre-focus, on-focus and post-focus region.

(15) a. man rāmi mar ʔams?
who Rami visited yesterday
'Whom did Rami visit yesterday?'

b. **Rā**.mi **mar** [**Lī**.na]$_F$ ʔ**ams**.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

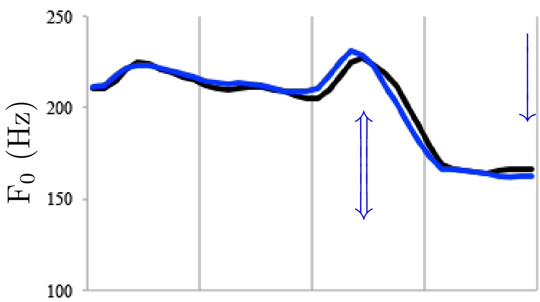
(16) a. waš sawwat rana li-manāl?
what made Rana for-Manal
'What was the last work Rana did for Manal?'

b. **Ra**.na **saw**.wat [mar.**yūl**]$_F$ li-Ma.**nāl**.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

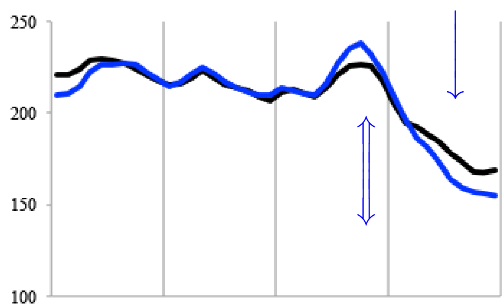
(17) a. wein hājar rāmi al-bāriḥ?
where emigrated Rami yesterday
'Where did Rami emigrate yesterday?'

b. **Rā**.mi **hā**.jar [li-**lan**.dan]$_F$ al-**bā**.riḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

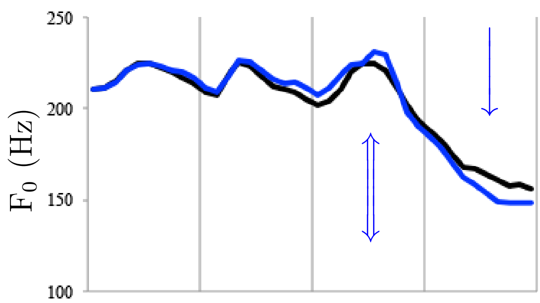
Figure 6.50 displays the time-normalized mean F_0 contours uttered with and without the information focus in the sentence-penultimate position, averaged across all the speakers' repetitions.



(a) /Rāmi mar **Līna** ʔams/



(b) /Rana sawwat **maryūl** li-Manāl/



(c) /Rāmi hājar **li-landan** al-bāriḥ/

Figure 6.50: Time-normalized mean F_0 contour: Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The black contour is sentence-focus contour (neutral intonation), the blue contour is where the sentence-penultimate item is information-focused. The key word is in boldface. ⇕=expansion of pitch range, ↓=lower pitch accent.

From the graphs in Figure 6.50, we can see clearly the prosodic effects of the information focus occurring in the sentence-penultimate position. We observe the following.

1. The F_0 peak of the information focused word in the sentence-penultimate position in the blue contour is higher than the F_0 peak of its neutral counterpart in the black contour. This is visible in Figure 6.50(b) and Figure 6.50(c). However, the F_0 of peal of the information focused word occurring in the sentence-penultimate position in Figure 6.50(a) is slightly higher than its neutral counterpart.

2. The F_0 of the post-focus word occurring after the information focus (in the blue contour) is lower than the F_0 of its neutral counterpart. This is clearly visible in Figure 6.50(b) and Figure 6.50(c). In Figure 6.50(a) , the F_0 of

the post-focus region occurring after the information focus does not show clearly a difference, compared with its neutral counterpart.

3. The F_0 peaks of the pre-focus words are similar to those of the same words in the neutral focus sentences. This is clearly seen in all the graphs. This indicates that information focus does not affect the pre-focus region.

4. The domain of the pitch accent (local F_0 maxima) is local with and without information focus. This is visible in all the graphs above.

5. The location of the F_0 peaks of all the words are the same with and without information focus. This is clearly shown in all the graphs above. This indicates that the information focus occurring in the sentence-penultimate position does not affect the peak alignment.

Table 6.36 summarizes the results from the auditory analyses of all the contours of sentence (15b), (16b) and (17b).[73]

Focus Region	**Pre-Focus**		**On-Focus**	**Post-Focus**
Sentence (15b)	*Rāmi*	*mar*	*Lina*	*ʔams*
	L+H* (83.75%) H* (16.25%)	L+H* (2.5%) H* (97.5%)	L+H* (100%)	H* (100%)
Sentence (16b)	*Rana*	*sawwat*	*maryūl*	*li-manāl*
	L+H* (38.75%) H* (61.25%)	H* (100%)	L+H* (96.25%) H* (3.75%)	H* (100%)
Sentence (17b)	*Rāmi*	*hājar*	*li-landan*	*al-bāriḥ*
	L+H* (21.25 %) H* (78.75%)	H* (100%)	L+H* (96.25%) H* (3.75%)	H* (100%)

Table 6.36: The frequency in percentage of the pitch accent distribution in the argument-focus structure wherein the sentence-penultimate word carries information focus. The percentage between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

From Table 6.36, we observe the following. First, the information-focus word was produced more with [L+H*] than with [H*]. Second, all the pre-focus words were produced with a pitch accent. This indicates that the pre-focus region occurring before the information focus is not deaccented (i.e. lack of F_0 movement), as shown clearly in all the graphs in Figure 6.50 above. Third, the post-focus word

[73] The full data transcription is in Appendix B.3.2.

occurring after the information-focused word was produced with a pitch accent. This indicates that the post-focus word is not deaccented. Finally, the peaks of the pitch accent of all the words are the same with and without the information focus. This is indicated through the use of 'star' associated with the H target, as shown in Table 6.36. This indicates that focus does not have an effect on the peak alignment.

Table 6.37 below shows the distribution of the pitch accents produced on the information-focused word, compared with the distribution of the pitch accents produced on its neutral counterpart in the sentence-focus structure.

Figure (6.50(a))		Figure (6.50(b))		Figure (6.50(c))	
Līna		**maryūl**		**li-landan**	
Sentence Focus	Information Focus	Sentence Focus	Information Focus	Sentence Focus	Information Focus
$L+H^*$ (72.5%) H^* (27.5%)	$L+H^*$ (100%)	$L+H^*$ (83.75%) H^* (27.5%)	$L+H^*$ (96.25%) H^* (3.75%)	$L+H^*$ (83.75%) H^* (16.25%)	$L+H^*$ (96.25%) $L+H^*$ (3.75%)

Table 6.37: The distribution of the pitch accents in percentage: information-focused item vs. its neutral counterpart in the sentence-focus structure. The percentage between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

From Table 6.37, we can clearly see the most common pitch accent produced on the information-focused word occurring in the sentence-penultimate position in the four-word declarative sentences. This table shows that the information-focused word was produced more with the bitonal pitch accent [$L+H^*$] than with the monotonal pitch accent [H^*], compared with its neutral counterpart in the sentence-focus structure. This suggests that the HA speakers have a tendency to produce the information-focused word with [$L+H^*$]. However, this does not suggest that this bitonal pitch accent [$L+H^*$] is the default pitch accent associated with the information-focused word. This is because there are cases in which the HA speakers produce the monotonal pitch accent [H^*] on the information-focused word, as shown clearly in Table 6.37 above.

The typical pitch tracks in Figure 6.51, 6.52 and 6.53 were all produced by the same speaker coded A4 (male speaker).

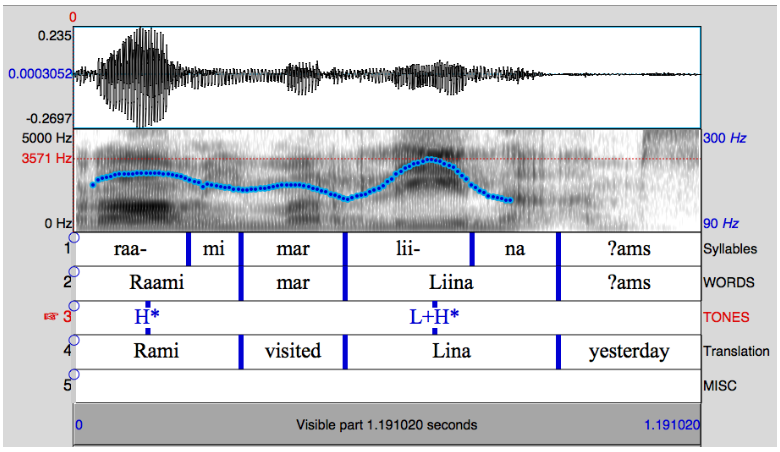


Figure 6.51: Male Speaker (Coded A4). Information focus is sentence-penultimate.

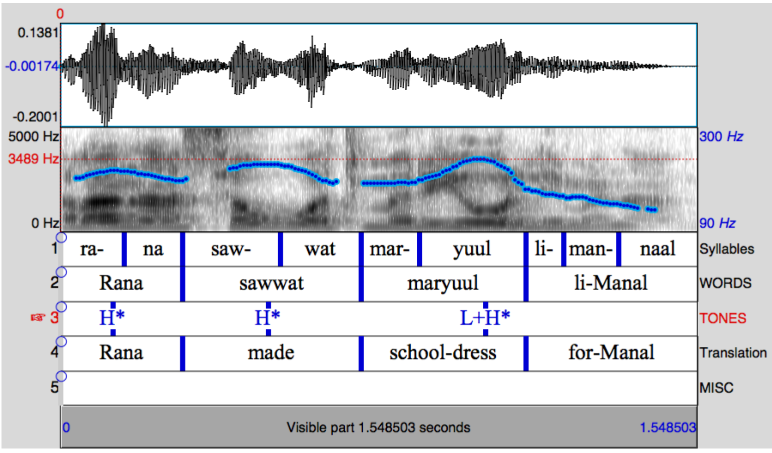


Figure 6.52: Male Speaker (Coded A4). Information focus is sentence-penultimate.

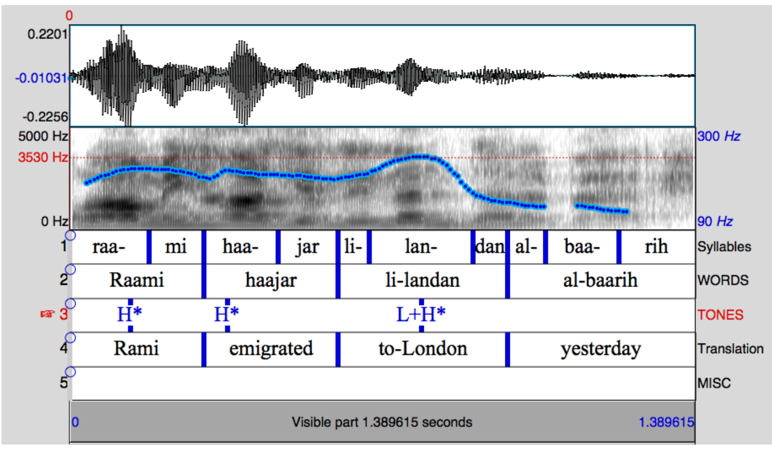


Figure 6.53: Male Speaker (Coded A4). Information focus is sentence-penultimate.

These pitch tracks show clearly that the information-focused word occurring in the sentence-penultimate position was produced with the highest pitch accent in the structure (i.e. the nuclear pitch accent of the clause). This word was mainly produced with the bitonal pitch accent [L+H*]. The prenuclear pitch accents were mostly [H*]. The pitch accent on the post-focus word was produced with a very compressed pitch accent.

To sum up, this section found that the information focus always attracts the nuclear pitch accent of the sentence. As for the post-focus region, it is shown to be pitch-accented. However, their pitch accents are visually shown be compressed as in Figure 6.50(b) and Figure 6.50(c). However, these observations need to be verified and hence this is the focus of Section 6.3.8. Moreover, the pitch accents on pre-focused words do not show any significant differences from their neutral counterparts in the sentence-focus structure.

The following section examines the difference between in-situ contrastive focus and its neutral counterpart in the sentence-focus structure.

6.3.3 Sentence Focus vs. in-situ Contrastive Focus

This section aims to answer the following research questions: (a) Does the contrastive focus differ phonologically from its neutral counterpart in sentence-focus sentence? If so how? (b) Do the words occurring before the contrastive focus (i.e. pre-focus region) differ phonologically from their counterparts in the sentence-focus sentence? If so how? and (c) Does the word occurring after the contrastive focus (i.e. post-focus region) differ phonologically from its counterparts in sentence-focus sentence? If so how? The three target sentences in (18b), (19b) and (20b) are embedded in the question-answer contexts (18a), (19a) and (20a) respectively to evoke contrastive focus on the sentence-penultimate word.

(18) a. man Rāmi mar ʔams? Rana?
who Rami visited yesterday rana
'Whom did Rami visit yesterday? Rana?'

b. **Rā**.mi **mar** [**Lī**.na]$_{CF}$ ʔ**ams**.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

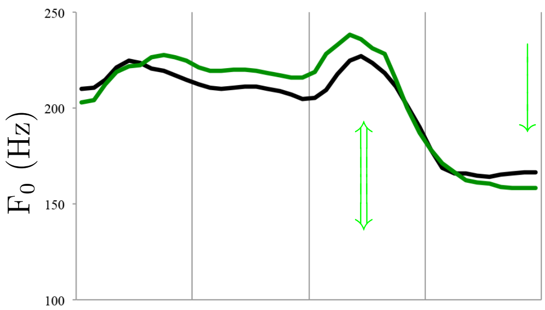
(19) a. waš sawwat Rana li-Manāl? miryalah?
what made Rana for-Manal apron
'What did Rana make for Manal? an apron?'

b. **Ra**.na **saw**.wat [mar.**yūl**]$_{CF}$ li-Ma.**nāl**.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

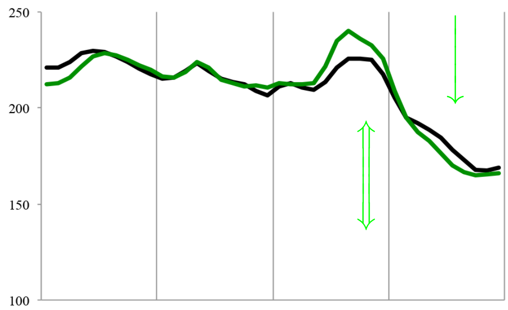
(20) a. wein hājar Rāmi al-bāriḥ? li-as-su^{c}ūdiah?
where emigrated Rami yesterday to-the-Saudi
'Where did Rami emigrate yesterday? To Saudi?'

b. **Rā**.mi **hā**.jar [li-**lan**.dan]$_{CF}$ al-**bā**.riḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

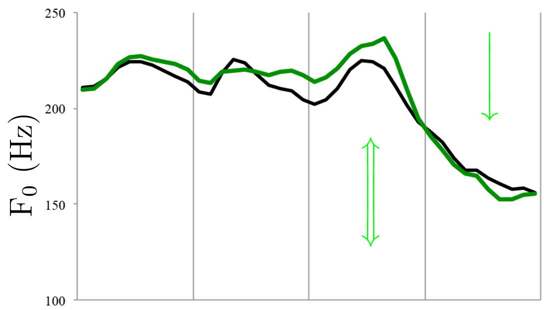
The time-normalized mean pitch contours for all the three sentences under in-situ contrastive focus and under neutral focus are presented in Figure 6.54, averaged across all speakers' repetitions.



(a) /Rāmi mar **Līna** ʔams/



(b) /Rana sawwat **maryūl** li-Manāl/



(c) /Rāmi hājar **li-landan** al-bāriḥ/

Figure 6.54: Time-normalized mean F_0 contour: Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The black contour is sentence-focus contour (neutral intonation), and the green contour is where the sentence-penultimate word is contrastive-focused. The key word is in boldface. ⇕=expansion of pitch range, ↓=lower pitch accent.

The graphs in Figure 6.54 show clearly the prosodic effects of the contrastive focus. Through the visual inspection of the graphs above, we observe the following.

1. The F_0 peak of the contrastive focus occurring in the sentence-penultimate position (in the green contour) is higher than the F_0 peak of its neutral counterpart (in the black contour). This is visible in all the graphs in Figure 6.54.

2. The pitch range of the contrastive-focused word is more expanded than the pitch range of its neutral counterpart. This is visible in all the graphs above.

3. The F_0 peak of the pre-focus words are to some extent the same with and without contrastive focus. In graph 6.54(b), the F_0 peaks of the pre-focus words are the same. In graph 6.54(a), the F_0 peaks of the pre-focused words occurring before the contrastive focus are relatively higher than the same

words in the sentence-focus structure. In graph 6.54(c), the F_0 of the verb /hājar/ 'emigrated' is flat; however, the F_0 peak of the sentence-initial word are the same with and without contrastive focus.

4. The F_0 peak of the post-focus word occurring after the contrastive focus (in the green contour) is lower than the same word under neutral focus (in the black contour). This is visible in all the graphs in Figure 6.54

5. The location of the F_0 peaks of all the words are the same with and without contrastive focus.

6. The domain of the pitch accent (local F_0 maxima) is local. This is visible in all the graphs above.

Table 6.38 summarizes the results from the auditory analyses of sentence (18b), (19b) and (20b).[74]

Focus Region	**Pre-Focus**		**On-Focus**	**Post-Focus**
Sentence (18b)	*Rāmi*	*mar*	*Līna*	*ʔams*
	L+H* (2.5%) H* (97.5%)	H* (100%)	L+H* (96.25%) H* (3.75%)	H* (100%)
Sentence (19b)	*Rana*	*sawwat*	*maryūl*	*li-manāl*
	L+H* (10%) H* (90%)	H* (100%)	L+H* (100%)	H* (100%)
Sentence (20b)	*Rāmi*	*hājar*	*li-landan*	*al-bāriḥ*
	L+H* (10%) H* (90%)	H* (100%)	L+H* (100%)	H* (100%)

Table 6.38: The frequency in percentage of the pitch accent distributions in the argument-focus structure with contrastive focus occurring in the sentence-penultimate position. The percentage between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

From the table above, we observe the following. First, the contrastive-focused word was produced more with [L+H*] than with [H*]. Second, the prenuclear pitch accents were mostly the monotonal pitch accent [H*]. Third, the post-focus word was produced with a pitch accent. Finally, the location of the peaks of all the pitch accents are the same with and without contrastive focus. This is

[74]The full data transcription is in Appendix B.3.3.

indicated in the table by associating the H target with a 'star'. This indicates that the contrastive focus does not affect the peak alignment.

Table 6.39 reveals that the contrastive-focused word was found to be associated to a greater extent with the bitonal pitch accent [L+H*] than its neutral counterpart in the sentence-focus structure. This indicates that the focus in HA attracts the nuclear pitch accent of the entire clause.

Figure (6.54(a))		Figure (6.54(b))		Figure (6.54(c))	
Līna		**maryūl**		**li-landan**	
Sentence Focus	Contrastive Focus	Sentence Focus	Contrastive Focus	Sentence Focus	Contrastive Focus
L+H* (72.5%) H* (27.5%)	L+H* (96.25%) H* (3.75%)	L+H* (83.75%) H* (27.5%)	L+H* (100%)	L+H* (83.75%) H* (16.25%)	L+H* (100%)

Table 6.39: The distribution of the pitch accents in percentage: contrastive-focused word vs. its neutral counterpart in the sentence-focus structure. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

The typical pitch tracks in Figure 6.55, 6.56 and 6.57 are all produced by the same speaker coded A4 (male speaker).

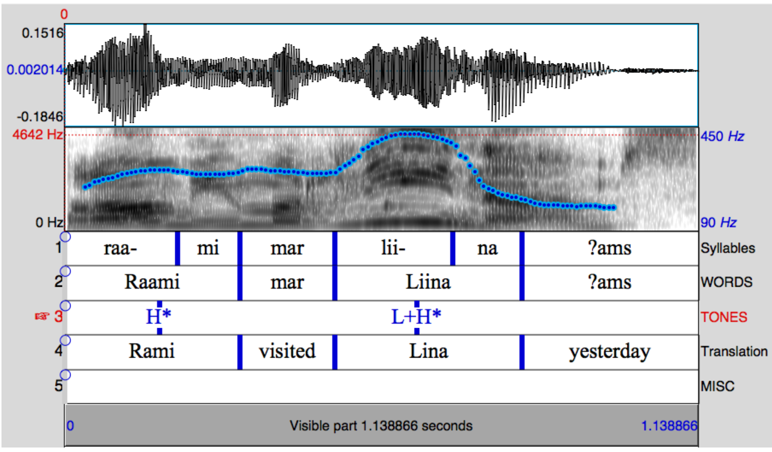


Figure 6.55: Male Speaker (Coded A4). Contrastive focus is sentence-penultimate.

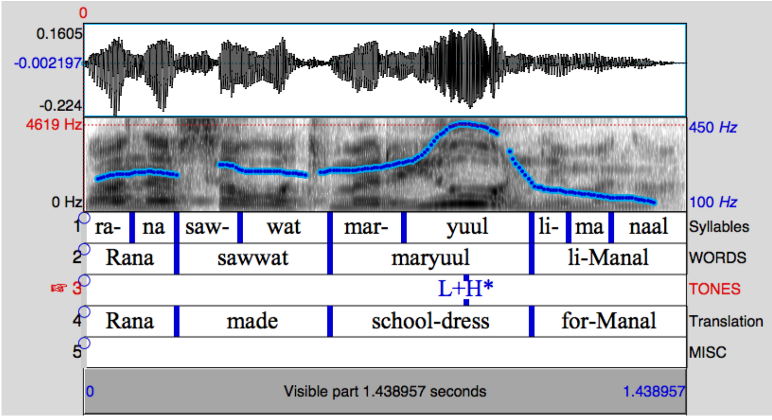


Figure 6.56: Male Speaker (Coded A4). Contrastive focus is sentence-penultimate.

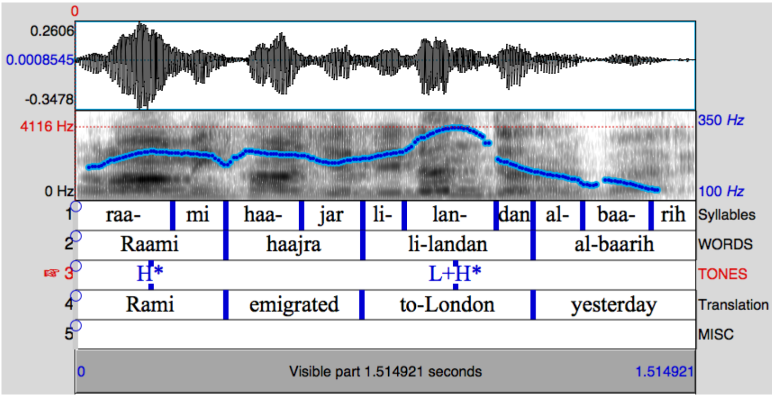


Figure 6.57: Male Speaker (Coded A4). Contrastive focus is sentence-penultimate.

These pitch tracks above show clearly that the contrastive-focused word in the sentence-penultimate position attracts the nuclear pitch accent [L+H*]. As for the post-focus words, its pitch accent is very compressed. For example, the post-focus word /al-bāriḥ/ 'yesterday' in Figure 6.57 was produced with a pitch accent; however, it is very compressed as shown clearly in the pitch track.

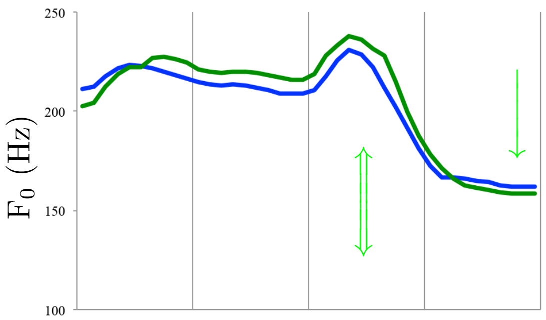
In short, this section has found that the contrastive-focused item in the sentence-penultimate attracts the nuclear picth accent [L+H*], followed by a very compressed pitch accent, and preceded by monotonal pitch accents [H*].

In the following section, we examine the phonological differences between the information focus and its contrastive-focused counterpart occurring in the same sentential position (i.e. sentence-penultimate position).

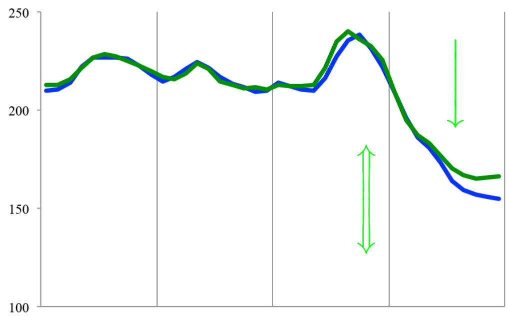
6.3.4 Information Focus vs. Contrastive Focus

This section aims to answer the following research questions: (a) Does the contrastive focus differ phonologically from its information-focused counterpart? If so how? (b) Do the words occurring before the contrastive focus (i.e. pre-focus region) differ phonologically from their counterparts occurring before the information-focused word ? If so how? and (c) Does the word occurring after the contrastive focus (i.e. post-focus region) differ phonologically from its counterpart occurring after the information-focused word? If so how?

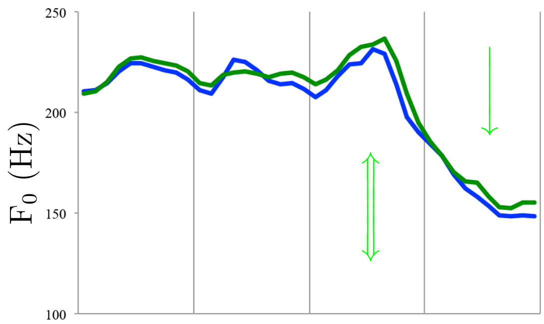
The time-normalized mean pitch contours for all the three sentences under information focus and under contrastive focus are presented in Figure 6.58, averaged across all the speakers' repetitions.



(a) /Rāmi mar **Līna** ʔams/



(b) /Rana sawwat **maryūl** li-Manāl/



(c) /Rāmi hājar **li-landan** al-bāriḥ/

Figure 6.58: Time-normalized mean F_0 contour: Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The blue contour is wherein the sentence-penultimate word is information-focused, and the green contour is where the sentence-penultimate word is contrastive-focused. The key word is in boldface. ⇳=expansion of pitch range, ↓=lower pitch accent.

The graphs in Figure 6.58 show the difference between the prosodic effects of the information focus occurring in the sentence-penultimate position and the prosodic effects of the same word under contrastive focus. From the graphs above, we observe the following.

1. The F_0 peak of the contrastive focus occurring in the sentence-penultimate position (in the green contour) is higher than the F_0 peak of the same word under information focus (in the blue contour). This is visible in all the graphs in Figure 6.58.

2. The F_0 peaks of the pre-focus words occurring before the contrastive focus and the F_0 peaks of their counterparts occurring before the information focus do not show systematic differences. That is, in Figure 6.58(b) the F_0 peaks of the pre-focused words are the same with information focus and with contrastive focus. In Figure 6.58(a), the F_0 peals of the pre-focused words occurring before the contrastive focus is relatively higher than the same words occurring before the information focus. In Figure 6.58(c), the F_0 peak of the verb /hājar/ 'emigrated' occurring before the contrastive-focus word is lower than the same word occurring before the information focus. These observations indicate that the focus condition does have systematic effects on the pre-focus region.

3. The F_0 of the post-focus word occurring after the contrastive focus (in the green contour) does not go below the F_0 of the same word occurring after the information focus. This seems to be predicated because the post-focus region only contains one word and thus the speakers could not articulatorily able to lower the pitch of the sentence-final word, particularly when the F_0 of the contrastive-focused word occurring in the sentence-penultimate is higher than the same word under information focus.

4. The location of the F_0 peaks of all the words are the same with information focus and with contrastive focus. This indicates that the focus does not have an effect on the peak alignment.

5. The domain of the pitch accent (local F_0 maxima) is local with information

focus and with contrastive focus. That is, the F_0 starts from around the onset of the stressed syllable, till it reaches the highest, then falls steadily across the unstressed syllable(s).

Table 6.40 shows the distribution of the pitch accents produced on the contrastive-focused word, compared with the distribution of the pitch accents produced on the its information-focused counterpart.

Figure (6.58(a))		Figure (6.58(b))		Figure (6.58(c))	
Līna		**maryūl**		**li-landan**	
Information Focus	Contrastive Focus	Information Focus	Contrastive Focus	Information Focus	Contrastive Focus
L+H* (100%)	L+H* (96.25%) H* (3.75%)	L+H* (96.25%) L+H* (3.75%)	L+H* (100%)	L+H* (96.25%) L+H* (3.75%)	L+H* (100%)

Table 6.40: The distribution of the pitch accents in percentation: information-focused word vs. contrastive-focused word. The percentage number between paranthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

It is clear from the table above that the HA speakers have the tendency to produce the bitonal pitch [L+H*] with the contrastive-focused words more than with the same word under information focus. This is taken in the present study to be as a result of adding more prosodic prominence to the contrastive focus, rather than as a default pitch accent associated with the contrastive focus.

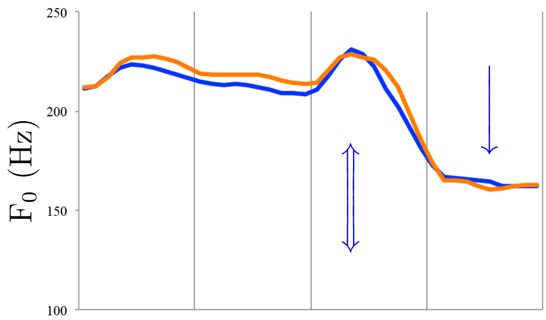
To sum up, this section examined the difference between information focus and contrastive focus. It has been found that the pitch accent realized on the contrastive-focused word is more expanded than the pitch accent on its information-focused counterpart. Furthermore, the pre-focused words occurring before the contrastive focus are largely unchanged, compared with the same words occurring before the information focus. As for the post-focus word, it has been shows that its F_0 does not go below the F_0 of the same word occurring after the information focus.

The following section will investigate the prosodic differences between the predicate-focus structures and their argument-focus counterparts with single information focus.

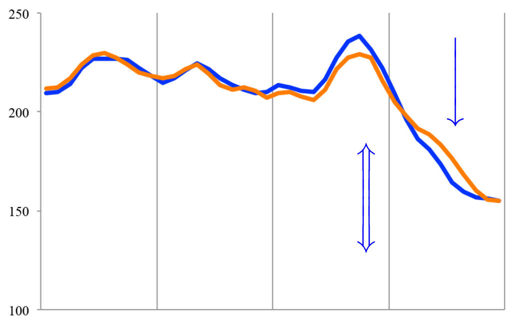
6.3.5 Predicate Focus vs. Information Focus

This section investigates the difference between predicate-focus structure and the argument-focus structure wherein the sentence-penultimate word carries information focus. The aim is to answer the following research questions: (a) Does the predicate-focus structure differ phonologically from its argument-focus counterpart wherein the sentence-penultimate word carries information focus? If so how? and (b) Does the word before the predicate focus differ phonologically from its counterpart in the argument-focus structure with single information focus occurring in the sentence-penultimate position? If so how? Since we observed in §6.3.1 that the sentence-penultimate word in the predicate-focus structure receives the highest pitch accent in the structure, the interesting question that arises is how the pitch accent on this word in the predicate-focus structure differs from the pitch accent occurs on the same word when it carries information focus.

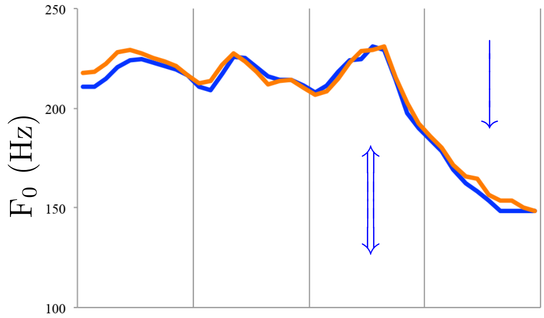
The time-normalized mean F_0 contours of the three target sentences produced by all the speakers are plotted in Figure 6.59 below.



(a) /Rāmi **mar Līna ʔams**/



(b) /Rana **sawwat maryūl li-Manāl**/



(c) /Rāmi **hājar li-landan al-bāriḥ**/

Figure 6.59: Time-normalized mean F_0 Contour: Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The blue contour is wherein the sentence-penultimate item is information focus. The orange contour is wherein the predicate in boldface is information focus. ⇕ indicates expansion of pitch range, and ↓ indicates lower pitch accent (i.e pitch-accent compression).

From the graphs in Figure 6.59, we can see clearly the prosodic difference between the predicate-focus structure and the argument-focus structure when the information focus occupies the sentence-penultimate position. The difference between these two focus structures is very slight. That is, the F_0 peak of the information-focused word (in the blue contour) occurring in the sentence-penultimate position is relatively higher than the F_0 peak of the same word under predicate focus (in the orange contour). As for the F_0 peaks of the pre-focused word, it is largely the same with information focus and with predicate focus.

Table 6.41 shows the distribution of the pitch accents produced on the information-focused word, compared with the distribution of the pitch accents produced on the same word under predicate focus.

Figure (6.59(a))		Figure (6.59(b))		Figure (6.59(c))	
Līna		**maryūl**		**li-landan**	
Predicate Focus	Information Focus	Predicate Focus	Information Focus	Predicate Focus	Information Focus
L+H* (67.5%) H* (32.5%)	L+H* (100%)	L+H* (72.5%) H* (22.5%)	L+H* (96.25%) L+H* (3.75%)	L+H* (71.25%) H* (28.75%)	L+H* (96.25%) L+H* (3.75%)

Table 6.41: The distribution of the pitch accents in percentage: information focus vs. its counterpart in the predicate-focus structure. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

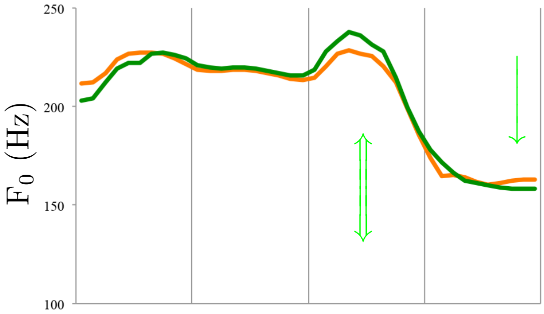
It is clear from the table above that the information-focused word was produced more with the bitonal pitch accent [L+H*] than the same word under predicate focus. This is predicated because the main prosodic prominence of the argument-focus structure with single information focus is placed on the information-focused word whereas the main prosodic prominence of the predicate-focus structure is distributed across the predicate-focus domain which includes the verb and its complements. This is clearly shown in the plots in §6.3.1.

The following section examines the difference between predicate-focus structure and argument-focus structure wherein the sentence-penultimate word carries contrastive focus.

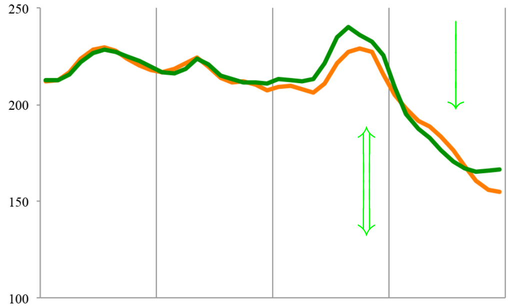
6.3.6 Predicate Focus vs. in-situ Contrastive Focus

This section investigates the phonological difference between predicate-focus structure and argument-focus structure wherein the sentence-penultimate item carries contrastive focus. The aim is to answer the following research questions: (a) Does the predicate-focus structure differ phonologically from its argument-focus counterpart wherein the sentence-penultimate item carries contrastive focus? If so how? and (b) Does the word before the predicate focus differ phonologically from its counterpart in the argument-focus structure wherein the sentence-penultimate item carries contrastive focus? If so how?

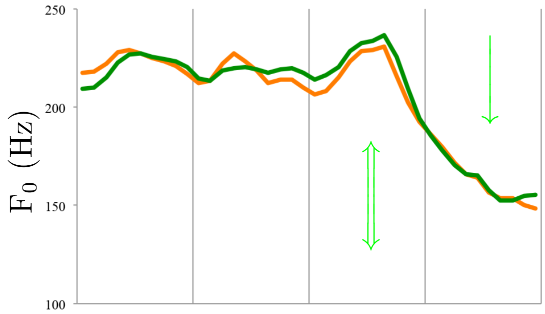
The time-normalized mean pitch contours for all the three target sentences in the predicate-focus and in-situ contrastive-focus condition are presented in Figure 6.60, averaged across all the speakers' repetitions.



(a) /Rāmi **mar Līna ʔams**/



(b) /Rana **sawwat maryūl li-Manāl**/



(c) /Rāmi **hājar li-landan al-bāriḥ**/

Figure 6.60: Time-normalized mean F_0 Contour: Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The green contour is wherein the sentence-penultimate word is contrastive focus. The orange contour is wherein the predicate in boldface is information focus. ⇕ indicates expansion of pitch range, and ↓ indicates lower pitch accent (i.e pitch-accent compression).

The graphs in Figure 6.60 above show the prosodic difference between the predicate-focus structure and its argument-focus structure with single contrastive focus occurring in the sentence-penultimate position. The difference is very slight. That is, the F_0 peak of the contrastive-focused word in the green contour is higher than the same word under predicate focus (in the orange contour). As for the F_0 peak of the sentence-initial item (topic), it is the same with predicate focus and with contrastive focus.

Table 6.42 shows the distribution of the pitch accents produced on the contrastive-focused word, compared with its counterpart in the predicate-focus structure.

Figure (6.60(a))		Figure (6.60(b))		Figure (6.60(c))	
Līna		**maryūl**		**li-landan**	
Predicate Focus	Contrastive Focus	Predicate Focus	Contrastive Focus	Predicate Focus	Contrastive Focus
L+H* (67.5%) H* (32.5%)	L+H* (96.25%) H* (3.75%)	L+H* (72.5%) H* (22.5%)	L+H* (100%)	L+H* (71.25%) H* (28.75%)	L+H* (100%)

Table 6.42: The distribution of the pitch accents: contrastive focus vs. its counterpart in the predicate-focus structure. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

The table above shows clearly that the contrastive-focused word was produced more with the bitonal pitch accent [L+H*] than the same word under predicate focus. This is predicated because the main prosodic of the predicate-focus structure is distributed across the words within the predicate-focus domain whereas the main prosodic prominence of the argument-focus structure is placed on the contrastive-focused word only.

The following section investigate the intonation of the focus preposing in which the contrastive-focused word is syntactically realized at the left periphery of the clause rather than in its canonical position.

6.3.7 Phonological Realization of Focus Preposing: ex-situ contrastive focus

The three target sentences in (21b), (22b) and (23b) are embedded in the question-answer contexts in (21a), (22a) and (23a) respectively to evoke the contrastive focus on the object of the predicate which is realized syntactically at the left-periphery of the clause. The aim is to find answers to the following research question: (a) How is focus preposing realized phonologically?

(21) a. man Rāmi mar ʔams? Rana?
who Rami visited yesterday rana
‘Whom did Rami visit yesterday? Rana?’

b. [**Lī**.na]$_{\text{CF}}$ **Rā**.mi **mar** ʔ**ams**.
Lina Rami visited yesterday
'Lina, Rami visited yesterday'

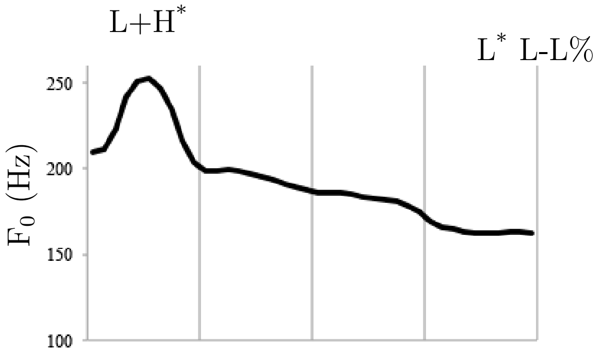
(22) a. waš sawwat Rana li-Manāl? miryalah?
what made Rana for-Manal apron
'What did Rana make for Manal? an apron?'

b. [mar.**yūl**]$_{\text{CF}}$ **Ra**.na **saw**.wat li-ma.**nāl**
school-dress Rana made for-Manāl
'A school dress, Rana made for Manal.'

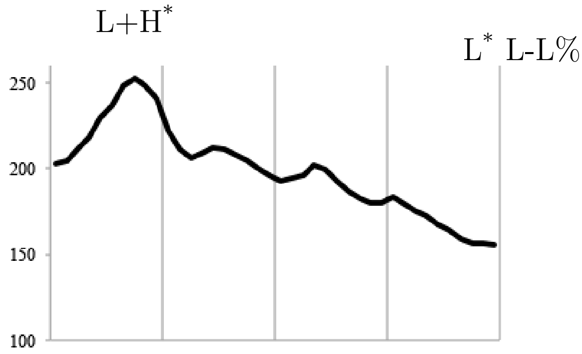
(23) a. wein hājar Rāmi al-bāriḥ? li-as-su^{c}ūdiah?
where emigrated Rami yesterday to-the-Saudi
'Where did Rami emigrate yesterday? To Saudi?'

b. [li-**lan**.dan]$_{\text{CF}}$ **Rā**.mi **hā**.jar al-**bā**.riḥ.
to-London Rāmi emigrated yesterday
'To London, Rami emigrated yesterday.'

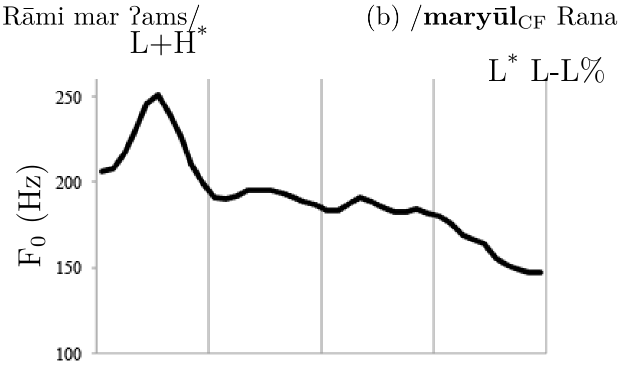
The time-normalized mean pitch contours for all the three target sentences under focus preposing are presented in Figure 6.61 below, averaged across all speakers' repetitions.



(a) /**Līna**$_{\mathrm{CF}}$ Rāmi mar ʔams/



(b) /**maryūl**$_{\mathrm{CF}}$ Rana sawwat li-manāl/



(c) /**li-landan**$_{\mathrm{CF}}$ Rāmi hājar al-bāriḥ/

Figure 6.61: Time-normalized mean F_0 Contour: Focus preposing wherein the contrastive-focused word (in boldface) is realized at the left periphery of the clause (i.e. ex-situ). Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. Tones displayed on the figures are based on F_0.

Visual inspections of the graphs in Figure 6.61 suggests the following.

1. The F_0 peak of the ex-situ contrastive-focused word in the left periphery of the clause is the highest in the structure. This is visible in all the graphs in Figure 6.61.

2. The F_0 peaks of all post-focused words occurring after the ex-situ contrastive focus are are very compressed.

3. The F_0 peaks of all the words occurring within the lexically stressed syllable including the ex-situ contrastive-focused word. This is visible in all the graphs above.

4. The F_0 domain of the pitch accent (local F_0 maxima) is local. That is, it starts a rise from around the onset of the syllable, then it reaches the highest

point around the middle of the stressed syllable, and then falls steadily towards the end of the prosodic word.

Table 6.43 summarizes the result from the auditory analyses of the target sentence (21b), (22b) and (23b).[75]

Focus Region	**On-Focus**	**Post-Focus**		
Sentence (6.61(a))	*Līna*	*Rāmi*	*mar*	*ʔams*
	$L+H^*$ (100%)	L^* (75%) H^* (25%)	L^* (72.5%) $L+H^*$ (8.75%) H^* (18.75%)	L^* (92.5%) H^* (7.5%)
Sentence (6.61(b))	*maryūl*	*Rana*	*sawwat*	*li-manāl*
	$L+H^*$ (96.25%) H^* (3.75%)	L^* (48%) H^* (36.25%) $L+H^*$ (3.75%)	L^* (63.75%) H^* (32.5%) $L+H^*$ (3.75%)	L^* (88.75%) H^* (11.25%)
Sentence (6.61(c))	*li-landan*	*Rāmi*	*hājar*	*al-bāriḥ*
	$L+H^*$ (95%) H^* (5%)	L^* (61.25%) H^* (32.5%) $L+H^*$ (3.75%)	L^* (66.25%) H^* (30%) $L+H^*$ (3.75%)	L^* (88.75%) H^* (11.25%)

Table 6.43: The frequency in percentage of the pitch accents distributions in the focus preposing with the ex-situ contrastive-focused word occurs at the left periphery of the clause (noncanonical position). The percentage between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 subjects.

The auditory analyses summarized in Table 6.43 above reveals that the ex-situ contrastive-focused word in the the left periphery of the clause was mostly produced with the bitonal pitch accent [$L+H^*$]. As for the post-focused words, they are mostly compressed. Post-focus compression seen in all the graphs in Figure 6.61 and in Table 6.43 is taken to be a phonological process employed by the HA speakers to express the ex-situ contrastive focus. This indicates that HA speakers do not only use syntax to express contrastive focus but also use prosody.

The typical pitch tracks in Figure 6.62, 6.63 and 6.64 are produced by the same speaker coded A4 (male speaker).

[75]The full data transcription is in Appendix B.3.4.

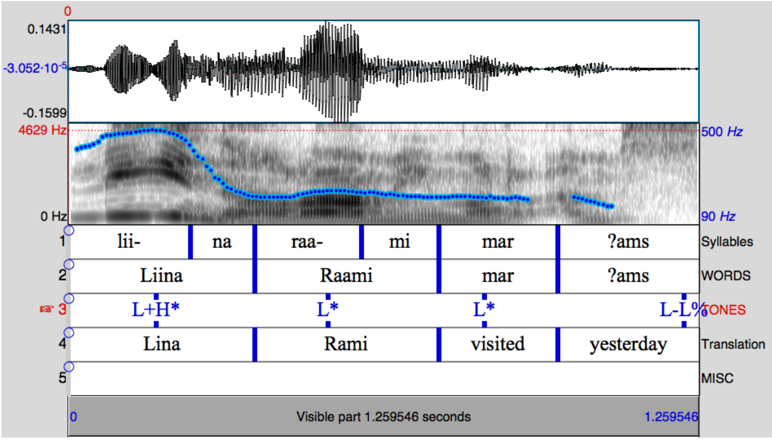


Figure 6.62: Male Speaker (Coded A4): Focus preposing.

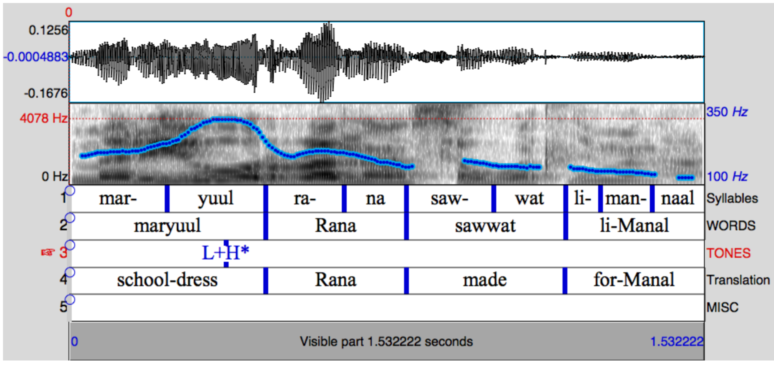


Figure 6.63: Male Speaker (Coded A4): Focus preposing.

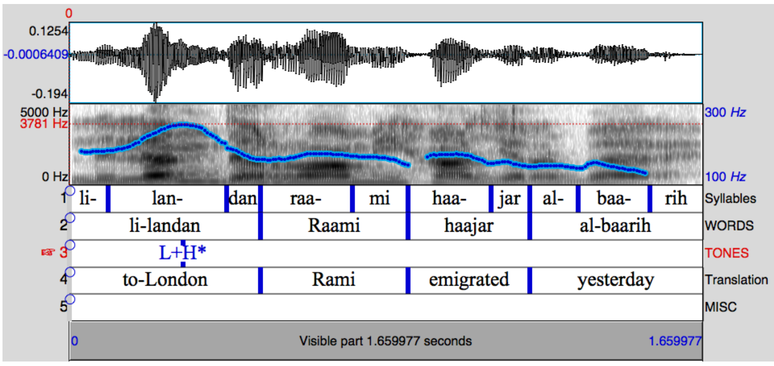


Figure 6.64: Male Speaker (Coded A4): Focus preposing.

All the typical pitch tracks in Figure 6.62, 6.63 and 6.64 represent the typical intonational patterns of the focus preposing in HA. That is, the tune structure of the focus preposing is made up of a nuclear pitch accent [L+H*] placed on the stressed syllable of the ex-situ contrastive-focused word occurring at the left-periphery of the clause, followed by post-focus compression towards the end of the structure.

The following section examines the phonetic difference in excursion size, Max F_0, Mean F_0, Mean Intensity and Mean Duration across the three focus conditions: sentence-focus, information-focus, in-situ contrastive-focus condition.

6.3.8 Phonetic Analyses

Figure 6.65 displays the time-normalized mean F_0 curves averaged across all the sixteen speakers, three sentences and five repetitions.

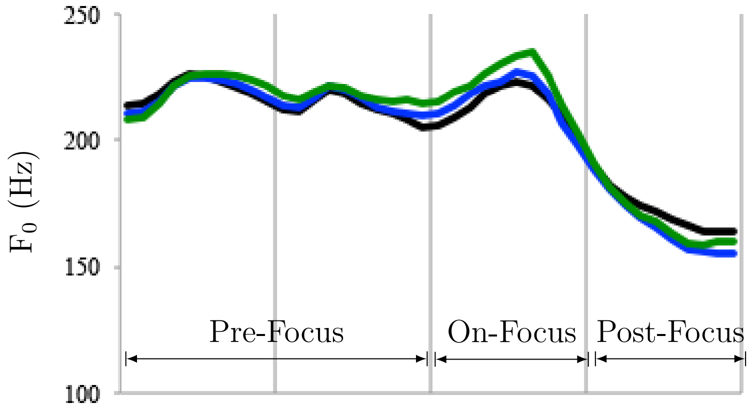


Figure 6.65: Time-normalized mean F_0 contours averaged across 16 speakers, 3 sentences and 5 repetitions. The vertical lines mark the word boundaries. The black contour is the sentence-focus structure (neutral contour), the blue contour is the argument-focus structure wherein the sentence-penultimate word is information-focused, and the green contour is the argument-focus structure wherein the sentence-penultimate word is contrastive-focused.

Figure 6.65 gives a clear visual picture of the prosodic effect of single information focus and in-situ contrastive focus in the four-word declarative sentences. Through the visual inspection of the above graph, we summarize the observations discussed in detail in §6.3.2 and 6.3.3 as follows.

1. The F_0 peak of the word under information focus (in the blue contour) and contrastive focus (in the green contour) are higher than the F_0 peak of the same word under neutral focus (in the black). This is visible in the graph in Figure 6.65,

2. The F_0 peak of the word under contrastive focus is slightly higher than the F_0 peak of the same word under information focus. This is seen the graph in Figure 6.65.

3. The F_0 peak of the post-focus word occurring after the information focus and occurring after the contrastive are lower than the F_0 peak of the same word under neutral focus. This is visible in the graph in Figure 6.65.

4. The F_0 peaks of all the pre-focus words do not show any significant differences across the three focus conditions: sentence-focus (black contour), information-focus (blue contour) and contrastive-focus (green contour). This is clearly shown in the graph above.

To verify these differences, Repeated Measures ANOVA tests are conducted. The main strategy adopted here is to make systematic comparisons between sentence-focus (neutral focus), information focus (in the sentence-penultimate position) and in-situ contrastive focus (in the sentence-penultimate position) in two separate focus regions: on-focus and post-focus region. Since pre-focus words, as shown clearly in the graph in Figure 6.65, do not show significant differences across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition, we do not take it into our acoustic analyses[76]. The dependent variables are excursion size (st.), Max F_0 (Hz), Mean F_0, mean intensity and mean duration. The independent variable is focus (information focus, contrastive focus and neutral focus). The methodology adopted in the present study was presented in detail in §5.8 and 5.9. The research questions that this section aims to answer were presented in detail in §5.1 and 5.9.

[76]We conducted Repeated Measures ANOVA tests to examine whether the focus condition has a statistically significant effect on the pre-focus regions. We found that a Repeated Measures ANOVA with Greenhouse-Geisser determines that the focus condition does not have a statistically significant effect on the Max F_0 of the pre-focus words across the three focus conditions [$F(1.312, 18.374)=0.931$, $P=0.374$]. Furthermore, a Repeated Measures ANOVA with Greenhouse-Geisser determines that the focus condition does not have a statistically significant effect on the Mean F_0 of the pre-focus words across the three focus conditions [$F(1.298, 18.167)=1.500$, $P=0.244$]. Furthermore, a Repeated Measures ANOVA with Sphericity determines that the focus condition does not have a statistically significant effect on the Mean Intensity of the pre-focus words across the three focus conditions [$F(2, 28)=2.670$, $P=0.087$]. There are languages in which focus does not have an effect on the pre-focus region (this point will be discussed further §8.4).

6.3.8.1 Excursion Size (st.)

This section aims to answer the following research questions: (a) Does the excursion size for the stressed syllable of the on-focus region (i.e. sentence-penultimate position) differ across sentence-focus, information-focus and in-situ contrastive-focus condition? If so how? and (b) Does the excursion size of the post-focus region differ across sentence-focus, information-focus and in-situ contrastive-focus condition? If so how?

Table 6.44 describes the scores of the excursion size of the stressed syllable of the on-focus region. It shows an increase in the mean score of the excursion size across the three focus conditions: sentence-focus (neutral focus), information focus and contrastive focus. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	4.14	4.79	6.50
	Std. Error	0.44	0.51	0.60
Median		4.04	4.54	5.96
Std. Deviation		1.78	2.04	2.42
Statistics	Maximum	7.62	8.66	10.66
	Minimum	1.30	1.43	2.22
Range		6.32	7.23	8.44

Table 6.44: Excursion size of stressed syllable of the on-focus region (in st.).

A Repeated Measures ANOVA with Greenhouse-Geisser[77] determines that the focus condition has a statistically significant effect on the excursion size of the on-focus region [$F(1.232,\ 17.254)= 24.385$, $P<0\ .001$]. The effect of gender was found to be non-significant: p=0.676. Post hoc comparison with Bonferroni adjustment[78] reveals that the excursion size of the information focus (M= 4.79, SD= 2.04) is statistically significantly more expanded than the excursion size of its neutral counterpart in the sentence-focus structure (M= 4.14, SD= 1.78): $p<0.004$. It also reveals that the excursion size of the contrastive focus (M= 6.50, SD= 2.42) is statistically significantly more expanded than its neutral counterpart: $p<0.001$.

[77]The table is in Table B.106 in Appendix B.3.5.1 on Page 436.
[78]The table is in Table B.107 in Appendix B.3.5.1 on Page 436.

The test also reveals that the excursion size of the contrastive focus is statistically significantly more expanded than the same word under information focus: $p<0.003$. Figure 6.66 shows the differences in the excursion size of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

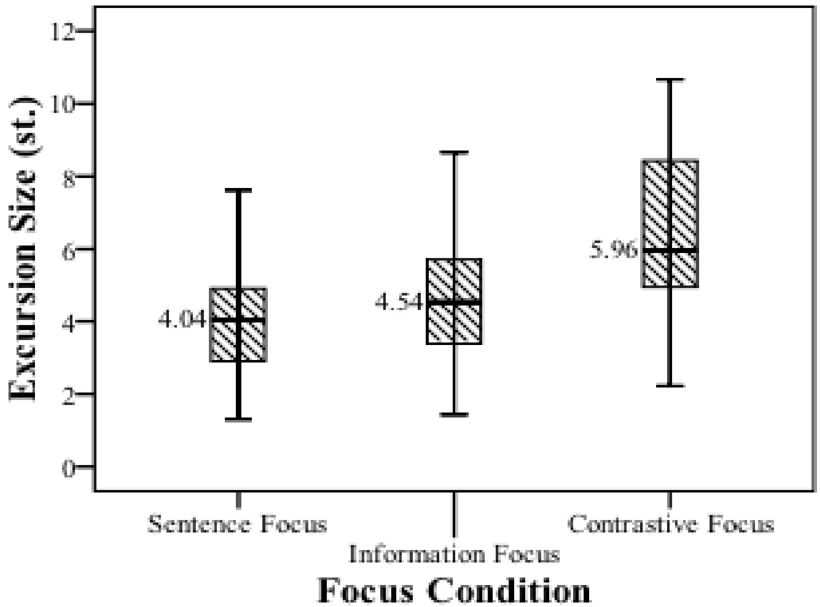


Figure 6.66: Boxplot of Excursion size of the stressed syllable of the on-focus region (in st.).

Table 6.45 describes the scores of the excursion size of the post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. it shows an increase in the mean score of the excursion size. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	4.41	4.56	5.25
	Std. Error	0.40	0.37	0.31
Median		3.91	4.30	4.81
Std. Deviation		1.61	1.48	1.26
Statistics	Maximum	8.51	8.46	8.07
	Minimum	2.47	2.22	3.52
Range		6.03	6.24	4.55

Table 6.45: Excursion size of the post-focus region (in st.).

A Repeated Measures ANOVA with Sphericity[79] determines that the focus condition has a statistically significant effect on the excursion size of the post-focus region [$F(2, 28)= 3.733$, $P<0.037$]. The effect of gender was found to be non-significant: $p=0.610$. Post hoc comparison with Bonferroni adjustment[80] reveals that the excursion size of the post-focus region occurring after the information focus ($M=4.56$, $SD=1.48$) is not statistically significantly different from its counterpart in the sentence-focus structure ($M=4.41$, $SD=1.61$): $p=1.000$. It also reveals that the excursion size of the post-focus region occurring after the contrastive focus ($M=5.25$, $SD=1.26$) is not statistically significantly different from its counterpart in sentence-focus structure: $p=0.07$. In addition, the excursion size of the post-focus region occurring after the contrastive focus is not statistically significantly different from its counterpart occurring after the information focus: $p=.279$. Figure 6.67 shows the differences in the excursion size of the post-focus region across the focus conditions.

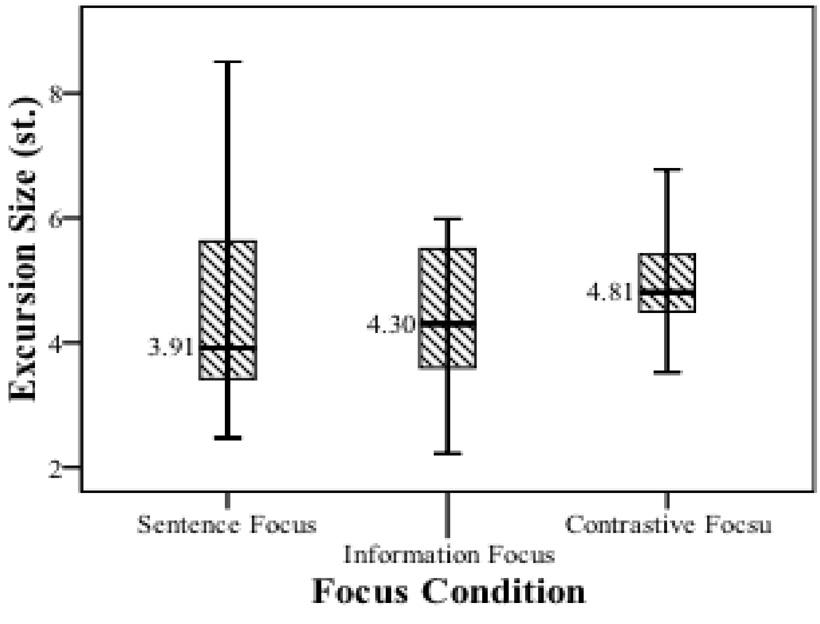


Figure 6.67: Boxplot of Excursion size of the post-focus region (in st.).

In short, this section found that the excursion size of stressed syllable of the on-focus region across the three focus conditions increases significantly. That is, the excursion of the stressed syllable of the contrastive was higher than its coun-

[79]The table is in Table B.109 in Appendix B.3.5.1 on Page 437.
[80]The table is in Table B.110 in Appendix B.3.5.1 on Page 437.

terpart in the sentence-focus structure and its information-focused counterpart. In addition, it has been found that the excursion size of the stressed syllable of the information focus was higher than its counterpart in the sentence-focus structure. This leads to conclude that the excursion size of the stressed syllable is a prosodic cue to focus in HA. As for the post-focus region, no statistically significant differences are found across the three focus conditions.

The following section examines the difference in Max F_0 of the on-focus and post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

6.3.8.2 Max F_0 (Hz)

This section aims to answer the following research questions: (a) Does the Max F_0 of the stressed syllable of the on-focus region differ across sentence-focus, information-focus and contrastive-focus condition? If so how? and (b) Does the Max F_0 of the post-focus region differ across sentence-focus, information-focus and in-situ contrastive-focus condition? If so how?

Table 6.46 describes the scores of the Max F_0 of the stressed syllable of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. It shows an increase in the mean score of the Max F_0 of the on-focus region across the focus conditions. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	246.02	256.38	273.88
	Std. Error	19.45	19.28	18.00
Median		228.87	251.96	267.30
Std. Deviation		77.82	77.13	72.02
Statistics	Maximum	378.94	381.58	397.25
	Minimum	141.41	155.21	180.94
Range		237.52	226.36	216.31

Table 6.46: Max F_0 of stressed syllable of the on-focus region (in Hz).

A Repeated Measures ANOVA with Sphericity[81] determines that the focus

[81] The table is in Table B.112 in Appendix B.3.5.2 on Page 438.

condition has a statistically significant effect on the Max F_0 of the on-focus region [$F(2, 28)= 18.193$, $P<0.001$]. The effect of gender was found to be significant: $p<0.014$. Tests of Between-Subjects Effects[82] determines that the difference among gender was statistically significant: $p<0.001$.[83]

Having split the data on the basis of gender[84], a Repeated Measures ANOVA with Sphericity[85] determines that the focus condition has a statistically significant effect on the Max F_0 of the on-focus region across the focus conditions among male subjects [$F(2, 14)= 15.670$, $P<0.001$]. Post hoc comparison with Bonferroni adjustment[86] reveals that the Max F_0 of the contrastive focus (M=228.49, SD=35.94) is statistically significantly higher than the Max F_0 of its counterpart in the sentence-focus structure (M=186.17, SD=32.27): $p<0.008$. It also reveals that the Max F_0 of the contrastive focus is statistically significantly higher than the Max F_0 of its information-focused counterpart (M=201.17, SD=38.25): $p<0.034$. However, the difference between the Max F_0 of the information focus and its counterpart in the sentence-focus structure is not statistically significant: p=0.07.

A Repeated Measures ANOVA with Sphericity[87] determines that the focus condition does not have a statistically significant effect on the Max F_0 of the on-focus region across the three focus conditions among female subjects [$F(2, 14)=$ 3.180, $P=$ .07].

Figure 6.68 shows the difference in the Max F_0 of the on-focus region across the three focus conditions, separated by gender.

[82] The table is in Table B.113 in Appendix B.3.5.2 on Page 438.

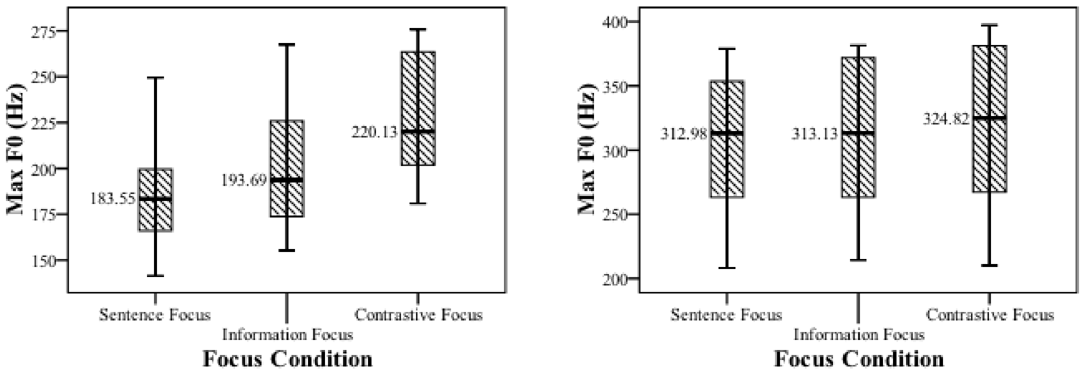
[83] It is not known why female and male participant are different in encoding the Max F_0 of the on-focus region.

[84] The descriptive data for the gender is in Table B.114 in Appendix B.3.5.2 on Page 439.

[85] The table is in Table B.116 in Appendix B.3.5.2 on Page 440.

[86] The table is in Table B.117 in Appendix B.3.5.2 on Page 440.

[87] The table is in Table B.116 in Appendix B.3.5.2 on Page 440.



(a) Male Participants. (b) Female Participants.

Figure 6.68: Boxplot of Max F_0 of the stressed syllable of the on-focus region (in st.).

Table 6.47 describes the scores of the Max F_0 of the post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. It shows the mean score of the Max F_0 of the post-focus region occurring after the information focus (M=178.49, SD=51.88) and the Max F_0 of the post-focus region occurring after the contrastive focus (M=179.81, SD=46.83) are lower than the mean score of the Max F_0 of their neutral counterpart in the sentence-focus structure (M=187.28, SD=57.01). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	187.28	178.49	179.81
	Std. Error	14.25	12.97	11.71
Median		167.75	166.85	167.64
Std. Deviation		57.01	51.88	46.83
Statistics	Maximum	296.33	266.89	263.66
	Minimum	125.40	117.60	123.88
Range		170.92	149.30	139.77

Table 6.47: Max F_0 of the post-focus region (in Hz).

A Repeated Measures ANOVA with Sphericity[88] determines that the focus condition has a statistically significant effect on the Max F_0 of the post-focus region [$F(2, 28)$= 3.949, $P<0.031$]. The effect of gender was found to be significant: $p<0.039$. Tests of Between-Subjects Effects determines that the difference among

[88] The table is in Table B.120 in Appendix B.3.5.2 on Page 441.

gender was statistically significant: $p<0.001$.[89]

Having split the data on the basis of gender[90], a Repeated Measures ANOVA with Sphericity[91] determines that the focus condition does not have a statistically significant effect on the Max F_0 of the post-focus region among male subjects: $p=0.230$.

A Repeated Measures ANOVA with Sphericity[92] determines that the focus condition has a statistically significant effect on the Max F_0 of the post-focus region across the focus conditions among female subjects: $p=0.024$. Post hoc comparison with Bonferroni adjustment reveals that the Max F_0 of the post-focus region occurring after the information focus ($M=224.71$, $SD=28.03$) is not statistically significantly different from its counterpart in the sentence-focus structure ($M=236.99$, $SD=35.34$): $p=0.187$. It also reveals that the Max F_0 of the post-focus region occurring after the information focus is not statistically significantly different from its counterpart occurring after the contrastive focus ($M=220.49$, $SD=27.65$): $p=0.637$. It also reveals that the Max F_0 of the post-focus region occurring after the contrastive focus is not statistically significantly different from its counterpart in the sentence-focus structure: $p=0.151$.

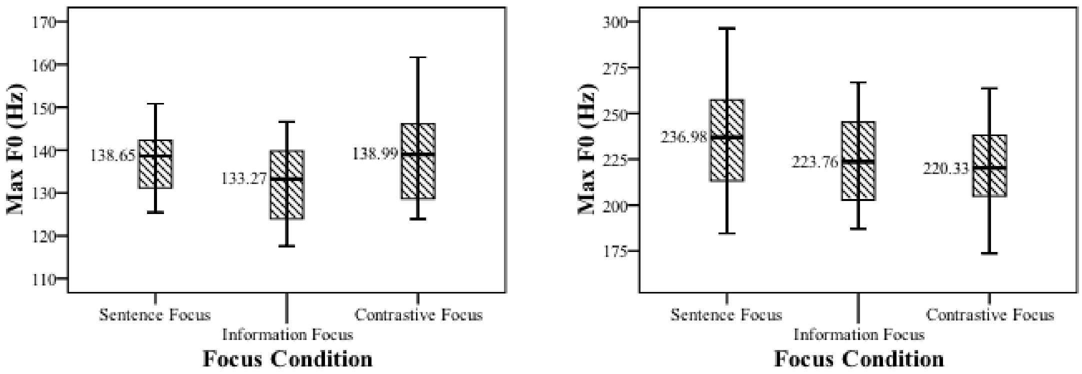
Figure 6.69 shows the difference in the Max F_0 of the post-focus region across the three focus conditions, separated by gender.

[89]It is not known why female and male participant are different in encoding the Max F_0 of the post-focus region.

[90]The descriptive data for the gender is in Table B.121 in Appendix B.3.5.2 on Page 442.

[91]The table is in Table B.123 in Appendix B.3.5.2 on Page 443.

[92]The table is in Table B.123 in Appendix B.3.5.2 on Page 443.



(a) Male Participants.

(b) Female Participants.

Figure 6.69: Boxplot of Max F_0 of the post-focus region (in st.).

In short, this section found that the Max F_0 of both the on-focus and post-focus region does not show systematic differences across the three focus conditions: sentence-focus, information-focus and in-situ contrastive focus condition.

The following section examines the difference in the Mean F_0 of the on-focus and the post-focus region across the three focus conditions.

6.3.8.3 Mean F_0 (Hz.)

This section aims to find answers to the following research questions: (a) Does the Mean F_0 of the stressed syllable of the on-focus region differ across sentence-focus, information-focus and in-situ contrastive-focus condition? If so how? and (b) Does the Mean F_0 of the post-focus region differ across sentence-focus, information-focus and in-situ contrastive-focus condition? If so how?

Table 6.48 describes the scores of the Mean F_0 of the stressed syllable of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. It shows an increase in the mean score of the Mean F_0 of the on-focus region across the focus conditions. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	224.14	230.71	238.59
	Std. Error	15.67	15.20	11.78
Median		213.29	230.90	248.04
Std. Deviation		62.68	60.81	47.13
Statistics	Maximum	328.07	335.61	310.52
	Minimum	134.25	143.76	163.69
Range		193.82	191.84	146.83

Table 6.48: Mean F_0 of stressed syllable of the on-focus region (in Hz).

A Repeated Measures ANOVA with sphericity[93] determines that the focus condition has a statistically significant effect on the Mean F_0 of the on-focus region [$F(2, 28) = 7.030$, $P<0.003$]. The effect of gender was found to be significant: $p<0.001$. The Tests of Between-Subjects Effects[94] shows that the difference among gender was statistically significant: $p<0.001$.[95]

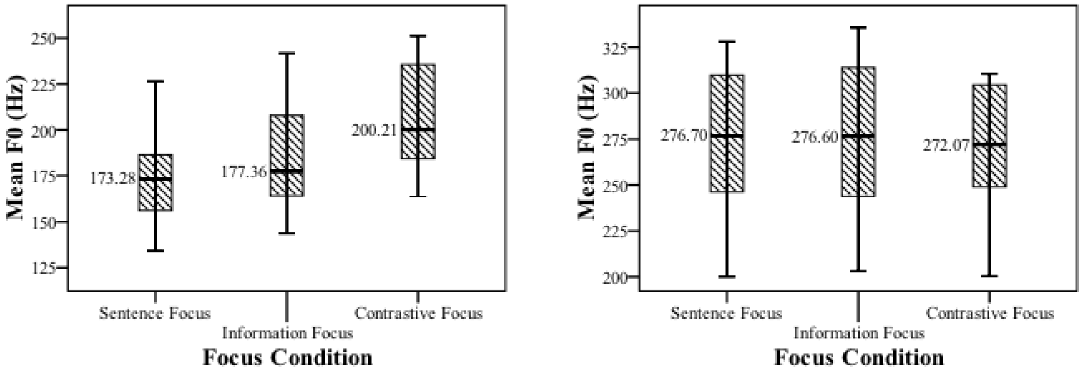
Having split the data on the basis of gender[96], a Repeated Measures ANOVA with Sphericity[97] determines that the focus condition has a statistically significant effect on the Mean F_0 of the on-focus region across the three focus conditions [$F(2, 14) = 14.675$, $P = .001$]. Post hoc comparison with Bonferroni adjustment[98] reveals that the Mean F_0 of the contrastive focus (M=206.90, SD=31.87) is statistically significantly higher than its counterpart in the sentence-focus structure (M=174.04, SD=27.85): $p<0.009$. It also reveals that the Mean F_0 of the contrastive focus is statistically significantly higher than its information-focused counterpart (M=185.49, SD=33.32): $p<0.038$. However, the test reveals that the difference between the Mean F_0 of the information focus and its counterpart in the sentence-focus structure is not statistically significant: P=0.077.

A Repeated Measures ANOVA with Sphericity[99] determines that the focus condition does not have a statistically significant effect on the Mean F_0 of the on-

[93]The table is in Table B.126 in Appendix B.3.5.3 on Page 444.
[94]The table is in Table B.127 in Appendix B.3.5.3 on Page 444.
[95]It is not known why female and male participant are different in encoding the Mean F_0 of the on-focus region.
[96]The table is in Table B.128 in Appendix B.3.5.3 on Page 445.
[97]The table is in Table B.130 in Appendix B.3.5.3 on Page 446.
[98]The table is in Table B.131 in Appendix B.3.5.3 on Page 446.
[99]The table is in Table B.130 in Appendix B.3.5.3 on Page 446.

focus region across the three focus condition among female subjects [$F(2, 14)=.774$, $P=0.480$].

Figure 6.70 shows the difference in the Mean F_0 of the on-focus region across the three focus conditions among male and female subjects.



(a) Male Participants. (b) Female Participants.

Figure 6.70: Boxplot of Mean F_0 of stressed syllable of the on-focus region (in Hz).

Table 6.49 describes the scores of the Mean F_0 of the post-focus region across the three focus conditions. It shows that the mean score of the Mean F_0 of the post-focus region occurring after the information focus (M=165.38, SD=47.31) and the mean score of the post-focus region occurring after the contrastive focus (M=165.53, SD=52.03) are higher than the mean score of the Mean F_0 of their counterpart in the sentence-focus structure (M=170.88, SD=52.03). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	170.88	165.38	165.53
	Std. Error	13.01	11.83	11.02
Median		146.85	155.68	149.04
Std. Deviation		52.03	47.31	44.09
Statistics	Maximum	275.69	243.57	246.56
	Minimum	108.44	109.45	115.09
Range		167.25	134.12	131.46

Table 6.49: Mean F_0 of the post-focus region (in Hz).

A Repeated Measures ANOVA with Greenhouse-Geisser[100] determines that

[100]The table is in Table B.133 in Appendix B.3.5.3 on Page 447.

the focus condition does not have a statistically significant effect on the Mean F_0 of the post-focus region [$F(1.42, 19.93) = .2.109$, $P = .157$]. Figure 6.71 shows the difference in the Mean F_0 of the post-focus region across the three focus conditions.

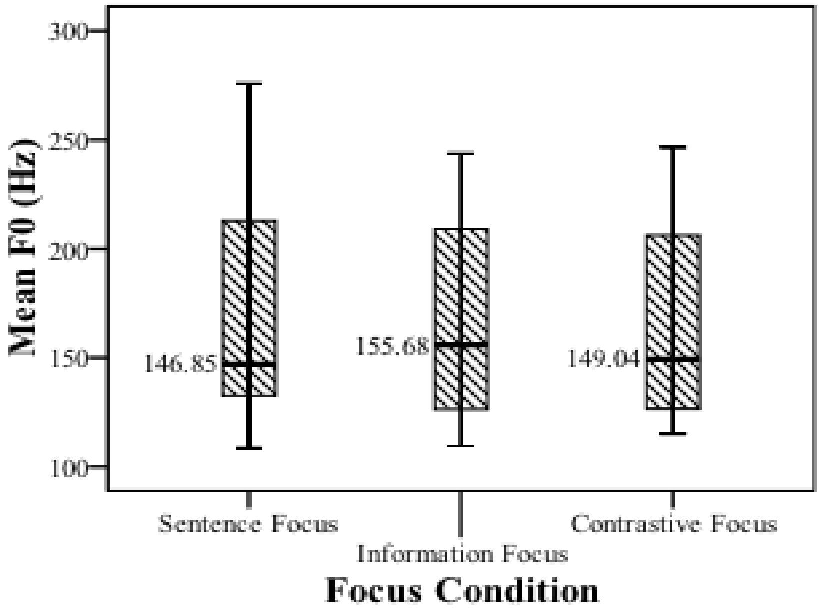


Figure 6.71: Boxplot of Mean F_0 of the post-focus region (in st.).

In short, this section found that the difference in Mean F_0 was not shown to be systematic across the three focus conditions.

The following section examines the Mean Intensity of the on-focus region and the post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

6.3.8.4 Mean Intensity (dB)

This section aims to answer the following research questions: (a) Does the Mean intensity of stressed syllable of the on-focus region differ across sentence-focus, information-focus and contrastive-focus condition? If so how? and (b) Does the Mean intensity of the post-focus region differ across sentence-focus, information-focus and contrastive-focus condition? If so how?

Table 6.50 describes the scores of the mean intensity of the stressed syllable of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. It shows an increase in the mean score of the mean intensity of the on-focus region. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	60.29	60.82	61.99
	Std. Error	1.03	1.16	1.27
Median		60.88	61.49	62.81
Std. Deviation		4.11	4.64	5.07
Statistics	Maximum	66.15	68.28	68.85
	Minimum	54.85	54.22	54.09
Range		11.30	14.06	14.76

Table 6.50: Mean Intensity of the stressed syllable of the on-focus region (dB).

A Repeated Measures ANOVA with Greenhouse-Geisser[101] determines that the focus condition has a statistically significant effect on the mean intensity of the on-focus region across the three focus conditions [$F(1.269, 17.770)= 8.287$, $P= .007$]. The effect of gender was found to be non-significant: p=0.435. Post hoc comparison with Bonferroni adjustment[102] reveals that the mean intensity of the contrastive focus (M= 61.99, SD= 5.07) is statistically significantly stronger than its counterpart in the sentence-focus structure (M= 60.29, SD= 4.11): $p<0.024$. However, the test reveals that the difference between the mean intensity of the contrastive focus (M= 61.99, SD= 5.07) and the mean intensity of its information-focused counterpart (M= 60.82, SD= 4.64) is statistically borderline significant: p=0.05. Furthermore, the difference between the mean intensity of the information focus (M= 60.82, SD= 4.64) and its counterpart in the sentence-focus structure (M= 60.29, SD= 4.11) is not statistically significant: p=0.148. Figure in (6.72) shows the differences across the three focus conditions.

[101]The table is in Table B.135 in Appendix B.3.5.4 on Page 448.
[102]The table is in Table B.136 in Appendix B.3.5.4 on Page 448.

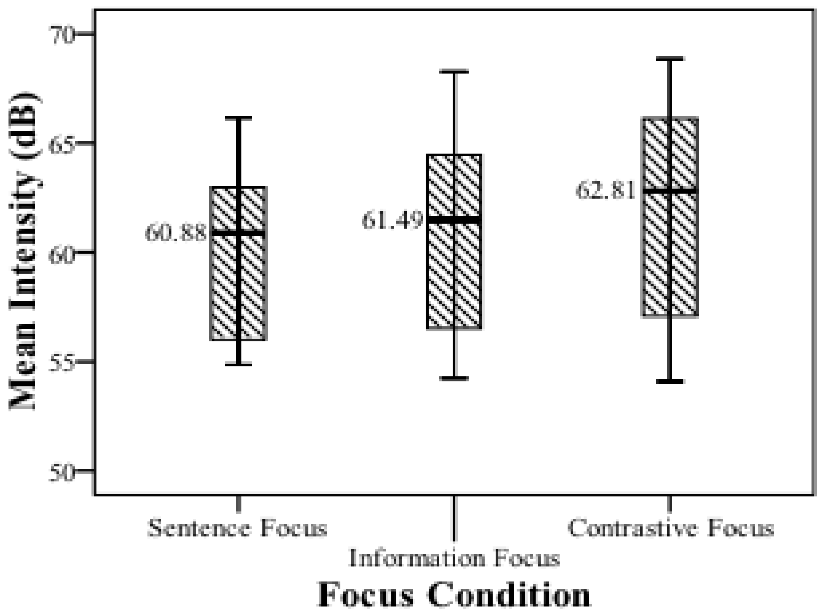


Figure 6.72: Boxplot of Mean Intensity of the stressed syllable of the on-focus region (in dB.).

Table 6.51 describes the scores of the mean intensity of the post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. It shows that there is a decrease in the mean score of the mean intensity of the post-focus region. To verify this decrease, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	53.85	52.59	52.27
	Std. Error	0.90	1.02	0.99
Median		53.07	51.35	51.58
Std. Deviation		3.59	4.08	3.95
Statistics	Maximum	60.67	58.56	58.25
	Minimum	47.88	44.95	44.71
Range		12.79	13.61	13.54

Table 6.51: Mean Intensity of the post-focus region (in dB).

A Repeated Measures ANOVA with Sphericity[103] determines that the focus condition has a statistically significant effect on the mean intensity of the post-focus region across the three focus condition [$F(2,\ 28)=$ 10.572, $P=$ .001]. The effect of gender was found to be non-significant: p=0.245. Post hoc com-

[103]The table is in Table B.138 in Appendix B.3.5.4 on Page 449.

parison with Bonferroni adjustment[104] reveals that the mean intensity of the post-focus region occurring after the information focus (M=52.59, SD=4.08) is statistically significantly weaker than the mean intensity of its counterpart in the sentence-focus structure (M=52.27, SD=3.95), (P=.007). It is also shown that the mean intensity of the post-focus region occurring after contrastive focus (M=52.27, SD=3.59) was statistically significantly lower that its counterpart in sentence-focus structure, (P=.009). However, the test shows that the mean intensity of the post-focus region occurring after contrastive focus was not statistically significantly different from its counterpart occurring after information focus, (P=.854). Figure 6.73 shows the difference in the mean intensity across the three focus conditions.

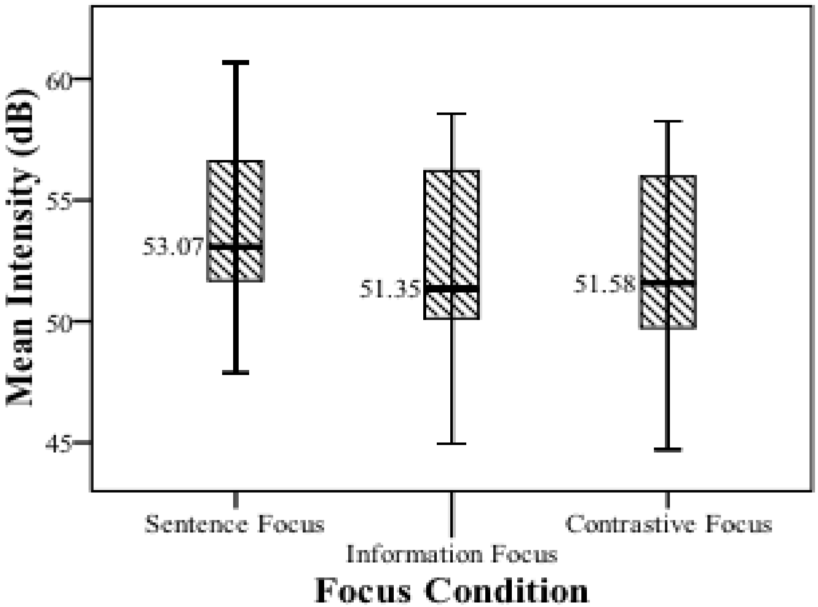


Figure 6.73: Boxplot of Mean Intensity of the post-focus region (in dB.).

In short, this section found that the only systematic difference found is on the mean intensity of the post-focus region across the three focus conditions. It is found that the mean intensity of the post-focus region occurring after both information focus and contrastive focus was weaker than its counterpart in the sentence-focus structure.

The following section examines the mean duration of the on-focus region and

[104]The table is in Table B.139 in Appendix B.3.5.4 on Page 449.

the post-focus region across the three focus conditions.

6.3.8.5 Mean Duration (ms)

This section aims to answer the following research questions: (a) Does the Mean duration for the stressed syllable of the on-focus region differ across sentence-focus condition, information focus, and in-situ contrastive focus? If so how? and (b) Does the Mean duration for the post-focus region differ across sentence-focus condition, information focus, and in-situ contrastive focus? If so how?

Since the key words in the three target sentences in (11) differ from each other in terms of their lexical forms, we investigate the effect of focus condition on their mean duration separately. This is to avoid the potential for a lexical form effect on the duration of the target word.

Table 6.52 describes the score of the mean duration of the stressed syllable of the key word /Līna/ occurring in the on-focus region in the target sentence /Rāmi mar Līna ʔams/. The table shows that there is an increase in the mean score of the duration of this key word /Līna/ across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	184.43	192.34	200.59
	Std. Error	8.15	8.85	8.91
Median		174.80	185.29	198.17
Std. Deviation		32.61	35.42	35.63
Statistics	Maximum	259.21	267.54	276.43
	Minimum	151.69	135.10	140.27
Range		107.52	132.44	136.15

Table 6.52: Mean Duration of the stressed syllable of the on-focus word /Līna/ (in ms).

A Repeated Measures ANOVA with Sphericity[105] determines that the focus condition has a statistically significant effect on the mean duration of the on-focus word /līna/ across the three focus conditions [$F(2, 28)= 3.867$, $P<0.033$].

[105]The table is in Table B.141 in Appendix B.3.5.5 on Page 450.

The effect of gender was found to be non-significant: p=.934. Post hoc comparison with Bonferroni adjustment[106] reveals that the difference between the mean duration of the key word /līna/ under information focus (M=192.34, SD=35.42) and its counterpart in the sentence-focus structure (M=184.43, SD=32.61) is not statistically significant: p=0.502. In addition, the difference between the mean duration of this word under contrastive focus (M=200.59, SD=35.63) and its counterpart in the sentence-focus structure is not statistically significant: p=0.071. Furthermore, the mean duration of this word under contrastive focus is not statistically significantly different from the mean duration of the same under neutral focus: p=0.486. Figure 6.74 shows the difference across the three focus conditions.

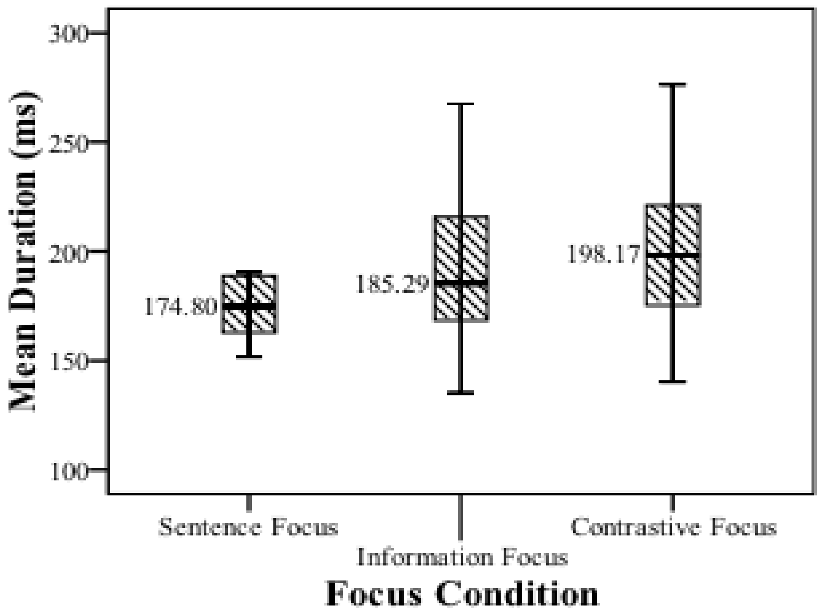


Figure 6.74: Boxplot of Mean Duration of the stressed syllable of the on-focus item /Līna/ (in ms).

Table 6.53 describes the scores of the stressed syllable of the on-focus word /maryūl/ in /Rana sawwat maryūl li-Manāl/. The table shows an increase in the mean score of this key word across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this increase, a Repeated Measures ANOVA is conducted.

[106]The table is in Table B.142 in Appendix B.3.5.5 on Page 450.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	187.41	192.19	205.38
	Std. Error	5.58	7.35	9.69
Median		179.60	186.78	198.19
Std. Deviation		22.33	29.42	38.74
Statistics	Maximum	225.17	261.63	298.48
	Minimum	150.20	140.67	155.70
Range		74.97	120.96	142.78

Table 6.53: Mean Duration of the stressed syllable of the on-focus word /maryūl/.

A Repeated Measures ANOVA with Greenhouse-Geisser[107] determines that the focus condition does not have a statistically significant effect on the mean duration of the on-focus word /maryūl/ across the three focus conditions [$F(1.140, 15.957) = 3.338$, $P = .082$]. Figure 6.75 shows the differences across the three focus conditions.

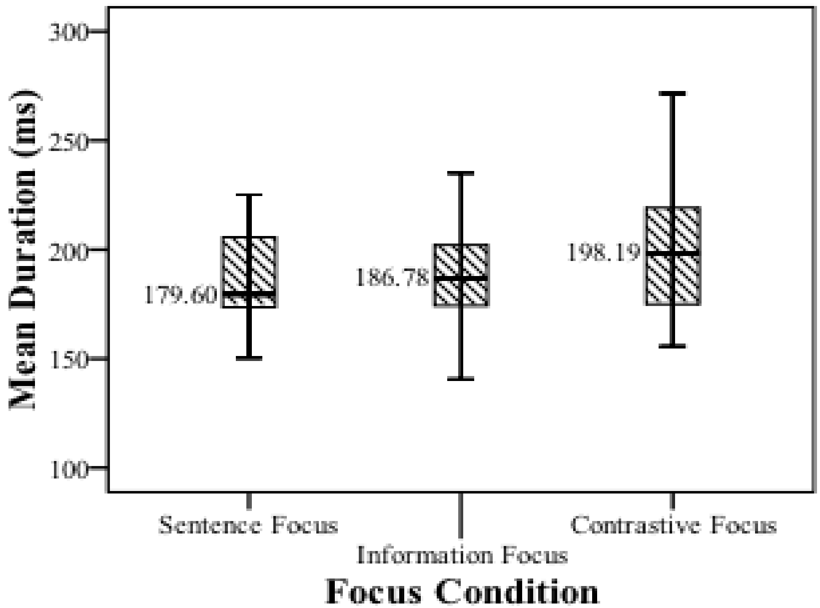


Figure 6.75: Boxplot of Mean Duration of the stressed syllable of the on-focus item /maryūl/ (in ms).

Table 6.54 describes the scores of the mean duration of the stressed syllable of the on-focus word /landan/ in /Rāmi hājar li-landan al-bāriḥ/. The table shows an increase in the mean score of the mean duration of the on-focus word /landan/ across the three focus conditions: sentence-focus, information-focus and

[107]The table is in Table B.144 in Appendix B.3.5.5 on Page 451.

contrastive-focus condition. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	163.05	181.10	205.55
	Std. Error	4.45	4.69	5.26
Median		159.78	177.96	203.31
Std. Deviation		17.82	18.77	21.05
Statistics	Maximum	198.62	207.76	246.02
	Minimum	140.77	147.44	166.82
Range		57.85	60.33	79.19

Table 6.54: Mean Duration of the stressed syllable of the on-focus word /landan/ (in ms).

A Repeated Measures ANOVA with Sphericity[108] determines that the focus condition has a statistically significant effect on the mean duration of the on-focus word /landan/ across the three focus conditions [$F(2, 28)= 47.674$, $P<0.001$]. The effect of gender was found to be non-significant: $p=0.364$. Post hoc comparison with Bonferroni adjustment[109] reveals that the mean duration of the on-focus word /landan/ under contrastive focus ($M= 205.55$, $SD= 21.05$) is statistically significantly longer than the mean duration of the same word under information focus ($M= 181.10$, $SD= 18.77$): $p<0.001$. It also reveals that the mean duration of the on-focus word under contrastive focus is statistically significantly longer than the mean duration of the same word under neutral focus ($M= 163.05$, $SD= 17.82$): $p<0.001$. Furthermore, the test reveals that the mean duration of the on-focus word under information focus is statistically significantly longer than the mean duration of the same word under neutral focus: $p<0.001$. Figure 6.76 shows the differences in the mean duration of the stressed syllable of the on-focus word /landan/ across the three focus conditions.

[108] The table is in Table B.146 in Appendix B.3.5.5 on Page 452.
[109] The table is in Table B.147 in Appendix B.3.5.5 on Page 452.

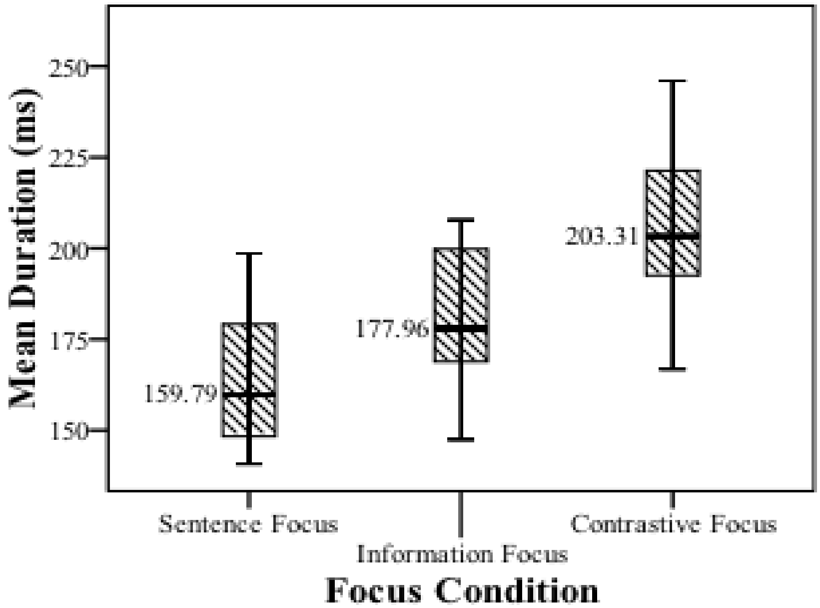


Figure 6.76: Boxplot of Mean Duration of the stressed syllable of the on-focus item /landan/ (in ms).

Turning now to investigate whether the Mean duration for the post-focus key words differs across sentence-focus, information-focus, and in-situ contrastive-focus condition.

Table 6.55 describes the scores of the mean duration of the post-focus word /ʔams/ in /Rāmi mar Līna ʔams/. The table shows that there is an increase in the mean score of the mean duration of this word across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	345.21	350.14	374.09
	Std. Error	16.34	18.76	19.54
Median		334.65	326.09	347.37
Std. Deviation		65.35	75.04	78.16
Statistics	Maximum	480.77	510.55	545.69
	Minimum	267.53	271.48	286.77
Range		213.24	239.07	258.93

Table 6.55: Mean Duration of the post-focus word /ʔams/ (in ms).

A Repeated Measures ANOVA with Sphericity[110] determines that the focus

[110]The table is in Table B.148 in Appendix B.3.5.5 on Page 453.

condition has a statistically significant effect on the mean duration of the post-focus word /ʔams/ across the three focus conditions [$F(2, 28)= 8.101$, $P<0.002$]. The effect of gender was found to be non-significant: $p=0.629$. Post hoc comparison with Bonferroni adjustment[111] reveals that the mean duration of the post-focus word /ʔams/ occurring after the contrastive focus ($M=374.09$, $SD=78.16$) is statistically significantly longer than its counterpart in the sentence-focus structure ($M=345.21$, $SD=65.35$): $p<0.009$. It also reveals that the mean duration of the post-focus word /ʔams/ occurring after the contrastive focus is statistically significantly longer than its counterpart occurring after the information focus ($M=350.14$, $SD=75.04$): $p<0.009$. However, the test reveals that the mean duration of the post-focus word /ʔams/ occurring after the information focus is not statistically significantly different from its counterpart in the sentence-focus structure: $p=1.000$. Figure 6.77 shows the difference across the three focus conditions.

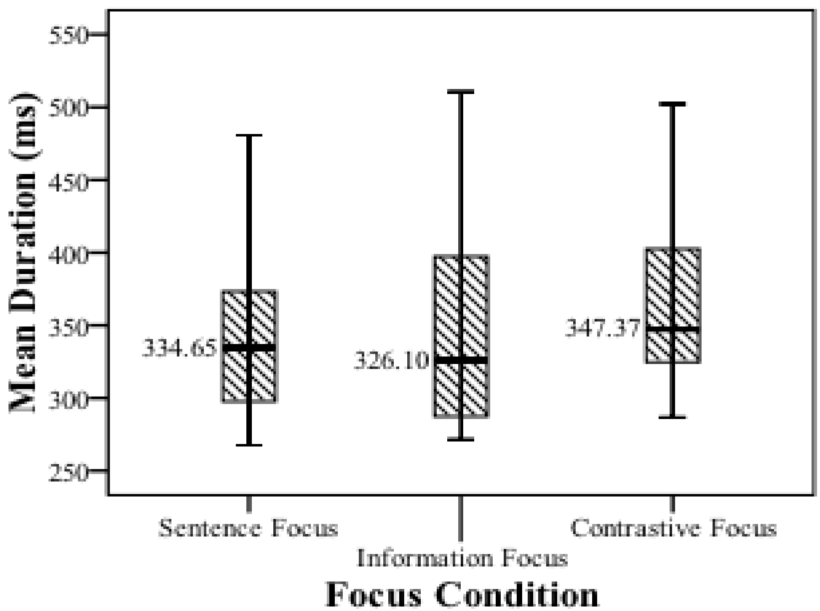


Figure 6.77: Boxplot of Mean Duration of the post-focus word /ʔams/ (in ms).

Table 6.56 describes the scores of the mean duration of the post-focus word /li-Manāl/ in /Rana sawwat maryūl li-Manāl/. This table show that the mean score for the mean duration of the post-focus word /li-Manāl/ occurring after the

[111]The table is in Table B.150 in Appendix B.3.5.5 on Page 453.

information focus (M=461.84, SD=87.73) is the highest score of all. It also shows that the mean score for the mean duration of the post-focus word /li-Manāl/ occurring after the contrastive focus (M=432.68, SD=59.80) is lower than its counterpart in the sentence-focus structure (M=442.09, SD=71.46). Descriptively the differences in the mean duration of this word are not systematic. To test the difference in the mean duration of this post-focus word, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	442.09	461.84	432.68
	Std. Error	17.87	21.93	14.95
Median		423.59	446.23	417.98
Std. Deviation		71.46	87.73	59.80
Statistics	Maximum	635.44	645.50	576.49
	Minimum	359.35	360.43	357.24
Range		276.08	285.07	219.24

Table 6.56: Mean Duration of the post-focus item /li-Manāl/ (in ms).

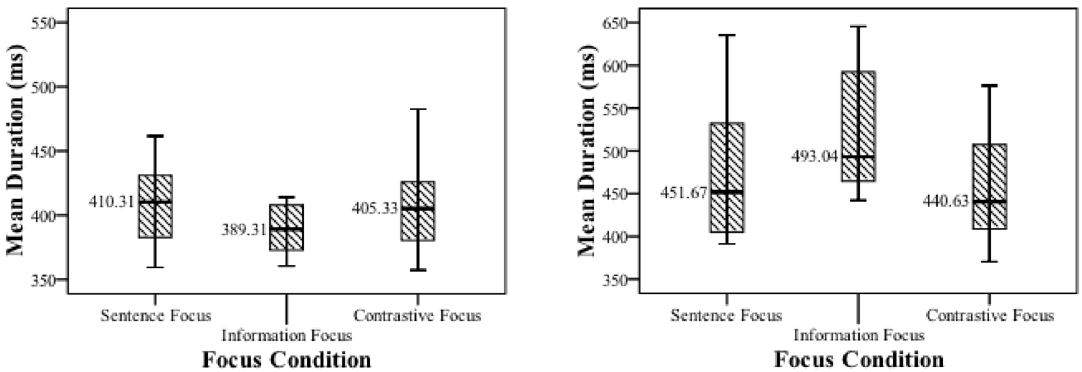
A Repeated Measures ANOVA with Sphericity[112] determines that the focus condition has a statistically significant effect on the mean duration of the post-focus word /li-Manāl/ [$F(2, 28)= 4.762$, $P<0.017$]. The effect of gender was found to be significant: $p<0.002$. Tests of Between-Subjects Effects[113] also determines that the difference among gender was statistically significant: $p=0.014$.[114]

Having split the data on the basis of gender[115], a Repeated Measures ANOVA with Sphericity[116] determines that the focus condition does not have a statistically significant effect on the post-focus word /li-Manāl/ across the focus conditions among male subjects [$F(2, 14)= .299$, $P=0.746$].

A Repeated Measures ANOVA with Sphericity[117] determines that the focus condition has a statistically significant effect on the mean duration of the post-focus word among female subjects /li-Manāl/ [$F(2, 14)= 10.127$, $P<0.002$].

[112] The table is in Table B.152 in Appendix B.3.5.5 on Page 454.
[113] The table is in Table B.153 in Appendix B.3.5.5 on Page 454.
[114] It is not known why female and male participant are different in encoding the mean duration of the post-focus word /li-Manāl/.
[115] The full descriptive data for gender is in Table B.154 in Appendix B.3.5.5 on Page 455.
[116] The table is in Table B.155 in Appendix B.3.5.5 on Page 456.
[117] The table is in Table B.155 in Appendix B.3.5.5 on Page 456.

Post hoc comparison with Bonferroni adjustment[118] reveals that the mean duration of the post-focus word /li-Manāl/ occurring after the contrastive focus (M=457.48, SD=68.35) is statistically significantly longer than its counterpart occurring after the information focus (M=523.41, SD=76.18): p<0.018. However, the difference between the mean duration of the post-focus word /li-Manāl/ occurring after the information focus is not statistically significantly different from the mean duration of its counterpart in the sentence-focus structure (M=475.55, SD=85.15): p=1.000. Furthermore, the difference between the mean duration of the post-focus word /li-Manāl/ occurring after the contrastive focus is not statistically significantly different from the mean duration of its counterpart in the sentence-focus structure: p=1.000. Figure 6.78 shows the differences in the mean duration of the post-focus word /li-Manāl/ across the three focus condition, separated by gender.



(a) Male Participants. (b) Female Participants.

Figure 6.78: Boxplot of Mean Duration of the post-focus word /li-Manāl/ (in ms).

Table 6.57 describes the scores of the mean duration of the post-focus word /al-bāriḥ/ in /Rāmi hājar li-landan al-bāriḥ/. The table shows an increase in the mean score of the mean duration of this word across the three focus conditions. To verify this increase, a Repeated Measures ANOVA is conducted.

[118]The table is in Table B.157 in Appendix B.3.5.5 on Page 456.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	512.68	524.65	526.29
	Std. Error	18.13	14.42	13.19
Median		499.83	14.42	513.88
Std. Deviation		72.52	57.68	52.76
Statistics	Maximum	633.77	648.98	645.57
	Minimum	402.72	460.22	475.43
Range		231.05	188.76	170.14

Table 6.57: Mean Duration of the post-focus word /al-bāriḥ/ (in ms).

A Repeated Measures ANOVA with Sphericity[119] determines that the focus condition does not have a statistically significant effect on the mean duration of the post-focus word /al-bāriḥ across the three focus conditions [$F(2, 28)= 2.511$, $P=0.099$]. Figure 6.79 shows the difference across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

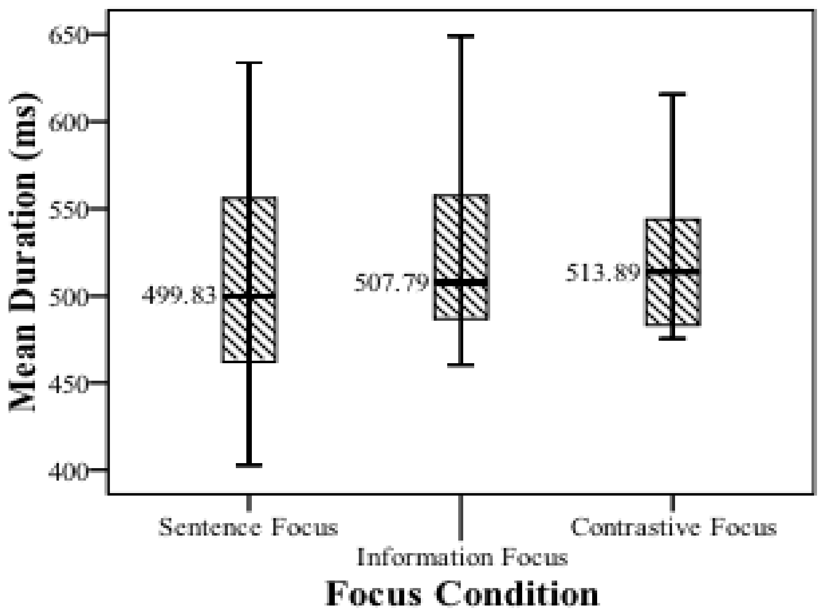


Figure 6.79: Boxplot of Mean Duration of the post-focus word /al-bāriḥ/ (in ms).

In short, this section found that the mean duration does not show any systematic differences across the three focus conditions.

[119] The table is in Table B.159 in Appendix B.3.5.5 on Page 457.

6.3.9 Discussion and Conclusion

This section had as its own objectives to investigate how focus occurring in the sentence-penultimate position affects the intonation of the four-word declarative sentences.

This section started with the investigation of the intonation of the predicate-focus structure, compared with its neutral counterpart. We found that there is no significant phonological differences between these two structures. A systematic quantitative analysis in §6.3.1.1 supported the impression that there are no differences between these two focus structures: No phonetic cues are used to encode predicate focus in HA.

Section 6.3.2 and 6.3.3 investigated the intonation of the information focus and contrastive focus, respectively. We found that the focused word always attracts the nuclear pitch accent of the clause. In §6.3.8, a systematic quantitative analysis was performed to assess the difference across the three focus conditions: sentence-focus, information-focus and in-situ contrastive-focus conditions. We found that HA speakers used the excursion size of the stressed syllable of the word in focus to differentiate between information focus and contrastive focus, compared with their counterpart in sentence-focus structure. That is, the excursion size of the stressed syllable of the information-focused word is significantly higher than its counterpart in the sentence-focus structure, the excursion size of the stressed syllable of contrastive-focused word is significantly higher than its counterpart in sentence-focus structure, and the excursion size of the stressed syllable of contrastive-focused word is significantly higher than its information-focused counterpart. As for the post-focus region, no phonetic effects were found across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. However, it is clearly shown on the time-normalized mean F_0 plots in §6.3.2 and 6.3.3 that the F_0 of the post-focus region occurring after the information-focused word and contrastive-focused word is reduced; however, the difference is weak and thus it was not detectable by the statistical tests.

Hypothetical AM representations of the surface F_0 counters of the time-normalized mean F_0 contours averaged across all the sixteen speakers, three sentences and five repetitions are in Figure 6.80, 6.81 and 6.82. $\Updownarrow_{\{X>Y\}}$`EXP` indicates that the excursion size of X is more expanded than its Y counterpart occurring in a different sentence, CF indicates <u>contrastive focus</u>, N indicates <u>neutral focus</u> and NF indicates <u>information focus</u>.

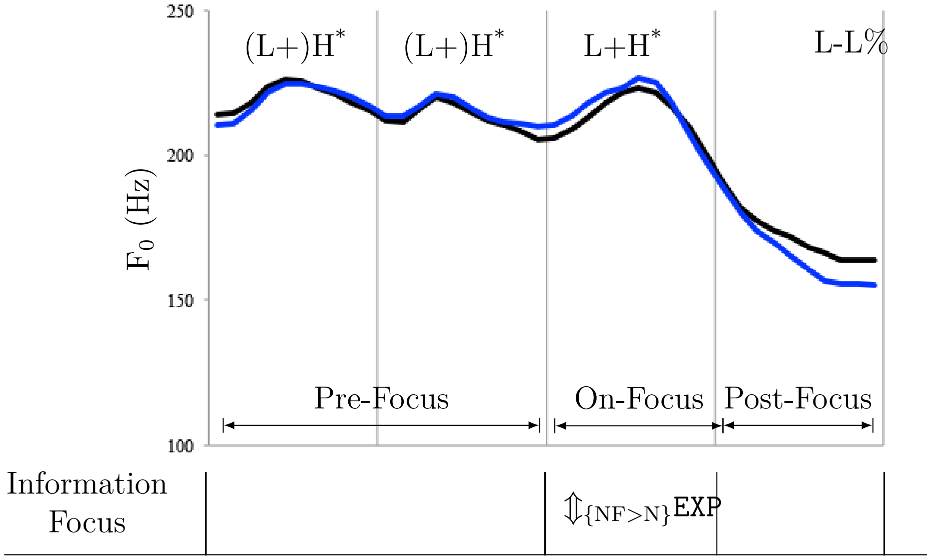


Figure 6.80: Time-normalized mean F_0 contours averaged across 16 speakers, 3 sentences and 5 repetitions. The vertical lines mark the word boundaries. The black contour is sentence-focus structure, and the blue contour is the argument-focus structure wherein the sentence-penultimate word is information-focused.

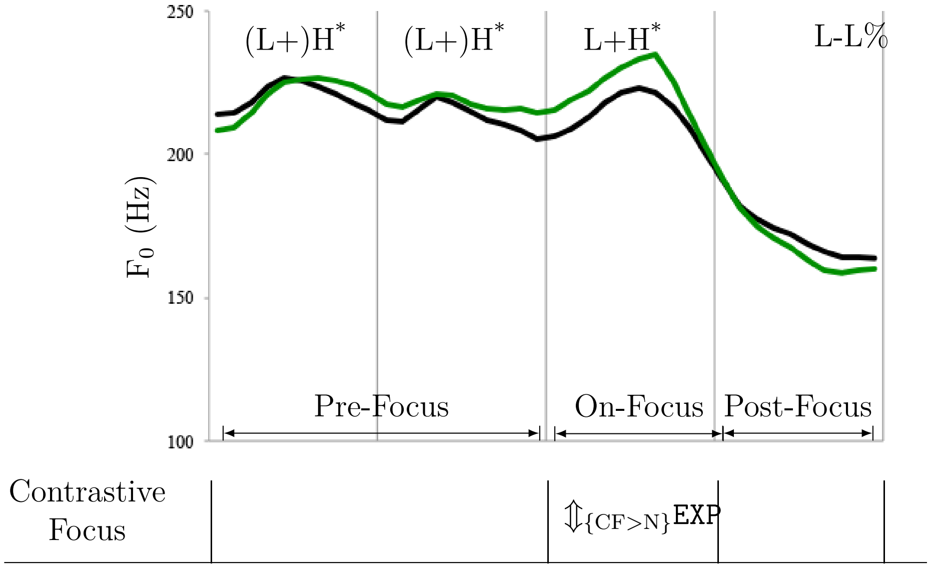


Figure 6.81: Time-normalized mean F_0 contours averaged across 16 speakers, 3 sentences and 5 repetitions. The vertical lines mark the word boundaries. The black contour is sentence-focus structure, and the green contour is the argument-focus structure wherein the sentence-penultimate word is contrastive-focused.

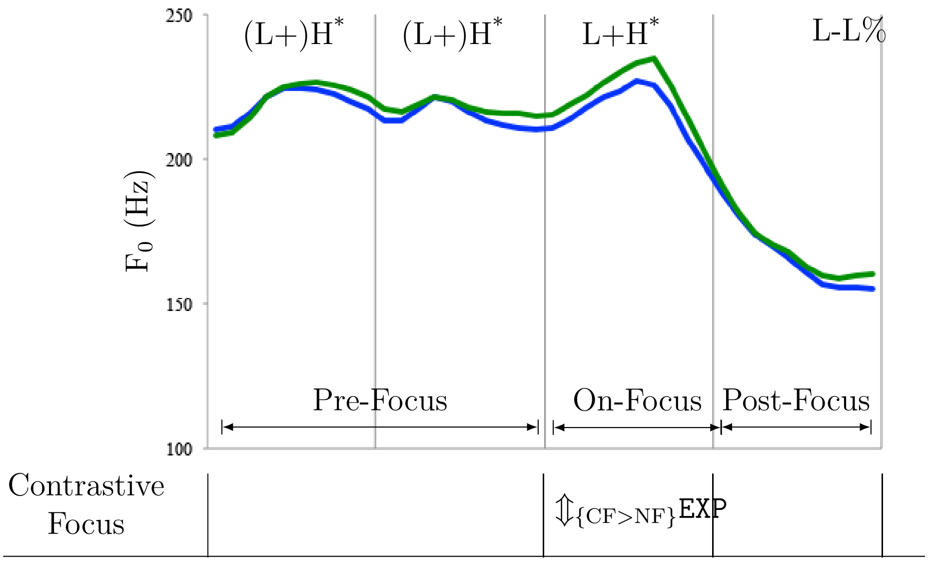


Figure 6.82: Time-normalized mean F_0 contours averaged across 16 speakers, 3 sentences and 5 repetitions. The vertical lines mark the word boundaries. The blue contour is argument-focus structure wherein the sentence-penultimate word is information-focused, and the green contour is the argument-focus structure wherein the sentence-penultimate word is contrastive-focused.

Section 6.3.7 investigated the F_0 patterns of the focus preposing wherein the object of the predicate carrying contrastive focus is syntactically realized at the left periphery of the clause. The analysis of this construction showed that it is characterized by an early nuclear pitch accent that has the phonological representation of the bitonal pitch accent [L+H*] on the ex-situ contrastive-focused item in the left periphery of the clause followed by post-focus compression up to the sentence end.

To sum up, this section found that information focus and contrastive focus as two different meanings have concrete phonological and phonetic reflexes on F_0 and affects particularly F_0 range of the word in focus (i.e. the sentence-penultimate item). As for the predicate-focus structure, it has found that there are no significant differences between the predicate-focus structure and its sentence-focus structure. Finally, this section found that focus preposing is defined by the specific intonational pattern: the nuclear pitch accent [L+H*] on the ex-situ contrastive-focused word, followed by post-focus compression to the utterance end.

6.4 Conclusion

Throughout the examination of the detailed F_0 in the four-word declarative sentences with difference focus conditions, we found that the excursion size of the information-focused and contrastive-focused words are expanded, the F_0 of the post-focused region is lowered when the focus is in the sentence-initial position, but when focus is in the sentence-penultimate position, the F_0 of the post-focus region did not differ significantly from their neutral counterpart in the sentence-focus structure in any of the acoustic parameters.

Furthermore, we found that the impressionistic auditory analysis of predicate-focus structures showed that there are no systematic differences between predicate-focus structures and their sentence-focus counterparts. The quantitative analysis supported the impression: predicate-focus structure did not differ acoustically from its sentence-focus counterpart in any of the acoustic parameters.

Finally, we found that the focus preposing is defined by the following specific intonational pattern: a nuclear pitch accent of the type: the bitonal pitch accent [L+H*], placed on the ex-situ contrastive-focused word in the the left periphery of the clause, followed by post-focus compression to the utterance end.

In the following chapter, the phonological and phonetic differences across sentence-focus, information-focus, in-situ contrastive-focus and ex-situ contrastive -focus condition in the two-word declarative sentences (intransitive structures) are examined.

Chapter 7

Prosodic encoding of focus in a two-word declarative sentence

The preceding chapter showed that the major acoustic correlate of focus in the four-word declarative sentences are the excursion size and the Max F_0. That is, the excursion size of the information focus and the in-situ contrastive focus is more expanded than their neutral counterparts in the sentence-focus structure. Furthermore, when the word in focus is in the sentence-initial position, the Max F_0 of the post-focus words occurring after the focused word are lower than the same words in the neutral sentences, but not when the word in focus is in the sentence-penultimate position. In addition, the preceding chapter examined the focus preposing and showed that this noncanonical syntactic option expressing ex-situ contrastive focus has a specific intonational contour: a nuclear pitch accent [L+H*] on the ex-situ contrastive-focused word, followed by deaccentuation/post-focus compression to the utterance end.

The current chapter has as its objective to investigate whether there is a prosodic marking of information focus, in-situ contrastive and ex-situ contrastive focus in the two-word declarative sentence (intransitive structure). It presents results from the empirical study of information focus and in-situ contrastive occurring in two different sentential positions: sentence-initial, and sentence-final position, and also of focus preposing wherein the verb of the intransitive structure is realized syntactically at the left periphery of the clause. This section aims to answer the research questions stated in detail in §5.1. The stimuli was presented in detail in §5.3.2. The methodology adopted was presented in detail in Chapter five.

The two target sentences examined in this chapter are in (1) below. Syllables are divided by a dot and the stressed syllable is in boldface.

(1) a. Mar.**wān māt**.
Marwan died
'Marwan died'

b. **Rā**.mi **šay**.yab.
Rami get-old
'Rami is getting old'

The chapter is organized as follows. Section 7.1 presents the analysis of the intonation of the the two-word declarative sentences in (1) under neutral focus. Section 7.2 investigates the prosodic effects of information focus and in-situ contrastive focus occurring in the sentence-initial position, compared with each other and with their neutral focus. Section 7.3 investigates the prosodic effects of information focus and in-situ contrastive focus occurring in the sentence-final position, compared with each other and with their neutral focus. Section 7.4 summarizes the results and concludes.

7.1 Sentence-Focus Structure: Base Line

The target sentences in (1) are embedded in the question-answer contexts in (2a) and (3a) to evoke neutral focus that produces neutral intonation with which contours for other focus conditions discussed in the following sections are compared phonologically and phonetically.

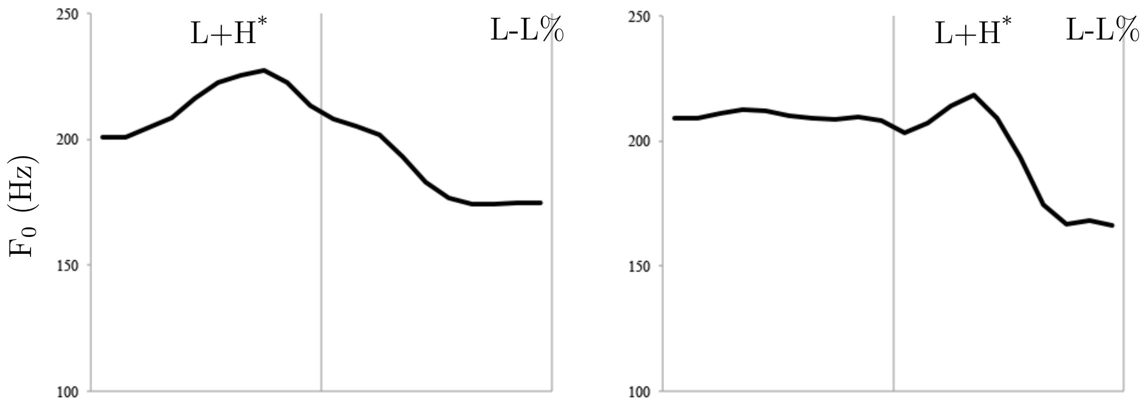
(2) a. What happened?

b. Mar.**wān māt**.
Marwan died
'Marwan died'

(3) a. What happened?

b. **Rā**.mi **šay**.yab.
Rami get-old
'Rami is getting old'

Figure 7.1 displays the time-normalized mean F_0 contours produced at normal rate by all the sixteen speakers, separated by sentence (2b) and (3b).



(a) /Mar.**wān māt**/

(b) /**Rā**.mi **šay**.yab/

Figure 7.1: Time-normalized mean F_0 contour: Sentence-Focus Contours. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The Tones displayed on figures are based on the displayed fundamental frequency only. Stressed syllables are in boldface.

From the graphs in Figure 7.1, we can see clearly the intonational patterns of the two target sentences under neutral focus. Through visual inspection of the graphs above, we observe the following.

1. The peak of the F_0 of all words occur within the stressed syllable. This is visible in all the graphs above.

2. The main prosodic prominence in Figure 7.1(a) is on the sentence-initial word /Marwān/ whereas the main prosodic prominence in Figure 7.1(b) is on the verb /šayyab/. This is in conformity with Ladd's (2008) assumption, that is '[i]n short sentences describing single events, nuclear accent on the subject is favoured [...] This is particularly true if the predicate denotes appearance or disappearance' (P. 245). Since the verb /māt/ in Figure 7.1(a) denotes disappearance, the placement of the nuclear pitch accent on

the subject /Marwān/ is favoured. This leads the assignment of the nuclear pitch accent in /Marwān māt/ to more likely depend on the semantic type of the verb /māt/ (i.e. denoting disappearance).

3. The domain of the pitch accent (local F_0 maxima) is local. That is, it starts from around the onset of the lexically stressed syllable to reach the highest point within the stressed syllable, then start lowering till the end of the prosodic word. This indicates that the pitch accent does not span across the entire prosodic word.

4. The entire F_0 of the sentences ends with the low boundary tone L%. This is visible in all the graphs in Figure 7.1.

These observations obtained from the graphs above are similar to those found in the four-word declarative sentences under neutral focus (§6.1).

Table 7.1 summarizes the results from the auditory analyses of sentence (2b) and (3b). This table displays the distribution of the pitch accents in these two target sentences under neutral focus[1].

Sentence (2b)	*Marwān*	*māt*
	L+H* (88.75%) H* (11.25%)	H* (91.25%) L* (8.75%)
Sentence (3b)	*Rāmi*	*šayyab*
	L+H* (2.5%) H* (97.5%)	L+H* (67.5%) H* (32.5%)

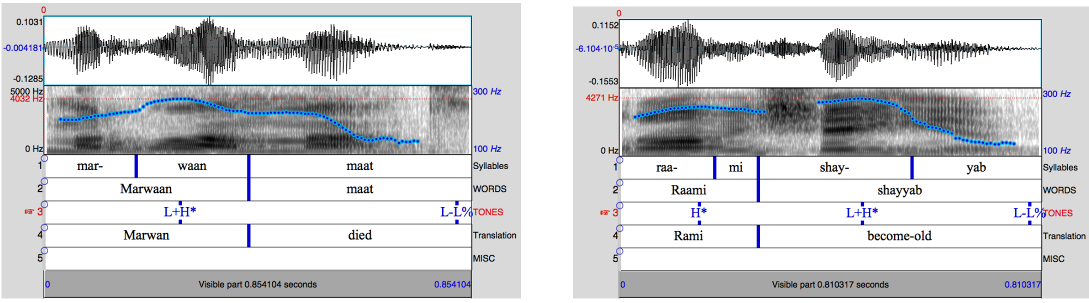
Table 7.1: The frequency in percentage of the pitch accent distributions in the neutral sentence. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 speakers. All the sentences end with the low boundary tone L%.

Table 7.1 shows clearly the following. First, there are two common pitch-accent types produced with these two sentences: [L+H*] and [H*] (see §5.6 for schematization and shape of these tones). Second, the H target of these pitch accents are always aligned with the stressed syllable of the word. This is clearly shown in the table through the use of 'star' annotation, following the AM convention (§2.4.1). Third, the sentence-initial word /Marwān/ in sentence (2b) was produced mostly

[1]See Appendix C.1 for the full data transcription.

with the bitonal pitch accent [L+H*], in contrast to the verb /māt/ in the same structure. This indicates that the HA speakers placed the nuclear pitch accent [L+H*] mostly on this word. Furthermore, the verb /šayyab/ in sentence (3b) was mostly produced with the bitonal pitch accent [L+H*] by the HA speakers, in contrast to the sentence-initial word /Rāmi/. As pointed out earlier, this indicates that the assignment of the nuclear pitch accent for /Marwān māt/ is more likely to depend on the semantic type of its intransitive verb.

Figure 7.2 displays the typical pitch tracks for /Mar**wān māt**/ and for /**Rā**mi **šay**yab/, produced by the same speaker coded A2 (male speaker).[2]



(a) Male Speaker (Coded A2) (b) Male Speaker (Coded A2)

Figure 7.2: Pitch Tracks: Neutral Contours.

These typical pitch tracks show that each word in the sentence is pitch-accented. The highest pitch accent is placed on sentence-initial word in /Mar**wān māt**/, as shown in Figure 7.2(a). However, the sentence-final word in /**Rā**mi **šay**yab/ received the highest pitch accent, as shown on Figure 7.2(b). As shown in the figures below, the peak of the pitch accents is aligned with the stressed syllable of the word.

To sum up, this section showed how the two target sentences are expressed intonationally under sentence-focus condition. It has been shown that the placement of the nuclear pitch accent in the two target sentences differ. The nuclear pitch accent of [Mar**wān māt**] is on the stressed syllable of sentence-initial word whereas the nuclear pitch accent of [**Rā**mi **šay**yab] is on the stressed syllable of the sentence-final word. Based on these F_0 patterns of the two target sentences, we

[2]He is 34 years old, educated and monolingual.

compare phonologically and phonetically the contours produced for the sentence-focus structures presented in this section with other contours produced for other focus conditions examined in the following sections.

7.2 Focus in Sentence-Initial Position

7.2.1 Sentence Focus vs. Information Focus

The sentences in (4b) and (5b) are embedded in the question-answer contexts in (4a) and (5a) respectively to evoke information focus on the sentence-initial word. The aim is to find answers to the following research questions: (a) Does the information focus differ phonologically from its neutral counterpart in the sentence-focus structure? If so how? and (b) Does the word occurring after the information focus (i.e. post-focus region) differ phonologically from its neutral counterpart in the sentence-focus structure? If so how?

(4) a. Who died?

b. [Mar.**wān**]$_{\mathrm{F}}$ **māt**.
Marwan died
'Marwan died'

(5) a. Who becomes old?

b. [**Rā**.mi]$_{\mathrm{F}}$ **šay**.yab.
Rami get-old
'Rami is getting old'

The mean F_0 contours of the two sentences uttered with and without information focus are presented in Figure 7.3 , averaged across all speakers' repetitions.

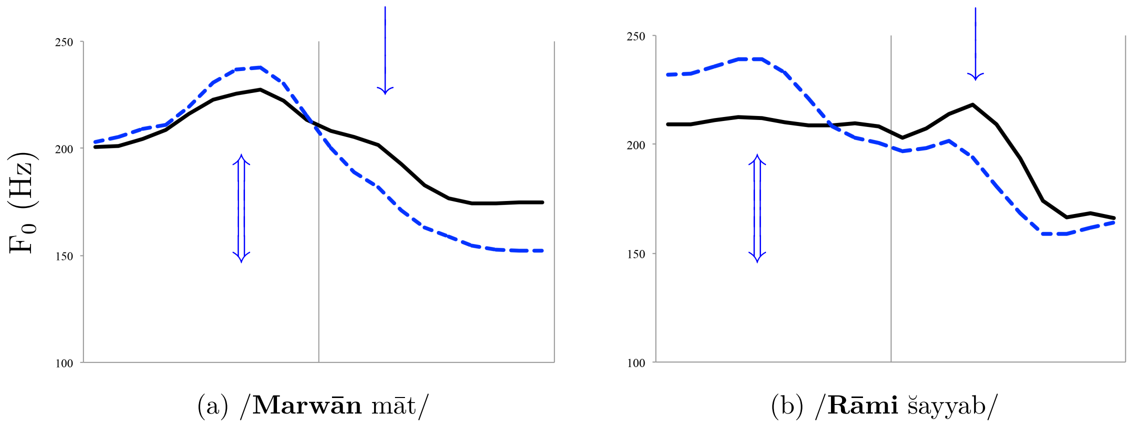


Figure 7.3: Time-normalized mean F_0 contour: Sentence-initial word (in boldface) is key word. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The black contour is sentence-focus structure and the blue contour is argument-focus structure wherein the sentence-initial word is information focus. ⇳ indicates expansion of pitch range, and ↓ indicates pitch-accent lowering.

The graphs in Figure 7.3 clearly show the prosodic effects of the information focus occurring in the sentence-initial position. From the graphs above, we observe the following.

1. The F_0 peak of the information-focused word occurring in the sentence-initial position (blue contour) is higher than the F_0 peak of the same word under neutral focus (black contour). This is visible in all the graphs in Figure 7.3.

2. The F_0 peak of the post-focus words occurring after the information focus (blue contour) is lower than the F_0 peak of the same word under neutral focus (black contour). This is seen in all the graphs above.

3. The location of the F_0 peaks of all the words are the same with and without information focus. This indicates that the information-focused word does not affect the peak alignment. This is visible in all the graphs in Figure 7.3.

4. The domain of the pitch accent (local F_0 maxima) is local. That is, it occurs within the stressed syllable and thus it does not span across the entire prosodic word.

Based on the auditory analyses of sentence (4b) and (5b), Table 7.2 displays the distribution of the pitch accents produced in these the argument-focus structure.[3]

Focus Region	**On-Focus**	**Post-Focus**
Sentence (4b)	*Marwān*	*māt*
	L+H* (86.25%) H* (13.75%)	H* (13.75%) L* (86.25%)
Sentence (5b)	*Rāmi*	*šayyab*
	L+H* (30%) H* (70%)	H* (90%) L* (10%)

Table 7.2: The frequency in percentage of the pitch accent distributions in the argument-focus structures with the information focus occurring in the sentence-initial position. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 speakers. All the sentences end with the low boundary tone L%.

Table 7.2 reveals the following. First, it shows that the pitch accent on the information-focused word /Marwān / in /Marwān māt/ and /Rāmi/ in /Rāmi šayyab/ was produced more with the bitonal pitch accent [L+H*] that starts from a low point in the speaker's range to the highest. However, there are few cases in which the information-focused word was produced with the monotonal pitch accent [H*]. Second, the verb /māt/ in /Marwān māt/ and /šayyab/ in /Rāmi šayyab/ were mostly produced with compressed pitch accents, compared with the neutral counterpart.

Table 7.3 displays the distribution of the pitch accents produced on the information-focused word, compared with the distribution of the pitch accents produced on the same word under neutral focus.

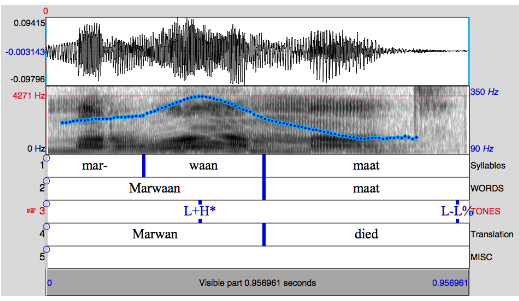
[3]The full tata transcription is in Appendix C.1.1.

Figure (7.3(a))		Figure (7.3(b))	
Marwān		**Rāmi**	
Sentence Focus	Information Focus	Sentence Focus	Information Focus
L+H* (88.75%) H* (11.25%)	L+H* (86.25%) H* (13.75%)	L+H* (2.5%) H* (97.5%)	L+H* (30%) H* (70%)

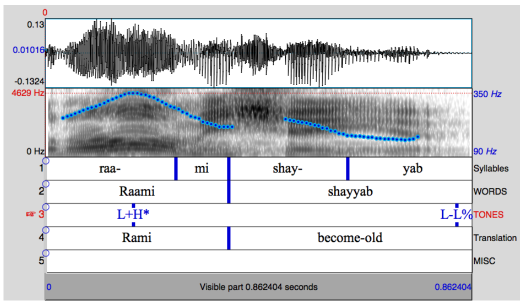
Table 7.3: The distribution of the pitch accents in percentage: information-focused word vs. its neutral counterpart in the sentence-focus structure. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 speakers.

Table 7.3 shows clearly that the information-focused words were produced more with the bitonal pitch accent [L+H*] than the same word under neutral focus. There are cases in which the information-focused word were produced with the monotonal pitch accent [H*], as shown in Table 7.3.

The typical pitch tracks in Figure 7.4 produced by the same speaker coded A2 show the typical patterns associated with the two sentences when there are produced with the single information focus occurring in the sentence-initial position.



(a) Male Speaker (Coded A2)



(b) Male Speaker (Coded A2)

Figure 7.4: Pitch Tracks: Information focus is sentence-initial.

The typical pitch tracks in Figure 7.4 above clearly show that the information-focused word in the sentence-initial position is produced with the highest pitch accent in the structure. As for the post-focused word, it was produced with a compressed pitch accent.

In short, this section found that the information-focused item attracts the nuclear pitch accent. As for the post-focus word, it showed that they were produced mostly with compressed pitch accent.

The following section investigates the phonological difference between the in-situ contrastive focus in the sentence-initial position and its neutral counterpart in the sentence-focus structure.

7.2.2 Sentence Focus vs. In-situ Contrastive Focus

The two sentences in (6b) and (7b) are embedded in the question-answer context in (6a) and (7a) respectively to evoke contrastive focus on sentence-initial word. This is to answer the following research questions: (a) Does the contrastive focus differ phonologically from its counterpart in sentence-focus structure ? If so how? and (b) Does the word occurring after the contrastive focus (i.e. post-focus region) differ phonologically from its counterparts in sentence-focus structure? If so how?

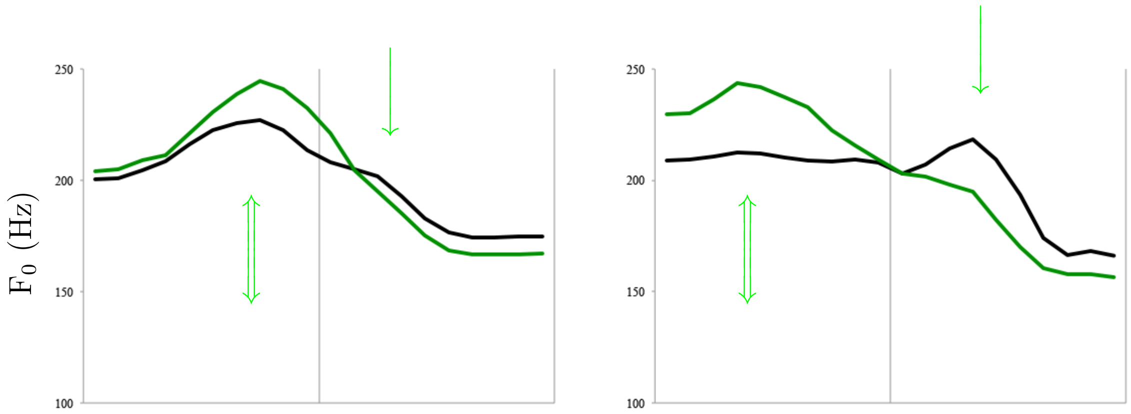
(6) a. Who died? Rami?

b. [Mar.**wān**]$_{\text{CF}}$ **māt**.
Marwan died
'Marwan died'

(7) a. Who becomes old? Marwan?

b. [**Rā**.mi]$_{\text{CF}}$ **šay**.yab.
Rami get-old
'Rami is getting old'

Figure 7.5 displays the mean pitch contours produced by all the sixteen speakers.



(a) /**Marwān** māt/ (b) /**Rāmi** šayyab/

Figure 7.5: Time-normalized mean F_0 contour: Sentence-initial word (in boldface) is key word. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The black contour is sentence-focus structure and the green contour is argument-focus structure wherein the sentence-initial word is contrastive focus. ⇳ indicates expansion of pitch range, and ↓ indicates pitch-accent lowering.

From the graphs in Figure 7.5, we see clearly the prosodic effects of the contrastive focus. We observe the following.

1. The F_0 peak of the contrastive focus in the sentence-initial position (green contour) is higher than the F_0 peak of its neutral counterpart in the sentence-focus structure (black contour). This is visible in all the graphs in Figure 7.5.

2. The F_0 peak of the post-focus words occurring after the contrastive focus (green contour) is lower than the F_0 peak of the same word under neutral focus (black contour). In all the graphs above, the post-focus word occurring after the contrastive-focus word (green contour) does not display any local F_0 maxima. This indicates that the post-focus word is very compressed or deaccented.

3. The location of all the F_0 peaks are the same with and without contrastive focus. This is visible in all the graphs in Figure 7.5.

4. The domain of the pitch accent (local F_0 maxima) is local. That is, it occurs within the stressed syllable and thus it does not span across the entire prosodic word. This is visible in the F_0 of the contrastive-focused

word in all the graphs above.

Based on the auditory analyses of the sentence (6b) and (7b), Table 7.4 displays a summary of the results of the analyses showing the distribution of the pitch accents in the argument-focus structure with a single contrastive focus occurring in the sentence-initial position.[4]

Focus Region	**On-Focus**	**Post-Focus**
Sentence (6b)	*Marwān*	*māt*
	L+H* (86.25%)	H* (30%)
	H* (13.75%)	L* (70%)
Sentence (7b)	*Rāmi*	*šayyab*
	L+H* (50%)	H* (50%)
	H* (50%)	L* (50%)

Table 7.4: The frequency in percentage of the pitch accent distributions in the argument-focus structures with the contrastive focus occurring in the sentence-initial position. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 speakers. All the sentences end with the low boundary tone L%.

From Table 7.4 above, we observe the following. First, the contrastive-focused word was produced more with the bitonal pitch accent [L+H*]. Second, the post-focus words are compressed. 70% of the tokens of the verb /māt/ in /Marwān māt/ was produced with a low pitch accent [L*] whereas half of the token of the verb /šayyab/ in /Rāmi šayyab/ was produced with a low pitch accent [L*]. This indicates that the contrastive-focus word has a partial effect on the post-focus word along with the effect of the low boundary tone of the entire structure.

Table 7.5 displays the percentage of the distribution of the pitch accents produced on the contrastive-focused word, compared with the percentage of the distribution of the pitch accent produced with its neutral counterpart in the sentence-focus structure.

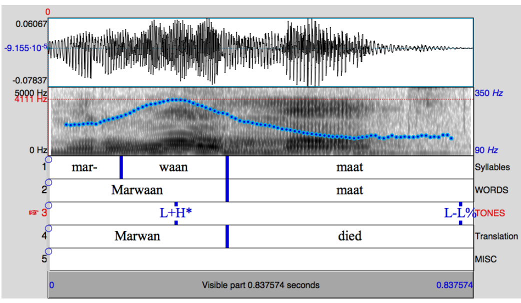
[4]See Appendix C.1.2 for the full data transcription.

Figure (7.5(a))		Figure (7.5(b))	
Marwān		**Rāmi**	
Sentence Focus	Contrastive Focus	Sentence Focus	Contrastive Focus
L+H* (88.75%) H* (11.25%)	L+H* (86.25%) H* (13.75%)	L+H* (2.5%) H* (97.5%)	L+H* (50%) H* (50%)

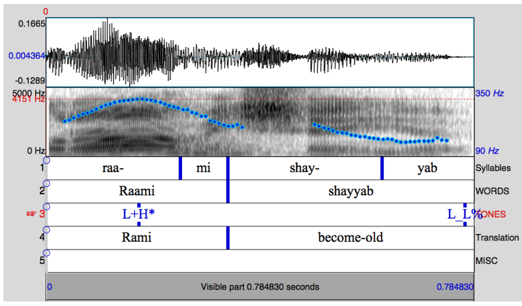
Table 7.5: The distribution of the pitch accents in percentage: contrastive-focused word vs. its neutral counterpart in the sentence-focus structure. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 speakers.

Table 7.5 shows clearly that the contrastive-focus word was produced more with the bitonal pitch accent [L+H*] than the same word under neutral focus. This is shown with the contrastive-focused word /Rāmi/ but not shown with the contrastive-focused word /Marwān/.

The typical pitch tracks in Figure 7.6 below produced by the same speaker coded A2 (male speaker) display the typical intonational patterns for the target sentences in which the sentence-initial word carries contrastive-focus.



(a) Male Speaker (Coded A2)



(b) Male Speaker (Coded A2)

Figure 7.6: Pitch Tracks: Contrastive focus is sentence-initial.

The typical pitch tracks on Figure 7.6 show clearly that the highest pitch accent of the intonational phrase is placed on the contrastive-focused word occurring in the sentence-initial position. The peak of this pitch accent is aligned with the lexically stressed syllable of the word. As for the post-focus word, it is compressed.

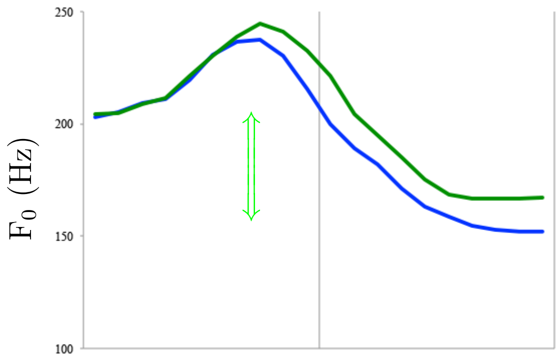
To sum up, this section found that the word in contrastive focus attracts the nuclear pitch accent of the structure that has been shown to be more expanded. As for the pitch accent on the post-focus word, it has been found to be lower/more compressed.

The following section examines the phonological difference between information focus and its contrastive-focus counterpart.

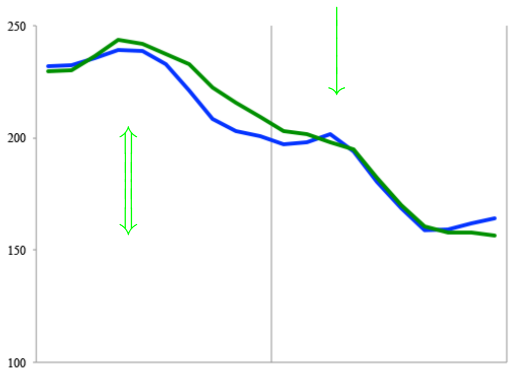
7.2.3 Information Focus vs. In-situ Contrastive Focus

This section aims to answer the following research questions: (a) Does the contrastive focus differ phonologically from its information-focused counterpart? If so how? and (b) Does the word occurring after the contrastive focus (i.e. post-focus region) differ phonologically from its counterparts occurring after information focus? If so how?

Figure 7.7 displays the time-normalized mean F_0 curves averaged across all the speakers' repetitions.



(a) /**Marwān** māt/



(b) /**Rāmi** šayyab/

Figure 7.7: Time-normalized mean F_0 contours: Sentence-initial word (in boldface) is key word. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The blue contour is the argument-focus structure wherein the sentence-initial word carries information focus whereas the green contour is the argument-focus structure wherein the sentence-initial word is contrastive focus. ⇳ indicates expansion of pitch range, and ↓ indicates pitch-accent lowering.

The graphs in Figure 7.7 show clearly the difference between the prosodic effects of the information-focused word and the prosodic effects of its contrastive-focused counterpart. From the graphs above, we observe the following.

1. The F_0 peak of the contrastive focus in the sentence-initial position (green contour) is higher than the F_0 peak of the same word under information

focus (blue contour). This is visible in all the graphs in Figure 7.7.

2. The F_0 peak of the post-focus words occurring after the contrastive focus (green contour) is shown to be more compressed than the same word occurring after the information focus (blue contour).

3. The location of all the F_0 peaks are the same with information focus and with contrastive focus. This is visible in all the graphs Figure 7.7.

4. The domain of the pitch accent (local F_0 maxima) is local. That is, it occurs within the lexically stressed syllable.

Table 7.6 displays the distribution of the pitch accents produced on the contrastive-focused word, compared with the distribution of the pitch accents produced on the same word under information focus.

Figure (7.7(a))		Figure (7.7(b))	
Marwān		**Rāmi**	
Information Focus	Contrastive Focus	Information Focus	Contrastive Focus
L+H* (86.25%) H* (13.75%)	L+H* (86.25%) H* (13.75%)	L+H* (30%) H* (70%)	L+H* (50%) H* (50%)

Table 7.6: The distribution of the pitch accents in percentage: contrastive-focused word vs. its information-focused counterpart. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 speakers.

The table above reveals that the information-focused word and its in-situ contrastive-focused counterpart were produced more with the bitonal pitch accent [L+H*]. However, as shown in the table HA speakers produced the bitonal pitch accent [L+H*] on the in-situ contrastive-focused word more than on its information-focused counterpart.

The following section investigates the phonetic differences in excursion size, Max F_0, Mean F_0, Mean Intensity and Mean Duration across the three focus conditions: sentence-focus, information-focus and in-situ contrastive-focus condition. This is to verify the auditory and the visual differences across the focus conditions presented and discussed in this section and in the preceding sections.

7.2.4 Phonetic Analyses

We investigates only the intransitive structure /**Rā**.mi **šay**.yab/ 'Rami is getting old', because the accent assignment for the intransitive verb /māt/ 'died' in /Mar.**wān māt**/ 'Marwan died' is likely to depend on its semantic type (§7.1). Figure 7.8 displays the time-normalized mean F_0 contours for /**Rā**.mi **šay**.yab/ averages across all the sixteen speakers and five repetitions.

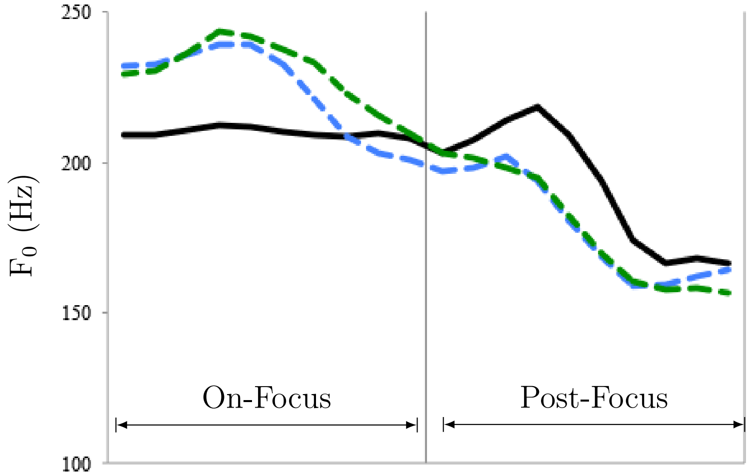


Figure 7.8: Time-normalized mean F_0 contours for /**Rā**.mi **šay**.yab/ averaged across 16 speakers and 5 repetitions. The vertical lines mark the word boundaries. The black contour is the sentence-focus structure, the blue contour is the argument-focus structure wherein the sentence-initial word is information-focused, and the green contour is the argument-focus structure wherein the sentence-initial word is contrastive-focused.

Figure 7.8 shows the main prosodic effects of both the information focus and the in-situ contrastive focus. From this graph, we see clearly that the focus in the sentence-initial position prosodically affects the word in focus and also the post-focus word. To verify the differences observed in this graph and discussed and presented in the preceding section, Repeated Measures ANOVA tests are conducted. The main strategy adopted here is to make systematic comparisons between the focus conditions: sentence-focus, information focus and contrastive focus, in two separate focus regions: on-focus and post-focus region. The dependent variables are excursion size, Max F_0, Mean F_0, mean intensity and mean duration taken from each focus region. The independent variable is focus (neutral focus, information focus and contrastive focus). The acoustic methodology was presented in detail in §5.8 and 5.9.

7.2.4.1 Excursion Size (st.)

This section aims to answer the following research questions: (a) Does the excursion size of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so how? and (b) Does the excursion size of the post-focus region differ across sentence-focus, information focus, and in-situ contrastive focus? If so how?

Table 7.7 below shows the scores of the excursion size of the stressed syllable of the on focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. It shows that the mean score of the mean excursion size of the stressed syllable of the information focus (*M*=4.01, *SD*=1.89) and the contrastive focus (*M*=4.19, *SD*=2.32) are higher than the mean score of the excursion size of the stressed syllable of their neutral counterpart in the sentence-focus structure (*M*=2.52, SD=1.51). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	2.52	4.01	4.19
	Std. Error	0.38	0.47	0.58
Median		1.91	3.62	4.20
Std. Deviation		1.51	1.89	2.32
Statistics	Maximum	6.64	7.18	8.60
	Minimum	0.72	0.88	0.83
Range		5.92	6.29	7.76

Table 7.7: Excursion size of stressed syllable of the on-focus region (st.).

A Repeated Measures ANOVA with Sphericity[5] determines that the focus condition has a statistically significant effect on the excursion size of the on-focus region [$F(2, 28)=10.426$, $P<0.001$]. The effect of gender was found to be non-

[5]The table is in Table C.8 in Appendix C.1.3.1 on page 464.

significant: p=0.138. Post hoc comparison with Bonferroni adjustment[6] reveals that the excursion size of the information focus (M=4.01, SD=1.89) is statistically significantly more expanded than the excursion size of its neutral counterpart in the sentence-focus structure (M=2.52, SD=1.51): p<0.001. It also reveals that the excursion size of the contrastive focus (M=4.19, SD=2.32) is statistically significantly more expanded than the excursion size of its neutral counterpart: p<0.003. However, the test reveals that there is no statistically significant difference between the excursion size of the contrastive focus and the excursion size of its information-focused counterpart: p=1.000. Figure 7.9 shows the differences in the excursion size of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

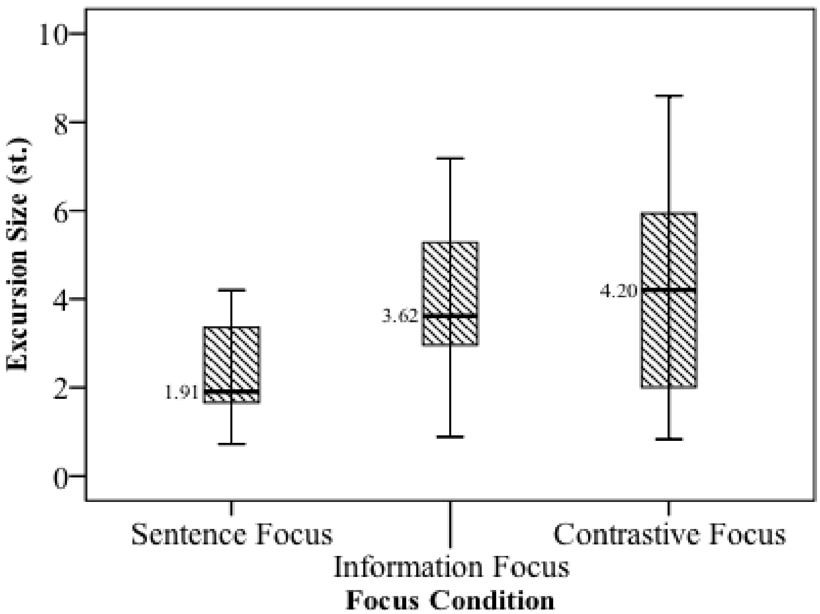


Figure 7.9: Boxplot of excursion size of the stressed syllable of the on-focus region (st.).

Table 7.8 describes the scores of the excursion size of the post-focus region. It shows that the mean scores of the excursion size of the post-focus region after information focus (M=7.34, SD=3.03) and contrastive focus (M=7.39, SD=3.04) are lower than the mean score of the excursion size of their counterpart in the sentence-focus condition (M=7.55, SD=2.85) . To verify this difference, a Repeated Measures ANOVA is conducted.

[6]The table is in Table C.9 in Appendix C.1.3.1 on page 464.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	7.55	7.34	7.39
	Std. Error	0.71	0.76	0.76
Median		6.93	6.44	6.98
Std. Deviation		2.85	3.03	3.04
Statistics	Maximum	12.33	14.83	12.97
	Minimum	3.55	3.59	0.68
Range		8.78	11.23	12.29

Table 7.8: Excursion size of the post-focus region (st.).

A Repeated Measures ANOVA with Sphericity[7] determines that the focus condition does not have a statistically significant effect on the excursion size of the post-focus region [$F(2, 28)=0.043$, $P=0.958$]. Figure 7.10 shows the differences in the excursion size of the post-focus region across the three focus conditions.

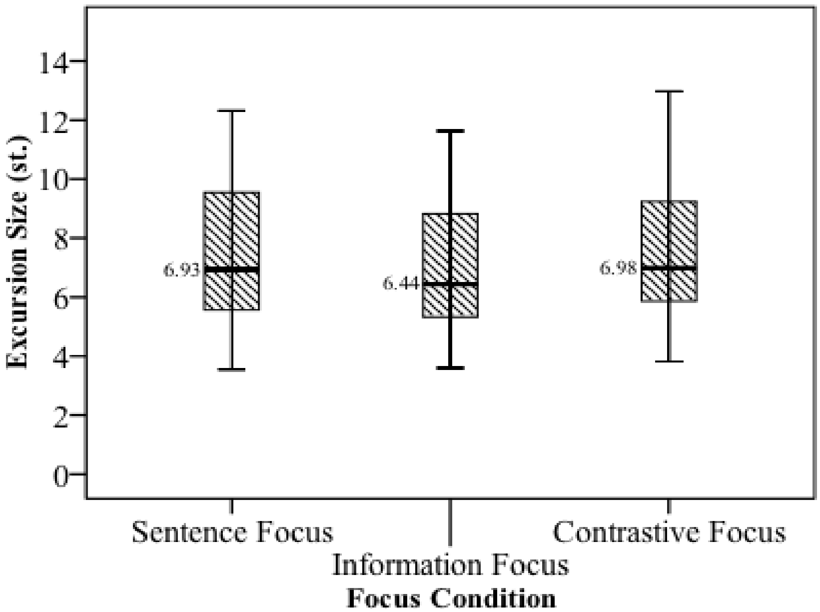


Figure 7.10: Boxplot of excursion size of the post-focus region (st.).

In short, this section only found that the excursion size of both the information-focused word and the contrastive-focus word are significantly higher than their neutral counterpart.

The following section investigates the difference in the Max F_0 across the three focus conditions.

[7]The table is in Table C.11 in Appendix C.1.3.1 on page 465.

7.2.4.2 Max F_0 (Hz.)

This section aims to answer the following research questions: (a) Does the Max F_0 of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so how? and (b) Does the Max F_0 of the post-focus region differ across sentence-focus, information focus, and in-situ contrastive focus? If so how?

Table 7.9 describes the scores of the Max F_0 of the stressed syllable of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. The table shows an increase in the mean score of the Max F_0 of the on-focus region across the three focus conditions. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	226.66	255.66	264.86
	Std. Error	17.21	15.08	13.79
Median		218.88	247.52	259.79
Std. Deviation		68.83	60.33	55.15
Statistics	Maximum	352.36	351.58	380.10
	Minimum	137.69	177.62	177.78
Range		214.67	173.96	202.33

Table 7.9: Max F_0 of the stressed syllable of the on-focus region.

A Repeated Measures ANOVA with Greenhouse-Geisser[8] determines that the focus condition has a statistically significant effect on the Max F_0 of the on-focus region [$F(1.417, 19.840)=11.333$, $P<0.001$]. The effect of gender was found to be non-significant: $p=0.261$. Post hoc comparison with Bonferroni adjustment[9] reveals that the Max F_0 of the information focus ($M=255.66$, $SD=60.33$) is statistically significantly higher than the Max F_0 of its neutral counterpart in the sentence-focus structure ($M=226.66$, $SD=68.83$): $p<0.001$. It also reveals that the Max F_0 of the contrastive focus ($M=264.86$, $SD=55.15$) is statistically significantly higher than the Max F_0 of its neutral counterpart: $p<0.006$. However, the test reveals that the difference between the Max F_0 of the contrastive focus and

[8]The table is in Table C.13 in Appendix C.1.3.2 on page 466.
[9]The table is in Table C.14 in Appendix C.1.3.2 on page 466.

the Max F_0 of its information-focused counterpart is not statistically significant: p=0.956. Figure 7.11 shows the differences in the Max F_0 of the on-focus region across the three focus conditions.

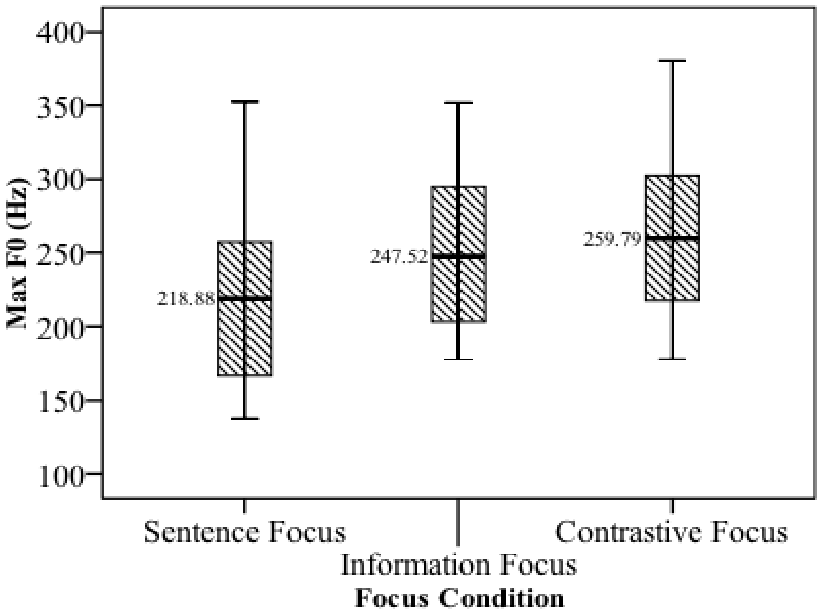


Figure 7.11: Boxplot of Max F_0 of the stressed syllable of the on-focus region (Hz).

Table 7.10 describes the scores of the Max F_0 of the post-focus region across the three focus conditions. It shows that there is a decrease in the mean score of the Max F_0 of the post-focus region across the three focus conditions. To verify this decrease, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	206.01	185.59	180.57
	Std. Error	18.45	16.85	14.57
Median		194.16	178.52	179.01
Std. Deviation		73.82	67.41	58.29
Statistics	Maximum	331.98	302.40	297.67
	Minimum	108.53	97.99	93.72
Range		223.44	204.41	203.95

Table 7.10: Max F_0 of the post-focus region (Hz).

A Repeated Measures ANOVA with Sphericity[10] determines that the focus condition has a statistically significant effect on the Max F_0 of the post-focus region [$F(2, 28)$= 6.590, P<0.005]. The effect of gender was found to be non-

[10]The table is in Table C.16 in Appendix C.1.3.2 on page 467.

significant: p=0.562. Post hoc comparison with Bonferroni adjustment[11] reveals that the Max F_0 of the post-focus region occurring after the information focus (M=185.59, SD=67.41) is statistically significantly lower than the Max F_0 of its neutral counterpart in the sentence-focus structure (M=206.01, SD=73.82): p<0.014. Moreover, the test reveals that the Max F_0 of the post-focus region occurring after the contrastive focus (M=180.57, SD=58.29) is statistically significantly lower than the Max F_0 of its neutral counterpart in the sentence-focus structure: p<0.045. However, the test determines that the difference between the Max F_0 of the post-focus region occurring after the information focus is not statistically significantly different from the Max F_0 of its counterpart occurring after the contrastive focus: p=1.000. Figure 7.12 shows the differences in the Max F_0 of the post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

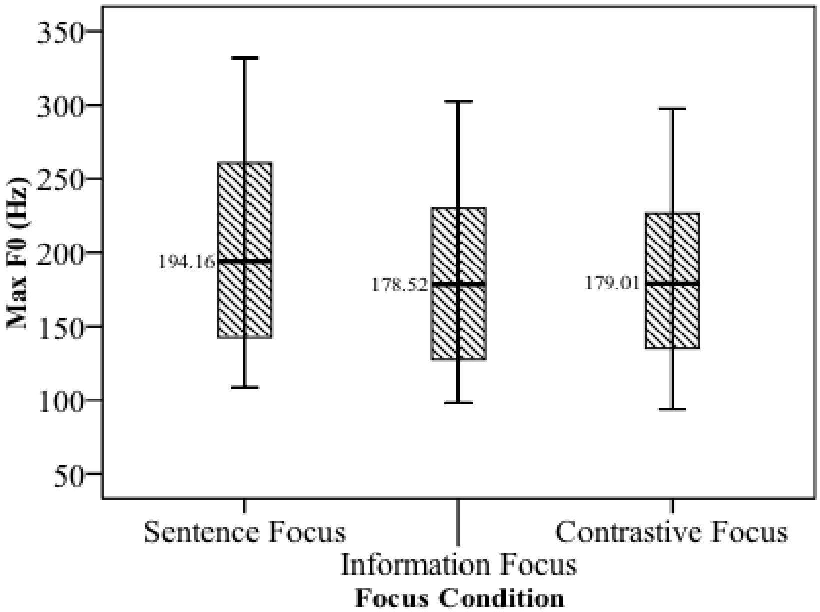


Figure 7.12: Boxplot of Max F_0 of the post-focus region (Hz).

To sum up, this section found only that the Max F_0 of both the information focus and the contrastive focus are higher than their neutral counterpart. As for the post-focus region, it has been found that the Max F_0 of the post-focus region occurring after the information focus and the contrastive focus are lower than

[11]The table is in **??** in Appendix C.1.3.2 on page **??**.

their neutral counterpart in the sentence-focus structure. These findings indicate that the Max F_0 as a prosodic cue to focus is used in the HA two-word declarative sentences in which the sentence-initial word carries focus.

The following section examines the Mean F_0 of the on-focus region and the post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

7.2.4.3 Mean F_0 (Hz.)

This sections aims to answer the following research questions: (a) Does the Mean F_0 of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so how? and (b) Does the Mean F_0 of the post-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so how?

Table 7.11 describes the scores of the Mean F_0 of the stressed syllable of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. The table shows an increase in the mean score of the Mean F_0 of the on-focus region across the three focus conditions. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	212.38	238.23	243.70
	Std. Error	14.48	12.69	10.55
Median		206.41	239.05	245.64
Std. Deviation		57.92	50.77	42.22
Statistics	Maximum	322.71	321.10	318.39
	Minimum	128.76	172.95	172.52
Range		193.95	148.14	145.87

Table 7.11: Mean F_0 of the stressed syllable of the on-focus region (Hz).

A Repeated Measures ANOVA with Greenhouse-Geisser[12] determines that the focus condition has a statistically significant effect on the Mean F_0 of the on-focus region [$F(1.449, 20.281)=9.818$, $P<0.002$]. The effect of gender was found to

[12]The table is in Table C.18 in Appendix C.1.3.3 on page 468.

be non-significant: p=0.347. Post hoc comparison with Bonferroni adjustment[13] reveals that the Mean F_0 of the information focus (M=238.23, SD=50.77) is statistically significantly higher than the Mean F_0 of its neutral counterpart in the sentence-focus structure (M=212.38, SD=57.92): p<0.001. It also reveals that the Mean F_0 of the contrastive focus (M=243.70, SD=42.22) is statistically significantly higher than its neutral counterpart: p<0.014. However, the difference between the Mean F_0 of the contrastive focus is not statistically significantly different from the Mean F_0 of its information-focused counterpart: p=1.000. Figure 7.13 shows the differences in the Mean F_0 of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

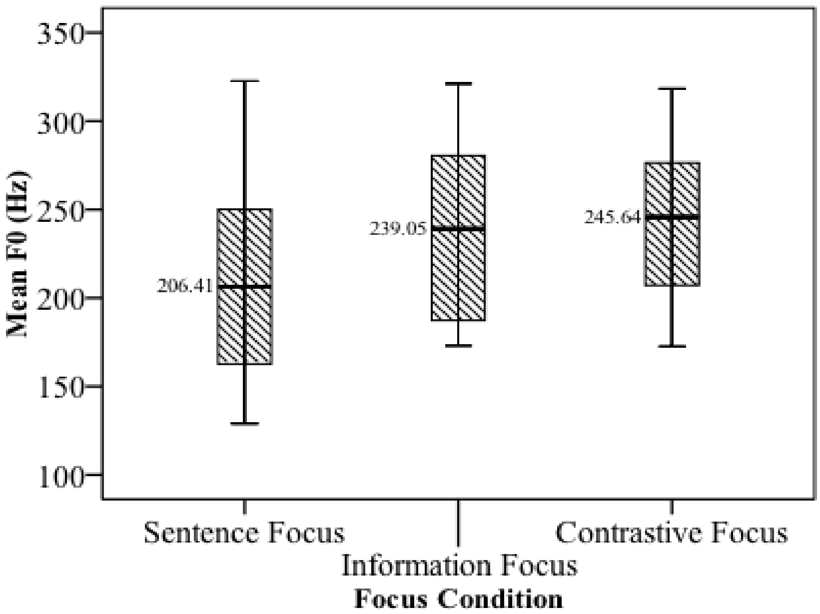


Figure 7.13: Boxplot of Mean F_0 of the stressed syllable of the on-focus region (Hz).

Table 7.12 describes the scores of the Mean F_0 of the post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. The table shows that the mean score of the Mean F_0 of the post-focus region occurring after the information focus (M=178.13, SD=53.73) and the contrastive focus (M=183.53, SD=53.54) are lower than their neutral counterpart in the sentence-focus structure (M=197.48, SD=57.29). To verify this difference, a

[13]The table is in Table C.19 in Appendix C.1.3.3 on page 468.

Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	200.84	180.49	180.47
	Std. Error	15.22	14.35	14.30
Median		194.32	186.73	176.04
Std. Deviation		60.87	57.39	57.18
Statistics	Maximum	316.67	290.72	296.68
	Minimum	119.93	101.33	92.48
Range		196.73	189.38	204.20

Table 7.12: Mean F_0 of the post-focus region (Hz).

A Repeated Measures ANOVA with Sphericity[14] determines that the focus condition has a statistically significant effect on the Mean F_0 of the post-focus region [$F(2, 28)$=7.379, P<0.003]. The effect of gender was found to be non-significant: p=0.956. Post hoc comparison with Bonferroni adjustment[15] reveals that the Mean F_0 of the post-focus region occurring after the information focus (M=180.49, SD=57.39) is statistically significantly lower than the Mean F_0 of its neutral counterpart in the sentence-focus structure (M=200.84, SD=60.87): p<0.011. However, the difference between the Mean F_0 of the post-focus region occurring after the contrastive focus (M=180.47, SD=57.18) and the Mean F_0 of its neutral counterpart in the sentence-focus structure is not statistically significant: p=0.053. The test also reveals that the Mean F_0 of the post-focus region occurring after the contrastive focus is not statistically different from the Mean F_0 of its counterpart occurring after the information focus: p=1.000. Figure 7.14 shows the differences in the Mean F_0 of the post-focus region across the three focus conditions.

[14]The table is in Table C.21 in Appendix C.1.3.3 on page 469.
[15]The table is in Table C.22 in Appendix C.1.3.3 on page 469.

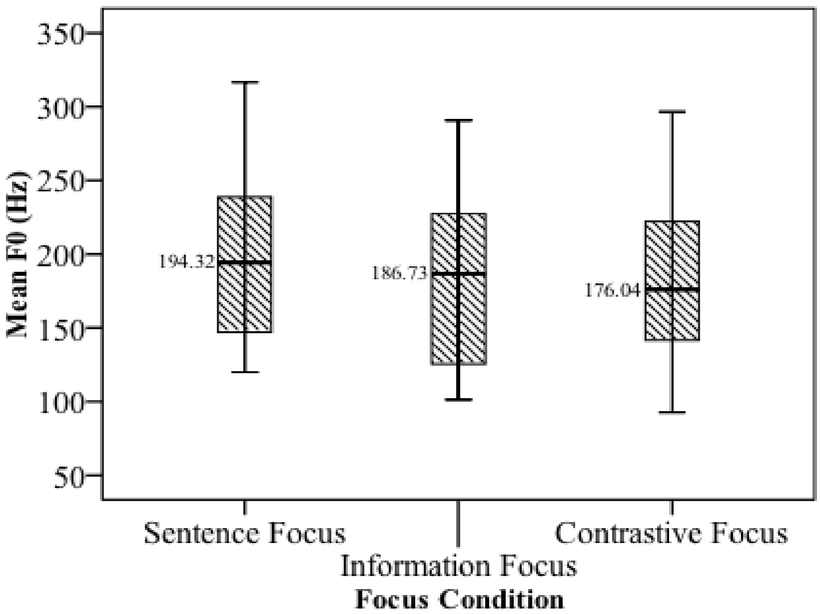


Figure 7.14: Boxplot of Mean F_0 of the post-focus region (Hz).

To sum up, this section found that Mean F_0 was used to encode focus in HA. That is, the Mean F_0 of the information-focused word and also the in-situ contrastive-focused word are statistically higher than their neutral counterpart. However, the Mean F_0 of the information-focused word is not statistically different from the Mean F_0 of its in-situ contrastive-focused counterpart. As for the post-focus region, it is found that the Mean F_0 of post-focus region occurring after the information focus is statistically lower than the Mean F_0 of its neutral counterpart. However, the Mean F_0 of the post-focus region occurring after the contrastive focus is not statistically different from the Mean F_0 of its neutral counterpart and also its counterpart after the information focus.

The following section examines the Mean Intensity of both the on-focus region and the post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

7.2.4.4 Mean Intensity (dB)

This section aims to answer are as follows: (a) Does the Mean intensity of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus? If so how? and (b) Does the Mean intensity of the post-focus region differ across sentence-focus, information focus, and in-situ contrastive focus? If so how?

Table 7.13 describes the scores of the mean intensity of the stressed syllable of the on-focus region across sentence-focus, information focus, and in-situ contrastive focus condition. It shows an increase in the mean score of the mean intensity of the on-focus region. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	65.23	66.09	67.62
	Std. Error	1.17	1.13	1.19
Median		65.27	65.91	68.94
Std. Deviation		4.68	4.54	4.77
Statistics	Maximum	74.24	74.92	75.40
	Minimum	59.09	59.90	59.11
Range		15.15	15.02	16.29

Table 7.13: Mean Intensity of the stressed syllable of the on-focus region (dB).

A Repeated Measures ANOVA with Greenhouse-Geisser[16] determines that the focus condition has a statistically significant effect on the mean intensity of the on-focus region [$F(1.330, 18.617)=10.215$, $P<0.003$]. The effect of gender was found to be non-significant: $p=0.287$. Post hoc comparison with Bonferroni adjustment[17] reveals that the mean intensity of the contrastive focus ($M=67.62$, $SD=4.77$) is significantly significantly stronger than the mean intensity of its neutral counterpart in the sentence-focus structure ($M=65.23$, $SD=4.68$): $p<0.013$. It also reveals that the mean intensity of the contrastive focus is statistically significantly stronger than the mean intensity of its information-focused counterpart ($M=66.09$, $SD=4.54$): $p<0.006$. However, the test reveals that the mean intensity of the information focus is not statistically significantly different from the mean intensity of its neutral counterpart in the sentence-focus structure: $p=0.238$. Figure 7.15 shows the difference in the mean intensity of the on-focus region across the three focus conditions.

[16]The table is in Table C.24 in Appendix C.1.3.4 on page 470.
[17]The table is in Table C.25 in Appendix C.1.3.4 on page 470.

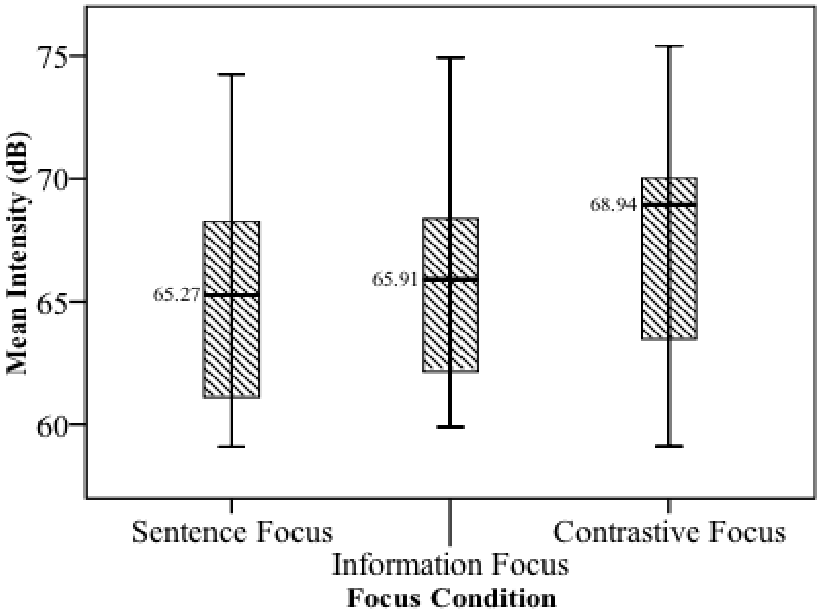


Figure 7.15: Boxplot of Mean Intensity of the stressed syllable of the on-focus region (dB).

Table 7.14 describes the scores of the mean intensity of the post-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. It shows that the mean score of the mean intensity of the post-focus region occurring after both the information focus (*M*=53.28, *SD*=4.30) and the contrastive focus (*M*=53.48, *SD*=4.93) are lower than the mean score of the mean intensity of their neutral counterpart in the sentence-focus structure (*M*=55.16, *SD*=3.79). To verify this difference, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	55.16	53.28	53.48
	Std. Error	0.95	1.08	1.23
Median		54.74	52.82	52.37
Std. Deviation		3.79	4.30	4.93
Statistics	Maximum	61.43	60.79	63.33
	Minimum	50.21	46.98	47.29
Range		11.21	13.82	16.04

Table 7.14: Mean Intensity of the post-focus region (dB).

A Repeated Measures ANOVA with Sphericity[18] determines that the focus con-

[18]The table is in Table C.27 in Appendix C.1.3.4 on page 471.

dition has a statistically significant effect on the mean intensity of the post-focus region [$F(2, 28)=7.232$, $P<0.003$]. The effect of gender was found to be significant: $p<0.029$. However, Tests of Between-Subjects Effects[19] determines that the difference among gender was not statistically significant: $p=0.974$. Post hoc comparison with Bonferroni adjustment[20] reveals that the intensity of the post-focus region occurring after the information focus ($M=53.28$, $SD=4.30$) is statistically significantly weaker than the mean intensity of its neutral counterpart in the sentence-focus structure ($M=55.16$, $SD=3.79$): $p<0.009$. However, the test reveals that the difference between the mean intensity of the post-focus region occurring after the contrastive focus is not statistically significantly different from the mean intensity of its neutral counterpart in the sentence-focus structure: $p=0.068$. Moreover, the test determines that the difference between the mean intensity of the post-focus region occurring after the contrastive focus and its counterpart after the information focus is not statistically significant: $p=1.000$. Figure 7.16 shows the differences in the mean intensity of the post-focus region across the three focus conditions.

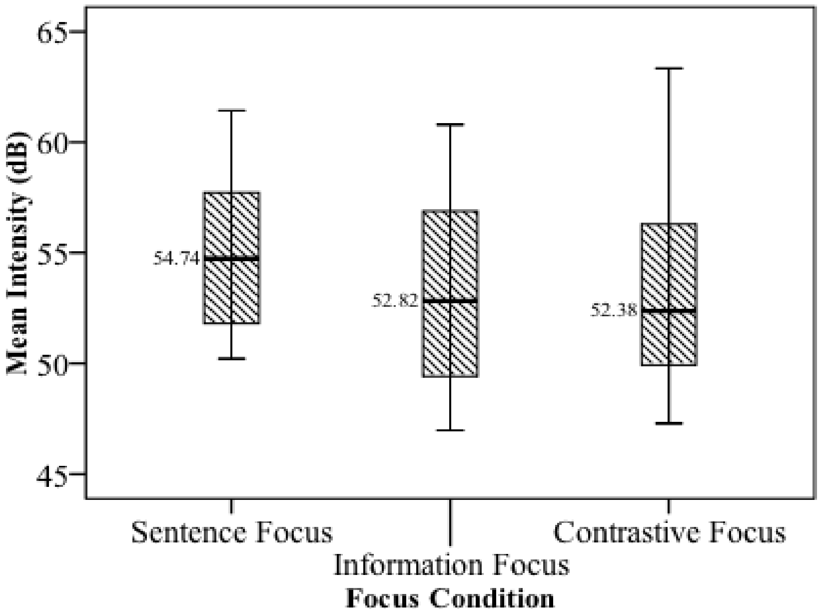


Figure 7.16: Boxplot of Mean Intensity of the post-focus region (dB).

To sum up, this section found only that the mean intensity of the contrast-

[19]The table is in Table C.28 in Appendix C.1.3.4 on page 471.
[20]The table is in Table C.29 in Appendix C.1.3.4 on page 472.

ive focus is stronger than the mean intensity of the its neutral counterpart and its information-focused counterpart. As for the post-focus region, this section found only that the mean intensity of the post-focus region occurring after the information focus is weaker than the mean intensity of its neutral counterpart.

The following section examines the mean duration of both the on-focus region and the post-focus region across the three focus conditions.

7.2.4.5 Mean Duration (ms.)

This section aims to answer the following research questions: (a) Does the Mean duration of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so how? and (b) Does the Mean duration of the post-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so how?

Table 7.15 describes the mean scores of the mean duration of the stressed syllable of the on-focus word /Rāmi/ in /Rāmi šayyab/ across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. The table shows an increase in the mean duration of the on-focused word /Rāmi/ across the three focus conditions. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	171.76	196.46	200.56
	Std. Error	6.14	6.35	8.12
Median		165.54	193.84	202.31
Std. Deviation		24.55	25.39	32.49
Statistics	Maximum	222.38	235.57	276.29
	Minimum	133.84	155.77	156.38
Range		88.54	79.80	119.91

Table 7.15: Mean Duration of the stressed syllable of the on-focus word /Rāmi/ (in ms.).

A Repeated Measures ANOVA with Sphericity[21] determines that the difference across the three focus conditions is statistically significant [$F(2, 28)$=12.133,

[21]The table is Table C.31 in Appendix C.1.3.5 on page 473.

$P<0.001$]. The effect of gender was found to be non-significant: $p=.397$. Post hoc comparison with Bonferroni adjustment[22] reveals that the mean duration of the information-focused word /Rāmi/ ($M=196.46$, $SD=25.39$) is statistically significantly greater than its neutral counterpart in the sentence-focus structure ($M=171.76$, $SD=24.55$): $p<0.001$. It is also determined that the mean duration of the contrastive-focused word /Rāmi/ ($M=200.56$, $SD=32.49$) is statistically significantly greater than its neutral counterpart in the sentence-focus structure: $p<0.001$. However, the test shows that the mean duration of the information-focused word /Rāmi/ and its contrastive-focused counterpart is not statistically significant: $p=1.000$. Figure 7.17 shows the difference across the three focus conditions.

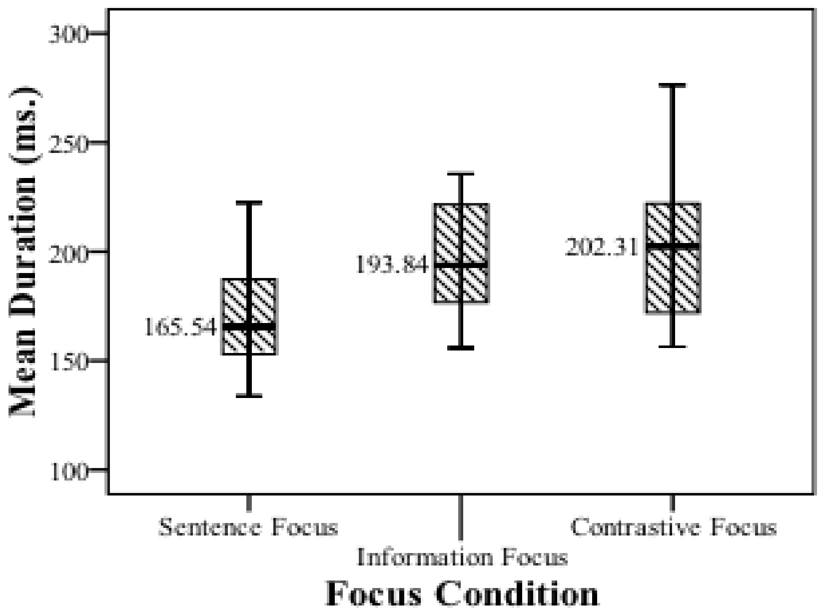


Figure 7.17: Boxplot of the stressed syllable of the on-focus word /Rāmi/ (in ms.).

Table 7.16 describes the scores of the mean duration of the post-focus word /šayyab/ in /Rāmi šayyab/ across the three focus conditions. It shows a decrease in the mean score of the mean intensity of this word across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this decrease, a Repeated Measures ANOVA is conducted.

[22]The table is in Table C.32 in Appendix C.1.3.5 on page 473.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	470.81	462.68	424.22
	Std. Error	13.97	19.74	15.37
Median		468.90	457.59	429.33
Std. Deviation		55.88	78.95	61.48
Statistics	Maximum	580.62	608.50	528.63
	Minimum	370.34	315.56	335.96
Range		210.28	292.93	192.67

Table 7.16: Mean Duration of the post-focus item /šayyab/ (in ms.).

A Repeated Measures ANOVA with Sphericity[23] determines that the focus condition has a statistically significant effect on the mean duration of the post-focus word /šayyab/ [$F(2, 28)=12.145$, $P<0.001$]. The effect of gender was found to be non-significant: $p=0.088$. Post hoc comparison with Bonferroni adjustment[24] reveals that the mean duration of the post-focus word /šayyab/ occurring after the contrastive focus ($M=424.22$, $SD=61.48$) is statistically significantly less than its neutral counterpart in the sentence-focus structure ($M=470.81$, $SD=55.88$): $p<0.001$. It also reveals that the mean duration of the post-focus word /šayyab/ occurring after the contrastive focus is statistically significantly less than its counterpart occurring after the information focus ($M=462.68$, $SD=78.95$): $p<0.008$. However, the test reveals that the difference between the mean duration of the post-focus word /šayyab/ occurring after the information focus and its neutral counterpart in the sentence-focus structure is not statistically significant: $p=1.000$. Figure 7.18 shows the difference across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

[23]The table is in Table C.34 in Appendix C.1.3.5 on page 474.
[24]The table is in Table C.35 in Appendix C.1.3.5 on page 474.

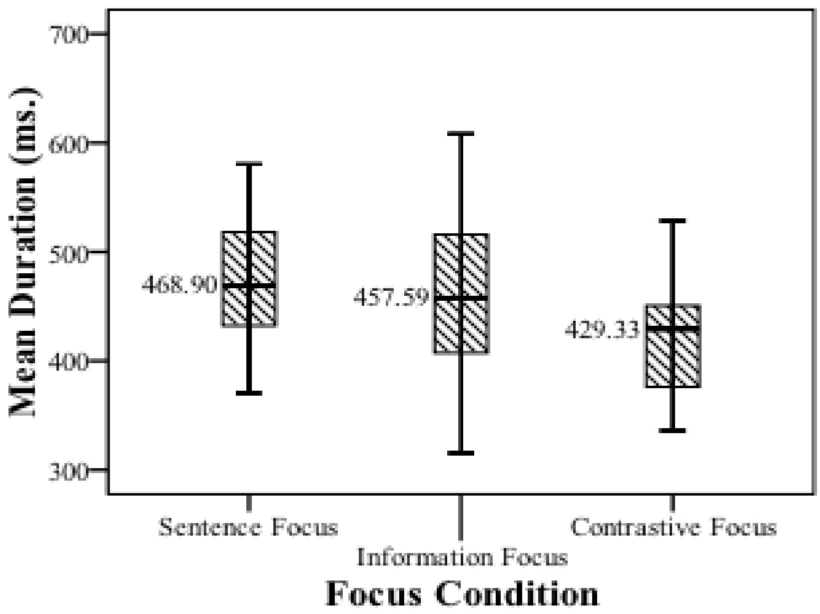


Figure 7.18: Boxplot of the post-focus word /šayyab/ (in ms.).

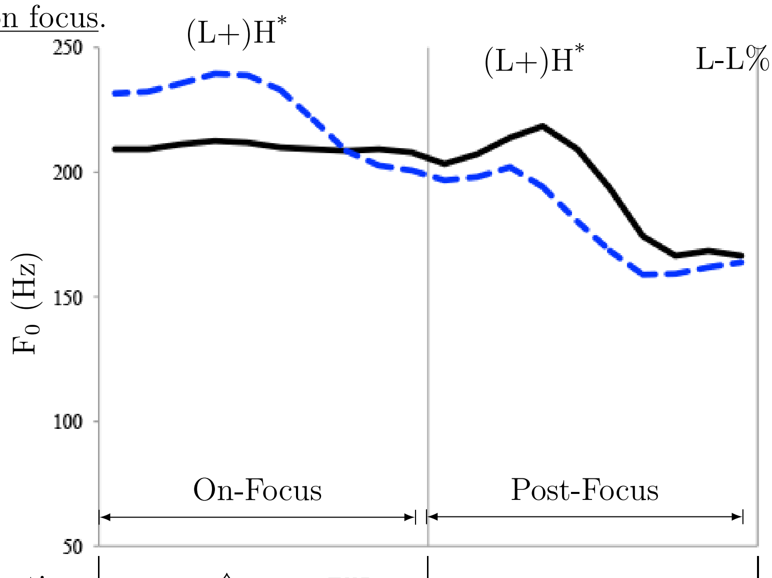
In short, this section found only that the mean durations of the information focus and contrastive are statistically significantly greater than the mean duration of its neutral counterpart. As for the post-focus region, this section found only that the mean duration of the post-focus region occurring after the contrastive focus is statistically significantly greater than the mean duration of its neutral counterpart and its counterpart after the information focus.

7.2.5 Discussion and Conclusion

This section had as its own objective to test if there is a prosodic encoding of the information focus and contrastive focus in the HA two-word declarative structures.

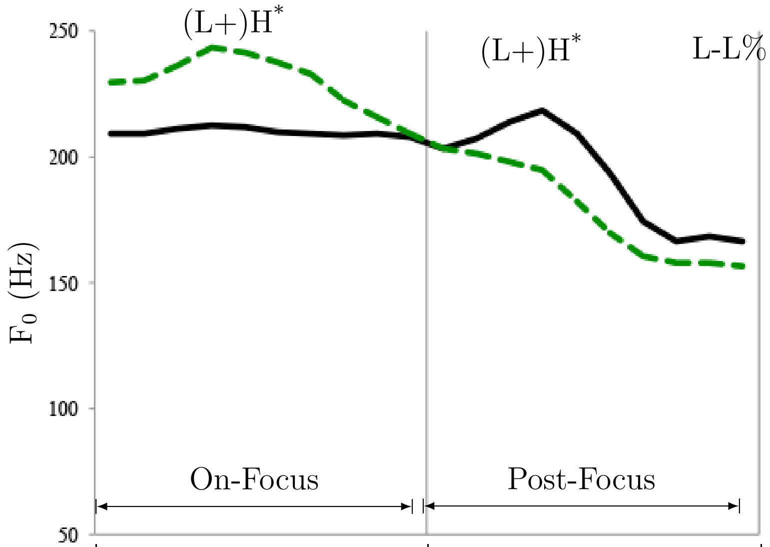
It has been found that the information focus and the in-situ contrastive-focus occurring in the sentence-initial position always attract the nuclear pitch accent of the target sentence. This is clearly shown in the time-normalized mean F_0 contours presented in the preceding sections. Section 7.2.4 reported the results for the phonetic analysis. The acoustic difference between the information-focused word and in-situ contrastive-focused word in one hand and their neutral counterpart in the sentence-focus structure in another in HA is clear: excursion size, Max F_0 and Mean F_0 are the main acoustic correlate of the information-focused and in-situ contrastive-focused word. These acoustic correlates of information focus and contrastive focus increased significantly in the on-focus words in sentence-initial position. Besides a decrease in Max F_0 is found in the post-focus word. Furthermore, the difference between information-focused word and its in-situ contrastive-focused counterpart was not found to be significant in both the on-focus word in the sentence-initial position and in the post-focus word.

Hypothetical AM representations of the surface F_0 counters of the time-normalized mean F_0 curves for /Rāmi šayyab/ averaged across all the sixteen speakers and five repetitions are shown in Figure 7.41, and Figure 7.42. $\Updownarrow_{\{X>Y\}}$`EXP` indicates that the excursion size of X is more expanded than its Y counterpart occurring in a different sentence, $\downarrow_{\{X>Y\}}$`LOW` indicates that the peak of X is lower than their Y counterpart occurring in a different sentence and $\uparrow_{\{X>Y\}}$`HIGH` indicates that the peak of X is higher than their Y counterpart occurring in a different sentence. CF indicates contrastive focus, N indicates neutral focus and NF indicates information focus.



Information Focus	$\Updownarrow_{\{NF>N\}}$`EXP` $\uparrow_{\{NF>N\}}$`HIGH`	$\downarrow_{\{NF>N\}}$`LOW`

Figure 7.19: Time-normalized mean F_0 contour for /Rāmi šayyab/ averaged across 16 speakers and 5 repetitions. The vertical lines mark the word boundaries. The black contour is sentence-focus structure, and the blue contour is the argument-focus structure wherein the sentence-initial word is information-focused.



Contrastive Focus	$\Updownarrow_{\{CF>N\}}$EXP $\uparrow_{\{CF>N\}}$HIGH	$\downarrow_{\{CF>N\}}$LOW

Figure 7.20: Time-normalized mean F_0 contour averaged across 16 speakers, 2 sentences and 5 repetitions. The vertical lines mark the word boundaries. The black contour is sentence-focus structure, and the green contour is the argument-focus structure wherein the sentence-initial word is in-situ contrastive-focused.

To sum up, this section found that the difference between on-focus (information focus and in-situ contrastive focus) and their counterpart in sentence-focus structure in HA is encoded phonologically and phonetically. That is, the F_0 in information-focused word and in-situ contrastive-focused word occurring in the sentence-initial position in the two-word declarative sentence is raised and expanded, compared with their neutral counterpart. Furthermore, this section found that the mean duration of the information focus and the contrastive focus is longer than its neutral counterpart. Moreover, this section found that the Max F_0 of the post-focus region occurring after the information focus is lower than its neutral counterpart. In addition, the Max F_0 of the post-focus region occurring after the contrastive focus is lower than its neutral counterpart. We also found that the mean duration of the post-focus region occurring after the contrastive focus is shorter than its neutral counterpart and its counterpart occurring after the information focus.

The following section provides (i) the phonological and phonetic analyses of information focus and in-situ contrastive focus when they are in the sentence-final position in the two-word declarative sentence, and (ii) phonological analysis of focus preposing.

7.3 Focus in Sentence-Final Position

The preceding section investigated the information focus and in-situ contrastive focus when they occur in the sentence-initial position. It is found that the excursion size, Max F_0 and Mean F_0 are the main acoustic correlates of focus occurring in the sentence-initial position in the HA two-word declarative sentence.

This section has its objectives to investigate whether information focus and in-situ contrastive focus occurring in the sentence-final position in the two-word declarative sentences in (1) repeated in (8) below for convenience have phonological and phonetic reflexes in HA. In addition, it investigates the phonological realization of the focus preposing wherein the the verb carries contrastive focus is structurally realized at the left periphery of the clause. The main strategy adopted here is to make systematic comparisons between different focus conditions: sentence-focus, information-focus, in-situ contrastive-focus condition and ex-situ contrastive-focus in two separate focus regions: pre-focus, and on-focus (and post-focus region in ex-situ contrastive focus condition).

(8) a. Mar.**wān māt**.
Marwan died
'Marwan died'

b. **Rā**.mi **šay**.yab.
Rami get-old
'Rami is getting old'

This section is organized as follows. Section7.3.1 investigates the phonological difference between the information focus and its neutral counterpart in the sentence-focus structure. Section 7.3.2 investigates the phonological difference between the in-situ contrastive focus and its neutral counterpart in the sentence-focus structure. Section 7.3.3 investigates the phonological difference between the in-situ contrastive focus and its information-focused counterpart. Section 7.3.4

investigates the phonological realization of focus preposing. Section 7.3.5 investigates the phonetic difference in excursion size, Max F_0, Mean F_0, Mean Intensity and Mean Duration across the three focus conditions: sentence-focus, information-focus and in-situ contrastive-focus condition. Section 7.3.6 summarizes the results and concludes.

7.3.1 Sentence Focus vs. Information Focus

This section aims to answer the following research questions: (a) Does the information focus differ phonologically from its counterpart in sentence-focus structure (i.e. neutral intonation)? If so how? and (b) Does the word occurring before the information focus (i.e. pre-focus region) differ phonologically from its counterpart in sentence-focus structure? If so how? The two target sentences in (9b) and (10b) below are embedded in the question-answer context in (9a) and (10a) respectively to evoke information focus on the sentence-final word (i.e. the verb).

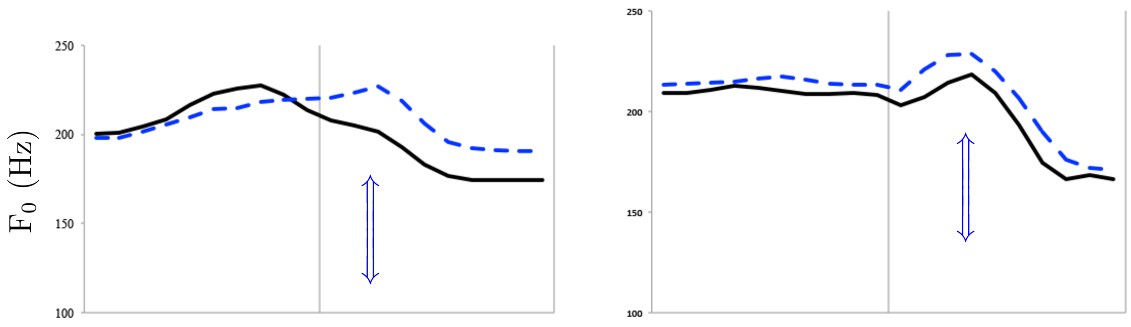
(9) a. What happened to Marwan?

b. Mar.**wān** [**māt**]$_F$.
Marwan died
'Marwan died'

(10) a. What is the news about Rami?

b. **Rā**.mi [**šay**.yab]$_F$.
Rami get-old
'Rami is getting old'

The time-normalized mean F_0 contours with and without information focus is in Figure 7.21, averaged across all the speakers' repetitions.



(a) /Marwān **māt**/ (b) /Rāmi **šayyab**/

Figure 7.21: Time-normalized mean F_0: Sentence-final word (in boldface) is key word. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The black contour is sentence-focus structure and the blue contour is wherein the sentence-final word is information focus. ⇳ indicates expansion of pitch range.

The graphs in Figure 7.21 display clearly the main prosodic effect of the information focus occurring in the sentence-final position (blue contour). From the graphs above, we observe the following.

1. The F_0 peak of the information-focused word occurring in the sentence-final position (blue contour) is higher than the F_0 peak of the same word under neutral focus. This is visible in all the graphs in Figure 7.21.

2. The F_0 peak of the pre-focus word occurring before the information focus does not show systematic difference. In Figure 7.21(a), the information-focused word attracts the nuclear pitch accent of the entire clause from being on the sentence-initial word under neutral focus to be on the word carrying information focus. As for the F_0 of the pre-focus word in Figure 7.21(b), it is largely the same with and without information focus. Although the level of the F_0 of the pre-focus word in Figure 7.21(b) (blue contour) is higher than the level of the F_0 of their neutral counterpart, the shape of this F_0 does not display a significant effect by the presence of the information focus in the sentence-final position.

3. The location of the F_0 peaks within each word are the same with and without information focus. This indicates that the information-focused word does

not affect the peak alignment. This is visible in all the graphs in Figure 7.21.

4. The domain of the pitch accent (local F_0 maxima) is local. That is, it occurs within the stressed syllable and thus it does not span across the entire prosodic word. This can been seen in Figure 7.21. with the F_0 movement taken placed within the stressed syllable of the information-focused word.

5. In Figure 7.21(a), the location of the pitch accent is shifted from being on /marwān/ in the neutral sentence to be on the information focus word /māt/. This indicates that the focus always attracts the nuclear pitch accent of the utterance.

Table 7.17 summarizes the distribution of the pitch accents in sentence (9b) and (10b).[25]

Focus Region	**Pre-Focus**	**On-Focus**
Sentence (9b)	*Marwān*	*māt*
	H* (100%)	H* (100%)
Sentence (10b)	*Rāmi*	*šayyab*
	H* (100%)	L+H* (72.5%) H* (27.5%)

Table 7.17: The frequency in percentage of the pitch accent distributions in the argument-focus structures with the information focus occurring in the sentence-final position. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 speakers. All the sentences end with the low boundary tone L%.

Table 7.17 shows that the information-focused word /māt/ in /Marwān māt/ was produced mainly with the monotonal pitch accent [H*]. As for the information-focused word /šayyab/ in /Rāmi šayyab/, it was produced more with the bitonal pitch accent[L+H*]. A possible explanation for the difference between the pitch accents realized on /māt/ in /Marwān māt/ and on /šayyab/ in /Rāmi šayyab/ is that the verb /māt/, unlike the verb /šayyab/, is monosyllabic and hence it is short.

Table 7.18 shows the percentage of the distribution of the pitch accents produced on the information-focused word, compared with the percentage of the dis-

[25]The full data transcription is in Appendix C.2.1.

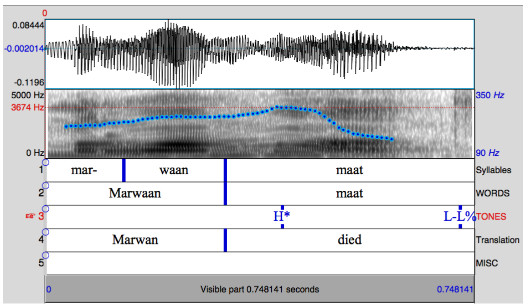
tribution of the pitch accents produced on its neutral counterpart in the sentence-focus structure.

Figure (7.21(a))		Figure (7.21(b))	
māt		**šayyab**	
Sentence Focus	Information Focus	Sentence Focus	Information Focus
H^* (91.25%) L^* (8.75%)	H^* (100%)	$L+H^*$ (67.5%) H^* (32.5%)	$L+H^*$ (72.5%) H^* (27.5%)

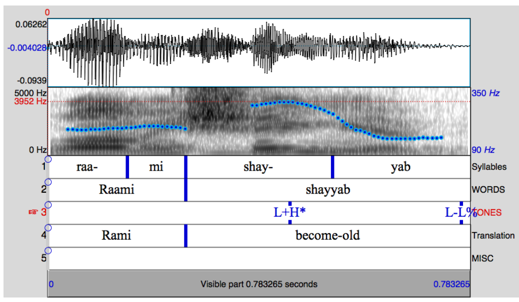
Table 7.18: The distribution of the pitch accents in percentage: information-focused word vs. its neutral counterpart. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 speakers.

The table above shows clearly that the nuclear pitch accent of the clause was placed on the information-focused word. For example, the verb /māt/ was produced 100% with the monotonal pitch accent [H^*] and thus it was produced more with the monotonal pitch accent [H^*] than its neutral counterpart. The verb /šayyab/ was produced more with the bitonal pitch accent [$L+H^*$] than the same word under neutral focus.

The typical pitch tracks in Figure 7.22 are all produced by the same speaker coded A2 (male speaker).



(a) Male Speaker (Coded A2)



(b) Male Speaker (Coded A2)

Figure 7.22: Pitch Tracks: Information focus is sentence-final.

The tracks shown above clearly show that the information-focused word was produced with the main prosodic prominence of the sentence. In Figure 7.22(a), the information-focused word /māt/ is produced with the monotonal pitch accent [H^*] that is more expanded than the monotonal pitch accent produced on the sentence-initial word /Marwān/ in the same structure. This expansion of the pitch accent distinguishes the monotonal pitch accent [H*] produced on the verb from the same pitch-accent type produced on the sentence-initial word. In Figure 7.22(b), the information-focused word /šayyab/ was produced with the bitonal pitch accent /[L+H*]/ which is the main prosodically prominent pitch accent in its structure.

In short, this section found that the information-focused word in the sentence-final position is prosodically more prominent than its neutral counterpart.

The following section examined the phonological difference between the contrastive focus in the sentence-final position and its neutral counterpart in the sentence-focus structure.

7.3.2 Sentence Focus vs. In-situ Contrastive Focus

This section aims to answer the following research questions: (a) Does the contrastive focus differ phonologically from its counterpart in the sentence-focus structure (i.e. neutral intonation)? If so how? and (b) Does the word occurring before contrastive focus (i.e. pre-focus region) differ phonologically from its counterpart in sentence-focus structure? If so how? The two target sentences in (11b) and (12b) are embedded in the question-answer context in (11a) and (12a) respectively to evoke contrastive focus on sentence-final word.

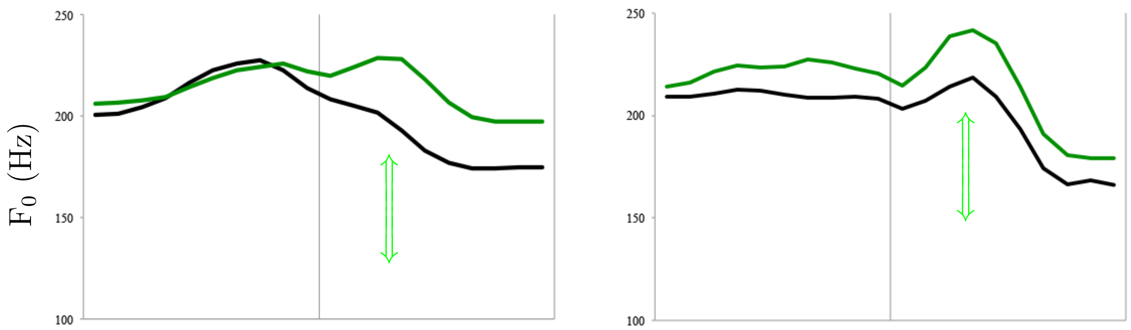
(11) a. What happened to Marwan after he went to hospital? recovered?

b. Mar.**wān** [**māt**]$_{\mathrm{CF}}$.
Marwan died
'Marwan died'

(12) a. What is the news about Rami? young?

b. **Rā**.mi [**šay**.yab]$_{\mathrm{CF}}$.
Rami get-old
'Rami is getting old'

For visual direct comparisons, Figure 7.23 displays the time-normalized mean F_0 pitch contours with and without contrastive focus occurring in the sentence-final position, averaged across all the speakers' repetitions.



(a) /Marwān **māt**/ (b) /Rāmi **šayyab**/

Figure 7.23: Time-normalized mean F_0 Contour: Sentence-final word (in boldface) is key word. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The black contour is sentence-focus structure and the green contour is wherein the sentence-final word is contrastive focus. ⇕ indicates expansion of pitch range.

The graphs in Figure 7.23 display clearly the the main prosodic effects of the contrastive focus in the two-word declarative sentences. From the graphs above, we observer the following.

1. The F_0 peak of the contrastive-focused word occurring in the sentence-final position (green contour) is higher than the F_0 peak of the same word under neutral focus. This is visible in both of the graphs above.

2. The F_0 peak of the pre-focus word is largely the same with and without contrastive focus. That is, the F_0 peak of the pre-focus word /Marwān/ in Figure 7.23(a) is the same with and without contrastive focus. In Figure 7.23(b), the F_0 of the pre-focus word /Rāmi/ occurring before the contrastive focus (green contour) is higher than the F_0 of the same word under neutral focus.

3. The F_0 of the contrastive-focused word is more expanded than the F_0 of the same word under neutral focus. This is visible in all the graphs in Figure 7.23

4. The location of the F_0 peaks of the words are the same with and without contrastive focus.

5. The domain of the pitch accent (local F_0 maxima) is local. That is, it occurs within the lexically stressed syllable.

6. In Figure 7.23(a), the location of the nuclear pitch accent is shifter from being on the subject /marwān/ in the neutral sentence to be on the contrastive-focused word /māt/. This indicates that the contrastive focus attracts the nuclear pitch accent of the utterance.

Table 7.19 summarizes the results from the auditory analyses of sentence (11b) and (12b). It shows the percentage of the distribution of the pitch accents produced in the argument-focus structure with single contrastive focus occurring in the sentence-final position.[26]

Focus Region	**Pre-Focus**	**On-Focus**
Sentence (11b)	*Marwān*	*māt*
	H^* (100%)	H^* (100%)
Sentence (12b)	*Rāmi*	*šayyab*
	H^* (100%)	$L+H^*$ (81.25%) H^* (18.75%)

Table 7.19: The frequency in percentage of the pitch accent distributions in the argument-focus structures with the contrastive focus occurring in the sentence-final position. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 speakers. All the sentences end with the low boundary tone L%.

From the above, we clearly observe that the contrastive-focused word /šayyab/ was produced more with the bitonal pitch accent [$L+H^*$] than the same word under neutral focus. As for the verb /māt/, it was produced mainly with the monotonal pitch accent [H^*] that, as seen clearly in Figure 7.23(a), is more expanded, compared with its neutral counterpart.

Table 7.20 shows the percentage of the pitch-accent distribution produced on the contrastive-focused word, compared with the same word under neutral focus.

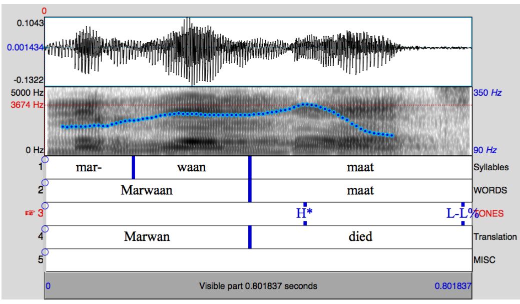
[26] The full data transcription is in Appendix C.2.2.

Figure (7.23(a))		Figure (7.23(b))	
māt		**šayyab**	
Sentence Focus	Contrastive Focus	Sentence Focus	Contrastive Focus
H^* (91.25%) L^* (8.75%)	H^* (100%)	$L+H^*$ (67.5%) H^* (32.5%)	$L+H^*$ (81.25%) H^* (18.75%)

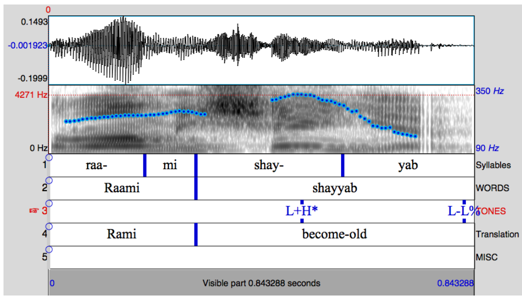
Table 7.20: The distribution of the pitch accents in percentage: contrastive-focused word vs. its neutral counterpart. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 speakers.

Table 7.20 reveals that the contrastive-focused verb /māt/ was produced more with the monotonal pitch accent [H^*] than the same word under neutral focus. Furthermore, the contrastive-focused verb /šayyab/ was produced more with the bitonal pitch accent [$L+H^*$] than the same word under neutral focus.

The typical pitch tracks is Figure 7.24 are all produced by the same speaker coded A2 (male speaker).



(a) Male Speaker (Coded A2)



(b) Male Speaker (Coded A2)

Figure 7.24: Pitch Tracks: Contrastive focus is sentence-final.

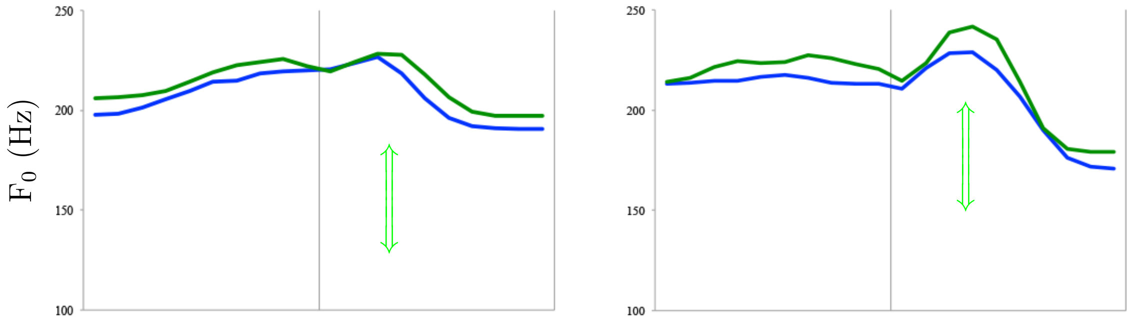
These pitch tracks show clearly that the contrastive-focused word occurring in the sentence-final position was produced with the most prominent pitch accent in the structure.

To sum up, this section found that the contrastive focus always attracts the nuclear pitch accent of the sentence. The following section examines the phonological difference between the information focus and its contrastive-focus.

7.3.3 Information Focus vs. In-situ Contrastive Focus

This section aims to answer the following research questions: (a) Does the contrastive focus differ phonologically from its information-focused counterpart? If so how? and (b) Does the word occurring before contrastive focus (i.e. pre-focus region) differ phonologically from its counterpart occurring after information focus? If so how?

Figure 7.25 displays the time-normalized mean F_0 contours with information focus and with contrastive focus, averaged across all the speakers' repetitions.



(a) /Marwān **māt**/ (b) /Rāmi **šayyab**/

Figure 7.25: Time-normalized mean F_0 Contour: Sentence-final word (in boldface) is key word. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. The blue contour is wherein the sentence-final word carries information focus and the green contour is wherein the sentence-final word is contrastive focus. ⇳ indicates expansion of pitch range.

From the graphs in Figure 7.25, we see clearly the difference between the prosodic effects of the information focus and the prosodic effects of the contrastive focus. From the graphs, we observe the following.

1. The F_0 peak of the word under contrastive focus (green contour) is higher than the F_0 peak of the same word under information focus (blue contour). This is visible in all the graphs in Figure 7.25.

2. The F_0 peak of the pre-focus word occurring before the contrastive focus (green contour) is higher than the F_0 peak of the same word occurring before the information focus (blue contour). This is visible in all the graphs above.

3. The location of the F_0 peaks within each word are the same with and without contrastive focus.

4. The domain of the pitch accent (local F_0 maxima) is local. That is, it occurs within the lexically stressed syllable.

Table 7.21 displays in percentage the difference between the distribution of the pitch accents produced on the contrastive focus and the distribution of the pitch accents produced on the same word under information focus.

Figure (7.25(a))		Figure (7.25(b))	
māt		**šayyab**	
Information Focus	Contrastive Focus	Information Focus	Contrastive Focus
H^* (100%)	H^* (100%)	$L+H^*$ (72.5%) H^* (27.5%)	$L+H^*$ (81.25%) H^* (18.75%)

Table 7.21: The distribution of the pitch accents in percentage: contrastive-focused word vs. its information-focused counterpart. The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 speakers.

The table above shows clearly that the verb /šayyab/ under contrastive focus was produced more with the bitonal pitch accent [$L+H^*$] than the same word under information focus.

This section examined that phonological difference between the in-situ contrastive focus and its information-focus counterpart. It is found that the in-situ contrastive-focused word always attracts the nuclear pitch accent of the utterance and thus it is more prosodically prominent than its information-focused counterpart.

The following section examined the phonological patterns for the focus preposing wherein the verb is structurally realized at the left-periphery of the clause.

7.3.4 Phonological Realization of Focus Preposing

This section aims to answer the following research question: (a) How is focus preposing as a noncanonical syntactic option to express contrastive focus realized phonologically? The two target sentences in (13b) and (14b) below are embedded in the question-answer context in (13a) and (14a) respectively to evoke contrastive focus on the verb which is structurally realized at the left-periphery of the clause and hence this word is called ex-situ contrastive-focused word.

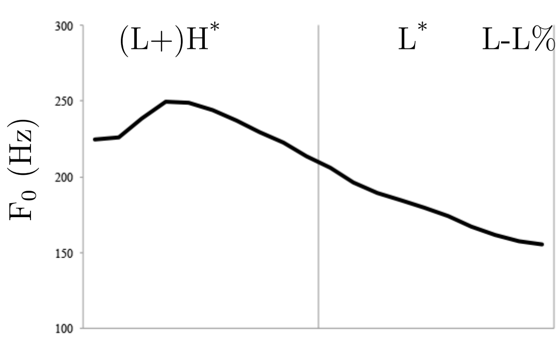
(13) a. What happened to Marwan after he went to hospital? recovered?

b. /[**māt**]$_{CF}$ Mar.**wān**/
died Marwan
Intended: 'Marwan died'

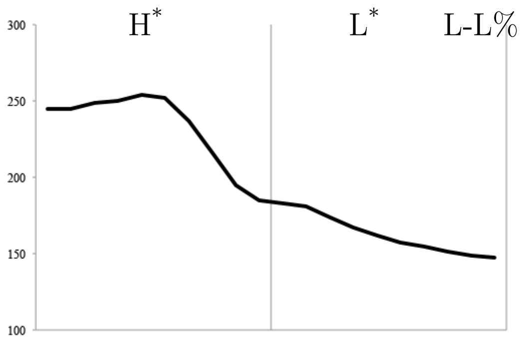
(14) a. What is the news about Rami? young?

b. /[**šay**.yab]$_{CF}$ **Rā**.mi/
become-old Rami
intended: 'Rami becomes old'

The time-normalized mean pitch contours for all the two target sentences under focus preposing are presented in Figure 7.26 below, averaged across all the speakers' repetitions.



(a) /**māt** Marwān/



(b) /**šayyab** Rāmi/

Figure 7.26: Time-normalized mean F_0 Contour: Focus preposing wherein the contrastive-focused word (in boldface) is realized at the left periphery of the clause (i.e. ex-situ). Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries.

The graphs in Figure 7.26 show clearly the prosodic effects of the contrastive focus (ex-situ) in the focus preposing. That is, the tune structure shown in all the graphs in Figure 7.26 is made up of the highest pitch accent placed on the ex-situ contrastive-focused word occurring at the left-periphery of the clause, followed by post-focus compression till the structure end.

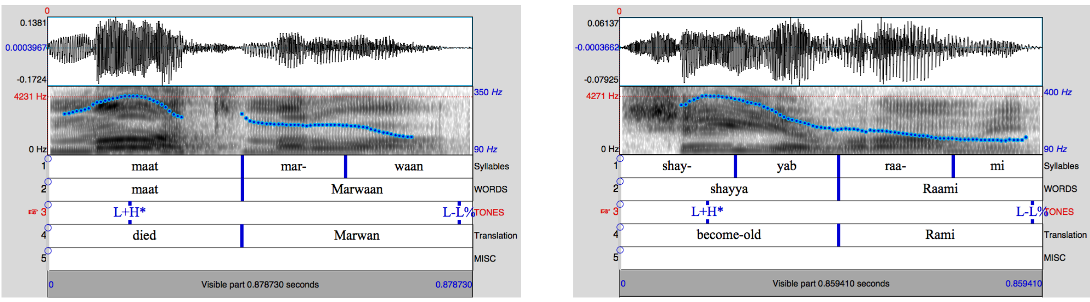
Table 7.22 displays the distribution of the pitch accents in the focus-preposing structure in percentage.

Focus Region	**On-Focus**	**Post-Focus**
Sentence (13b)	*māt*	*Marwān*
	L+H* (67.5%) H* (32.5%)	L* (97.5%) H* (2.5%)
Sentence (14b)	*šayyab*	*Rāmi*
	L+H* (47.5%) H* (52.5%)	L* (98.75%) H* (1.25%)

Table 7.22: The frequency in percentage of the pitch accent distributions in the focus preposing structures with the contrastive focus occurring at the left-periphery of the clause (ex-situ contrastive focus). The percentage number between parenthesis indicates the percentage of the tokens (80 repetitions) produced by 16 speakers. All the sentences end with the low boundary tone L%.

The table above reveals clearly that the ex-situ contrastive-focused word was produced more with the bitonal pitch accent [L+H*] in which its peak is aligned with the stressed syllable of the word. As for the post-focus word, HA speakers largely de-accented its pitch accent.

The typical pitch tracks in Figure 7.27 are all produced by the same speaker coded A2 (male speaker).



(a) Male Speaker (Coded A2) (b) Male Speaker (Coded A2)

Figure 7.27: Pitch Tracks: Ex-situ contrastive focus is at the left-periphery of the clause.

The pitch tracks above clearly show that the highest pitch accent occurs on the stressed syllable of the ex-situ contrastive-focus word realized structurally at the left-periphery of the clause, followed by post-focus compression till the end of the structure.

In short, this section found that focus preposing as a noncanonical syntactic option to express contrastive focus is associated with a specific phonological realization. That is, this construction is phonologically characterized by the realization of the nuclear accent occurring on the stressed syllable of the left-focused item (ex-situ contrastive focus), followed by post-focus compression towards the end of the structure. This is exactly what is observed with the focus preposing in the four-word declarative sentences discussed in §6.3.7.

The following section provides a systematic acoustic analyses of the differences, observed and discussed in this section, across the different focus conditions: sentence-focus, information-focus and contrastive-focus condition, in two separate focus regions: on-focus and pre-focus region.

7.3.5 Phonetic Analysis

In this section, we investigate only /Rāmi šayyab/ 'Rami is getting old', because the accent assignment of /marwān māt/ 'Marwan died' is likely to depend on the semantic type its intransitive verb /māt/ 'died'. Figure 7.28 displays the time-normalized mean F_0 contours for /Rāmi šayyab/ averaged across all the sixteen speakers and five repetitions.

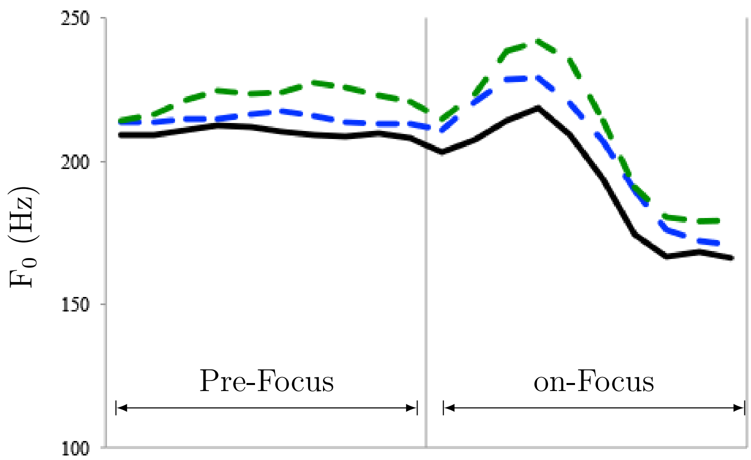


Figure 7.28: Time-normalized mean F_0 contours for /Rāmi šayyab/ averaged across 16 speakers and 5 repetitions. The vertical lines mark the word boundaries. The black contour is the sentence-focus structure, the blue contour is wherein the sentence-final word (i.e. the verb) is information-focused, and the green contour is wherein the sentence-final word (i.e. the verb) is contrastive-focused.

From the graph in Figure 7.28, we see clearly the prosodic differences across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. Through visual inspection of the graph above, we observe the following.

1. The F_0 peak of the word under both information focus (blue contour) and contrastive focus (green contour) are higher than the F_0 peak of the same word under neutral focus. This is visible in the graph in Figure 7.28.

2. The F_0 peak of the word under contrastive focus (green contour) is higher than the F_0 peak of the same word under information focus (blue contour).

3. The F_0 of the contrastive-focused and the information-focused word are more expanded than the F_0 of their neutral counterpart. This can been seen clearly in the graph in Figure 7.28.

4. The F_0 of the word under contrastive focus (green contour) is more expanded than the same word under information focus (blue contour). This is clearly visible in the graph in Figure 7.28.

5. The F_0 levels of the pre-focus word occurring before the information focus (blue contour) and the contrastive focus (green contour) are higher than their neutral counterpart.

6. The F_0 level of the pre-focus word occurring before the contrastive focus (green contour) is higher than the F_0 level of its counterpart occurring before the information focus (blue contour).

To verify these differences, Repeated Measures ANOVA test are conducted. The main strategy adopted here is to make systematic comparisons between sentence-focus, information-focus and contrastive-focus condition in one focus region: on-focus region and pre-focus region.

7.3.5.1 Excursion Size (in st.)

This section aims to find an answer to the following research questions: (a) Does the excursion size of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so how? (b) Does the excursion size of the pre-focus region differ across sentence-focus, information focus, and in-situ contrastive focus? If so how?

Table 7.23 describes the scores of the excursion size of the stressed syllable of the on-focus region across the three focus conditions. It shows an increase in the mean score of the excursion size of the stressed syllable of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	4.59	6.29	6.43
	Std. Error	0.38	0.64	0.56
Median		4.07	5.58	6.00
Std. Deviation		1.53	2.54	2.22
Statistics	Maximum	7.99	12.62	11.39
	Minimum	2.68	3.68	3.44
Range		5.31	8.94	7.95

Table 7.23: Excursion size of the stressed syllable of the on-focus region (in st.).

A Repeated Measures ANOVA with Greenhouse-Geisser[27] determines that the focus condition has a statistically significant effect on the excursion size of the on-focus region [$F(1.446, 20.243)=7.134$, $P<0.008$]. The effect of gender was found to be non-significant: $p=0.743$. Post hoc comparison with Bonferroni adjustment[28] reveals that the excursion size of the information focus ($M=6.29$, $SD=2.54$) is statistically significantly more expanded than the excursion size of its neutral counterpart in the sentence-focus structure ($M=4.59$, $SD=1.53$): $p<0.002$. It also reveals that the excursion size of the contrastive focus ($M=6.43$, $SD=2.22$) is statistically significantly more expanded than the excursion size of its neutral

[27]The table is in Table C.43 in Appendix C.2.4.1 on page 481.
[28]The table is in Table C.44 in Appendix C.2.4.1 on page 481.

counterpart: p<0.009. However, the test reveals that the difference between the excursion size of the information focus and the excursion size of its contrastive-focus counterpart is not statistically significant: p=1.000. Figure 7.29 shows the difference in the excursion size of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

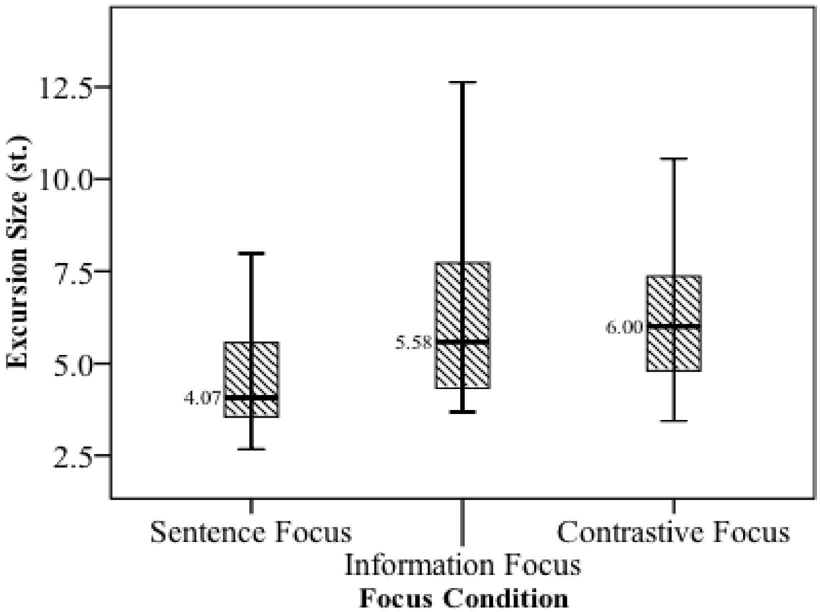


Figure 7.29: Boxplot of excursion size of the stressed syllable of the on-focus region (st.).

Table 7.24 describes the mean scores of the excursion size of the pre-focus region across the three focus conditions. The table shows that the mean score of the excursion size of the pre-focus focus region occurring before the contrastive focus (M=5.05, SD=2.12) is higher than the mean score of the excursion size of the pre-focus region occurring before the information focus (M=4.81, SD=2.59) and its neutral counterpart (M=4.96, SD=1.80). Moreover, the tables shows that the mean score of the excursion size of the pre-focus region occurring before the information focus is lower than the mean score of the excursion size of its neutral counterpart. To verify these differences, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	4.96	4.81	5.05
	Std. Error	0.45	0.65	0.53
Median		5.00	4.11	6.03
Std. Deviation		1.80	2.59	2.12
Statistics	Maximum	7.86	10.74	8.43
	Minimum	1.93	1.85	1.55
Range		5.93	8.89	6.88

Table 7.24: Excursion size of the pre-focus region (in st.).

A Repeated Measures ANOVA with Sphericity [29] determines that the difference in the excursion size of the pre-focus region across the three focus conditions was not statistically significant [$F(2, 28)=0.108$, $P<0.898$]. Figure 7.30 shows the difference in the excursion size of the pre-focus region across the three focus conditions.

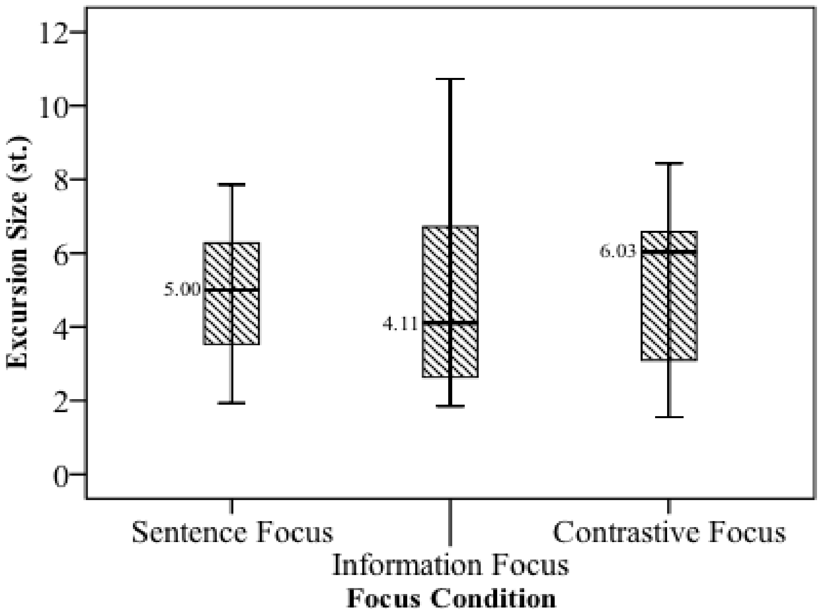


Figure 7.30: Boxplot of excursion size of the pre-focus region (st.).

In short, this section found that the excursion size of both the information focus and the contrastive focus are statistically higher than their neutral counterpart. However, it is found that the excursion size of the information focus does not differ statistically form the excursion size of its contrastive-focused counterpart. As for the pre-focus region, it is found that the difference in the excursion size of the

[29]The table is in Table C.46 in Appendix C.2.4.1 on page 482.

pre-focus region across the three focus conditions was not statistically significant.

The following section examines the difference in Max F_0 across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

7.3.5.2 Max F_0 (in Hz.)

This sections aims to answer the following research questions: (a) Does the Max F_0 of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so how? (b) Does the Max F_0 of the pre-focus region differ across sentence-focus, information focus, and in-situ contrastive focus? If so how?

Table 7.25 describes the scores of the Max F_0 of the stressed syllable of the on-focus region across the three focus condition. It shows an increase in the mean score of the Max F_0 of the on-focus region across the three focus condition: sentence-focus, information-focus and contrastive-focus condition. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	237.16	261.66	270.82
	Std. Error	19.45	18.00	18.88
Median		239.69	257.03	267.71
Std. Deviation		77.81	72.02	75.53
Statistics	Maximum	368.55	380.62	383.53
	Minimum	140.38	154.67	161.54
Range		228.18	225.95	221.99

Table 7.25: Max F_0 of the stressed syllable of the on-focus region (Hz).

A Repeated Measures ANOVA with Greenhouse-Geisser[30] determines that the focus condition has a statistically significant effect on the Max F_0 of the on-focus region [F(1.379, 19.310)=14.521, P<0.001]. The effect of gender was found to be non-significant: p=0.564. Post hoc comparison with Bonferroni adjustment[31] reveals that the Max F_0 of the information focus (M=261.66, SD=72.02) is higher than the Max F_0 of its neutral counterpart in the sentence-focus struc-

[30]The table is in Table C.48 in Appendix C.2.4.2 on page 483.
[31]The table is in Table C.49 in Appendix C.2.4.2 on page 483.

ture (M=237.16, SD=77.81): $p<0.001$. It also reveals that the Max F_0 of the contrastive focus (M=270.82, SD=75.53) is statistically significantly higher than the Max F_0 of its neutral counterpart: $p<0.002$. However, the test reveals that the difference between the Max F_0 of the contrastive focus is not statistically significantly different from the Max F_0 of its information-focused counterpart: p=0.702. Figure 7.31 shows the difference in the Max F_0 of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

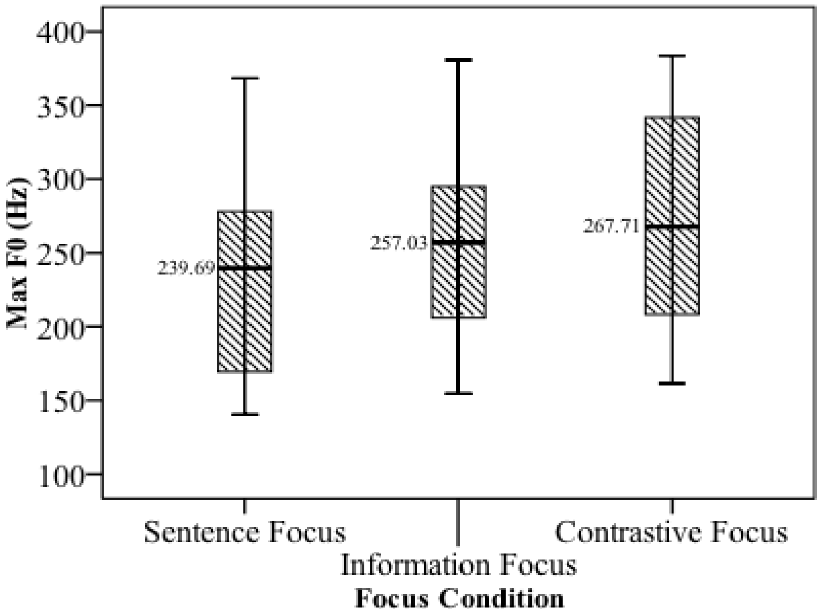


Figure 7.31: Boxplot of Max F_0 of the stressed syllable of the on-focus region (Hz).

Table 7.26 describes the scores of the Max F_0 of the pre-focus region across the three focus conditions: sentence-focus, information-focus and contrastive focus. The table shows an increase in the mean score of the Max F_0 of the pre-focus region across the three focus conditions. To verify this increase, a Repeated Measures ANOVA is performed.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	241.09	247.02	253.31
	Std. Error	18.11	18.11	17.50
Median		242.34	245.19	249.96
Std. Deviation		72.44	72.44	70.01
Statistics	Maximum	358.62	382.21	382.73
	Minimum	138.40	153.22	156.31
Range		220.22	228.99	226.42

Table 7.26: Max F_0 of the pre-focus region (Hz).

A Repeated Measures ANOVA with Sphericity[32] determines that the focus condition does not have a statistically significant effect on the Max F_0 of the pre-focus region [$F(2, 28)=3.285$, $P<0.052$].

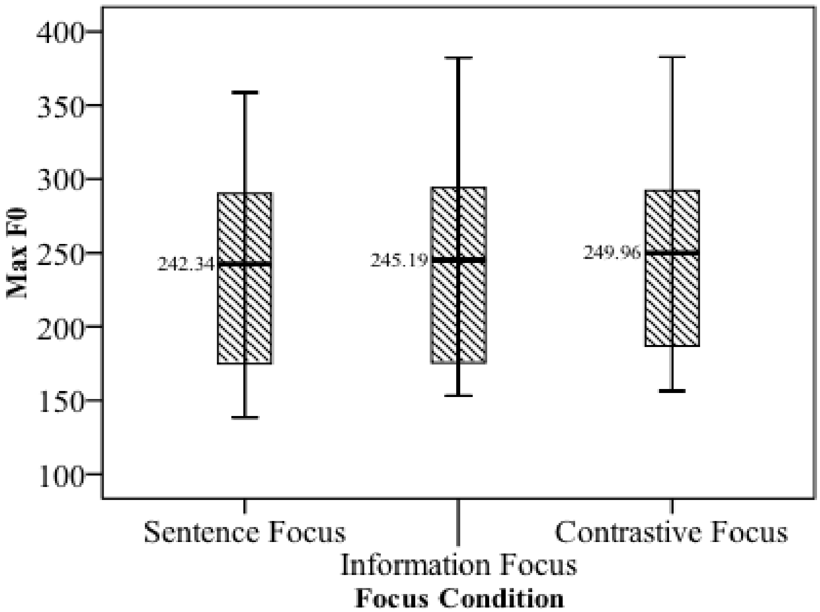


Figure 7.32: Boxplot of Max F_0 of the stressed syllable of the on-focus region (Hz).

To sum up, this section found that the Max F_0 of both the information focus and the contrastive are statistically higher than their neutral counterpart. However, it is found that the Max F_0 of the information focus is not statistically different from the Max F_0 of its contrastive-focused counterpart. Ad for the pre-focus region, it is found that there is no significant effect on the Max F_0 of the pre-focus region across the three focus conditions.

[32]The table is in Table C.51 in Appendix C.2.4.2 on page 484.

The following section examines the Mean F_0 of the stressed syllable of the on-focus region and also the Mean F_0 of the pre-focus region cross the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

7.3.5.3 Mean F_0 (in Hz.)

This section aims to answer the following research questions: (a) Does the Mean F_0 of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so how? (b) Does the Mean F_0 of the pre-focus region differ across sentence-focus, information focus, and in-situ contrastive focus? If so how?

Table 7.27 describes the scores of the Mean F_0 of the stressed syllable of the on-focus region across the three focus conditions. It shows an increase in the mean score of the Mean F_0 of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	213.47	228.30	238.32
	Std. Error	16.80	15.20	15.66
Median		208.70	223.79	244.02
Std. Deviation		67.19	60.80	62.64
Statistics	Maximum	338.82	328.75	354.22
	Minimum	131.34	135.73	147.80
Range		207.48	193.02	206.42

Table 7.27: Mean F_0 of the stressed syllable of the on-focus region (Hz).

A Repeated Measures ANOVA with Sphericity[33] determines that the focus condition has a statistically significant effect on the Mean F_0 of the on-focus region [$F(2, 28)$=13.568, P=.001]. The effect of gender was found to be non-significant: p=0.195. Post hoc comparison with Bonferroni adjustment[34] reveals that the Mean F_0 of the information focus (M=228.30, SD=60.80) is statistically significantly higher than the Mean F_0 of its neutral counterpart in the sentence-

[33]The table is in Table C.53 in Appendix C.2.4.3 on page 485.
[34]The table is in Table C.54 in Appendix C.2.4.3 on page 485.

focus structure (M=213.47, SD=67.19): p<0.012. It also reveals that the Mean F_0 of the contrastive focus (M=238.32, SD=62.64) is statistically significantly higher than the Mean F_0 of its neutral counterpart: p<0.001. However, the test reveals that the Mean F_0 of the contrastive focus is not statistically significantly different from the Mean F_0 of its information-focused counterpart: p=0.270. Figure 7.33 shows the difference in the Mean F_0 of the on-focus region across the three focus conditions.

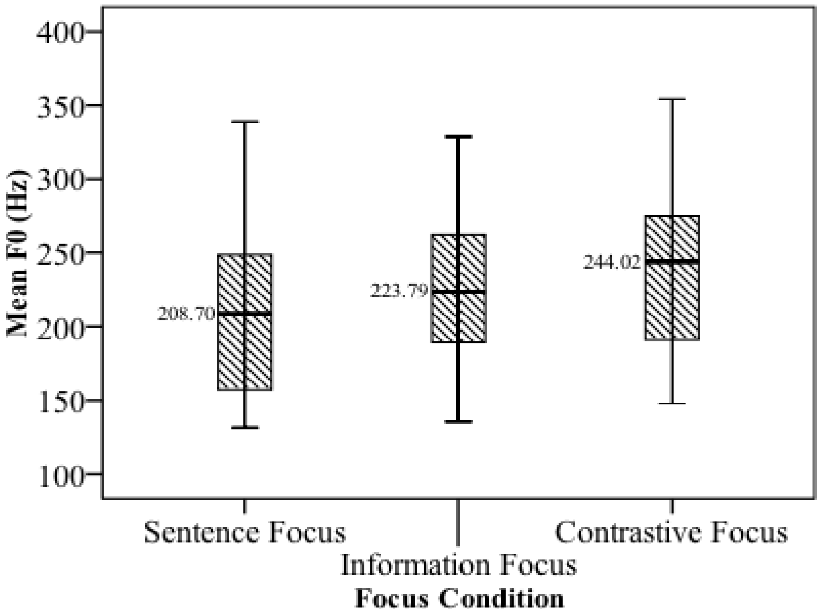


Figure 7.33: Boxplot of Mean F_0 of the stressed syllable of the on-focus region (Hz).

Table 7.28 describes the Mean F_0 of the pre-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus. It shows that the mean score of the Mean F_0 of the pre-focus occurring before the contrastive focus (M=226.51, SD=59.02) is higher than the mean score of the Mean F_0 of the pre-focus region occurring before the information focus (M=217.91, SD=54.96) and its neutral counterpart (M=213.05, SD=58.51). It also shows that the mean score of the Mean F_0 of the pre-focus region occurring before the information focus is higher than its neutral counterpart. To verify these differences, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	213.05	217.91	226.51
	Std. Error	14.63	13.74	14.75
Median		219.96	218.50	227.16
Std. Deviation		58.51	54.96	59.02
Statistics	Maximum	303.62	295.04	327.65
	Minimum	123.97	136.27	143.20
Range		179.65	158.77	184.45

Table 7.28: Mean F_0 of the pre-focus region (Hz).

A Repeated Measures ANOVA with Sphericity[35] determines that the focus condition has a statistically significant effect on the Mean F_0 of the on-focus region [$F(2, 28)=7.095$, $P=.003$]. The effect of gender was found to be non-significant: $p=0.635$. Post hoc comparison with Bonferroni adjustment[36] reveals that the Mean F_0 of the pre-focus occurring before the contrastive focus ($M=226.51$, $SD=59.02$) is statistically significantly higher than its neutral counterpart ($M=213.05$, $SD=58.51$): $p<0.014$. However, the difference between the Mean F_0 of the pre-focus region occurring before the information focus ($M=217.91$, $SD=54.96$) and its neutral counterpart is not statistically significant: $p=0.302$. Moreover, the difference between the Mean F_0 of the pre-focus region occurring before the contrastive focus and the Mean F_0 of its counterpart occurring before the information focus is not statistically significant: $p=0.139$. Figure 7.34 shows the difference in the Mean F_0 of the pre-focus region across the three focus conditions.

[35] The table is in Table C.56 in Appendix C.2.4.3 on page 486.
[36] The table is in Table C.57 in Appendix C.2.4.3 on page 486.

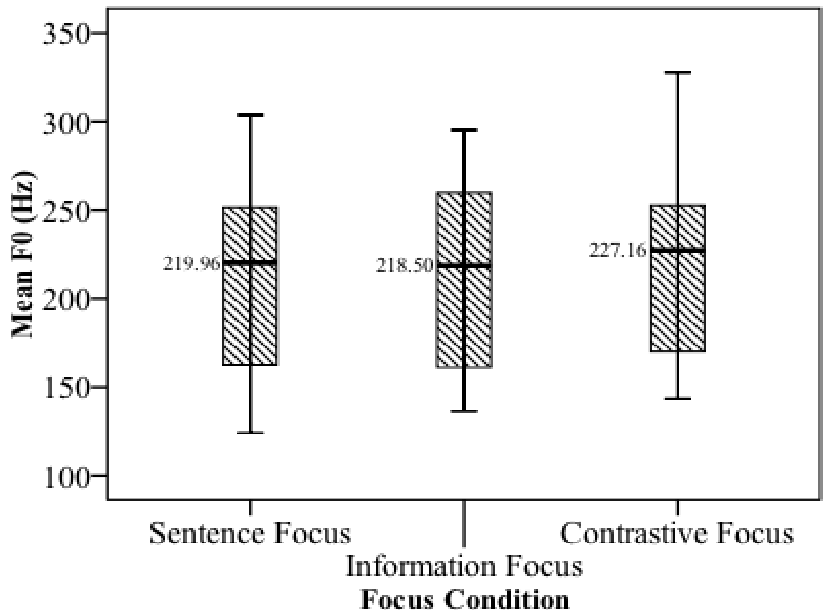


Figure 7.34: Boxplot of Mean F_0 of the stressed syllable of the on-focus region (Hz).

In short, this section found that the Mean F_0 of both the information focus and the contrastive focus are statistically higher than their neutral counterpart in the sentence-focus structure. However, the Mean F_0 of the information focus is not statistically different from the Mean F_0 of its contrastive-focused counterpart. As for the pre-focus region, it is found that the difference in the Mean F_0 of the pre-focus region is not systematic.

The following section examines the Mean Intensity of the stressed syllable of the on-focus region and the Mean Intensity of the pre-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition.

7.3.5.4 Mean Intensity (in dB)

This section aims to answer the following research questions: (a) Does the Mean Intensity of the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus condition? If so how? (b) Does the Mean Intensity of the pre-focus region differ across sentence-focus, information focus, and in-situ contrastive focus? If so how?

Table 7.29 describes the mean scores of the Mean Intensity of the stressed syllable of the on-focus region across the three focus conditions. It shows an increase in the mean score of the mean intensity of the on-focus region across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	56.51	58.28	59.50
	Std. Error	0.97	1.05	1.11
Median		55.52	59.12	58.92
Std. Deviation		3.87	4.20	4.42
Statistics	Maximum	62.96	64.99	67.12
	Minimum	51.14	52.68	53.51
Range		11.82	12.31	13.60

Table 7.29: Mean Intensity of the stressed syllable of the on-focus region (in dB).

A Repeated Measures ANOVA with Sphericity[37] determines that the focus condition has a statistically significant effect on the mean intensity of the on-focus region [$F(2, 28)=18.448$, $P<0.001$]. The effect of gender was found to be non-significant: $p=0.320$. Post hoc comparison with Bonferroni adjustment[38] reveals that the mean intensity of the information focus ($M=58.28$, $SD=4.20$) is statistically significantly stronger than its neutral counterpart in the sentence-focus structure ($M=56.51$, $SD=3.87$): $p<0.008$. It also reveals that the mean intensity of the contrastive focus ($M=59.50$, $SD=4.42$) is statistically significantly stronger than its neutral counterpart: $p<0.001$. Furthermore, the test reveals that the mean intensity of the contrastive focus is statistically significantly stronger than the mean intensity of its information-focused counterpart: $p<0.021$. Figure 7.35 shows the difference in the mean intensity of the on-focus region across the focus conditions.

[37]The table is in Table C.59 in Appendix C.2.4.4 on page 487.
[38]The table is in Table C.60 in Appendix C.2.4.4 on page 487.

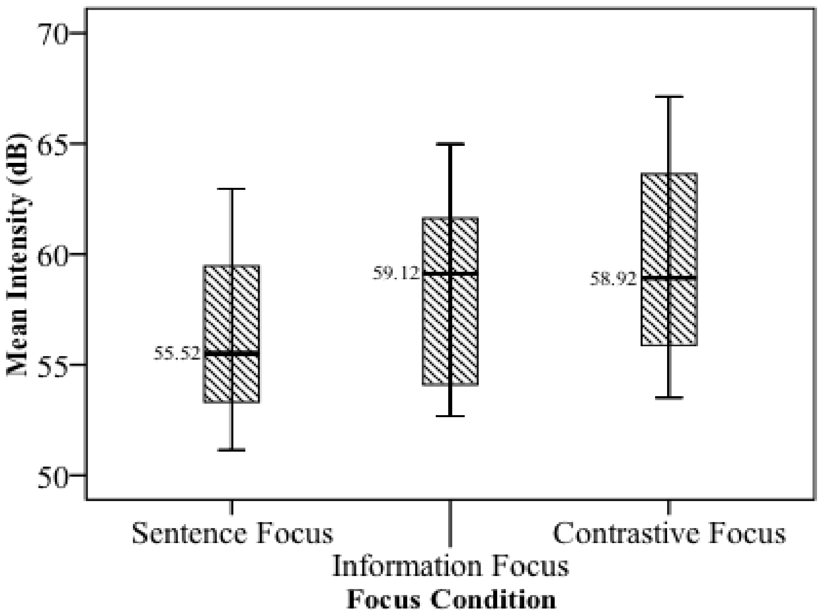


Figure 7.35: Boxplot of Mean Intensity of the stressed syllable of the on-focus region (in dB).

Table 7.30 shows the scores of the Mean Intensity of the pre-focus region across the three focus conditions. It shows clearly that there is an increase in the mean score of the Mean Intensity of the pre-focus region across the three focus conditions. TO verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	63.59	64.04	226.51
	Std. Error	1.13	1.17	14.76
Median		63.34	63.47	227.16
Std. Deviation		4.53	4.68	59.02
Statistics	Maximum	72.15	71.92	327.65
	Minimum	58.04	56.54	143.21
Range		14.12	15.38	184.45

Table 7.30: Mean Intensity of the pre-focus region (in dB).

A Repeated Measures ANOVA with Greenhouse-Geisser[39] determines that the focus condition has a statistically significant effect on the mean intensity of the on-focus region [$F(1.003, 14.038)=330.945$, $P<0.001$]. The effect of gender was found to be significant: $p<0.001$. In addition, Tests of Between-Subjects Effects[40]

[39]The table is in Table C.62 in Appendix C.2.4.4 on page 488.
[40]The table is in Table C.63 in Appendix C.2.4.4 on page 488.

determines that the difference among gender is statistically significant: $p<0.003$[41].

Among male participants, A Repeated Measures ANOVA with Greenhouse-Geisser[42] determines that the focus condition has a statistically significant effect on the mean intensity of the on-focus region [$F(1.002, 7.016)=104.837$, $P<0.001$]. Post hoc comparison with Bonferroni adjustment[43] reveals that the Mean Intensity of the pre-focus region occurring before the contrastive focus (M=182.98, SD=35.91) is statistically significantly greater than the mean intensity of its neutral counterpart (M=64.13, SD=4.13): $p<0.001$. It also reveals that the Mean Intensity of the pre-focus region occurring before the contrastive focus is statistically significantly greater than its counterpart occurring before the information focus (M=64.66, SD=4.53): $p<0.001$. However, the difference between the Mean Intensity of pre-focus region occurring before the information focus and the its neutral counterpart is not statistically significant: $p=0.88$. Figure 7.36 shows the difference among the male participants in the mean intensity of the pre-focus region across the focus conditions.

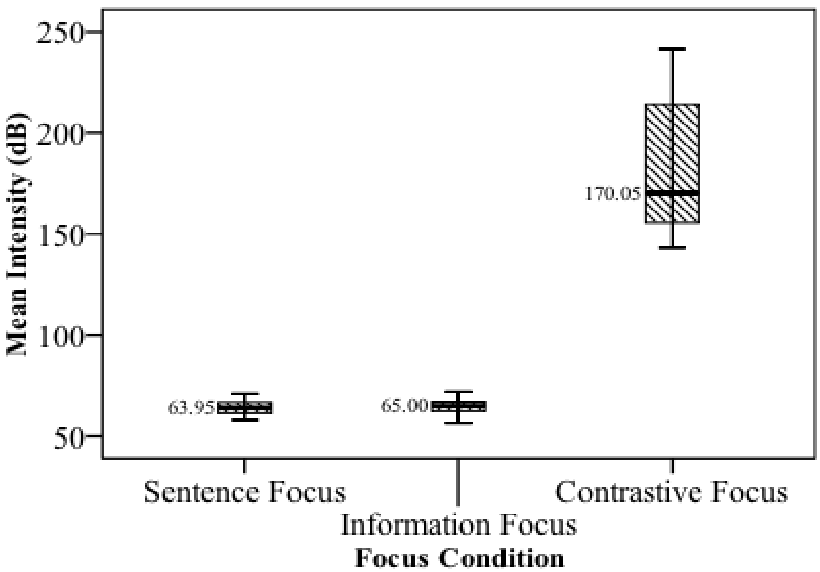


Figure 7.36: Boxplot of Mean Intensity of the pre-focus region (in dB) among the male participants.

[41]The reason why gender shows a difference in the Mean Intensity of the pre-focus region across the three focus conditions is not known and left unexplained.

[42]The table is in Table C.66 in Appendix C.2.4.4 on page 490.

[43]The table is in Table C.67 in Appendix C.2.4.4 on page 490.

Among female participants, A Repeated Measures ANOVA with Greenhouse-Geisser[44] determines that the focus condition has a statistically significant effect on the mean intensity of the on-focus region [$F(1.003, 7.021)=230.191$, $P<0.001$]. Post hoc comparison with Bonferroni adjustment[45] reveals that the Mean Intensity of the pre-focus region occurring before the contrastive focus (M=270.04, SD=42.94) is statistically significantly greater than the mean intensity of its neutral counterpart (M=63.06, SD=5.12): $p<0.001$. It also reveals that the Mean Intensity of the pre-focus region occurring before the contrastive focus is statistically significantly greater than its counterpart occurring before the information focus (M=63.42, SD=5.05): $p<0.001$. However, the difference between the Mean Intensity of pre-focus region occurring before the information focus and the its neutral counterpart is not statistically significant: p=1.00. Figure 7.36 shows the difference among male participants in the mean intensity of the pre-focus region across the focus conditions. Figure 7.37 shows the difference among the female participants in the mean intensity of the pre-focus region across the focus conditions.

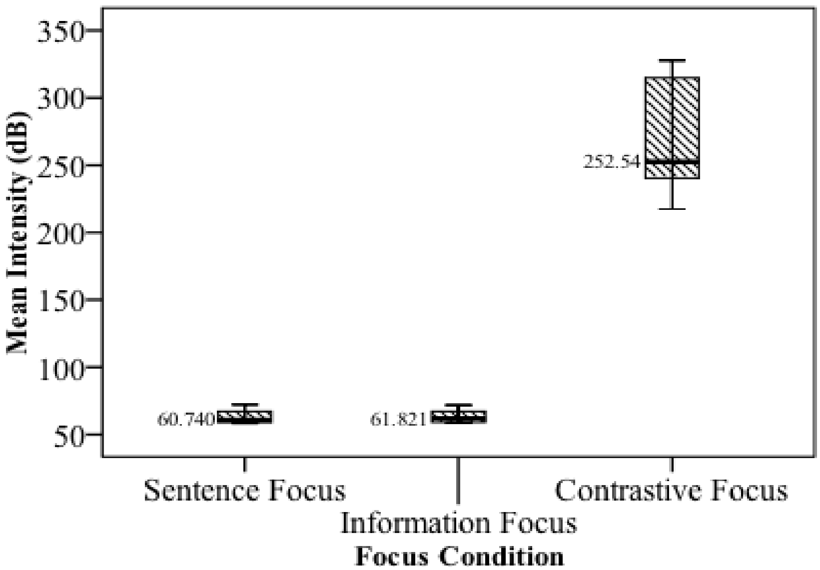


Figure 7.37: Boxplot of Mean Intensity of the pre-focus region (in dB) among the female participants.

[44]The table is in Table C.66 in Appendix C.2.4.4 on page 490.
[45]The table is in Table C.67 in Appendix C.2.4.4 on page 490.

To sum up, this section found that the mean intensity of both the information focus and the contrastive focus are statistically stronger than its counterpart in the sentence-focus structure, and that the mean intensity of the contrastive focus is statistically stronger than the mean intensity of its information-focused counterpart. As for the pre-focus region, the difference in the Mean Intensity of the pre-focus region across the three focus conditions does not show systematic differences.

The following section examines the difference in the mean duration across the three focus conditions.

7.3.5.5 Mean Duration (in ms.)

This section aims to answer the following research questions: (a) Does the Mean duration for the stressed syllable of the on-focus region differ across sentence-focus, information focus, and in-situ contrastive focus? If so how? (b) Does the Mean Duration of the pre-focus region differ across sentence-focus, information focus, and in-situ contrastive focus? If so how?

Table 7.31 describes the scores of the mean duration of the stressed syllable of the on-focus word /šayyab/ in /Rāmi šayyab/ across the three focus conditions. It shows an increase in the mean duration of this word across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. To verify this increase, a Repeated Measures ANOVA is conducted.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	221.24	230.26	245.65
	Std. Error	5.53	6.04	7.90
Median		225.24	235.03	246.39
Std. Deviation		22.11	24.17	31.61
Statistics	Maximum	257.01	261.48	293.84
	Minimum	185.42	181.96	177.94
Range		71.59	79.51	115.90

Table 7.31: Mean Duration of the stressed syllable of the on-focus item /šayyab/.

A Repeated Measures ANOVA with Sphericity[46] determines that the focus

[46] The table is in Table C.69 in Appendix C.2.4.5 on page 491.

condition has a statistically significant effect on the mean intensity of the on-focus word /šayyab/ in /Rāmi šayyab/ [$F(2, 28)=10.864$, $P<0.001$]. The effect of gender was found to be non-significant: $p=0.794$. Post hoc comparison with Bonferroni adjustment[47] reveals that the mean duration of /šayyab/ under contrastive focus ($M=245.65$, $SD=31.61$) is statistically significantly longer than its counterpart in the sentence-focus structure ($M=221.24$, $SD=22.11$): $p<0.001$). However, the test reveals that the mean duration of information focus /šayyab/ ($M=230.26$, $SD=24.17$) is not statistically significantly different from its counterpart in sentence-focus structure: $p=0.105$. In addition, the test reveals that the mean duration of the information focused word /šayyab/ is not statistically significantly different from its contrastive-focus counterpart: $p=0.093$. Figure 7.38 shows the difference in the mean duration of the on-focus word /šayyab/ across the three focus conditions.

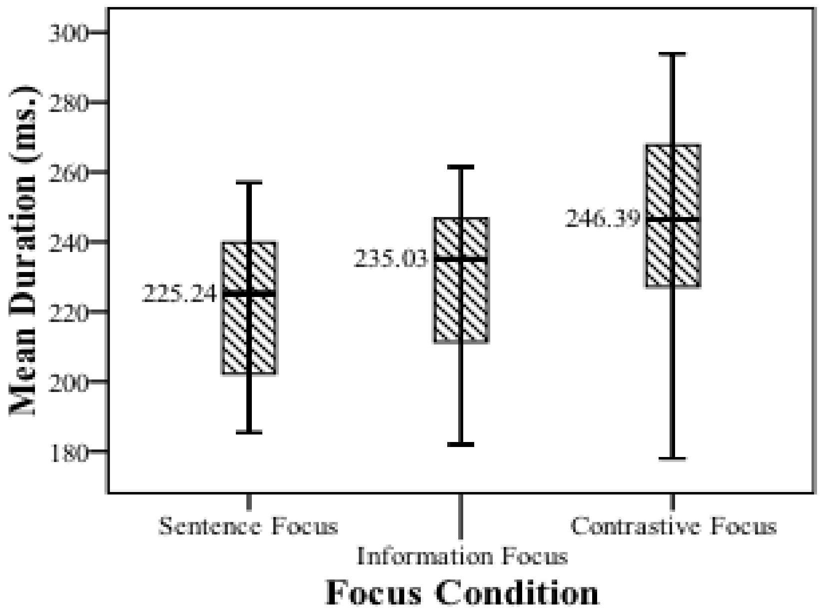


Figure 7.38: Boxplot of Mean duration of the stressed syllable of the on-focus word /šayyab/ (in ms).

Table 7.32 describes the scores of the Mean Duration of the pre-focus region across the three focus conditions. It shows an increase in the mean score of the Mean Duration of the pre-focus region across the focus conditions. To verify this increase, a Repeated Measures ANOVA is conducted.

[47]The table is in Table C.70 in Appendix C.2.4.5 on page 491.

		Focus Condition		
		Sentence-Focus	Information-Focus	Contrastive-Focus
Mean	Statistics	291.00	294.80	304.14
	Std. Error	10.76	12.89	13.52
Median		273.25	287.61	286.92
Std. Deviation		43.02	51.58	54.06
Statistics	Maximum	388.57	404.50	423.54
	Minimum	241.98	228.14	233.62
Range		146.58	176.36	189.92

Table 7.32: Mean Duration of the pre-focus item /rāmi/.

A Repeated Measures ANOVA with Sphericity[48] determines that the focus condition has a statistically significant effect on the mean intensity of the on-focus region [$F(2,\ 28)$=6.708, P<0.004]. The effect of gender was found to be significant: p<0.004. In addition, Tests of Between-Subjects Effects[49] determines that the difference among gender is statistically significant: p<0.047[50].

Among male participants, A Repeated Measures ANOVA with Sphericity[51] determines that the focus condition does not have a statistically significant effect on the mean duration of the pre-focus region [$F(2,\ 14)$=0.006, P=0.994]. Figure 7.39 shows the difference among the male participants in the mean duration of the pre-focus region across the focus conditions.

48 The table is in Table C.72 in Appendix C.2.4.4 on page 492.
49 The table is in Table C.73 in Appendix C.2.4.4 on page 492.
50 The reason why gender shows a difference in the Mean duration of the pre-focus region across the three focus conditions is not known and left unexplained.
51 The table is in Table C.76 in Appendix C.2.4.4 on page 494.

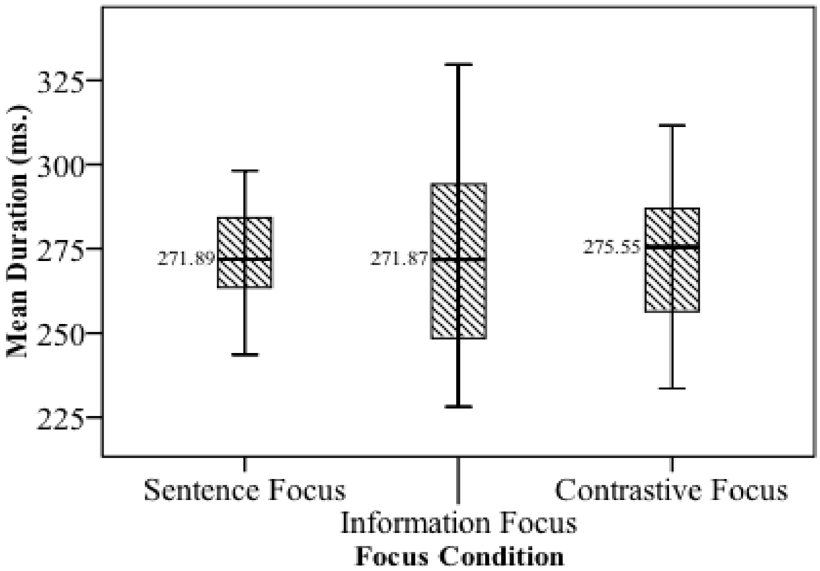


Figure 7.39: Boxplot of Mean Duration of the pre-focus region (in ms.) among the male participants.

Among female participants, A Repeated Measures ANOVA with Sphericity[52] determines that the focus condition does not have a statistically significant effect on the mean duration of the pre-focus region [$F(2, 14)=27.705$, $P<0.001$]. Post hoc comparison with Bonferroni adjustment[53] reveals that the mean duration of the pre-focus region occurring before the contrastive focus ($M=335.42$, $SD=58.65$) is statistically significantly longer than the mean duration of its neutral counterpart ($M=309.39$, $SD=53.79$): $p<0.001$). It also reveals that the mean duration of the pre-focus region occurring before the contrastive focus is statistically significantly longer than its counterpart occurring before the information focus ($M=316.27$, $SD=59.21$): $p<0.001$). However, the difference between the mean duration of the pre-focus region occurring before the information focus is not statistically significantly different from its neutral counterpart: $p<0.509$). **??** shows the difference among the female participants in the mean duration of the pre-focus region across the focus conditions.

[52]The table is in Table C.76 in Appendix C.2.4.4 on page 494.
[53]The table is in Table C.77 in Appendix C.2.4.5 on page 494.

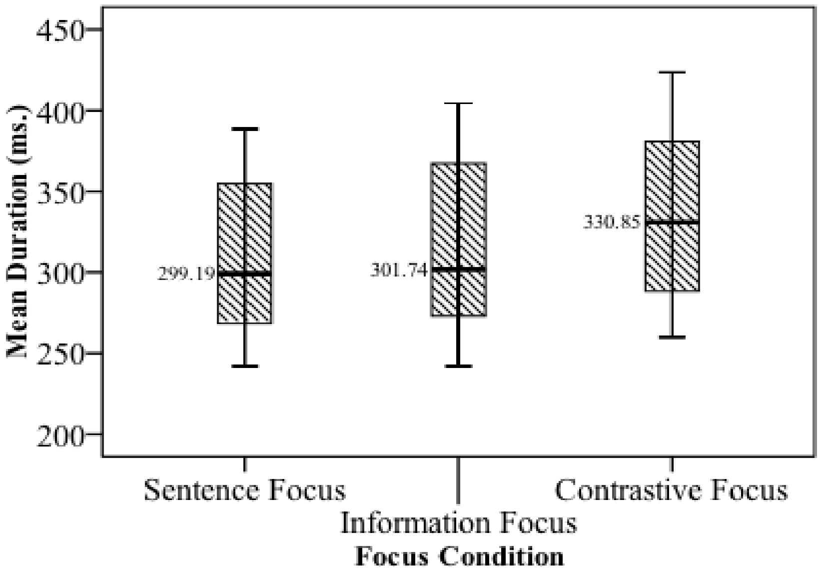


Figure 7.40: Boxplot of Mean Duration of the pre-focus region (in ms.) among the female participants.

In short, this section found that the mean duration of the on-focus region does not show systematic differences across the three focus conditions. As for the pre-focus region, the difference in the mean duration across the three focus conditions is not systematic. Therefore, we conclude that the mean duration as an independent variable was not used as a prosodic cue to focus in the data under investigation.

7.3.6 Discussion and Conclusion

This section had as its own objective to test if there is a prosodic encoding of the information focus and contrastive focus occurring in the sentence-final position in the two-word declarative structure.

We found that the major acoustic correlates of focus occurring in the sentence-final position in the HA two-word declarative sentences are excursion size, Max F_0, Mean F_0 and mean intensity. That is, we found that the excursion size of the information focus and the in-situ contrastive focus are significantly more expanded than their neutral counterpart in the sentence-focus structure. Furthermore, we found that the Max F_0 and MeanF_0 of the information focus and the in-situ contrastive focus are significantly higher than their neutral counterpart in sentence-focus structure. Furthermore, it is found that the mean intensity of information focus and the in-situ contrastive focus are significantly stronger than their neutral counterpart in the sentence-focus structure. In addition, the mean intensity of the in-situ contrastive focus is significantly stronger than the mean intensity of its information-focused counterpart.

Hypothetical AM representations of the surface F_0 counters of the time-normalized mean F_0 contour for /Rāmi šayyab/ averaged across all the sixteen speakers and five repetitions are shown in Figure 7.41, 7.42 and 7.43. $\Updownarrow_{\{X>Y\}}$`EXP` indicates that the excursion size of X is more expanded than its Y counterpart occurring in a different sentence, $\uparrow_{\{X>Y\}}$`HIGH` indicates that the peak of X is higher than their Y counterpart occurring in a different sentence and $\nwarrow_{\{X>Y\}}$`STRONG` indicates that the intensity of X is stronger than its Y counterpart occurring in a different sentence.. CF indicates <u>contrastive focus</u>, N indicates <u>neutral focus</u> and NF indicates <u>information focus</u>.

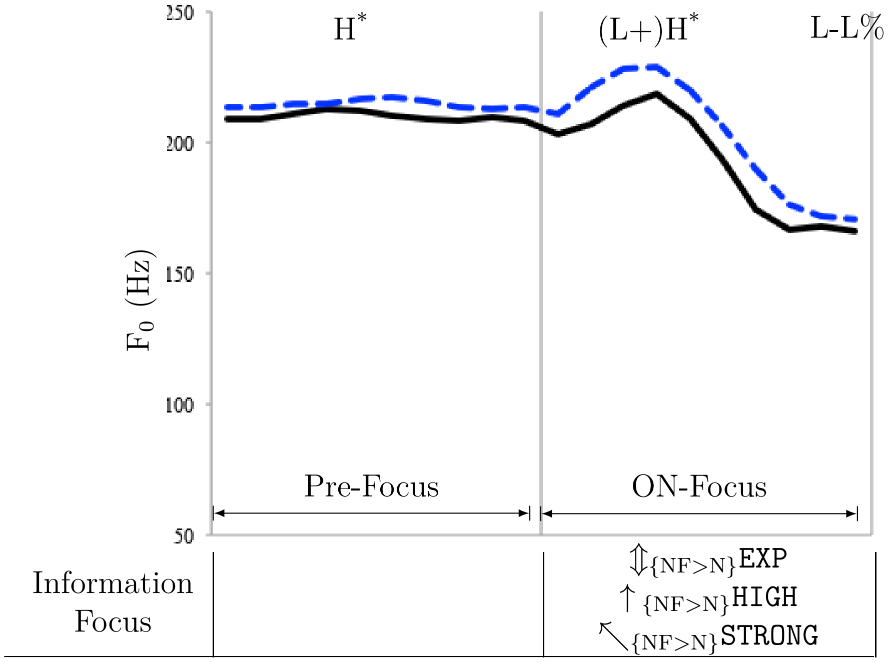


Figure 7.41: Time-normalized mean F_0 contour for /Rāmi šayyab/ averaged across 16 speakers and 5 repetitions. The vertical lines mark the word boundaries. The black contour is sentence-focus structure, and the blue contour is the argument-focus structure wherein the sentence-initial word is information-focused.

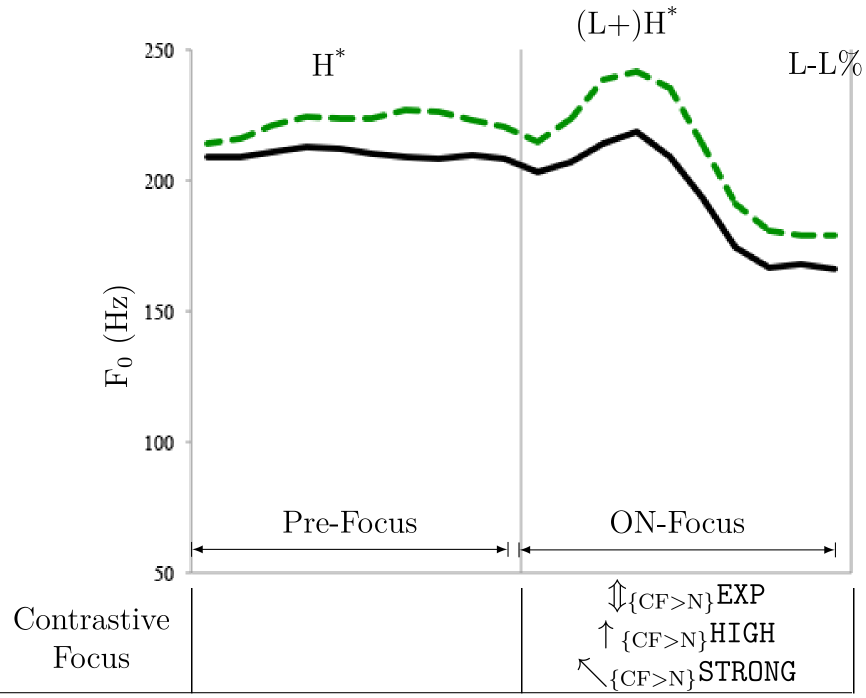


Figure 7.42: Time-normalized mean F_0 contour averaged across 16 speakers, 2 sentences and 5 repetitions. The vertical lines mark the word boundaries. The black contour is sentence-focus structure, and the green contour is the argument-focus structure wherein the sentence-initial word is in-situ contrastive-focused.

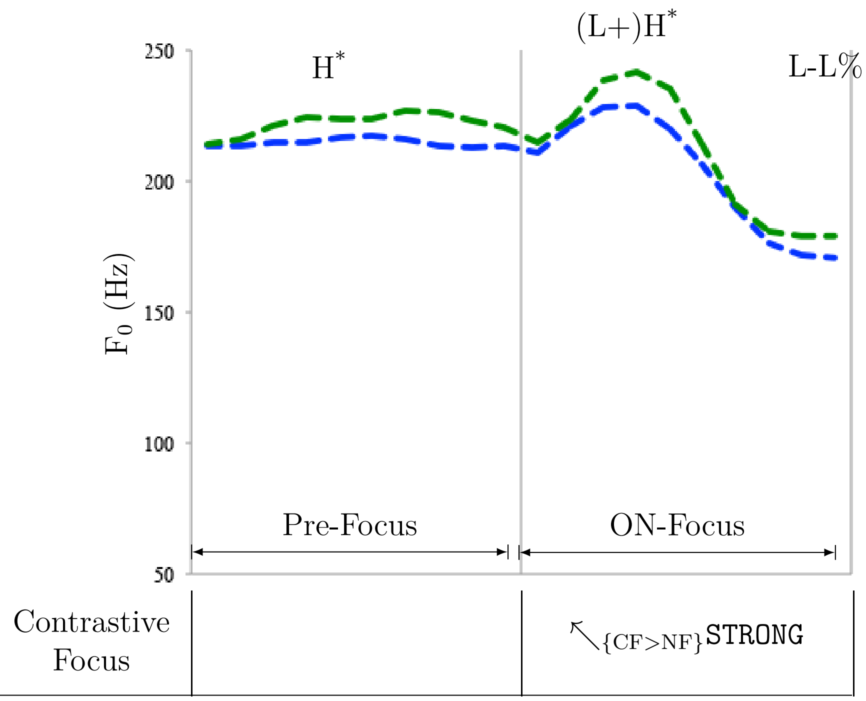


Figure 7.43: Time-normalized mean F_0 contours averaged across 16 speakers, 2 sentences and 5 repetitions. The vertical lines mark the word boundaries. The blue contour is wherein the sentence-final word is information-focused, and the green contour is wherein the sentence-final word is contrastive-focused.

Finally, this section investigated the F_0 patterns of the focus preposing wherein the verb is realized syntactically at the left periphery of the clause. It is found that this noncanonical syntactic option for marking contrastive focus (i.e. ex-situ contrastive focus) is characterized by the presence of a nuclear pitch accent on the ex-situ contrastive-focused word realized at the left periphery of the clause, followed by post-focus compression till the utterance ends

In short, this section found that the information focus and the contrastive focus in the sentence-final position in the two-word declarative sentences are realized higher and more expanded, compared with their neutral counterpart. It is also found that the mean intensity as a major acoustic correlate of focus distinguishes information focus from its counterpart in sentence-focus structure, in-situ contrastive focus from its counterpart in sentence-focus structure and also in-situ contrastive focus from its information-focused counterpart. Moreover, it is found that the intensity increases across the three focus conditions: sentence-focus, information-focus and contrastive-focus condition. Finally, this section found that the contour of focus preposing in a two-word declarative sentence is defined by the presence of a nuclear pitch accent on the ex-situ contrastive-focused item at the left periphery of the clause, followed by post-focus compression.

7.4 Conclusion

The experiment presented in this chapter demonstrated that the pitch accent on information focus and in-situ contrastive focus are higher/more expanded than their counterpart in sentence-focus structure. The phonetic analyses found that excursion size, Max F_0 and Mean F_0 are the major acoustic correlates of prosodic focus in HA. We found that the excursion size, Max F_0 and Mean F_0 are increased in information focus and contrastive focus, compared with their counterpart in sentence-focus structure. However, the difference between information focus and in-situ contrastive focus occurring in the sentence-initial position was not statistically significant. The intensity is found to be one of the major acoustic correlates of focus alongside the excursion size, Max F_0 and Mean F_0 when the word in focus is in the sentence-final position. That is, it is found that the intensity of the information focus and in-situ contrastive focus are statistically higher than their neutral counterpart in the sentence-focus structure, and, in addition, the intensity of the in-situ contrastive focus in the sentence-final position is statistically higher than its information-focused counterpart.

Finally, this section found that the contour of the focus preposing is characterized by the presence of the nuclear pitch accent on the ex-situ contrastive-focused word at the left periphery of the clause followed by post-focus compression till the utterance end.

In the following chapter, the results reported in this chapter and in the preceding chapter are evaluated and compared with the results from other languages. This is to shed light on the similarities and differences between the prosodic focus in HA and the prosodic focus in other languages including Arabic vernaculars reviewed so far in §3.2.

Chapter 8

Discussion

The two preceding chapters presented the results from the empirical study of sentence-focus, predicate-focus, argument-focus (with single information/contrastive focus constituent) and focus-preposing structures in HA (a less-studied language). This chapter aims to (i) discuss the results and their implications in HA grammar, and (ii) make comparison between the phenomena described for HA and those of Arabic vernaculars and other more distantly related languages.

This chapter is structured as follows. Section 8.1 discusses the intonational patterns of sentence-focus structure. Section 8.2 discusses the intonational patterns of the predicate-focus structure. Section 8.3 discusses the global intonational patterns of the argument-focus structures. Section 8.4 discusses the intonational patterns of focus preposing. Section 8.5 discusses the distribution of pitch accents in the HA declaratives with an aim to place HA within a prosodic typological space Section 8.6 concludes.

8.1 Sentence-Focus Structure in HA

This section aims to discuss the global intonational patterns of sentence-focus structure in HA in a cross-linguistic perspective. The discussion is based on the analyses presented in Chapters six and seven.[1] For comparison purposes, data

[1] The test materials are in §5.3.

from other studies will be considered, in particular Chahal (2001) and Hellmuth (2006).

Following Gussenhoven (1984), Hayes and Lahiri (1991), Féry (1993), Ladd (1996, 2008), Selkirk (1995), we take the global intonational patterns of the HA sentence-focus structure (§2.1.1) to be the default/neutral intonational patterns in HA.[2] Since the target sentences used in this thesis are of two types: four-word declarative sentences and two-word declarative sentences, we predict that the intonational patterns of the sentence-focus structures in HA is diverse in terms of both the placement of nuclear pitch accent and the realization of the height of pitch accents on almost every lexically stressed syllable.

In the four-word declarative structures (§6.2), the auditory analyses showed that there are two predominant F_0 patterns. First, the majorities of the tokens for the sentence /Rāmi mar Līna ʔams/ and /Rana sawwat maryūl li-Manāl/ were produced by HA speakers with the nuclear pitch accent [L+H*] occurs on the lexically stressed syllable of the sentence-penultimate item. As for the prenuclear and postnuclear pitch accents, they are of [H*] pitch-accent type (see §6.1 and 7.1 for examples).

Second, there is quite a large number of sentences produced with gradual declination in the height of the pitch peaks, as exemplified in Figure 8.1 and 8.2.

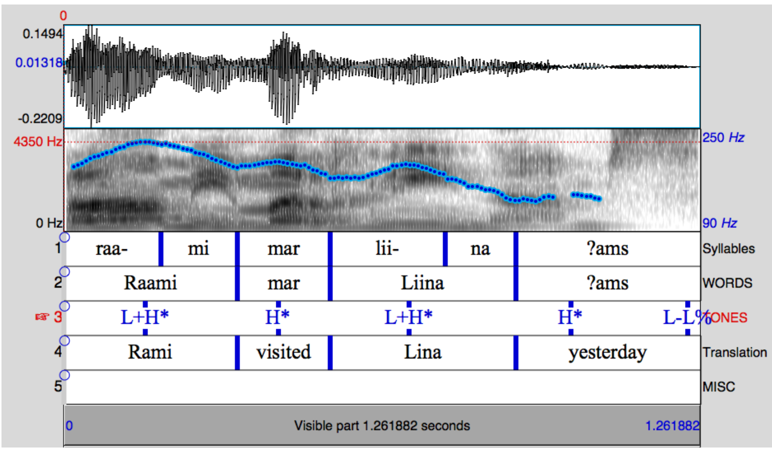


Figure 8.1: Male Speaker (Coded A4).

[2]As noted in §2.2.1 and 4.3.1, this structure lacks narrow focus in which one argument in the structure carries focus in the discourse and also it lacks given information in which items are been mentioned in the discourse before. Due to that, this structure is predicted to produce neutral intonation in which there is no 'additional' prosodic prominence.

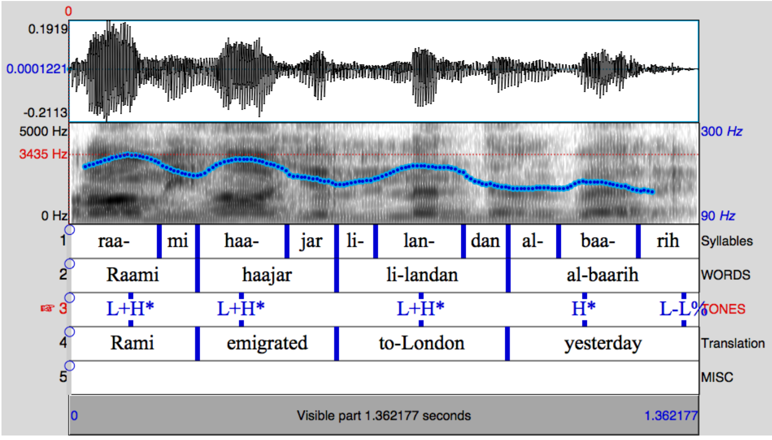
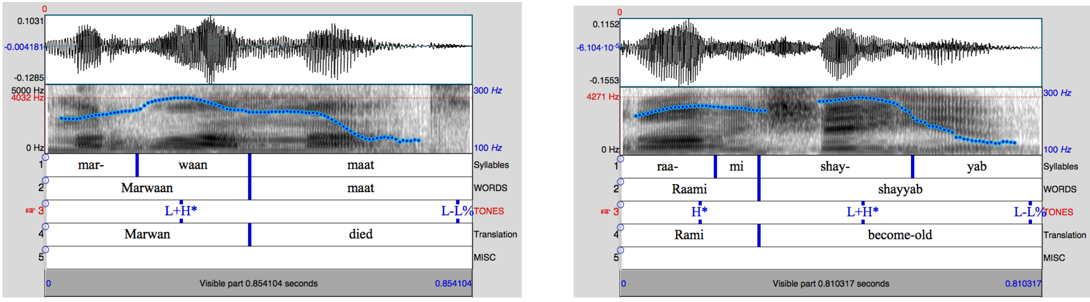


Figure 8.2: Male Speaker (Coded A4).

It is clear from the example that the peak of the pitch accent on the sentence-initial word is the highest, compared with other peaks of the pitch accents in the sentence. The peaks of the following pitch accents (i.e. after the sentence-initial word) are declined gradually over the course of the sentence. The most interesting finding is that a speaker of HA can produce the same pitch accent on every lexically stressed syllable in the structure as shown clearly in Figure 8.2 above. The pitch accent within every lexically stressed syllable in Figure 8.2 is the same across the sentence, apart from the sentence-final item which was produced with [H*].

In the case of the two-word sentences (§7.2), their global intonational patterns differ from each other in terms of the placement of nuclear pitch accent. The majority of the tokens of the sentence /Marwān māt/ “Marwan died” was produced with a nuclear pitch accent on the stressed syllable of the sentence-initial item as shown in Figure 8.3(a). It is more likely that the intransitive verb /māt/ ‘died’ denoting disappearance causes causes the nuclear pitch accent to be placed on the subject /Marwān/ (see Ladd 2008, P. 245). However, the majority of the tokens of the sentence /Rāmi šayyab/ ‘Rami becomes old’ was produced with a nuclear pitch accent on the stressed syllable of the sentence-final item (i.e. the verb), as shown in Figure 8.3(b).



(a) Male Speaker (Coded A2) (b) Male Speaker (Coded A2)

Figure 8.3: Pitch Tracks: Neutral Contours.

What we found in the relation between the semantic type of the intransitive verb (i.e. /māt/ 'died') and the location of the stress in HA is not surprising. In English, Ladd (2008) points out that 'nuclear accent on the subject is favoured [. . .] if the predicate denotes appearance or disappearance' (ibid., P. 245).[3] An example from English is below. Small capitals indicate prosodic prominence.

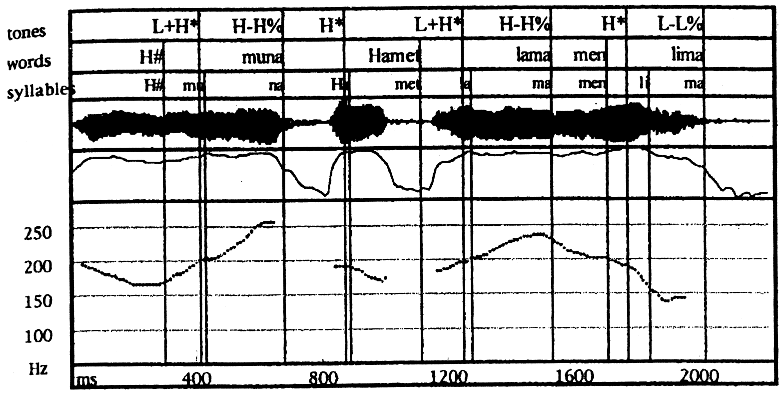
(1) His MOTHER died. (ibid., P. 245)

In Lebanese Arabic, Chahal (2001) shows two common global intonational patterns of sentence-focus structure.[4] Firstly, every content word in the sentence is associated with a nuclear pitch accent: [L+H*] or [H*], and hence it forms its own intermediate phrase (ip), as shown in Figure 8.4(a). Secondly, a sentence can be produced with multiple intermediate phrases (ip), as shown in Figure 8.4(b). In Figure 8.4(b), the first intermediate phrase was headed by the sentence-initial target item whereas the second intermediate phrase was headed with the last

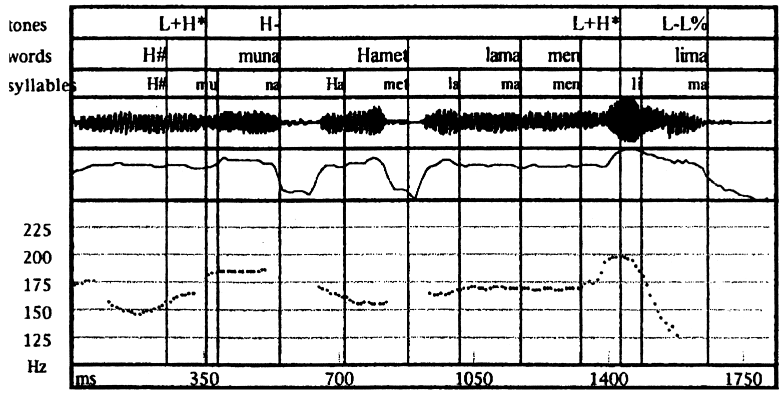
[3]See Ladd (2008) and the references therein.

[4]Chahal (2001) uses the term 'broad focus' to refer to what we call 'sentence-focus' in this thesis. Chahal's (2001) experiment on focus is very limited as noted in §3.2. She only used one five-word target sentence in the form /X protected Y from Z/. She employed only three speakers (one male and three female) who repeated the target sentences in each focus condition five times. There is an issue with Chahal's (2001) experiment on focus. In her test materials, she used the target sentence in sentence-focus condition as a subordinate clause. That is, the target sentences in sentence-focus condition is preceded with /yalli Saar ?innu/ 'what happened is that '. She states that '[a]nswers to the broad focus questions began with the phrase /yalli Saar ?innu/ "what happened is that' followed by the target sentence [. . .] [t]his initial phrase was realized as a separate intonational phrase and did not affect the tonal pattern of the target sentence' (Ibid., P. 145). Although she states the phrase 'what happened is that' is realized within its own phrase and does not affect the following items, there is still a concern whether the F_0 in the target sentence is phonologically and acoustically affected by virtue of being embedded in the matrix clause.

target item wherein the medial target item was deaccented (i.e. the lack of pitch accent).



(a)



(b)

Figure 8.4: Waveform and F_0-trajectories of the sentence /muna Hamet lama men lima/ 'Muna protected Lama from Lima'. The figures are taken from Chahal (2001, P. 156).

Like HA, in Egyptian Arabic Hellmuth (2006) shows that every lexically stressed syllable in sentence-focus structure[5] was produced with a pitch accent [L+H*], and the whole sentence is realized with the low boundary tone [L%]. Furthermore, she shows that the peaks of the pitch accents decline over the course of the sentence as shown in Figure 8.5.[6]

[5]Hellmuth (2006) uses the term 'neutral declarative' to refer to what we call 'sentence-focus'.
[6]Hellmuth (2007) shows that every content word in Egyptian Arabic forms its own phrase.

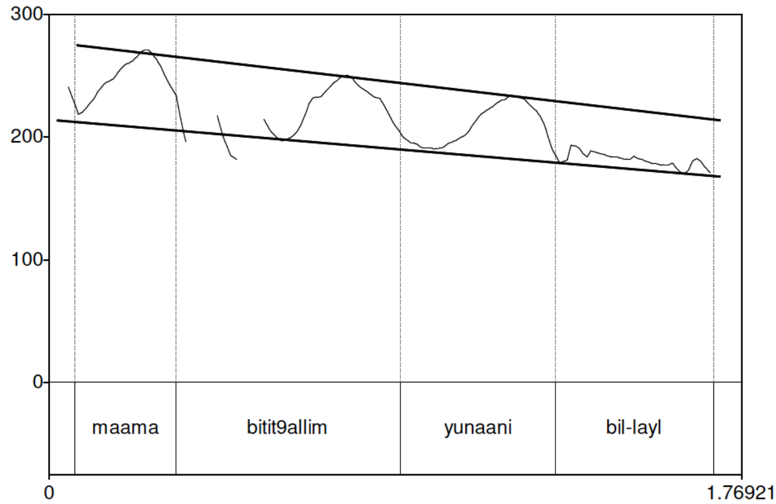


Figure 8.5: F_0-trajectories of the target sentences /**maa**ma bititʕ**al**lim yu**naa**ni bil-**layl**/ "Mum is learning Greek in the evenings" in sentence-focus condition. The stressed syllable is in boldface. This figure is from Hellmuth (2006, P. 71)

This section has discussed the different declarative tunes for the sentence-focus structure in HA in a cross-linguistic perspective. It showed that HA declarative tunes share some prosodic features with declarative tunes in Lebanese and Egyptian Arabic. What follows is a discussion on the global intonational patterns of the predicate-focus structures in HA.

8.2 Predicate-Focus Structure in HA

This section aims to discuss the results of the analyses of predicate-focus structures in HA reported in §6.4.1 in a cross-linguistic perspective. Predicate-focus structure refers to a structure wherein focus spans over the entire predicate including the verb and its compliment(s) (see §2.2.1 and 4.3.1).

Section 6.4.1 showed that the declarative tune of the predicate-focus structure in HA consists of a nuclear part, a prenuclear part and a postnuclear part. The nuclear pitch accent [L+H*] occurs on the stressed syllable of the sentence-penultimate item, a prenuclear accent [H*] occurs on the stressed syllable of the sentence-initial item (topic) placed outside the predicate-focus domain, and a post-nuclear accent [H*] occurs on the stressed syllable of the sentence-final item which is within the focus domain. The boundary tone of the predicate-focus structure is [L%]. Figure 8.6 is an example (see §9.4.1 for more examples).

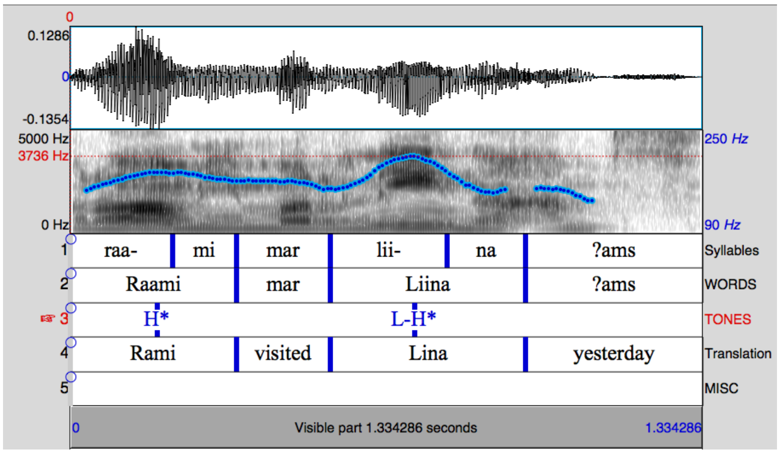


Figure 8.6: Male Speaker (Coded A4).

Although predicate-focus structure is to some extent realized phonologically differently from its sentence-focus counterpart, the phonetic analyses reported in §6.4.1.1 showed that predicate-focus structure does not acoustically differ from its sentence-focus counterpart at any measurements. Therefore, the difference between the intonation of predicate-focus structure and the intonation of its sentence-focus counterpart is phonologically encoded via the placement of the nuclear pitch accent of the phrase on the stressed syllable of the sentence-penultimate item, but not phonetically.

Studies on the intonational patterns of predicate-focus structure in Arabic are few. To my knowledge, Phillips-Bourass (2012) is the only research which investigates the difference between sentence-focus structure and predicate-focus structure in an Arabic vernacular (in this case, Moroccan Arabic). She shows that predicate-focus structure is made up of two intonational phrases. The first intonational phrase includes the subject (topic) occurs at sentence-initial position, associated with a pitch accent. The second intonational phrase includes the predicate focus (i.e. the verb and its compliment). She shows that the nuclear pitch accent of the second intonational phrase is on the sentence-final item. Figure 8.7 gives an example adopted from Phillips-Bourass (2012).

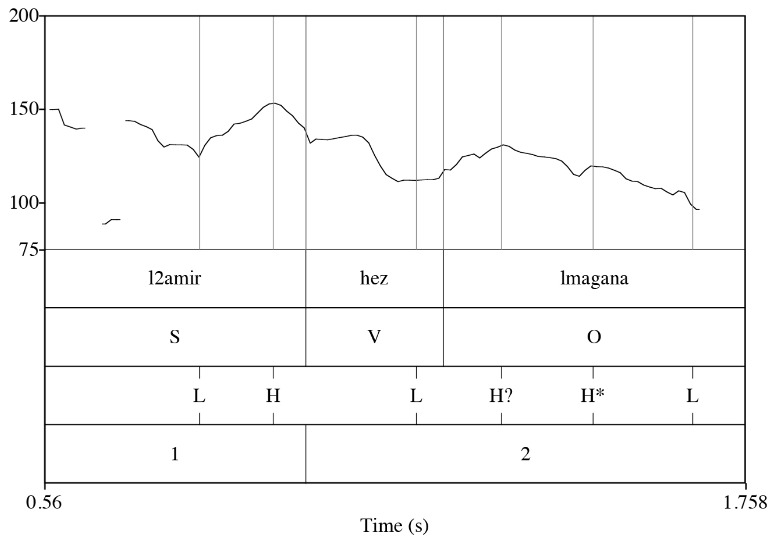


Figure 8.7: 2 phrases, VP focus (Phillips-Bourass 2012).

Unlike HA wherein the nuclear accent within the predicate phrase is on the sentence-penultimate word, the default position of the nuclear pitch accent in Moroccan (Benkirane 1998, Phillips-Bourass 2012) and Lebanese phrase is on the sentence-final word, as exemplified in the figure above.

Lambrecht (1994, P. 296 and 298) states clearly that predicate-focus structure is universally unmarked in terms of grammar and discourse. He notes that 'the different focus construals [...] are not uniquely determined by the prosodic structure of the various sentences [...] [r]ather they are. in part at least, determined by expectations created with the context questions' (ibid., P. 298). For example, the sentences in (2) are used as answers to "What happened to your car?". SMALL CAPITALS are used to indicate prosodic prominence.

(2) a. My car/It broke DOWN.

b. (La mia macchina) si é ROTTA. Italian

c. (Ma voiture) elle est en PANNE. French

d. (Kuruma wa) KOSHOO-SHI-TA. Japanese (ibid., P. 223)

It is clear from the examples above that the prosodic prominence in these languages is on the final content word. As a result, these structures are associated with two focus readings. Firstly, these structures could be interpreted as a argument-focus structure with a single narrow focus constituent (i.e the final content word). Secondly, they could be interpreted as a predicate-focus structure in which the focus spans the entire predicate phrase. This leads Lambrecht (1994) to claim that predicate-focus structure is often used an an alternative to other focus structures like argument-focus structure (see §2.2.1 and 2.2.2).[7]

To sum up, predicate-focus structure does not acoustically differ from sentence-focus structure in HA. The difference between predicate-focus structure and sentence-focus structure is perhaps contextual and not prosodically signalled in HA.

8.3 Argument-Focus Structure in HA

This section aims to discuss the analyses of global intonational patterns of the argument-focus structure (with a single information/in-situ contrastive focus) reported in Chapters six and seven. For comparison purposes, data and results from other studies on the intonation of argument-focus structures are also be considered, in particular studies on Arabic reviewed in §3.2.

The results from the empirical study showed that the word in information/in-situ contrastive focus has local and global effects on the HA declarative sentences. The declarative tune of the argument-focus structure consists of a nuclear part (in which focused word occurs), a postnuclear part (if any) and a prenuclear part (if any). The nuclear part was mostly produced with the bitonal pitch accent [L+H*].

[7]To capture this linguistic phenomenon, Lambrecht (1994, P. 3-4) proposes the following "Principle of Predicate-Focus Interpretation":

> "Sentences whose verb phrases carry an accent have predicate-focus structure. The predicate-focus structure is the unmarked focus structure and allows for alternative focus readings. Such alternative readings are contextually determined" (ibid., P. 304).

In English, Gussenhoven (1983b) shows empirically that listeners were not able to distinguish between predicate-focus structure and argument-focus structure with a single focus constituent occurs in the sentence-final position. This is so because in these focus structures, the nuclear pitch accent is always placed on the sentence-final item and thus these structures are not prosodically distinguishable. In Chinese, LaPolla (1995) points out that the predicate-focus structure is prosodically unmarked (ibid., P. 300). These finding empirically support Lambrecht's (1994) assumption.

If the word in focus occurs at non-final sentential position, the postnuclear part is expected to occur: the most common prenuclear accent is the monotonal pitch accent [H*] which its peak occurs within the lexically stressed syllable. If the focused item occurs at non-initial sentential position, the prenuclear part is expected whose pitch accent(s) is largely neutral, compared with their counterparts in sentence-focus structure and in other argument-focus structures.

Statistically, §6.3.4, 6.4.8, 7.3.4 and 7.4.5 set out to determine which acoustic features correlate most reliably with focus in HA. These sections determined that the main acoustic correlates of focus in-situ are excursion size[8] and Max F_0.

In the four-word declarative sentences (Chapter six), the excursion size of the word in focus in both sentence-initial and sentence-penultimate position was significantly more expanded than its neutral counterpart in the sentence-focus structure. Furthermore, the excursion size of the in-situ contrastive-focused word in both sentence-initial and sentence-penultimate position was significantly more expanded than its information-focused counterpart. Statistical tests displayed two different results with regard the post-focus region. First, when the word in focus is in the sentence-initial position, the Max F_0 of the post-focus words significantly decreased, compared with their neutral counterparts in the sentence-focus structure. Furthermore, the Max F_0 of the post-focus words occurring after the in-situ contrastive focus in the sentence-initial position were significantly lower than their counterparts occurring after the information focus. However, when the word in focus is in the sentence-penultimate position, no statistically significant differences in any measurement were found in the post-focus word.

In the two-word declarative sentences (§7.3.4 and 7.4.5), the main acoustic correlates to focus are excursion size, Max F_0, Mean F_0 and Mean Intensity. The excursion size, the Max F_0 and the Mean F_0 of the word in focus in any sentential locations were significantly higher than its neutral counterpart in the sentence-focus structure. Regarding post-focus item, no significant differences at

[8]As noted in §5.8, this thesis takes the excursion size as an indicator to pitch range.

any measurement were found in this region apart from the Mean Duration. That is, when the word in focus is in the sentence-initial position in the two declarative sentences, the mean duration of the post-focus region occurring after the information focus and the contrastie focus is shorter than their neutral counterpart in the sentence-focus structure.[9]

The results from the empirical study have shown generally that focus in HA has effects on the on-focus region and also on the post-focus region (if any). As reviewed in §3.2, studies on Arabic vernaculars show clearly that focus is marked by the expansion of the pitch range. For example, in Lebanese Arabic Chahal (2001) shows that information-focused word is realized with higher F_0, stronger intensity and longer duration than its neutral counterpart. Unlike HA, she shows that the F_0 in pre-focus and post-focus words in Lebanese Arabic are reduced, compared with their counterpart in sentence-focus structure[10].

Like HA, in Egyptian Arabic Hellmuth (2006, 2011) shows that the pitch accent of the contrastive-focused item in the sentence-initial position in the four-word declarative sentence is acoustically more expanded than its information-focused counterpart. In addition, post-focus word is more compressed than its counterpart occurring after information focus.[11]

As presented in § 2.5, focus is prosodically marked cross-linguistically by either assignment of a default pitch accent, peak alignment and expansion of the pitch range. As shown empirically in Chapters six and seven, HA speakers do not replace or delete the pitch accent of the focused word(s) and of the pre- and post-focused word(s) in the argument-focus structures. This shows that there is no

[9]The results are formulated within the AM model in §7.3.5 and 7.4.6.

[10]As noted in §3.2.2, Chahal's (2001) study on focus is limited in terms of the number of subjects (three speakers), test materials (one target sentence in the form /X protected Y from Z/) and the categories of information structure examined. She also investigates the prosodic difference between information focus and its counterpart in sentence-focus structure. So, how contrastive focus in this dialect is prosodically encoded, to my knowledge, has not been answered yet. See footnote 4.

[11]Hellmuth (2006, 2011) only investigate the prosodic difference between in-situ contrastive focus and information focus. How these categories are prosodically encoded compared with their counterpart in sentence-focus structure, to my knowledge, has not been investigated yet. Hellmuth's (2006) experiment is discussed and evaluated in detail in §3.2.1.

default pitch accent to focus in this language. As shown in the preceding chapters, information focus and contrastive focus can be produced by either [L+H*] or [H*]. It is true that there is a tendency for contrastive focus in HA to be produced mostly with [L+H*], but this is taken in the present study to be a mechanism for adding more emphasis and not a specific prosodic category (Bolinger 1961, 1989, Chafe 1976, Couper-Kuhlen 1984, Lambrecht 1994, Gibbon 1998, Wagner 1999). Studies on Arabic vernaculars reviewed in §3.2 support our claim. All the studies on Arabic focus reviewed in §3.2 show clearly that focus is prosodically cued through expanding the pitch range. There are studies which represent the pitch range in the phonological system of the language. For example, Godjevac (2005b) represents the pitch range called '*pitch range adjustment*' in her transcription of the Serbo-Croatian intonation. She uses it to refer to the peak of the pitch accent of the item that 'is higher than the peak of the previous word' (ibid., P. 170). Following her insight, we follow her in representing the pitch range within the AM model of HA focus intonation. However, we represent the pitch range in our hypothetical AM representations of the results in § 6.2.5, 6.3.9, 7.2.5 and 7.3.4 in a rather different way. That is, the expansion and the compression of pitch range referred to in our hypothetical AM representations of the results are relative to sentences with the same structure. So the expansion and the compression are in comparison between different sentences rather than within the same sentence. This is considered to be a critical distinction in our study.

As noted in § 2.5, Xu (2011) classifies languages into two separate groups. The first group shows post-focus compression (PFC) such as English (Cooper et al. 1985, Xu and Xu 2005), Swedish (Bruce 1982), and Mandarin (Xu 1999). The second group describes languages that does not show post-focus compression. Such languages are Wolof (Rialland and Robert 2001), Taiwanese Pan (2007) and others (see Xu 2011). Based on his classification, we classify HA as a PFC language. This is so because when the focused item is in the sentence-initial position in the four-word declarative sentence, the pitch accents of post-focus items have been found acoustically to be lowered (§6.3.5). However, when the focused item is in the sentence-penultimate position, the pitch accent on the post-focus word(s) item was not found statistically to be different, compared with their counterpart in sentence-focus structure. Like HA, in Turkish, Ipek (2011) shows that when focused item is in the sentence-medial position, the pitch accent of post-focus item does not differ acoustically from their counterpart in sentence-focus structure; however, when focused item is in the sentence-initial position, the pitch accent of post-focused items are acoustically reduced, compared with their counterparts in sentence-focus structure. Based on the empirical results presented in Chapters six and seven, HA is a PFC language and hence it is added to Xu's (2011) increasing list of PFC languages.

8.4 Focus-Preposing Structure in HA

This section aims to discuss the global intonational patterns of focus preposing in HA in a cross-linguistic perspective. As noted in §4.3.2, focus preposing used in this thesis to refer a construction wherein a contrastive-focused constituent other than the subject is realized syntactically at the left periphery of the clause, without any left trace at its canonical position. This noncanonical syntactic construction is used optionally by HA speakers to encode contrastive focus (§4.3.2).

Section 6.4.7 and 7.4.4 showed that the declarative tune structure of the focus preposing consists of a nuclear pitch accent [L+H*] occurring on the stressed syllable of the left-realized item (i.e. ex-situ contrastive-focused item), followed by post-focus compression towards the end of the structure. The post-focus syllables occurring after the ex-situ contrastive-focused item are mostly compressed (impressionistically and visually). Figure 8.8 and 8.9 give two examples.

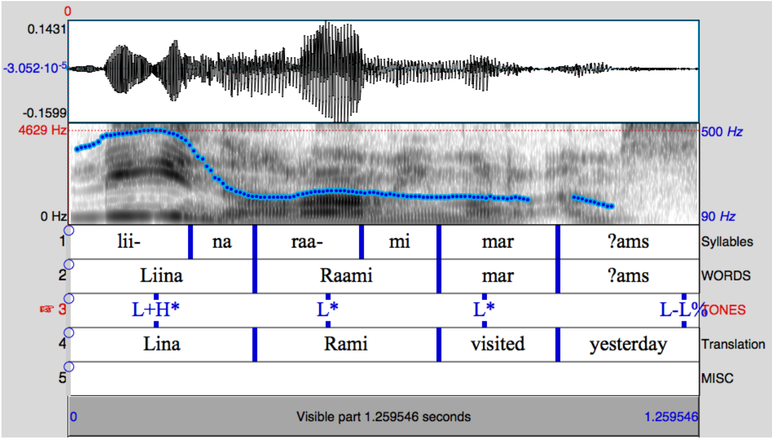


Figure 8.8: Male Speaker (Coded A4): Focus preposing.

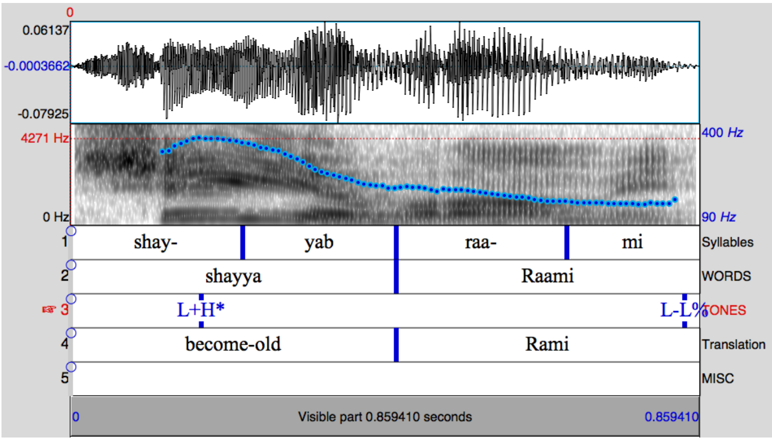


Figure 8.9: Male Speaker (Coded A1): Focus preposing.

It is clear from the examples above that the F_0 reaches its maximum on the middle of the stressed syllable of the first content word which is the ex-situ contrastive focus. Items occurring after ex-situ contrastive focus are almost compressed, as noted in §6.4.7 and 7.4.4.

The global intonational patterns associated with ex-contrastive focus indicates that HA speakers do not only use syntax to express contrastive focus but also use prosody.[12]

The global intonational patterns of focus preposing in HA has been found to be in other languages. For example, in Spanish Face (2002) shows that when contrastive focus is in the sentence-initial position, it was produced with the nuc-

[12]In this thesis, we did not acoustically investigate whether ex-situ contrastive focus has effects on post-focus region. This is so because focus preposing as noted in §4.3.2 is a noncanonical syntactic construction and hence it is acoustically impractical to compare it with a canonical syntactic structure exhibiting neutral intonation.

lear pitch accent of the sentence, followed by deaccentuation till the end of the structure, as shown in Figure 8.10 below. In addition, he shows that there are cases where the pitch accents on the post-focus items occurring after contrastive focus are compressed, as in Figure 8.11 below.

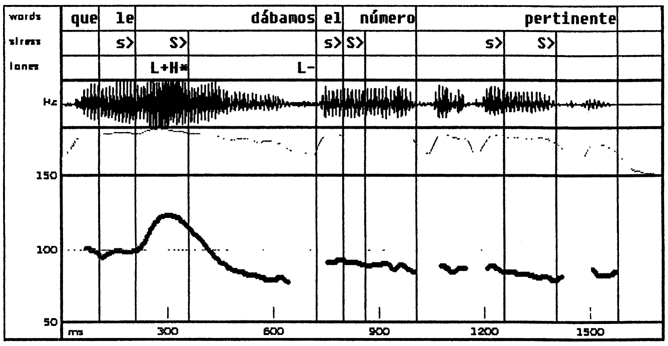


Figure 8.10: Reading of the sentence/Que le dábamos el número pertinente/ 'That were were giving him the relevant number' with contrastive focus on the word /dábamos/ 'were giving'. This figure is taken from Face (2002, P. 65).

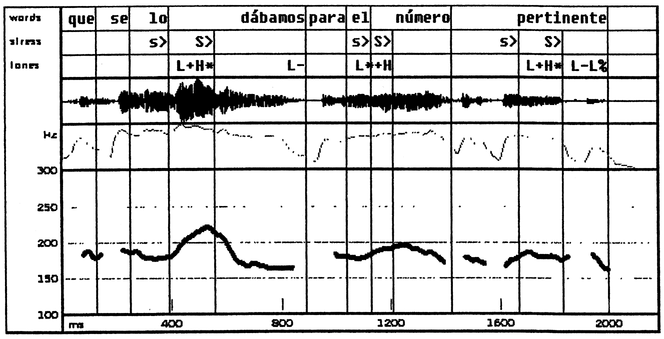


Figure 8.11: Reading of the sentence/Que le dábamos el número pertinente/ 'That were were giving him the relevant number' with contrastive focus on the word /dábamos/. This figure is taken from Face (2002, P. 66).

Face (2002) concludes that this global intonational patterns observed in the two figures are a strategy used by speakers for expressing contrastive focus (ibid., PP. 75–76).

8.5 The Distribution of Pitch Accents in HA

Although the current study was designated to examine the relationship between the categories of information structure and intonation, the data examined in Chapter six and seven give new insights into the distribution of pitch accents in HA. Therefore, it contributes new and additional data to the growing body of prosodic typological research.[13]

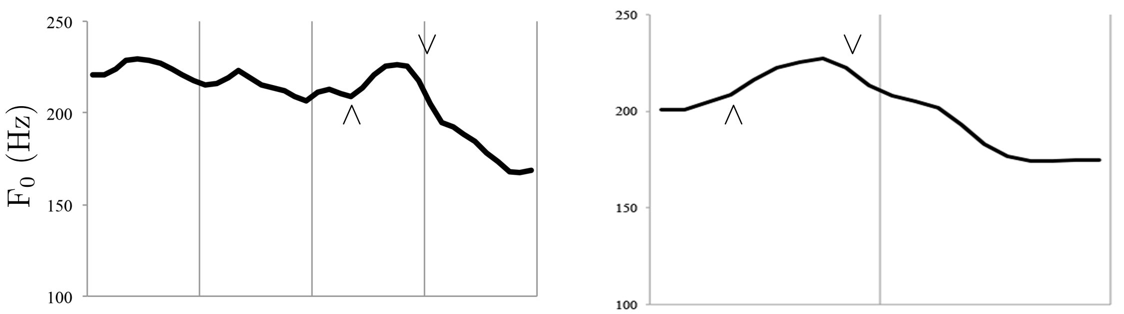
The preceding two chapters showed clearly that HA speakers placed a pitch accent on every lexically stressed syllable in the sentence. This indicates that pitch accents are densely distributed in HA. Based on the impressionistic analyses,[14] we observed only two common phonological categories of pitch accents: the bitonal pitch accent [L+H*] and the monotonal pitch accent [H*].[15] The tonal shape of [L+H*] consists of a rise from a low point in the speaker's range to a peak, with the peak occurs within the lexically stressed syllable; then the F_0 contour falls steadily across the following unstressed syllable(s) of the item. The tonal shape of [H*] consists of a rise from a mid point in the speaker's range to the high point which occurs in the lexically stressed syllable. We observed that the onset of the rise in both categories coincides with the onset of the lexically stressed syllable whether word or root-initial and the H peak is situated in the lexically stressed syllable thus we assign the 'starred tone' to the H target.[16] Figure 8.12 illustrates further.

[13]As stated by Jun (2005a), '[f]inding similarities and differences of prosodic features across languages would make sense only if these languages were described in the same framework in terms of the same prosodic categories' (ibid., P. 430). Since the present study adopts AM to describe the contours of HA declaratives, it is possible to make comparisons with other languages 'described in the same framework'. As noted in §2.4.1, this model has been adopted widely to describe the intonational systems of a language including Lebanese (Chahal 2001) and Egyptian Arabic (Hellmuth 2006).

[14]The complete version of impressionistic analyses had been summarized and reported in the tables in the relevant sections in Chapter six and seven.

[15]There is another pitch accent which is [L*] (mainly low accent). It is mostly evoked on post-focus item(s) occurring after the ex-situ contrastive focus (i.e. in the focus preposing structure). Due to that, we do not consider it as a common/typical pitch accents. We will discuss it in more detail in §8.4.

[16]The schematization of these phonological categories is in §5.6.



(a) /**Ra**na **saw**wat mar**yūl** li-Ma**nāl**/ (b) /Mar**wān** **māt**/

Figure 8.12: Time-normalized mean F_0 Contour: Sentence-Focus Contours. Each curve is an average of 80 repetitions by 16 subjects. The vertical lines mark the word boundaries. Stressed syllables are in boldface. ∧ indicates the onset of the lexically stressed syllable, and ∨ indicates the offset of the stressed syllable.

Through the visual inspection, we observed two prosodic features in the figures above. Firstly, there is a pitch accent (local F_0 maxima) on every word in the sentence.[17] Secondly, the pitch accent (local F_0 maxima) on every stressed syllable is local. For example, the F_0 rise of the sentence-penultimate item /Mar**yūl**/ in Figure 8.12(a) starts around the onset of the stressed syllable, with the peak occurs in the middle of the stressed syllable; then the F_0 falls steadily across the stressed syllables. As for the F_0 rise of the sentence-initial item /Mar**wān**/ in Figure 8.12(b) starts quite early before the stressed syllable;[18] however the noticeable/real rise coincides with the onset of the stressed syllable. Most of which can been seen in the F_0 plots in Chapter six and seven.

Another additional fact found in the data is that all the declarative sentences in all focus conditions were produced with a low boundary tone [L%].

Overall, the intonational tune of HA declarative sentences is composed of pitch accents and a boundary tone. The distribution of the pitch accents can be formalized as obligatory association of phonological targets either [L+H*] or [H*] with every lexically stressed syllable in a HA sentence.

Jun (2012) categorizes languages that have ‘a small number of pitch accents

[17] This F_0 movement is taken to be a pitch accent, see §2.3.1.

[18] This might be due to the syntactic position of this item. Many studies have shown that the initial phrase in the structure starts with a higher F_0 than the following phrases, see Wang and Xu (2011) and the references therein.

[. . .] and/or a rising tone as the most common pitch accent in a phrase [. . .] [t]hey also tend to have one pitch accent per every content word' as having 'strong macro-rhythm' (ibid., P. 537).[19] Since HA has 'a small number of pitch accents' ([L+H*], [H*] and [L*]) and has 'one pitch accent per every content word', we add it to Jun's (2012) increasing list of languages including Egyptian Arabic, Spanish, Catalan, Brazilian Portuguese as well as others that have 'strong macro-rhythm'.

HA is an Arabic variant that possess as many phonological similarities with other Arabic vernaculars (§4.4), it would be of no surprise if the HA prosodic system was found to share most prosodic features with other Arabic vernaculars. For example, in Egyptian Arabic Hellmuth (2006) shows that each word in a sentence is pitch-accented. Furthermore, she shows that the peak of the accent is situated in the lexically stressed syllable. These prosodic features are similar to the those in HA in which every HA word is pitch-accented, with the peak occurring within the stressed syllable. However, Egyptian Arabic differs from HA

[19]This paper has been republished in Jun (2014). Jun (2005b) classifies languages into head-prominence languages and edge-prominence languages. Head-prominence languages are roughly those languages in which the prominence is marked by a pitch accent/manipulation of supra-segmental features placed on the stressed syllable (the head). Such languages are English, German and among others. Edge-prominence languages are roughly those languages in which the prominence is marked by placing the word at the beginning or the end of the phrase. Such languages include Korean, Japanese, Bengali and others (for more discussion, see Jun (2005b, 2014)). Jun (2012, 2014) goes on to add a third parameter on which languages can be categorized called 'Macro-rhythm'. Macro-rhythm 'is a tonal rhythm (a sequence of H/L alternation) formed *within* an Intonation Phrase' (Jun 2012, 535). This parameter is sub-categorized into three sub-categories:

(3) a. **Head-prominence with strong macro-rhythm** is those '[l]anguages [. . .] a small number of pitch accents [. . .] and/or a rising tone as the most common pitch accent in a phrase [. . .] [t]hey also tend to have one pitch accent per every content word' (ibid., P. 537).

b. **Head-prominence with medium macro-rhythm** is those languages 'that [. . .] have multiple types of pitch accents, with the most common prenuclear pitch accent in declaratives being a level tone (e.g., H*), and the domain of pitch accent is larger than a single content word' (ibid. P. 537). Languages within this category includes English, Dutch, German, and European Portuguese.

c. **Head-prominence with weak macro-rhythm** include 'tone languages. Since each syllable/word can carry various tone types, a tone language would have the least regular alternation of H and L within a phrase, thus having the weakest macro-rhythm in head-prominence languages. Among the tone languages, however, contour tone languages like Mandarin and Cantonese would be less macro-rhythmic than level tone languages because in contour tone languages the H/L alternation can occur even within a syllable' (ibid., P. 537).

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in some prosodic features. For example, Hellmuth (2006, PP. 76–83) posits only one phonological category [L+H*] produced on every content word. An example from Egyptian Arabic is in (8.13) below.

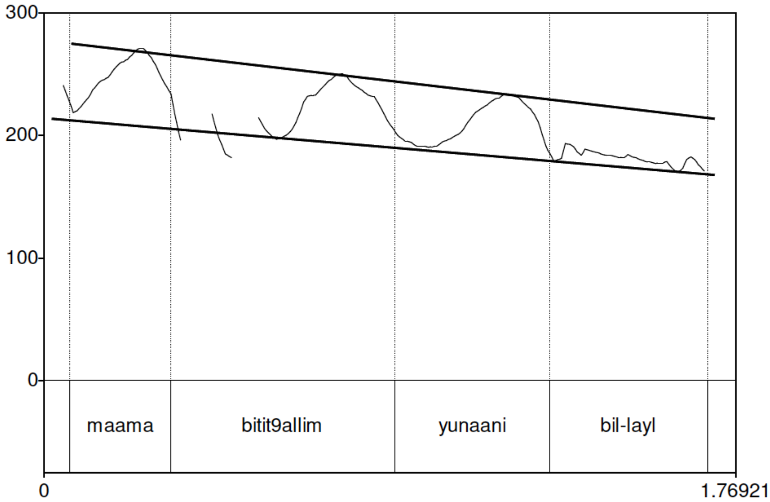
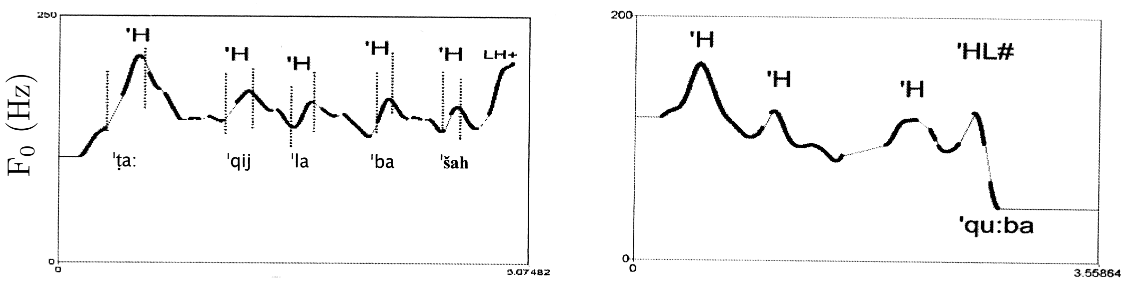


Figure 8.13: F_0-trajectories of the target sentences /**maa**ma bitit**ʕal**lim yu**naa**ni bil-**layl**/ “Mum is learning Greek in the evenings” in sentence-focus condition. The stressed syllable is in boldface. This figure is from Hellmuth (2006, P. 71).

Like HA, Rifaat (2005), reviewed in §3.2, posits two phonological categories for MSA sentences.[20] They are the monotonal pitch accent [’H] tone, and the bitonal pitch accent [’HL#].[21] He shows that every lexically stressed syllable in the sentence is pitch-accented. Figure 8.14 is an example of MSA sentences spoken in the Egyptian Radio.



(a) /ʔinna ʔal-ṭāqata ʔal-ḥaqiqiyata ʔalati tanbaʕiṯu fi šahri ʔal-ṣawm/ “The real energy that is revived in the fasting month,”.

(b) /ʔal-nawmu liʔahali ʔalġaflati ʔuqūba/ “Sleeping for the inadvertent is a punishment”.

Figure 8.14: F_0-trajectories of MSA sentences showing that every lexically stressed syllable is pitch-accented. This figures are taken from Rifaat (2005, P. 59).

[20] For his methodology, see §3.2.

[21] Rifaat (2005) uses the notation [’] to indicate to the ‘preceding tone for tone associated with the stressed syllable’, and [#] to indicate to to the ‘tune initial and boundary tones’ (ibid., P. 52).

Like HA, in Tunisian Arabic Ghazali et al. (2007) posit two phonological categories [L+H*] and [H*], where the H target occurring within the lexically stressed syllable.[22] The Figure 8.15 gives an example for a speaker of Tunisian Arabic.[23]

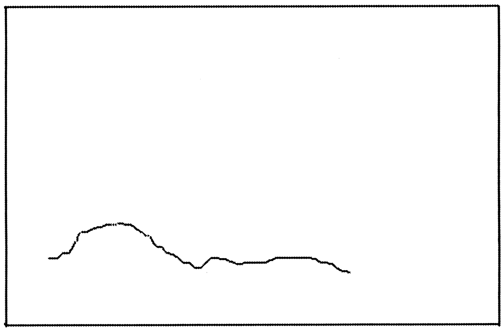


Figure 8.15: F_0-trajectories of Tunisian Arabic ' sentence /baarda ljuum/ "It's cold today". This figure is taken from Knis (2004) (as cited in Ghazali et al. 2007, P. 117).

Parallels can also be drawn with other, distantly related languages. For example, Greek as a stress accent language places a pitch accent on every content word in a sentence (Arvaniti et al. 1998, Baltazani and Jun 1999, Arvaniti and Baltazani 2005). The nuclear accent of a Greek sentence is always the bitonal pitch accent [L+H*] in which the H target occurs within the lexically stressed syllable. As for the prenuclear accents,[24] they are of [L*+H]. In Northern European Portuguese, Vigário and Frota. (2003) show that almost every content word in a sentence is pitch-accented. Figure 8.16 gives an example.

[22]Ghazali et al. (2007) provide a preliminary analysis of the intonational patterns of five Arabic dialects: Egyptian, Syrian, Iraqi, Moroccan and Tunisian Arabic. Their analysis is based on Knis (2004)'s recording data obtained from two native speakers of each Arabic dialect were asked to narrate a story from "The Little Red Riding Hood". Although their study is limited in terms of the number of subjects involved in the experiment, it gives an interesting overview of the differences in the intonational patterns across these Arabic dialects.

[23]For space limit, the intonational patterns of sentences in Iraqi, Moroccan and Syrian Arabic are not discussed here. Generally, these Arabic dialects share the prosodic features with either HA or Egyptian Arabic or both. That is, these dialects show that the pitch accents are densely distributed in a sense that there is a pitch accent on almost every content word. For more information on these dialects, see Ghazali et al. (2007).

[24]Prenuclear accents refer to accents occurring before the nuclear pitch accent. It is referred to as 'Head' within the British school model of Intonation. This model had been reviewed in §2.4.

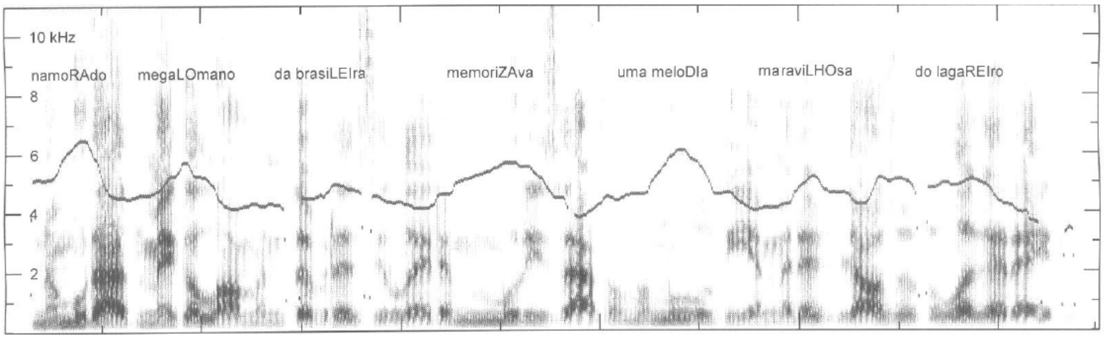


Figure 8.16: F_0-trajectories of Northern European Portuguese sentence /O namorado megalómano da brasileira memorizava uma melodia maravilhosa do lagareiro/. The nuclear pitch accent is the stressed syllable (in boldface) of /laga**reir**o/ "The Brazilian girl megalomaniac boyfriend was learning a wonderful song from the olive-pressman". This figure is from Vigário and Frota. (2003, Fig. 6).

Other languages that have a pitch accent on almost every content word include Spanish (Hualde 2002, Elordieta et al. 2005), Bengali (ud Dowla Khan 2008), Romanian (Manolescu et al. 2009) as well as other languages (see Jun 2005a, 2014).

Despite its exploratory nature, the present study offers some insights on the distribution of pitch accents in HA. It showed that HA has a small number of pitch accents [L+H*] and [H*] wherein the H target occurs within the lexically stressed syllable. Within Jun's (2012) model of prosodic typology, we categorize HA as having 'strong macro-rhythm' in which every lexically stressed syllable is pitch-accented.

8.6 Conclusion

This chapter discussed the findings of the experiment reported in Chapter six and seven in a cross-linguistic perspective. The findings suggest that the two major acoustic correlates for focus in HA are excursion size on the word in focus and the F_0 height in post-focus region. The discussion of the results was discussed within the AM model. The HA results had been discussed within the cross-linguistic variations. HA had been shown to share some prosodic features with other Arabic vernaculars including Lebanese and Egyptian Arabic. We also showed how HA differs from Arabic dialects in some prosodic features. Data from other languages also had been taken into consideration and had been discussed and compared with HA data. We showed that they are some differences and similarities between the phenomena described for HA and those of other languages.

Chapter 9

Conclusion

In this thesis, we presented results from the empirical study of the relation between information structure and intonation. It provided both the phonological (i.e. couched in Autosegmental-Metrical Approach (AM)), and phonetic analysis of the experimental data. This chapter summarizes the findings of this thesis. It also discusses areas for future research.

9.1 Summary of the thesis

This thesis adds HA to those languages that exhibit prosodic effects of focus. It has been shown empirically that there is a relation between intonation and focus in HA. The aims of this thesis was twofold: (i) to provide an analysis of the word order in HA and how it is used to express information structure, and (ii) to provide an in-depth and systematic analysis of the ways that intonation is used both phonologically and phonetically to encode neutral focus, information focus, in-situ contrastive focus and ex-situ contrastive focus in four focus structures: sentence-focus, predicate-focus, argument-focus and focus-preposing structure.

In Chapter four, we discussed several word orders in HA. We showed that there are two categories of Focus: information focus and contrastive focus. Each of these categories are shown be reflected lexicogrammatically in this dialect. That is, information focus was shown to be obligatorily realized in-situ in the syntax.

However, contrastive focus can be expressed in-situ or can be left-dislocated. This optionality observed with contrastive focus led this thesis to consider contrastive focus and information are two separate and independent categories of information focus.

In Chapter six, we showed empirically how focus in two different sentential positions (initial and penultimate) in the four-word declarative sentences is prosodically expressed. In all sentential positions examined, the excursion size of the word in focus (i.e. information focus and in-situ contrastive focus) is significantly more expanded than its neutral counterpart. In addition, we found that in all the sentential positions the excursion size of the contrastive focus is significantly more expanded than the excursion size of its information-focus counterpart. Furthermore, when the focus is in the sentence-initial position, the F_0 of the post-focus words are significantly lowered, compared to their neutral counterparts. In addition to that, the F_0 of the post-focus words occurring after the in-situ contrastive focus in the sentence-initial position is significantly lower than the F_0 of their neutral counterpart. However, when the word in focus is in the sentence-penultimate position, the F_0 of the post-focus word does not significantly differ, compared with their neutral counterpart. As for the pre-focus word(s), we found that they are largely neutral, compared to their neutral counterpart(s).

In Chapter six, we also examined the phonological and the phonetic differences between the predicate-focus structure and its sentence-focus counterpart for the four-word declarative sentences. We found that there are no phonological and phonetic differences between these focus structures.

In Chapter seven, we showed empirically how focus in two different sentential positions (initial and final) in the two-word declarative sentences is phonologically and phonetically expressed. We found that the word in focus (i.e. information focus and in-situ contrastive focus) in all the sentential positions has more expanded excursion size, higher F_0, compared with its neutral counterpart. As for the pre-focus region, we found that they do not significantly differ from their neutral counterparts. When the word in focus is in the sentence-initial position, the Max F_0 of the post-focus region after both the information focus and the contrastive focus becomes statistically significantly lower than their neutral counterpart.

In Chapter six and seven, we investigated the intonational patterns of focus preposing wherein the ex-situ contrastive focus is realized syntactically at the left-periphery of the clause. We found that this noncanonical syntactic option for expressing contrastive focus is characterized by a specific intonational pattern: the bitonal pitch accent [L+H*] is placed on the ex-situ contrastive focus word occurring in the left periphery of the clause, followed by post-focus compression to the utterance end.

In Chapter eight, we discussed the findings presented in Chapters six and seven in a cross-linguistic perspective. Based on a small range of sentence types, we showed that HA is classified within the group of the languages that have 'strong macro-rhythm'. This is so because we showed that HA has a small number of pitch-accent types: [L+H*], [H*] and [L*], and, in addition, it places a pitch accent on almost every content word. Furthermore, we classified HA as a language among other languages that has post-focus compression. This is based on empirical findings that show the pitch accents on the words following focus is compressed.

These empirical findings presented and examined in this thesis filled the knowledge gap in the literature and contributes new data to the body of empirical literature investigating the relation between information structure and intonation.

9.2 Implications

The findings of this thesis have two implications: First, intonation plays an important role in identifying the focus of an utterance in HA. Since focus is difficult to determine based on syntax, intonation as a reliable and objective criterion can determine the focus of a given utterance.

Second, expressing the information structuring of a given utterance through employing noncanonical syntactic constructions including focus preposing does not prevent intonation from being used as a second means for expressing information structure. That is, the intonation patterns for focus preposing as a noncanonical syntactic option used to express contrastive focus reported in the present study provide evidence for using both intonation and syntax to express information structure in HA.

9.3 Future Research Directions

There are various topics for future research that enrich the current literature on the relation between information structure and intonation and also the relation between syntax and intonation.

The relation between the categories of information structure including information focus and contrastive focus, and making systematic comparisons between them in Arabic dialects have received little attention in the previous studies. It would be interesting if future studies in Arabic dialects examine the relation between the categories of information structure and make systematic comparisons between them. This will help to understand Arabic and clarify and define the role of intonation in Arabic grammar.

Another important area for future research is whether intonation is used by speakers of Arabic dialects to disambiguate between thematic roles in cases of subject and object in OSV and SOV word order.

Another area for future research concerns the prosodic effects of multiple foci in an utterance in Arabic. it would be interesting if future research examines how two foci are encoding prosodically in one utterance.

Finally, the present study has dealt exclusively with how focus is prosodically produced in HA. It is strongly recommended to test whether HA listeners are able to associate the prosodic effects identified in the present study with the word in focus. That is, it will be useful to determine whether post-focus compression and pitch expansion as prosodic cues to focus found in the present study are perceptually useful for speakers of HA.

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Appendices

Appendix A

Test Materials

A.1 Four-Word Declarative Sentences

Sentence-Focus condition

Rami and Lina are brothers. Rami lives in Taif and Lina lives in Jeddah. They had not visited each other for a long time. But yesterday, Rami went to Jeddah and visited Lina there.

رامي و لينا أخوان. رامي عايش في الطائف و لينا عايشه في جده. لهم فترة طويلة ما زارو بعض . ولكن أمس رامي راح جده و مر لينا هناك.

وش صار؟
What happened?
رامي مر لينا أمس.

(1) Rāmi mar Līna ʔams.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

Argument-Focus condition with single information focus

Rami has one sister whose name is Lina. Rami lives in Taif and Lina lives in Jeddah. They had not visited each other for a long time. But yesterday, Rami went to Jeddah and visited Lina there.

رامي عنده أخت إسمها لينا. رامي عايش في الطائف و لينا عايشه في جده. لهم فترة طولية ما يتواصلوا مع بعض. لكن أمس رامي راح جده و مر لينا هناك.

من رامي مر أمس؟
Who did Rami visit yesterday?
رامي مر لينا أمس.

(2) Rāmi mar [**Līna**]$_F$ ʔams.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

Predicate-Focus condition

Rami is a very organized person. He puts down all the things he is going to do every day. One example of his carefulness is that he puts down his visits to his relatives and friends. It is in his yesterday daily table that he went to Jeddah yesterday and spent time with Lina there.

رامي شخص منظم جدا . يسجل كل الأشياء اللي راح يسويها في كل يوم. من كثر حرصه إنه يسجل حتى زياراته لأقاربه و أصدقاه. من ضمن جدول رامي أمس إنه راح جده و مر لينا هناك.

وش سوى رامي ؟
What did Rami do?
رامي مر لينا أمس.

(3) Rāmi [**mar Līna ʔams**]$_F$.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

Argument-Focus condition with single in-situ contrastive focus

Rami, Marwan and Lina are brothers. Rami lives in Taif. Marwan and Lina live in Jeddah. Each one of them lives in a separate house. Rami and Marwan exchange visits. But Rami does not visit Lina because Lina makes troubles a lot. Due to that, Rami does not visit her when we goes to Jeddah. But yesterday and without one's knowledge, Rami went to Jeddah and visited Lina and spent time with her there.

رامي و مروان و لينا أخوان. رامي عايش في الطائف. و مرون ولينا عايشين في جده. كل واحد فيهم في بيت مستقل. رامي و مروان يتبادلوا الزيارات مع بعض. لكن رامي ما يزور لينا بسبب لينا تسوي مشاكل كثير. لذلك رامي ما يزورها لما يروح جده. لكن أمس و بدون محد يتوقع رامي راح جده و مر لينا و جلس معها هناك.

من رامي مر امس؟ رنا؟
Who did Rami visit yesterday? Rana?
رامي مر لينا أمس.

(4) Rāmi mar [**Līna**]$_{\mathrm{CF}}$ ʔams.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

Focus Preposing: ex-situ contrastive focus

Rami, Rana and Lina are brothers. Rami lives in Taif. Lina and Rana live in Jeddah and each one of them lives in a separate house. Rami likes Rana a lot. But Lina, Rami does not like. So when Rami visits Jeddah, he never visits Lina. Rami and Rana visit each other and contact each other continuously. But yesterday. without anyone expected, Rami went to Jeddah, visited and spent time with Lina there.

رامي و رنا و لينا أخوان. رامي عايش في الطائف. و لينا و رنا عايشين في جده. كل وحده فيهم في بيت مستقل. رامي يحب رنا كثير. بس لينا رامي يكرها نوعا ما. لذلك رامي لما يزور جده ما يمر على لينا ابد. مروان و رنا بينهم زيارات و تواصل مع بعض بإستمرار. لكن أمس وبدون محد يتوقع رامي راح جده و مر لينا هناك.

من رامي مر امس؟ رنا؟
Who did Rami visit yesterday? Rana?
لينا رامي مر أمس.

(5) [**Līna**]$_{\mathrm{CF}}$ Rāmi mar ʔams.
Lina Rami visited yesterday
'Lina, Rami visited yesterday.'

Argument-Focus condition with single information focus

Rami, Rana and Lina are brothers. Rami lives in Taif. Lina and Rana live in Jeddah and each one of them lives in a separate house. Rami likes Rana a lot. But Lina, Rami does not like. So when Rami visits Jeddah, he never visits Lina. Rami and Rana visit each other and contact each other continuously. But yesterday. without anyone expected, Rami went to Jeddah, visited and spent time with Lina there.

رامي و رنا و لينا أخوان. رامي عايش في الطائف. و لينا و رنا عايشين في جده. كل وحده فيهم في بيت مستقل. رامي يحب رنا كثير. بس لينا رامي يكرها نوعا ما. لذلك رامي لما يزور جده ما يمر على لينا. مروان و رنا بينهم زيارات و تواصل مع بعض بإستمرار. لكن أمس وبدون محد يتوقع رامي راح جده و مر لينا هناك.

من مر لينا أمس؟
Who visited Lina yesterday?
رامي مر لينا أمس.

(6) **[Rāmi]$_{\mathbf{CF}}$ mar Līna** ʔams.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

Argument-Focus condition with single in-situ contrastive focus

Rami, Rana and Lina are brothers. Rami lives in Taif. Lina and Rana live in Jeddah and each one of them lives in a separate house. Rami likes Rana a lot. But Lina, Rami does not like. So when Rami visits Jeddah, he never visits Lina. Rami and Rana visit each other and contact each other continuously. But yesterday. without anyone expected, Rami went to Jeddah, visited and spent time with Lina there.

رامي و رنا و لينا أخوان. رامي عايش في الطائف. و لينا و رنا عايشين في جده. كل وحده فيهم في بيت مستقل. رامي يحب رنا كثير. بس لينا رامي يكرها نوعا ما. لذلك رامي لما يزور جده ما يمر على لينا. مروان و رنا بينهم زيارات و تواصل مع بعض بإستمرار. لكن أمس وبدون محد يتوقع رامي راح جده و مر لينا هناك.

من مر لينا أمس؟ مروان؟
Who visited Lina yesterday? Marwan?
رامي مر لينا أمس.

(7) **[Rāmi]$_{\mathbf{CF}}$ mar Līna** ʔams.
Rami visited Lina yesterday
'Rami visited Lina yesterday.'

Sentence-Focus condition

Rana and Manal are sisters. Rana is older than Manal. Their father died and their mother is ill and she is in hospital. Because of being poor, Rana dropped from school and works as a tailor in order to have money. Manal has just enrolled in school. The school requires a specific school dress. Therefore, Rana made a school dress for Manal.

رنا و منال أخوات . رنا أكبر من منال . أبوهم مات و أمهم مريضة متنومة في المستشفى. بسبب فقرهم، رنا بطلت الدراسة. و اشتغلت خياطه حتى تصرف على البيت. منال توها سجلت في المدرسة. المدرسة طالبه مريول مخصص. لذلك رنا سوت مريول لمنال.

وش الموضوع؟
What is the topic?
رنا سوت مريول لمنال

(8) Rana sawwat maryūl li-Manāl.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

Predicate-focus condition

Rana is clever at many things. She is a cooker and a tailor. She almost cooks all the international food, for example, Chinese food and Italian. She always cooks in special occasions. Two day ago, she cooked chinese food for her brother's engagement party. Rana also likes to make dresses for her sisters a lot. Yesterday, she made a school dress for Manal.

رنا بنت ماهرة في أشياء كثيرة مثل الطباخة و الخياطة. تعرف تطبخ تقريبا جميع الأكلات العالمية المشهورة كالأكل الصيني و الإيطالي. دائم تطبخ في المناسبات الخاصة. قبل يومين طبخت أكل صيني بمناسبة خطبة أخوها رامي. رنا برضه كمان تعشق الخياطة و تخيط ملابس لأخواتها كثير. أمس سوت مريول لمنال.

وش آخر أعمال رنا؟
What did Rana do last?
رنا سوت مريول لمنال

(9) Rana [**sawwat maryūl li-Manāl**]$_{\text{F}}$.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

Argument-focus condition with single information focus

Rana is a clever tailor. A lot of people ask her to make dresses for them. Manal is a secondary school student. Before the school year started, Manal asked Rana to make a school dress for her. Therefore, Rana made a school dress for Manal.

رنا خياطة ماهرة. وناس كثير تطلب منها تسوي لها فساتين. منال طالبة ثانوية. قبل ما تبدأ المدرسة طلبت من رنا تسويلها مريول للمدرسة. وبتالي رنا سوت مريول لمنال.

وش سوت رنا لمنال؟
What did Rana make for Manal?
رنا سوت مريول لمنال

(10) Rana sawwat [**maryūl**]$_{\mathrm{F}}$ li-Manāl.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

Argument-focus condition with single in-situ contrastive focus

Manal is a secondary school student. She asked her mother for the tailor Rana to make a school dress and an apron for her. Her mother accepted that Rana made a school dress for her but she refused to let Rana to make an apron for Manal. Therefore, Rana made a school dress for Manal only.

منال طالبة ثانوية. طلبت من أمها إنها تفصل مريول و مريلة عند رنا الخياطة. أمها وافقت إنها تفصل مريول عند رنا. لكتها رفضت إنها تخلي رنا تفصلها مريلة. وبتالي رنا سوت مريول لمنال بس.

وش سوت رنا لمنال؟ مريله؟
What did Rana make for Manal? an apron?
رنا سوت مريول لمنال

(11) Rana sawwat [**maryūl**]$_{\mathrm{CF}}$ li-Manāl.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

Focus preposing: ex-situ contrastive focus

Rami has two daughters: Lina and Manal. They are primary school students. Each one of them wants Rana to make for her something. Manal wants Rana to make her a school dress. «nd Lina wants Rana to make an apron for her. Rana made a school dress for Manal and an apron for Lina.

رامي له بنتين لينا و منال. هم طالبتين في الإبتدائية. وكل وحدة منهم تبي رنا تخيط لها شئ. منال تبي رنا تسوي لها مريول. و لينا تبي رنا تسوي لها مريله. رنا سوت لمنال مريول و سوت للينا مريلة.

وش سوت رنا لمنال؟ مريله؟
What did Rana make for Manal? an apron?
مريول رنا سوت لمنال

(12) [**maryūl**]$_{\text{CF}}$ Rana sawwat li-Manāl.
school-dress Rana made for-Manāl
'A school dress, Rana made for Manal'.

Argument-focus condition with single information focus

Rana is a clever tailor. A lot of people ask her to make dresses for the. Manal is a secondary school student. Before the school year started, she went to Rana and asked her to make a school dress for her. Rana made a school dress for her.

رنا خياطة ماهرة. كثير ناس تفصل عندها فساتين. منال طالبة ثانوية. قبل بدء الدراسة راحت لي رنا عشان تفصل لها مريول. وبتالي رنا سوتلها مريول.

من سوت مريول لمنال؟
Who made a school dress for Manal?
رنا سوت مريول لمنال

(13) [**Rana**]$_F$ sawwat maryūl li-Manāl.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

Argument-focus condition with single in-situ contrastive focus

Lina and Manal are sisters. All of them are secondary school students. Each one of them went to a tailor to make a school dress. Lina went to Nawal to make her a school dress. As for Manal, she went to Rana to make a school dress for her.

لينا و منال أخوات. كلهم طالبات في الثانوية العامة. كل وحده فيهم راحت لخياطة تخيط لها مريول. لينا راحت لي نوال تخيط لها مريول. أما منال راحت عند رنا تخيط لها مريول.

من سوت مريول لمنال؟ نوال؟
Who made a school dress for Manal? Nawal?
رنا سوت مريول لمنال

(14) [**Rana**]$_{CF}$ sawwat maryūl li-Manāl.
Rana made school-dress for-Manāl
'Rana made a school dress for Manal'.

Sentence-Focus condition

Rami was living in Egypt. He was working there. His job was good and he got good salary. But one month ago, he quitted his job. He emigrated to London yesterday.

رامي كان عايش في مصر لمدة طويلة. وكان يشتغل هناك. كانت وظيفتة حلوه. و يجيله راتب حلو. لكن قبل شهر فصل من وظيفته. و هاجر للندن البارح.

وش الموضوع؟
What happened?
رامي هاجر للندن البارح.

(15) Rāmi hājar li-london al-bāriḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

Predicate-Focus condition

Rami was linving in Egypt for 25 years. He was an engineer. For the time being, Egypt is suffering from shortage of works. Therefore, Rami emigrated to London yesterday.

رامي كان عايش في مصر لمدة ٢٥ سنة. وكان شغال مهندس. في الأونة الأخيرة مصر ما فيها شغل. لذلك رامي هاجر للندن البارح.

وش صار على رامي؟
What happened to Rami?
رامي هاجر للندن البارح.

(16) Rāmi [**hājar li-london al-bāriḥ**]$_F$.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

Argument-Focus condition with single information focus

Rami was living in Egypt. He was a teacher of Arabic language. A month ago, he quitted his job and he emigrated to London yesterday.

رامي كان عايش في مصر. كان شغال مدرس لغة عربية. وكان راتبه حلو. لكن قبل شهر رامي فصل من وظيفته و هاجر للندن البارح.

وين هاجر رامي البارح؟
Where did Rami emigrate yesterday?
رامي هاجر للندن البارح.

(17) Rāmi hājar [**li-london**]$_F$ al-bāriḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

Argument-Focus condition with single ins-situ contrastive focus

Rami and Marwan were working in Egypt. Their salary was good. But one month ago, they quitted from their job. Therefore, Rami emigrated to London yesterday and Marwan to Saudi.

رامي و مروان كانوا يشتغلون في مصر. وكانت رواتبهم حلوة. ولكن قبل شهر فصلوا من وظائفهم. وبتالي رامي هاجر للندن البارح و مروان لسعودية.

وين هاجر رامي البارح؟ لسعودية؟
Where did Rami emigrate yesterday? To Saudi?
رامي هاجر للندن البارح.

(18) Rāmi hājar [**li-london**]$_{CF}$ al-bāriḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

Focus preposing: ex-situ contrastive focus

Rami and Marwan were working in Egypt. Their salary was good. But after the revolution, They quitted from their job. Therefore, Rami emigrated to London yesterday and Marwan to Saudi.

رامي و مروان كانوا يشتغلون في مصر. كانت رواتبهم حلوة . لكن بعد الثورة فصلوا من وظائفهم. وبتالي رامي هاجر للندن البارح و مروان لسعودية.

وين هاجر رامي البارح؟ لسعودية؟
Where did Rami emigrate yesterday? To Saudi?
للندن رامي هاجر البارح

(19) [**li-london**]$_{\mathrm{CF}}$ Rāmi hājar al-bāriḥ.
to-London Rāmi emigrated yesterday
'To London, Rami emigrated yesterday'.

Argument-Focus condition with single information focus

Rami and Marwan are brothers. All of them were teachers of Arabic language in Egypt. Rami quitted his job and emigrated to London yesterday. As for Rami, he quitted his job and works in a factory.

رامي و مروان أخوان. وكلهم كانوا مدرسين لغة عربية في مصر. رامي فصل من وظيفته و هاجر للندن البارح. أما مروان فصل من وظيفته و راح يشتغل في مصنع.

من هاجر للندن البارح؟
Who emigrated to London yesterday?
رامي هاجر للندن البارح.

(20) [**Rāmi**]$_{\mathrm{F}}$ hājar li-london al-bāriḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

Argument-Focus condition with single in-situ contrastive focus

Rami and Marwan were working in Egypt. Their salary was good. But after the revolution, They quitted from their job. Therefore, Rami emigrated to London yesterday and Marwan to Saudi.

رامي و مروان كانوا يشتغلون في مصر. وكانت رواتبهم حلوة. ولكن بعد الثورة فصلوا من وظائفهم. وبتالي رامي هاجر للندن البارح و مروان لسعودية.

من هاجر للندن البارح؟ مروان؟
Who emigrated to London yesterday? Marwan?
رامي هاجر للندن البارح.

(21) [**Rāmi**]$_{\text{CF}}$ hājar li-london al-bāriḥ.
Rāmi emigrated to-London yesterday
'Rami emigrated to London yesterday'.

A.2 Two-Word Declarative Sentences

Sentence-Focus condition

Marwan is a generous and honest man. He is married. He fathers three children, their ages do not exceed 12 years old. Marwan likes to help and provide aids to people. Everyday, Marwan visited his parents. His parents like him a lot because he is the only child for them. Yesterday, he decided with his parents to make a party for his elder child for his success. In the day of party, Marwan died.

مروان رجل صادق و كريم . متزوج وله ثلاث أطفال. أعمارهم لا تتجاوز ١٢ سنة. مروان يحب الخير ومساعدة الغير. كل يوم يزور أبوه و أمه . أبوه و أمه يحبونه كثير لأنه هو الوحيد لهم .أمس إتفق مع أمه و أبوه إنه يسوي حفلة كبيرة بمناسبة نجاح ولده الأكبر. في يوم الحفل مروان مات.

وش صار؟
What happened?
مروان مات

(22) Marwān māt.
Marwan died
'Marwan died'

Predicate-Focus condition: single information focus

Manal and Rami have a love affair. This love affair was rewarded with marriage. There have been10 years passed on with their marriage. They have only one child. They named him Marwad. The father and mother love him a lot. Within the last days, Marwan suffered from an unknown disease. Yesterday, he died.

منال و رامي بينهم قصة حب. قصة الحب هذه توجت بزواج. مضى على زواجهم ١٠ سنوات . جابوا بس ولد واحد. سموه مروان. الأب و الأم يحبونه كثير. في الفترة الأخيرة مروان أصيب بمرض غير معروف. و أمس مات.

وش صار لمروان؟
What happened to Marwan?
مروان مات

(23) Marwān [**māt**]$_{F}$.
Marwan died
'Marwan died'

Predicate-Focus condition: single in-situ contrastive focsu

Marwan is a man suffering from asthma since he was a child. When he was 35 years old, asthma had worsened. But he did not see a doctor. He was careless about his health. When asthma became more worsened, he went to hospital. Doctors tried to do their best to recover him. But unfortunately, his respiratory was affected badly, and the medicines and sprays did not help. Suddenly, he died.

مروان رجل أصيب بمرض الربو من يوم ما كان صغير. ولما صار عمره تقريبا ٣٥ سنة، إزداد عليه الربو. لكنه ما راح لدكتور ليشوف حالته. أهمل صحته. ولما تعب مره راح للمستشفى. و حاولوا يعالجونه. لكن للأسف الجهاز التنفسي تبع مروان تأثر تأثير كبير. و مانفعت معه الأدوية ولا البخاخات. وفجأه مات.

وش صار لمروان؟ تشافى؟
What happened to Marwan? recovered?
مروان مات

(24) Marwān [**māt**]$_{CF}$.
Marwan died
'Marwan died'

Focus preposing: ex-situ contrastive focus

Marwan suffered from cancer. His father tried to find a Saudi hospital to treat his child. but this did not help. Their neighbour advised Marwan's father to take his child to China to find a treatment there. Marwan's father and his child Marwan travelled to China and stayed three days there, looking for treatment. On the fourth day there, Marwan died.

مروان أصيب بمرض السرطان. أبوه حاول يعالجه في المستشفيات السعودية لكن ما نفع. جارهم نصح ابو مروان إنه ياخذ ولده مروان ويسافر لصين و يشوف له علاج هناك. أبو مروان و مروان سافروا الصين. و جلسوا هناك ثلاث أيام يدورون على علاج . و في اليوم الرابع هناك مروان مات.

وش صار لمروان؟ تشافى؟
What happened to Marwan? recovered?
مات مروان

(25) [**māt**]$_{\mathrm{CF}}$ Marwān.
died Marwan
'died, Marwan.'

Argument-Focus condition: single information focus

Marwan and Rami were friends since childhood. they like each other as brothers. Marwan suffered from his kidney a year ago. He went to hospital. Doctors said that Marwan was in a need of a kidney replacement. During that time, Rami was studying abroad. He did not know about Mawran's health status because Marwan's family did not want Rami to know that because thy did not want to bother him while he was studying abroad. Marwan's health was worsened and then he died.

مروان و رامي أصدقاء من الصغر. يحبون بعض كالإخوة. قبل سنة تعب مروان من كليته. وراح المستشفى و قالوا الدكاتره إن مروان بحاجه الى كليه. وقتها كان رامي مسافر لدراسة ومادرى عن مروان و حالته الصحية. لأن أهل مروان ما يبغون يزعجون رامي في غربته. مروان إشتد عليه المرض و مات.

من مات؟
Who died?
مروان مات

(26) [**Marwān**]$_{\mathrm{F}}$ māt.
Marwan died
'Marwan died'

Argument-Focus condition: single in-situ contrastive focus

Marwan and Rami travelled to Riyadh by car yesterday. Their car crashed on their way to Riyadh. Marwan died and Rami is suffering from a head injury and they took him to hospital.

مروان ورامي أمس سافروا الى الرياض بر. في الطريق صار عليهم حادث . مروان مات في وقت الحادث. أما رامي أصيب في راسه و نقلوه المستشفى.

من مات؟ رامي؟
Who died? Rami?
مروان مات

(27) [**Marwān**]$_{\mathrm{CF}}$ māt.
Marwan died
'Marwan died'

Sentence-Focus condition

Rami is a person whose village needs him. Since he was 10 years old, he was the only person who can bring water from the will for his village. He kept doing this till last year. Now, Rami cannot walk and he is getting old.

رامي شخص ما تستغني عنه قريته. من يوم ما كان عمرة ١٠ سنين وهو الشخص الوحيد اللي ينزل للبير يجيب ماء لقريته. إستمر على مساعدة قريته حتى قبل سنه. الأن ما عاد يقدر يمشي. رامي شيب.

وش القصة؟
What happened?
رامي شيب

(28) Rāmi šayyab.
Rami get-old
'Rami is getting old'

Predicate-Focus condition: single information focus

Rami is well-known among his people. The people know him because he is keen on helping them people in the village. He is the only one who goes to the city every morning to get food, drinks, clothes and others. But when Rami is getting old, he is unable to walk. Rami is old.

رامي إنسان معروف عند جماعته. الناس تعرفه من كثر إهتمامه لمساعدة الناس في القرية. هو الوحيد اللي في القرية يروح للمدينة كل صباح يجيب أغراض منها للقرية من أكل و شرب وملابس وغيرها. لكن لما رامي كبر صار ما عاد يقدر يمشي. رامي شيب.

وش أخبار رامي؟
What is the news about Rami?
رامي شيب

(29) Rāmi [**šayyab**]$_{\mathrm{F}}$.
Rami get-old
'Rami is getting old'

Predicate-Focus condition: single in-situ contrastive focus

Rami is known with helping others in the village. He always went to the city to bring food, clothes and drinks for the village. But during the last days, Ramy cannot walk. Rami is getting old.

رامي معروف في القرية على حب مساعدة الغير. دايم يروح للمدينة يجيب أكل وملابس للقرية. لكن في الأيام الأخيرة رامي صار ما يقدر يمشي. رامي شيب.

وش أخبار رامي؟ شباب؟
What is the news about Rami? young?
رامي شيب

(30) Rāmi [**šayyab**]$_{\mathrm{CF}}$.
Rami get-old
'Rami is getting old'

Focus preposing: ex-situ contrastive focus

Rami is known with helping others in the village. He always went to the city to bring food, clothes and drinks for the village. But during the last days, Ramy cannot walk. Rami is getting old.

رامي معروف في القرية على حب مساعدة الغير. دايم يروح للمدينة يجيب أكل وملابس للقرية. لكن في الأيام الأخيرة رامي صار ما يقدر يمشي. رامي شيب.

وش أخبار رامي؟ شباب؟
What is the news about Rami? young?
رامي شيب

(31) [**šayyab**]$_{\mathrm{CF}}$Rāmi.
get-old Rami
'is getting old, Rami'

Argument-Focus condition: single information focus

Rami and Marwan are brothers. They are well known in the village. They like to help others. Marwan always brouht water from the will for the village. And Rami always goes to the city to bring food and clothes for the village. But during the last days, Rami cannot walk. Rami is getting old.

رامي و مروان أخوان. ومعروفين في القرية على حب مساعدة الغير. مروان دائم ينزل في البير يجيب للقرية مويه. و رامي دايم يروح للمدينة يجيب أكل وملابس و للقرية. لكن في الأيام الأخيرة رامي ما يقدر يمشي. رامي شيب.

من شيب؟
Who is getting old?
رامي شيب

(32) [**Rāmi**]$_{\mathrm{F}}$ šayyab.
Rami get-old
'Rami is getting old'

Argument-Focus condition: single ins-situ contrastive focus

Rami and Marwan are brothers. They are well known in the village. They like to help others. Marwan always brouht water from the will for the village. And Rami always goes to the city to bring food and clothes for the village. But during the last days, Rami cannot walk. Rami is getting old.

رامي و مروان أخوان. ومعروفين في القرية على حب مساعدة الغير. مروان دائم ينزل في البير يجيب للقرية مويه. و رامي دايم يروح للمدينة يجيب أكل وملابس و للقرية. لكن في الأيام الأخيرة رامي ما يقدر يمشي. رامي شيب.

من شيب؟ مروان؟
Who is getting old? Marwan?
رامي شيب

(33) [**Rāmi**]$_{\mathrm{CF}}$ šayyab.
Rami get-old
'Rami is getting old'

Appendix B

Chapter six

B.1 Sentence-Focus Structure: Base Line

Gender	**Subject** Code	*Rāmi*	*mar*	*Līna*	*ʔams*
Male	A1	L+H* (2) H*(3)	H* (5)	L+H* (2) H* (3)	H* (5)
	A2	H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	L+H* (1) H* (4)	H* (5)	L+H* (3) H* (2)	H* (5)
	A4	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	A5	H* (5)	H* (5)	L+H* (4) H* (1)	H* (5)
	A6	H* (5)	H* (5)	H* (5)	H* (5)
	A7	L+H* (4) H* (1)	H* (5)	L+H* (5)	H* (5)
	A8	H* (5)	H* (5)	H* (5)	H* (5)
Female	B1	L+H* (1) H* (4)	H* (5)	L+H* (5)	H* (5)
	B2	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	B3	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	B4	H* (5)	H* (5)	L+H* (3) H* (2)	H* (5)
	B5	L+H* (2) H* (3)	H* (5)	L+H* (4) H* (1)	H* (5)
	B6	H* (5)	H* (5)	L+H* (2) H* (3)	H* (5)
	B7	H* (5)	H* (5)	L+H* (5)	H* (5)
	B8	L+H* (5)	H* (5)	L+H* (5)	H* (5)

Table B.1: Transcription results for the sentence-focus sentence /Rāmi mar Līna ʔams/. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rana*	*sawwat*	*maryūl*	*li-Manāl*
Male	A1	H* (5)	H* (5)	L+H* (1) H* (4)	H* (5)
	A2	H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	H* (5)	H* (5)	H* (5)	H* (5)
	A4	L+H* (3) H* (2)	H* (5)	L+H* (5)	H* (5)
	A5	H* (5)	H* (5)	L+H* (5)	H* (5)
	A6	H* (5)	H* (5) H* (5)	L+H* (1) H* (4)	H* (5) H* (5)
	A7	L+H* (3) H* (2)	H* (5)	L+H* (5)	H* (5)
	A8	H* (5)	H* (5)	L+H* (2) H* (3)	H* (5)
Female	B1	H* (5)	L+H* (2) H* (3)	L+H* (5)	H* (5)
	B2	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	B3	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	B4	H* (5)	L+H* (2) H* (3)	L+H* (5)	H* (5)
	B5	L+H* (4) H* (1)	H* (5)	L+H* (5)	H* (5)
	B6	H* (5)	H* (5)	L+H* (1) H* (4)	H*(5)
	B7	H* (5)	L+H* (5)	L+H* (5)	H*(5)
	B8	L+H* (4) H* (1)	L+H* (1) H* (4)	L+H* (5)	H*(5)

Table B.2: Transcription results for the sentence-focus sentence /Rana sawwat maryūl li-Manāl/. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rāmi*	*hājar*	*li-landan*	*al-bāriḥ*
Male	A1	L+H* (1) H* (4)	H* (5)	H* (5)	H* (5)
	A2	H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	H* (5)	H* (5)	L+H* (1) H* (4)	H* (5)
	A4	L+H* (4) H* (1)	L+H* (5)	L+H* (5)	H* (5)
	A5	H* (5)	H* (5)	L+H* (5)	H* (5)
	A6	H* (5)	H* (5)	L+H* (2) H* (3)	H* (5)
	A7	L+H* (2) H* (3)	H* (5)	L+H* (5)	H* (5)
	A8	H* (5)	H* (5)	L+H* (5)	H* (5)
Female	B1	H* (5)	H* (5)	L+H* (5)	H* (5)
	B2	L+H* (3) H* (2)	H* (5)	L+H* (5)	H* (5)
	B3	L+H* (4) H* (1)	L+H* (1) H* (4)	L+H* (5)	H* (5)
	B4	H* (5)	H* (5)	L+H* (5)	H* (5)
	B5	L+H* (5)	L+H* (5)	L+H* (5)	H* (5)
	B6	H* (5)	H* (5)	L+H* (4) H* (1)	H* (5)
	B7	H* (5)	L+H* (4) H* (1)	L+H* (5)	H* (5)
	B8	L+H* (5)	L+H* (4) H* (1)	L+H* (5)	H* (5)

Table B.3: Transcription results for the sentence-focus sentence /Rāmi hājar li-landan al-bāriḥ/. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

B.2 Sentence-Initial Position

B.2.1 Information Focus vs. Sentence Focus

Gender	**Subject** Code	*Rāmi*	*mar*	*Līna*	*ʔams*
Male	A1	L+H* (5)	H* (5)	H* (5)	H* (5)
	A2	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	L+H* (2) H* (3)	H* (5)	H* (5)	H* (5)
	A4	L+H* (5)	H* (5)	L+H* (2) H* (3)	H* (5)
	A5	L+H* (5)	H* (5)	L+H* (1) H* (4)	H* (5)
	A6	L+H* (2) H* (3)	H* (5)	L+H* (2) H* (3)	H* (5)
	A7	L+H* (5)	H* (5)	L+H* (1) H* (4)	H* (5)
	A8	L+H* (1) H* (4)	H* (5)	H* (5)	H* (5)
Female	B1	L+H* (2) H* (3)	H* (5)	L+H* (3) H* (2)	H* (5)
	B2	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	B3	L+H* (4) H* (1)	L+H* (2) H* (3)	L+H* (5)	H* (5)
	B4	H* (5)	L+H* (4) H* (1)	L+H* (5)	H* (5)
	B5	L+H* (2) H* (3)	H* (5)	L+H* (2) H* (3)	H* (5)
	B6	L+H* (2) H* (3)	H* (5)	L+H* (1) H* (4)	H* (5)
	B7	L+H* (1) H* (4)	L+H* (1) H* (4)	L+H* (5)	H* (5)
	B8	L+H* (4) H* (1)	H* (5)	L+H* (2) H* (3)	H* (5)

Table B.4: Transcription results for sentence /[Rāmi]$_F$ mar Līna ʔams/. The sentence-initial item carries information focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rana*	*sawwat*	*maryūl*	*li-Manāl*
Male	A1	L+H* (5)	H* (5)	H* (5)	H* (5)
	A2	L+H* (5)	H* (5)	L+H* (4) H* (1)	H* (5)
	A3	L+H* (5)	H* (5)	H* (5)	H* (5)
	A4	L+H* (4) H* (1)	H* (5)	H* (5)	H* (5)
	A5	L+H* (5)	H* (5)	H* (5)	H* (5)
	A6	L+H* (5)	H* (5)	H* (5)	H* (5)
	A7	L+H* (5)	H* (5)	H* (5)	H* (5)
	A8	L+H* (3) H* (2)	H* (5)	H* (5)	H* (5)
Female	B1	L+H* (4) H* (1)	H* (5)	H* (5)	H* (5)
	B2	L+H* (3) H* (2)	H* (5)	L+H* (5)	H* (5)
	B3	L+H* (5)	H* (5)	H* (5)	H* (5)
	B4	H* (5)	H* (5)	H* (5)	H* (5)
	B5	L+H* (5)	H* (5)	H* (5)	H* (5)
	B6	L+H* (1) H* (4)	H* (5)	H* (5)	H* (5)
	B7	L+H* (2) H* (3)	H* (5)	H* (5)	H* (5)
	B8	L+H* (5)	H* (5)	H* (5)	H* (5)

Table B.5: Transcription results for sentence /[Rana]$_{\mathrm{F}}$ sawwat maryūl li-Manāl/. The sentence-initial item carries information focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rāmi*	*hājar*	*li-landan*	*al-bāriḥ*
Male	A1	L+H* (5)	H* (5)	L+H* (1) H* (4)	H* (5)
	A2	L+H* (3) H* (2)	L+H* (1) H* (4)	L+H* (3) H* (2)	H* (5)
	A3	L+H* (2) H* (3)	H* (5)	H* (5)	H* (5)
	A4	L+H* (5)	L+H* (2) H* (3)	L+H* (1) H* (4)	H* (5)
	A5	L+H* (5)	H* (5)	H* (5)	H* (5)
	A6	L+H* (5)	H* (5)	H* (5)	H* (5)
	A7	L+H* (5)	H* (5)	L+H* (1) H* (4)	H* (5)
	A8	L+H* (4) H* (1)	H* (5)	L+H* (1) H* (4)	H* (5)
Female	B1	L+H* (2) H* (3)	H* (5)	H* (5)	H* (5)
	B2	L+H* (4) H* (1)	H* (5)	L+H* (3) H* (2)	H* (5)
	B3	L+H* (3) H* (2)	L+H* (2) H* (3)	L+H* (1) H* (4)	H* (5)
	B4	L+H* (1) H* (4)	H* (5)	L+H* (1) H* (4)	H* (5)
	B5	L+H* (5)	H* (5)	L+H* (1) H* (4)	H* (5)
	B6	L+H* (3) H* (2)	H* (5)	H* (5)	H* (5)
	B7	L+H* (5)	H* (5)	L+H* (4) H* (1)	H* (5)
	B8	L+H* (5)	H* (5)	H* (5)	H* (5)

Table B.6: Transcription results for sentence /[Rāmi]$_{\mathrm{F}}$ hājar li-landan al-bāriḥ/. The sentence-initial item carries information focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

B.2.2 Contrastive Focus vs. Sentence Focus

Gender	**Subject** Code	*Rāmi*	*mar*	*Līna*	*ʔams*
Male	A1	L+H* (5)	H* (5)	H* (5)	H* (5)
	A2	L+H* (5)	H* (5)	H* (5)	H* (5)
	A3	L+H* (5)	H* (5)	H* (5)	H* (5)
	A4	L+H* (5)	H* (5)	H* (5)	H* (5)
	A5	L+H* (5)	H* (5)	H* (5)	H* (5)
	A6	L+H* (5)	H* (5)	H* (5)	H* (5)
	A7	L+H* (5)	H* (5)	H* (5)	H* (5)
	A8	L+H* (5)	H* (5)	H* (5)	H* (5)
Female	B1	L+H* (4) H* (1)	H* (5)	L+H* (1) H* (4)	H* (5)
	B2	L+H* (5)	H* (5)	H* (5)	H* (5)
	B3	L+H* (5)	H* (5)	H* (5)	H* (5)
	B4	L+H* (5)	H* (5)	H* (5)	H* (5)
	B5	L+H* (5)	H* (5)	H* (5)	H* (5)
	B6	L+H* (5)	H* (5)	H* (5)	H* (5)
	B7	L+H* (5)	H* (5)	H* (5)	H* (5)
	B8	L+H* (5)	H* (5)	H* (5)	H* (5)

Table B.7: Transcription results for sentence /[Rāmi]$_{\mathrm{CF}}$ mar Līna ʔams/. The sentence-initial item carries contrastive focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rana*	*sawwat*	*maryūl*	*li-Manāl*
Male	A1	L+H* (5)	H* (5)	H* (5)	H* (5)
	A2	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	L+H* (5)	H* (5)	H* (5)	H* (5)
	A4	L+H* (5)	H* (5)	H* (5)	H* (5)
	A5	L+H* (5)	H* (5)	H* (5)	H* (5)
	A6	L+H* (5)	H* (5)	H* (5)	H* (5)
	A7	L+H* (5)	H* (5)	L+H* (1) H* (4)	H* (5) H* (5)
	A8	L+H* (5)	H* (5)	H* (5)	H* (5)
Female	B1	L+H* (4) H* (1)	H* (5)	H* (5)	H* (5)
	B2	L+H* (3) H* (2)	H* (5)	H* (5)	H* (5)
	B3	L+H* (5)	H* (5)	H* (5)	H* (5)
	B4	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	B5	L+H* (5)	H* (5)	H* (5)	H* (5)
	B6	L+H* (2) H* (3)	H* (5)	H* (5)	H* (5)
	B7	L+H* (3) H* (2)	H* (5)	H* (5)	H* (5)
	B8	L+H* (5)	H* (5)	H* (5)	H* (5)

Table B.8: Transcription results for sentence /[Rana]$_{\text{CF}}$ sawwat maryūl li-Manāl/. The sentence-initial item carries contrastive focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rāmi*	*hājar*	*li-landan*	*al-bāriḥ*
Male	A1	L+H* (5)	H* (5)	H* (5)	H* (5)
	A2	L+H* (5)	H* (5)	H* (5)	H* (5)
	A3	L+H* (5)	H* (5)	H* (5)	H* (5)
	A4	L+H* (5)	H* (5)	H* (5)	H* (5)
	A5	L+H* (5)	H* (5)	H* (5)	H* (5)
	A6	L+H* (5)	H* (5)	H* (5)	H* (5)
	A7	L+H* (5)	H* (5)	H* (5)	H* (5)
	A8	L+H* (5)	H* (5)	H* (5)	H* (5)
Female	B1	L+H* (3) H* (2)	H* (5)	H* (5)	H* (5)
	B2	L+H* (5)	H* (5)	H* (5)	H* (5)
	B3	L+H* (5)	H* (5)	H* (5)	H* (5)
	B4	L+H* (2) H* (3)	H* (5)	H* (5)	H* (5)
	B5	L+H* (5)	H* (5)	H* (5)	H* (5)
	B6	L+H* (1) H* (4)	H* (5)	H* (5)	H* (5)
	B7	L+H* (4) H* (1)	H* (5)	H* (5)	H* (5)
	B8	L+H* (5)	H* (5)	H* (5)	H* (5)

Table B.9: Transcription results for sentence /[Rāmi]$_{\mathrm{CF}}$ hājar li-landan al-bāriḥ/. The sentence-initial item carries contrastive focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

B.2.3 Phonetic Analyses

B.2.3.1 Excursion Size (st.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.503	8.928	2	.012	.668	.765	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.10: Mauchly's Test of Sphericity: excursion size of stressed syllable of on-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	45.406	2	22.703	21.540	.000
	Greenhouse-Geisser	45.406	1.336	33.982	21.540	.000
	Huynh-Feldt	45.406	1.530	29.672	21.540	.000
	Lower-bound	45.406	1.000	45.406	21.540	.000
Focus * Gender	Sphericity Assumed	4.445	2	2.222	2.109	.140
	Greenhouse-Geisser	4.445	1.336	3.327	2.109	.160
	Huynh-Feldt	4.445	1.530	2.905	2.109	.154
	Lower-bound	4.445	1.000	4.445	2.109	.169
Error(Focus)	Sphericity Assumed	29.512	28	1.054		
	Greenhouse-Geisser	29.512	18.706	1.578		
	Huynh-Feldt	29.512	21.423	1.378		
	Lower-bound	29.512	14.000	2.108		

Table B.11: Tests of Within-Subjects Effects: excursion size of stressed syllable of on-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-.995*	.250	.004	-1.674	-.317
	Contrastive Focus	-2.372*	.469	.001	-3.647	-1.098
Information Focus	Sentence Focus	.995*	.250	.004	.317	1.674
	Contrastive Focus	-1.377*	.336	.003	-2.291	-.463
Contrastive Focus	Sentence Focus	2.372*	.469	.001	1.098	3.647
	Information Focus	1.377*	.336	.003	.463	2.291

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.12: Pairwise Comparisons: excursion size of stressed syllable of on-focus region

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.763	3.510	2	.173	.809	.964	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.13: Mauchly's Test of Sphericity: excursion size of post-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	35.159	2	17.579	8.353	.001
	Greenhouse-Geisser	35.159	1.617	21.739	8.353	.003
	Huynh-Feldt	35.159	1.928	18.234	8.353	.002
	Lower-bound	35.159	1.000	35.159	8.353	.012
Focus * Gender	Sphericity Assumed	1.233	2	.617	.293	.748
	Greenhouse-Geisser	1.233	1.617	.762	.293	.703
	Huynh-Feldt	1.233	1.928	.639	.293	.741
	Lower-bound	1.233	1.000	1.233	.293	.597
Error(Focus)	Sphericity Assumed	58.930	28	2.105		
	Greenhouse-Geisser	58.930	22.642	2.603		
	Huynh-Feldt	58.930	26.996	2.183		
	Lower-bound	58.930	14.000	4.209		

Table B.14: Tests of Within-Subjects Effects: excursion size of post-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	.872	.446	.212	-.340	2.083
	Contrastive Focus	2.087*	.625	.015	.387	3.787
Information Focus	Sentence Focus	-.872	.446	.212	-2.083	.340
	Contrastive Focus	1.215*	.447	.050	.001	2.429
Contrastive Focus	Sentence Focus	-2.087*	.625	.015	-3.787	-.387
	Information Focus	-1.215*	.447	.050	-2.429	-.001

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table B.15: Pairwise Comparisons: excursion size of post-focus region

B.2.3.2 Max F_0 (Hz.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.603	6.567	2	.037	.716	.832	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.16: Mauchly's Test of Sphericity: Max F_0 of stressed syllable of on-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	11113.969	2	5556.984	12.234	.000
	Greenhouse-Geisser	11113.969	1.432	7760.918	12.234	.001
	Huynh-Feldt	11113.969	1.664	6679.193	12.234	.000
	Lower-bound	11113.969	1.000	11113.969	12.234	.004
Focus * Gender	Sphericity Assumed	1799.598	2	899.799	1.981	.157
	Greenhouse-Geisser	1799.598	1.432	1256.665	1.981	.172
	Huynh-Feldt	1799.598	1.664	1081.509	1.981	.166
	Lower-bound	1799.598	1.000	1799.598	1.981	.181
Error(Focus)	Sphericity Assumed	12718.327	28	454.226		
	Greenhouse-Geisser	12718.327	20.049	634.375		
	Huynh-Feldt	12718.327	23.296	545.955		
	Lower-bound	12718.327	14.000	908.452		

Table B.17: Tests of Within-Subjects Effects: Max F_0 of stressed syllable of on-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-6.403	5.923	.894	-22.501	9.694
	Contrastive Focus	-35.001*	9.604	.008	-61.103	-8.899
Information Focus	Sentence Focus	6.403	5.923	.894	-9.694	22.501
	Contrastive Focus	-28.597*	6.558	.002	-46.421	-10.774
Contrastive Focus	Sentence Focus	35.001*	9.604	.008	8.899	61.103
	Information Focus	28.597*	6.558	.002	10.774	46.421

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table B.18: Pairwise Comparisons: Max F_0 of stressed syllable of on-focus region

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.554	7.674	2	.022	.692	.798	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.19: Mauchly's Test of Sphericity: Max F_0 of post-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	12683.840	2	6341.920	12.134	.000
	Greenhouse-Geisser	12683.840	1.383	9169.445	12.134	.001
	Huynh-Feldt	12683.840	1.596	7948.823	12.134	.001
	Lower-bound	12683.840	1.000	12683.840	12.134	.004
Focus * Gender	Sphericity Assumed	274.084	2	137.042	.262	.771
	Greenhouse-Geisser	274.084	1.383	198.142	.262	.690
	Huynh-Feldt	274.084	1.596	171.766	.262	.722
	Lower-bound	274.084	1.000	274.084	.262	.617
Error(Focus)	Sphericity Assumed	14634.445	28	522.659		
	Greenhouse-Geisser	14634.445	19.366	755.685		
	Huynh-Feldt	14634.445	22.340	655.089		
	Lower-bound	14634.445	14.000	1045.317		

Table B.20: Tests of Within-Subjects Effects: Max F_0 of post-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	25.813*	9.272	.044	.614	51.013
	Contrastive Focus	39.162*	9.396	.003	13.625	64.700
Information Focus	Sentence Focus	-25.813*	9.272	.044	-51.013	-.614
	Contrastive Focus	13.349*	4.661	.038	.680	26.018
Contrastive Focus	Sentence Focus	-39.162*	9.396	.003	-64.700	-13.625
	Information Focus	-13.349*	4.661	.038	-26.018	-.680

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.21: Pairwise Comparisons: Max F_0 of post-focus region

B.2.3.3 Mean F_0 (Hz.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.649	5.619	2	.060	.740	.866	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.22: Mauchly's Test of Sphericity: Mean F_0 of stressed syllable of on-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	5087.584	2	2543.792	7.323	.003
	Greenhouse-Geisser	5087.584	1.480	3436.534	7.323	.007
	Huynh-Feldt	5087.584	1.732	2936.975	7.323	.004
	Lower-bound	5087.584	1.000	5087.584	7.323	.017
Focus * Gender	Sphericity Assumed	2142.016	2	1071.008	3.083	.062
	Greenhouse-Geisser	2142.016	1.480	1446.878	3.083	.080
	Huynh-Feldt	2142.016	1.732	1236.549	3.083	.070
	Lower-bound	2142.016	1.000	2142.016	3.083	.101
Error(Focus)	Sphericity Assumed	9726.313	28	347.368		
	Greenhouse-Geisser	9726.313	20.726	469.277		
	Huynh-Feldt	9726.313	24.252	401.060		
	Lower-bound	9726.313	14.000	694.737		

Table B.23: Tests of Within-Subjects Effects: Mean F_0 of stressed syllable of on-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-.700	6.491	1.000	-18.342	16.941
	Contrastive Focus	-22.181*	8.143	.049	-44.312	-.050
Information Focus	Sentence Focus	.700	6.491	1.000	-16.941	18.342
	Contrastive Focus	-21.481*	4.671	.001	-34.174	-8.787
Contrastive Focus	Sentence Focus	22.181*	8.143	.049	.050	44.312
	Information Focus	21.481*	4.671	.001	8.787	34.174

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table B.24: Pairwise Comparisons: Mean F_0 of stressed syllable of on-focus region

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.446	10.499	2	.005	.643	.731	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.25: Mauchly's Test of Sphericity: Mean F_0 of post-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	2691.168	2	1345.584	13.198	.000
	Greenhouse-Geisser	2691.168	1.287	2091.158	13.198	.001
	Huynh-Feldt	2691.168	1.462	1840.316	13.198	.001
	Lower-bound	2691.168	1.000	2691.168	13.198	.003
Focus * Gender	Sphericity Assumed	111.118	2	55.559	.545	.586
	Greenhouse-Geisser	111.118	1.287	86.344	.545	.513
	Huynh-Feldt	111.118	1.462	75.986	.545	.534
	Lower-bound	111.118	1.000	111.118	.545	.473
Error(Focus)	Sphericity Assumed	2854.740	28	101.955		
	Greenhouse-Geisser	2854.740	18.017	158.447		
	Huynh-Feldt	2854.740	20.473	139.441		
	Lower-bound	2854.740	14.000	203.910		

Table B.26: Tests of Within-Subjects Effects: Mean F_0 of post-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence focus	Information Focus	15.950*	4.435	.009	3.896	28.005
	Contrastive Focus	15.817*	3.859	.003	5.329	26.304
Information Focus	Sentence Focus	-15.950*	4.435	.009	-28.005	-3.896
	Contrastive Focus	-.134	1.915	1.000	-5.339	5.072
Contrastive Focus	Sentence Focus	-15.817*	3.859	.003	-26.304	-5.329
	Information Focus	.134	1.915	1.000	-5.072	5.339

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.27: Pairwise Comparisons: Mean F_0 of post-focus region

B.2.3.4 Mean Intensity (dB)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.399	11.939	2	.003	.625	.705	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.28: Mauchly's Test of Sphericity: Mean Intensity of stressed syllable of on-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	42.169	2	21.085	14.966	.000
	Greenhouse-Geisser	42.169	1.249	33.753	14.966	.001
	Huynh-Feldt	42.169	1.411	29.889	14.966	.000
	Lower-bound	42.169	1.000	42.169	14.966	.002
Focus * Gender	Sphericity Assumed	.812	2	.406	.288	.752
	Greenhouse-Geisser	.812	1.249	.650	.288	.649
	Huynh-Feldt	.812	1.411	.576	.288	.676
	Lower-bound	.812	1.000	.812	.288	.600
Error(Focus)	Sphericity Assumed	39.448	28	1.409		
	Greenhouse-Geisser	39.448	17.491	2.255		
	Huynh-Feldt	39.448	19.752	1.997		
	Lower-bound	39.448	14.000	2.818		

Table B.29: Tests of Within-Subjects Effects: Mean Intensity of stressed syllable of on-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Sentence Focus	Information Focus	-.604	.258	.103	-1.305	.096
	Contrastive Focus	-2.220*	.549	.004	-3.712	-.728
Information Focus	Sentence Focus	.604	.258	.103	-.096	1.305
	Contrastive Focus	-1.616*	.401	.004	-2.705	-.527
Contrastive Focus	Sentence Focus	2.220*	.549	.004	.728	3.712
	Information Focus	1.616*	.401	.004	.527	2.705

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table B.30: Pairwise Comparisons: Mean Intensity of stressed syllable of on-focus region

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.699	4.656	2	.097	.769	.907	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.31: Mauchly's Test of Sphericity: Mean Intensity of post-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	19.365	2	9.683	12.615	.000
	Greenhouse-Geisser	19.365	1.537	12.598	12.615	.001
	Huynh-Feldt	19.365	1.813	10.681	12.615	.000
	Lower-bound	19.365	1.000	19.365	12.615	.003
Focus * Gender	Sphericity Assumed	1.754	2	.877	1.142	.334
	Greenhouse-Geisser	1.754	1.537	1.141	1.142	.324
	Huynh-Feldt	1.754	1.813	.967	1.142	.330
	Lower-bound	1.754	1.000	1.754	1.142	.303
Error(Focus)	Sphericity Assumed	21.492	28	.768		
	Greenhouse-Geisser	21.492	21.521	.999		
	Huynh-Feldt	21.492	25.382	.847		
	Lower-bound	21.492	14.000	1.535		

Table B.32: Tests of Within-Subjects Effects: Mean Intensity of post-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	1.199*	.291	.003	.408	1.990
	Contrastive Focus	1.458*	.382	.006	.419	2.497
Information Focus	Sentence Focus	-1.199*	.291	.003	-1.990	-.408
	Contrastive Focus	.259	.239	.889	-.390	.908
Contrastive Focus	Sentence Focus	-1.458*	.382	.006	-2.497	-.419
	Information Focus	-.259	.239	.889	-.908	.390

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.33: Pairwise Comparisons: Mean Intensity of post-focus region

B.2.3.5 Mean Duration (ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.744	3.839	2	.147	.796	.946	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.34: Mauchly's Test of Sphericity: Mean Duration of stressed syllable of on-focus item /Rāmi/

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	7513.476	2	3756.738	27.741	.000
	Greenhouse-Geisser	7513.476	1.593	4717.341	27.741	.000
	Huynh-Feldt	7513.476	1.893	3969.622	27.741	.000
	Lower-bound	7513.476	1.000	7513.476	27.741	.000
Focus * Gender	Sphericity Assumed	3252.222	2	1626.111	12.008	.000
	Greenhouse-Geisser	3252.222	1.593	2041.909	12.008	.001
	Huynh-Feldt	3252.222	1.893	1718.258	12.008	.000
	Lower-bound	3252.222	1.000	3252.222	12.008	.004
Error(Focus)	Sphericity Assumed	3791.879	28	135.424		
	Greenhouse-Geisser	3791.879	22.298	170.052		
	Huynh-Feldt	3791.879	26.498	143.098		
	Lower-bound	3791.879	14.000	270.849		

Table B.35: Tests of Within-Subjects Effects: Mean Duration of stressed syllable of on-focus item /Rāmi/

Tests of Between-Subjects Effects

Measure:MEASURE_1
Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1790687.66	1	1790687.66	936.732	.000
Gender	6.296	1	6.296	.003	.955
Error	26762.853	14	1911.632		

Table B.36: Tests of Between-Subjects Effects: Mean Duration of stressed syllable of on-focus item /Rāmi/

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I–J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-10.413*	2.994	.011	-18.549	-2.278
	Contrastive Focus	-30.168*	4.860	.000	-43.377	-16.958
Information Focus	Sentence Focus	10.413*	2.994	.011	2.278	18.549
	Contrastive Focus	-19.755*	4.266	.001	-31.349	-8.160
Contrastive Focus	Sentence Focus	30.168*	4.860	.000	16.958	43.377
	Information Focus	19.755*	4.266	.001	8.160	31.349

Based on estimated marginal means

*. The mean difference is significant at the

a. Adjustment for multiple comparisons: Bonferroni.

Table B.37: Pairwise Comparisons: Mean Duration of stressed syllable of on-focus item /Rāmi/

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.801	2.880	2	.237	.834	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.38: Mauchly's Test of Sphericity: Mean Duration of stressed syllable of on-focus item /Rana/

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	4439.489	2	2219.744	13.533	.000
	Greenhouse-Geisser	4439.489	1.668	2660.818	13.533	.000
	Huynh-Feldt	4439.489	2.000	2219.744	13.533	.000
	Lower-bound	4439.489	1.000	4439.489	13.533	.002
Focus * Gender	Sphericity Assumed	3688.411	2	1844.205	11.243	.000
	Greenhouse-Geisser	3688.411	1.668	2210.658	11.243	.001
	Huynh-Feldt	3688.411	2.000	1844.205	11.243	.000
	Lower-bound	3688.411	1.000	3688.411	11.243	.005
Error(Focus)	Sphericity Assumed	4592.805	28	164.029		
	Greenhouse-Geisser	4592.805	23.359	196.622		
	Huynh-Feldt	4592.805	28.000	164.029		
	Lower-bound	4592.805	14.000	328.057		

Table B.39: Tests of Within-Subjects Effects: Mean Duration of stressed syllable of on-focus item /Rana/

Tests of Between-Subjects Effects

Measure:MEASURE_1
Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1002600.98	1	1002600.98	432.003	.000
Gender	234.843	1	234.843	.101	.755
Error	32491.477	14	2320.820		

Table B.40: Tests of Between-Subjects Effects: Mean Duration of stressed syllable of on-focus item /Rana/

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I–J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-11.333	4.948	.114	-24.780	2.113
	Contrastive Focus	-23.552*	5.064	.001	-37.314	-9.789
Information Focus	Sentence Focus	11.333	4.948	.114	-2.113	24.780
	Contrastive Focus	-12.218*	3.375	.008	-21.390	-3.047
Contrastive Focus	Sentence Focus	23.552*	5.064	.001	9.789	37.314
	Information Focus	12.218*	3.375	.008	3.047	21.390

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table B.41: Pairwise Comparisons: Mean Duration of stressed syllable of on-focus item /Rana/

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.937	.849	2	.654	.941	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.42: Mauchly's Test of Sphericity: Mean Duration of post-focus region /mar l̄ina ʔams/

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	273.723	2	136.862	1.827	.180
	Greenhouse-Geisser	273.723	1.881	145.517	1.827	.182
	Huynh-Feldt	273.723	2.000	136.862	1.827	.180
	Lower-bound	273.723	1.000	273.723	1.827	.198
Focus * Gender	Sphericity Assumed	9.239	2	4.619	.062	.940
	Greenhouse-Geisser	9.239	1.881	4.912	.062	.932
	Huynh-Feldt	9.239	2.000	4.619	.062	.940
	Lower-bound	9.239	1.000	9.239	.062	.807
Error(Focus)	Sphericity Assumed	2097.434	28	74.908		
	Greenhouse-Geisser	2097.434	26.335	79.646		
	Huynh-Feldt	2097.434	28.000	74.908		
	Lower-bound	2097.434	14.000	149.817		

Table B.43: Tests of Within-Subjects Effects: Mean Duration of post-focus region /mar līna ʔams/

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.562	7.502	2	.023	.695	.803	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.44: Mauchly's Test of Sphericity: Mean Duration of post-focus region /sawwat maryūl li-Manāl/

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	4257.343	2	2128.671	14.207	.000
	Greenhouse-Geisser	4257.343	1.390	3062.027	14.207	.000
	Huynh-Feldt	4257.343	1.606	2651.578	14.207	.000
	Lower-bound	4257.343	1.000	4257.343	14.207	.002
Focus * Gender	Sphericity Assumed	32.440	2	16.220	.108	.898
	Greenhouse-Geisser	32.440	1.390	23.332	.108	.825
	Huynh-Feldt	32.440	1.606	20.205	.108	.856
	Lower-bound	32.440	1.000	32.440	.108	.747
Error(Focus)	Sphericity Assumed	4195.283	28	149.832		
	Greenhouse-Geisser	4195.283	19.465	215.528		
	Huynh-Feldt	4195.283	22.478	186.638		
	Lower-bound	4195.283	14.000	299.663		

Table B.45: Tests of Within-Subjects Effects: Mean Duration of post-focus region /sawwat maryūl li-Manāl/

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	22.602*	5.454	.003	7.778	37.425
	Contrastive Focus	15.300*	4.260	.009	3.724	26.877
Information Focus	Sentence Focus	-22.602*	5.454	.003	-37.425	-7.778
	Contrastive Focus	-7.301	2.880	.071	-15.128	.525
Contrastive Focus	Sentence Focus	-15.300*	4.260	.009	-26.877	-3.724
	Information Focus	7.301	2.880	.071	-.525	15.128

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.46: Pairwise Comparisons: Mean Duration of post-focus region /sawwat maryūl li-Manāl/

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.969	.410	2	.814	.970	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.47: Mauchly's Test of Sphericity: Mean Duration of post-focus region /hājar li-landan al-bāriḥ/

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	1050.084	2	525.042	4.311	.023
	Greenhouse-Geisser	1050.084	1.940	541.362	4.311	.025
	Huynh-Feldt	1050.084	2.000	525.042	4.311	.023
	Lower-bound	1050.084	1.000	1050.084	4.311	.057
Focus * Gender	Sphericity Assumed	196.929	2	98.465	.809	.456
	Greenhouse-Geisser	196.929	1.940	101.525	.809	.453
	Huynh-Feldt	196.929	2.000	98.465	.809	.456
	Lower-bound	196.929	1.000	196.929	.809	.384
Error(Focus)	Sphericity Assumed	3409.763	28	121.777		
	Greenhouse-Geisser	3409.763	27.156	125.562		
	Huynh-Feldt	3409.763	28.000	121.777		
	Lower-bound	3409.763	14.000	243.554		

Table B.48: Tests of Within-Subjects Effects: Mean Duration of post-focus region /hājar li-landan al-bāriḥ/

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I–J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Sentence Focus	Information Focus	4.245	3.900	.884	-6.354	14.843
	Conrastive Focus	11.338	4.190	.051	-.048	22.725
Information Focus	Sentence Focus	-4.245	3.900	.884	-14.843	6.354
	Conrastive Focus	7.093	3.592	.205	-2.670	16.857
Contrastive Focus	Sentence Focus	-11.338	4.190	.051	-22.725	.048
	Information Focus	-7.093	3.592	.205	-16.857	2.670

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Table B.49: Pairwise Comparisons: Mean Duration of post-focus region /hājar li-landan al-bāriḥ/

B.3 Sentence-Penultimate Position

B.3.1 Sentence Focus vs. Predicate Focus

Gender	**Subject** Code	*Rāmi*	*mar*	*L̄ina*	*ʔams*
Male	A1	H* (5)	H* (5)	L+H* (1) H* (4)	H* (5)
	A2	H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	H* (5)	H* (5)	L+H* (1) H* (4)	H* (5)
	A4	H* (5)	H* (5)	L+H* (4) H* (1)	H* (5)
	A5	H* (5)	H* (5)	L+H* (5)	H* (5)
	A6	H* (5)	H* (5)	L+H* (5)	H* (5)
	A7	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	A8	H* (5)	H* (5)	L+H* (5)	H* (5)
Female	B1	H* (5)	H* (5)	L+H* (2) H* (3)	H* (5)
	B2	H* (5)	H* (5)	H* (5)	H* (5)
	B3	H* (5)	H* (5)	L+H* (4) H* (1)	H* (5)
	B4	H* (5)	H* (5)	L+H* (5)	H* (5)
	B5	H* (5)	H* (5)	L+H* (5)	H* (5)
	B6	H* (5)	H* (5)	H* (5)	H* (5)
	B7	H* (5)	H* (5)	L+H* (2) H* (3)	H* (5)
	B8	H* (5)	H* (5)	L+H* (5)	H* (5)

Table B.50: Transcription results for sentence /Rāmi [mar L̄ina ʔams]$_F$ /. The predicate domain (verb and its compliments) carries information focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rana*	*sawwat*	*maryūl*	*li-Manāl*
Male	A1	H* (5)	H* (5)	H* (5)	H* (5)
	A2	H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	H* (5)	H* (5)	L+H* (2) H* (3)	H* (5)
	A4	H* (5)	H* (5)	L+H* (5)	H* (5)
	A5	H* (5)	H* (5)	L+H* (5)	H* (5)
	A6	H* (5)	H* (5)	L+H* (3) H* (2)	H* (5)
	A7	H* (5)	H* (5)	L+H* (5)	H* (5)
	A8	H* (5)	H* (5)	L+H* (5)	H* (5)
Female	B1	H* (5)	H* (5)	L+H* (1) H* (4)	H* (5)
	B2	H* (5)	H* (5)	L+H* (5)	H* (5)
	B3	H* (5)	H* (5)	L+H* (5)	H* (5)
	B4	H* (5)	H* (5)	L+H* (5)	H* (5)
	B5	H* (5)	H* (5)	L+H* (3) H* (2)	H* (5)
	B6	H* (5)	H* (5)	H* (5)	H* (5)
	B7	H* (5)	H* (5)	L+H* (4) H* (1)	H* (5)
	B8	H* (5)	H* (5)	L+H* (5)	H* (5)

Table B.51: Transcription results for the sentence /Rana [sawwat maryūl li-Manāl]$_F$/. The predicate domain (verb and its compliments) carries information focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions)

Gender	**Subject** Code	*Rāmi*	*hājar*	*li-landan*	*al-bāriḥ*
Male	A1	H* (5)	H* (5)	H* (5)	H* (5)
	A2	H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	H* (5)	H* (5)	L+H* (1) H* (4)	H* (5)
	A4	L+H* (1) H* (4)	H* (5)	L+H* (1) H* (4)	H* (5)
	A5	H* (5)	H* (5)	L+H* (5)	H* (5)
	A6	H* (5)	H* (5)	L+H* (5)	H* (5)
	A7	L+H* (3) H* (2)	H* (5)	L+H* (5)	H* (5)
	A8	H* (5)	H* (5)	L+H* (3) H* (2)	H* (5)
Female	B1	H* (5)	H* (5)	L+H* (5)	H* (5)
	B2	H* (5)	H* (5)	L+H* (1) H* (4)	H* (5)
	B3	H* (5)	H* (5)	L+H* (5)	H* (5)
	B4	H* (5)	H* (5)	L+H* (2) H* (3)	H* (5)
	B5	H* (5)	H* (5)	L+H* (4) H* (1)	H* (5)
	B6	H* (5)	H* (5)	L+H* (5)	H* (5)
	B7	H* (5)	H* (5)	L+H* (5)	H* (5)
	B8	H* (5)	H* (5)	L+H* (5)	H* (5)

Table B.52: Transcription results for the sentence /Rāmi [hājar li-landan al-bāriḥ]$_F$/. The predicate domain (verb and its compliments) carries information focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions)

B.3.1.1 Sentence Focus vs. Predicate Focus: Phonetic Perspective

B.3.1.1.1 Excursion Size (in st.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.53: Mauchly's Test of Sphericity: excursion size of stressed syllable of on-focus region (i.e sentence-penultimate item)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	2.701	1	2.701	.615	.446
	Greenhouse-Geisser	2.701	1.000	2.701	.615	.446
	Huynh-Feldt	2.701	1.000	2.701	.615	.446
	Lower-bound	2.701	1.000	2.701	.615	.446
Focus * Gender	Sphericity Assumed	.338	1	.338	.077	.785
	Greenhouse-Geisser	.338	1.000	.338	.077	.785
	Huynh-Feldt	.338	1.000	.338	.077	.785
	Lower-bound	.338	1.000	.338	.077	.785
Error(Focus)	Sphericity Assumed	61.515	14	4.394		
	Greenhouse-Geisser	61.515	14.000	4.394		
	Huynh-Feldt	61.515	14.000	4.394		
	Lower-bound	61.515	14.000	4.394		

Table B.54: Tests of Within-Subjects Effects: excursion size of stressed syllable of on-focus region (i.e sentence-penultimate item)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.55: Mauchly's Test of Sphericity: excursion size of pre-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	.248	1	.248	.892	.361
	Greenhouse-Geisser	.248	1.000	.248	.892	.361
	Huynh-Feldt	.248	1.000	.248	.892	.361
	Lower-bound	.248	1.000	.248	.892	.361
Focus * Gender	Sphericity Assumed	.060	1	.060	.217	.649
	Greenhouse-Geisser	.060	1.000	.060	.217	.649
	Huynh-Feldt	.060	1.000	.060	.217	.649
	Lower-bound	.060	1.000	.060	.217	.649
Error(Focus)	Sphericity Assumed	3.898	14	.278		
	Greenhouse-Geisser	3.898	14.000	.278		
	Huynh-Feldt	3.898	14.000	.278		
	Lower-bound	3.898	14.000	.278		

Table B.56: Tests of Within-Subjects Effects: excursion size of pre-focus region

B.3.1.1.2 Max F_0 (Hz.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.57: Mauchly's Test of Sphericity: Max F_0 of stressed syllable of on-focus region (i.e sentence-penultimate item)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	500.511	1	500.511	9.179	.009
	Greenhouse-Geisser	500.511	1.000	500.511	9.179	.009
	Huynh-Feldt	500.511	1.000	500.511	9.179	.009
	Lower-bound	500.511	1.000	500.511	9.179	.009
Focus * Gender	Sphericity Assumed	266.680	1	266.680	4.891	.044
	Greenhouse-Geisser	266.680	1.000	266.680	4.891	.044
	Huynh-Feldt	266.680	1.000	266.680	4.891	.044
	Lower-bound	266.680	1.000	266.680	4.891	.044
Error(Focus)	Sphericity Assumed	763.418	14	54.530		
	Greenhouse-Geisser	763.418	14.000	54.530		
	Huynh-Feldt	763.418	14.000	54.530		
	Lower-bound	763.418	14.000	54.530		

Table B.58: Tests of Within-Subjects Effects: Max F_0 of stressed syllable of on-focus region (i.e sentence-penultimate item)

Tests of Between-Subjects Effects

Measure:MEASURE_1
Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1999622.18	1	1999622.18	407.763	.000
Gender	103841.992	1	103841.992	21.175	.000
Error	68654.441	14	4903.889		

Table B.59: Tests of Between-Subjects Effects: Max F_0 of stressed syllable of on-focus region (i.e sentence-penultimate item)

Statistics

Gender			Broad_Focus Sentence Focus	Predicate_ Focus Predicate Focus
1 Male	N	Valid	8	8
		Missing	0	0
	Mean		186.16925	199.85262
	Std. Error of Mean		11.407951	11.802360
	Median		183.54500	195.89817
	Std. Deviation		32.266558	33.382116
	Range		108.078	109.322
	Minimum		141.411	149.873
	Maximum		249.489	259.195
2 female	N	Valid	8	8
		Missing	0	0
	Mean		305.87379	308.00987
	Std. Error of Mean		21.643986	22.398783
	Median		312.97600	308.33400
	Std. Deviation		61.218436	63.353324
	Range		170.687	171.835
	Minimum		208.249	210.639
	Maximum		378.936	382.474

Table B.60: Max F_0 of stressed syllable of on-focus region (i.e sentence-penultimate item), separated by gender

Tests of Within-Subjects Effects

Measure:MEASURE_1

Gender	Source		Type III Sum of Squares	df	Mean Square	F	Sig.
1 Male	Focus	Sphericity Assumed	748.939	1	748.939	12.191	.010
		Greenhouse-Geisser	748.939	1.000	748.939	12.191	.010
		Huynh-Feldt	748.939	1.000	748.939	12.191	.010
		Lower-bound	748.939	1.000	748.939	12.191	.010
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	430.042	7	61.435		
		Greenhouse-Geisser	430.042	7.000	61.435		
		Huynh-Feldt	430.042	7.000	61.435		
		Lower-bound	430.042	7.000	61.435		
2 female	Focus	Sphericity Assumed	18.251	1	18.251	.383	.555
		Greenhouse-Geisser	18.251	1.000	18.251	.383	.555
		Huynh-Feldt	18.251	1.000	18.251	.383	.555
		Lower-bound	18.251	1.000	18.251	.383	.555
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	333.376	7	47.625		
		Greenhouse-Geisser	333.376	7.000	47.625		
		Huynh-Feldt	333.376	7.000	47.625		
		Lower-bound	333.376	7.000	47.625		

Table B.61: Tests of Within-Subjects Effects: Max F_0 of stressed syllable of on-focus region (i.e sentence-penultimate item), separated by gender

Pairwise Comparisons

Measure:MEASURE_1

Gender	(I) Focus	(J) Focus	Mean Difference (I–J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
1 Male	Sentence Focus	Predicate Focus	-13.683*	3.919	.010	-22.950	-4.416
	Predicate Focus	Sentence Focus	13.683*	3.919	.010	4.416	22.950
2 female	Sentence Focus	Predicate Focus	-2.136	3.451	.555	-10.295	6.023
	Predicate Focus	Sentence Focus	2.136	3.451	.555	-6.023	10.295

Based on estimated marginal means

*. The mean difference is significant at the

a. Adjustment for multiple comparisons: Bonferroni.

Table B.62: Pairwise Comparisons: Max F_0 of stressed syllable of on-focus region (i.e sentence-penultimate item), separated by gender

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.63: Mauchly's Test of Sphericity: Max F_0 of pre-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	226.772	1	226.772	1.315	.271
	Greenhouse-Geisser	226.772	1.000	226.772	1.315	.271
	Huynh-Feldt	226.772	1.000	226.772	1.315	.271
	Lower-bound	226.772	1.000	226.772	1.315	.271
Focus * Gender	Sphericity Assumed	278.580	1	278.580	1.616	.224
	Greenhouse-Geisser	278.580	1.000	278.580	1.616	.224
	Huynh-Feldt	278.580	1.000	278.580	1.616	.224
	Lower-bound	278.580	1.000	278.580	1.616	.224
Error(Focus)	Sphericity Assumed	2413.603	14	172.400		
	Greenhouse-Geisser	2413.603	14.000	172.400		
	Huynh-Feldt	2413.603	14.000	172.400		
	Lower-bound	2413.603	14.000	172.400		

Table B.64: Tests of Within-Subjects Effects: Max F_0 of pre-focus region

B.3.1.1.3 Mean F_0 (Hz.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.65: Mauchly's Test of Sphericity: Mean F_0 of stressed syllable of on-focus region (i.e sentence-penultimate item)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	237.664	1	237.664	7.565	.016
	Greenhouse-Geisser	237.664	1.000	237.664	7.565	.016
	Huynh-Feldt	237.664	1.000	237.664	7.565	.016
	Lower-bound	237.664	1.000	237.664	7.565	.016
Focus * Gender	Sphericity Assumed	188.426	1	188.426	5.998	.028
	Greenhouse-Geisser	188.426	1.000	188.426	5.998	.028
	Huynh-Feldt	188.426	1.000	188.426	5.998	.028
	Lower-bound	188.426	1.000	188.426	5.998	.028
Error(Focus)	Sphericity Assumed	439.828	14	31.416		
	Greenhouse-Geisser	439.828	14.000	31.416		
	Huynh-Feldt	439.828	14.000	31.416		
	Lower-bound	439.828	14.000	31.416		

Table B.66: Tests of Within-Subjects Effects: Mean F_0 of stressed syllable of on-focus region (i.e sentence-penultimate item)

Tests of Between-Subjects Effects

Measure:MEASURE_1
Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1647031.73	1	1647031.73	604.143	.000
Gender	72740.036	1	72740.036	26.682	.000
Error	38167.223	14	2726.230		

Table B.67: Tests of Between-Subjects Effects: Mean F_0 of stressed syllable of on-focus region (i.e sentence-penultimate item)

Statistics

Gender			Broad_Focus Sentence Focus	Predicate_ Focus Predicate Focus
1 Male	N	Valid	8	8
		Missing	0	0
	Mean		174.04029	184.34396
	Std. Error of Mean		9.846581	10.189995
	Median		173.27800	180.78450
	Std. Deviation		27.850335	28.821659
	Range		92.196	91.408
	Minimum		134.254	140.969
	Maximum		226.450	232.377
2 Female	N	Valid	8	8
		Missing	0	0
	Mean		274.24808	274.84542
	Std. Error of Mean		15.436744	15.821738
	Median		276.69700	278.25650
	Std. Deviation		43.661705	44.750634
	Range		127.933	138.445
	Minimum		200.141	202.747
	Maximum		328.074	341.192

Table B.68: Mean F_0 of stressed syllable of on-focus region (i.e sentence-penultimate item), separated by gender

Tests of Within-Subjects Effects

Measure:MEASURE_1

Gender	Source		Type III Sum of Squares	df	Mean Square	F	Sig.
1 Male	Focus	Sphericity Assumed	424.662	1	424.662	11.158	.012
		Greenhouse-Geisser	424.662	1.000	424.662	11.158	.012
		Huynh-Feldt	424.662	1.000	424.662	11.158	.012
		Lower-bound	424.662	1.000	424.662	11.158	.012
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	266.402	7	38.057		
		Greenhouse-Geisser	266.402	7.000	38.057		
		Huynh-Feldt	266.402	7.000	38.057		
		Lower-bound	266.402	7.000	38.057		
2 Female	Focus	Sphericity Assumed	1.427	1	1.427	.058	.817
		Greenhouse-Geisser	1.427	1.000	1.427	.058	.817
		Huynh-Feldt	1.427	1.000	1.427	.058	.817
		Lower-bound	1.427	1.000	1.427	.058	.817
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	173.426	7	24.775		
		Greenhouse-Geisser	173.426	7.000	24.775		
		Huynh-Feldt	173.426	7.000	24.775		
		Lower-bound	173.426	7.000	24.775		

Table B.69: Tests of Within-Subjects Effects: Mean F_0 of stressed syllable of on-focus region (i.e sentence-penultimate item), separated by gender

Pairwise Comparisons

Measure:MEASURE_1

Gender	(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
1 Male	Sentence Focus	Predicate Focus	-10.304*	3.085	.012	-17.597	-3.010
	Predicate Focus	Sentence Focus	10.304*	3.085	.012	3.010	17.597
2 Female	Sentence Focus	Predicate Focus	-.597	2.489	.817	-6.482	5.288
	Predicate Focus	Sentence Focus	.597	2.489	.817	-5.288	6.482

Based on estimated marginal means

*. The mean difference is significant at the

a. Adjustment for multiple comparisons: Bonferroni.

Table B.70: Pairwise Comparisons: Mean F_0 of stressed syllable of on-focus region (i.e sentence-penultimate item), separated by gender

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.71: Mauchly's Test of Sphericity: Mean F_0 of pre-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	425.999	1	425.999	4.068	.063
	Greenhouse-Geisser	425.999	1.000	425.999	4.068	.063
	Huynh-Feldt	425.999	1.000	425.999	4.068	.063
	Lower-bound	425.999	1.000	425.999	4.068	.063
Focus * Gender	Sphericity Assumed	151.061	1	151.061	1.442	.250
	Greenhouse-Geisser	151.061	1.000	151.061	1.442	.250
	Huynh-Feldt	151.061	1.000	151.061	1.442	.250
	Lower-bound	151.061	1.000	151.061	1.442	.250
Error(Focus)	Sphericity Assumed	1466.232	14	104.731		
	Greenhouse-Geisser	1466.232	14.000	104.731		
	Huynh-Feldt	1466.232	14.000	104.731		
	Lower-bound	1466.232	14.000	104.731		

Table B.72: Tests of Within-Subjects Effects: Mean F_0 of pre-focus region

B.3.1.1.4 Mean Intensity (dB)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.73: Mauchly's Test of Sphericity: Mean Intensity of stressed syllable of on-focus region (i.e sentence-penultimate item)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	2.750	1	2.750	13.641	.002
	Greenhouse-Geisser	2.750	1.000	2.750	13.641	.002
	Huynh-Feldt	2.750	1.000	2.750	13.641	.002
	Lower-bound	2.750	1.000	2.750	13.641	.002
Focus * Gender	Sphericity Assumed	.749	1	.749	3.715	.074
	Greenhouse-Geisser	.749	1.000	.749	3.715	.074
	Huynh-Feldt	.749	1.000	.749	3.715	.074
	Lower-bound	.749	1.000	.749	3.715	.074
Error(Focus)	Sphericity Assumed	2.823	14	.202		
	Greenhouse-Geisser	2.823	14.000	.202		
	Huynh-Feldt	2.823	14.000	.202		
	Lower-bound	2.823	14.000	.202		

Table B.74: Tests of Within-Subjects Effects: Mean Intensity of stressed syllable of on-focus region (i.e sentence-penultimate item)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Predicate Focus	-.586*	.159	.002	-.927	-.246
Predicate Focus	Sentence Focus	.586*	.159	.002	.246	.927

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.75: Pairwise Comparisons: Mean Intensity of stressed syllable of on-focus region (i.e sentence-penultimate item)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.76: Mauchly's Test of Sphericity: Mean Intensity of pre-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	38.050	1	38.050	53.562	.000
	Greenhouse-Geisser	38.050	1.000	38.050	53.562	.000
	Huynh-Feldt	38.050	1.000	38.050	53.562	.000
	Lower-bound	38.050	1.000	38.050	53.562	.000
Focus * Gender	Sphericity Assumed	.014	1	.014	.019	.892
	Greenhouse-Geisser	.014	1.000	.014	.019	.892
	Huynh-Feldt	.014	1.000	.014	.019	.892
	Lower-bound	.014	1.000	.014	.019	.892
Error(Focus)	Sphericity Assumed	9.946	14	.710		
	Greenhouse-Geisser	9.946	14.000	.710		
	Huynh-Feldt	9.946	14.000	.710		
	Lower-bound	9.946	14.000	.710		

Table B.77: Tests of Within-Subjects Effects: Mean Intensity of pre-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Predicate Focus	-2.181*	.298	.000	-2.820	-1.542
Predicate Focus	Sentence Focus	2.181*	.298	.000	1.542	2.820

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.78: Pairwise Comparisons: Mean Intensity of pre-focus region

B.3.1.1.5 Mean Duration (ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.79: Mauchly's Test of Sphericity: Mean Duration of stressed syllable of Sentence-Penultimate Item /Līna/ (in ms.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	18.315	1	18.315	.095	.763
	Greenhouse-Geisser	18.315	1.000	18.315	.095	.763
	Huynh-Feldt	18.315	1.000	18.315	.095	.763
	Lower-bound	18.315	1.000	18.315	.095	.763
Focus * Gender	Sphericity Assumed	74.954	1	74.954	.387	.544
	Greenhouse-Geisser	74.954	1.000	74.954	.387	.544
	Huynh-Feldt	74.954	1.000	74.954	.387	.544
	Lower-bound	74.954	1.000	74.954	.387	.544
Error(Focus)	Sphericity Assumed	2708.350	14	193.454		
	Greenhouse-Geisser	2708.350	14.000	193.454		
	Huynh-Feldt	2708.350	14.000	193.454		
	Lower-bound	2708.350	14.000	193.454		

Table B.80: Tests of Within-Subjects Effects: Mean Duration of stressed syllable of Sentence-Penultimate Item /Līna/ (in ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.81: Mauchly's Test of Sphericity: Mean Duration of stressed syllable of Sentence-Penultimate Item /maryūl/ (in ms.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	1487.677	1	1487.677	10.698	.006
	Greenhouse-Geisser	1487.677	1.000	1487.677	10.698	.006
	Huynh-Feldt	1487.677	1.000	1487.677	10.698	.006
	Lower-bound	1487.677	1.000	1487.677	10.698	.006
Focus * Gender	Sphericity Assumed	.083	1	.083	.001	.981
	Greenhouse-Geisser	.083	1.000	.083	.001	.981
	Huynh-Feldt	.083	1.000	.083	.001	.981
	Lower-bound	.083	1.000	.083	.001	.981
Error(Focus)	Sphericity Assumed	1946.824	14	139.059		
	Greenhouse-Geisser	1946.824	14.000	139.059		
	Huynh-Feldt	1946.824	14.000	139.059		
	Lower-bound	1946.824	14.000	139.059		

Table B.82: Tests of Within-Subjects Effects: Mean Duration of stressed syllable of Sentence-Penultimate Item /maryūl/ (in ms.)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Predicate Focus	-13.637*	4.169	.006	-22.579	-4.695
Predicate Focus	Sentence Focus	13.637*	4.169	.006	4.695	22.579

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.83: Pairwise Comparisons: Mean Duration of stressed syllable of Sentence-Penultimate Item /maryūl/ (in ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.84: Mauchly's Test of Sphericity: Mean Duration of stressed syllable of Sentence-Penultimate Item /li-landan/ (in ms.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	1799.260	1	1799.260	27.366	.000
	Greenhouse-Geisser	1799.260	1.000	1799.260	27.366	.000
	Huynh-Feldt	1799.260	1.000	1799.260	27.366	.000
	Lower-bound	1799.260	1.000	1799.260	27.366	.000
Focus * Gender	Sphericity Assumed	240.370	1	240.370	3.656	.077
	Greenhouse-Geisser	240.370	1.000	240.370	3.656	.077
	Huynh-Feldt	240.370	1.000	240.370	3.656	.077
	Lower-bound	240.370	1.000	240.370	3.656	.077
Error(Focus)	Sphericity Assumed	920.462	14	65.747		
	Greenhouse-Geisser	920.462	14.000	65.747		
	Huynh-Feldt	920.462	14.000	65.747		
	Lower-bound	920.462	14.000	65.747		

Table B.85: Tests of Within-Subjects Effects: Mean Duration of stressed syllable of Sentence-Penultimate Item /li-landan/ (in ms.)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Predicate Focsu	14.997*	2.867	.000	8.848	21.146
Predicate Focus	Sentence Focus	-14.997*	2.867	.000	-21.146	-8.848

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.86: Pairwise Comparisons: Mean Duration of stressed syllable of Sentence-Penultimate Item /li-landan/ (in ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.87: Mauchly's Test of Sphericity: Mean Duration of pre-focus Item /Rāmi/ (in ms.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	30276.229	1	30276.229	107.461	.000
	Greenhouse-Geisser	30276.229	1.000	30276.229	107.461	.000
	Huynh-Feldt	30276.229	1.000	30276.229	107.461	.000
	Lower-bound	30276.229	1.000	30276.229	107.461	.000
Focus * Gender	Sphericity Assumed	.005	1	.005	.000	.997
	Greenhouse-Geisser	.005	1.000	.005	.000	.997
	Huynh-Feldt	.005	1.000	.005	.000	.997
	Lower-bound	.005	1.000	.005	.000	.997
Error(Focus)	Sphericity Assumed	3944.385	14	281.742		
	Greenhouse-Geisser	3944.385	14.000	281.742		
	Huynh-Feldt	3944.385	14.000	281.742		
	Lower-bound	3944.385	14.000	281.742		

Table B.88: Tests of Within-Subjects Effects: Mean Duration of pre-focus Item /Rāmi/ (in ms.)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Sentence Focus	Predicate Focus	-61.519*	5.934	.000	-74.247	-48.790
Predicate Focus	Sentence Focus	61.519*	5.934	.000	48.790	74.247

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.89: Pairwise Comparisons: Mean Duration of pre-focus Item /Rāmi/ (in ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.90: Mauchly's Test of Sphericity: Mean Duration of pre-focus Item /Rana/ (in ms.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	468.327	1	468.327	4.735	.047
	Greenhouse-Geisser	468.327	1.000	468.327	4.735	.047
	Huynh-Feldt	468.327	1.000	468.327	4.735	.047
	Lower-bound	468.327	1.000	468.327	4.735	.047
Focus * Gender	Sphericity Assumed	2.809	1	2.809	.028	.869
	Greenhouse-Geisser	2.809	1.000	2.809	.028	.869
	Huynh-Feldt	2.809	1.000	2.809	.028	.869
	Lower-bound	2.809	1.000	2.809	.028	.869
Error(Focus)	Sphericity Assumed	1384.571	14	98.898		
	Greenhouse-Geisser	1384.571	14.000	98.898		
	Huynh-Feldt	1384.571	14.000	98.898		
	Lower-bound	1384.571	14.000	98.898		

Table B.91: Tests of Within-Subjects Effects: Mean Duration of pre-focus Item /Rana/ (in ms.)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Predicate Focus	-7.651*	3.516	.047	-15.192	-.110
Predicate Focus	Sentence Focus	7.651*	3.516	.047	.110	15.192

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.92: Pairwise Comparisons: Mean Duration of pre-focus Item /Rana/ (in ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.93: Mauchly's Test of Sphericity: Mean Duration of pre-focus Item /Rāmi/ (in ms.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	5295.282	1	5295.282	20.967	.000
	Greenhouse-Geisser	5295.282	1.000	5295.282	20.967	.000
	Huynh-Feldt	5295.282	1.000	5295.282	20.967	.000
	Lower-bound	5295.282	1.000	5295.282	20.967	.000
Focus * Gender	Sphericity Assumed	120.983	1	120.983	.479	.500
	Greenhouse-Geisser	120.983	1.000	120.983	.479	.500
	Huynh-Feldt	120.983	1.000	120.983	.479	.500
	Lower-bound	120.983	1.000	120.983	.479	.500
Error(Focus)	Sphericity Assumed	3535.709	14	252.551		
	Greenhouse-Geisser	3535.709	14.000	252.551		
	Huynh-Feldt	3535.709	14.000	252.551		
	Lower-bound	3535.709	14.000	252.551		

Table B.94: Tests of Within-Subjects Effects: Mean Duration of pre-focus Item /Rāmi/ (in ms.)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	predicate Focus	25.728*	5.619	.000	13.677	37.778
Predicate Focus	Sentence Focus	-25.728*	5.619	.000	-37.778	-13.677

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.95: Pairwise Comparisons: Mean Duration of pre-focus Item /Rāmi/ (in ms.)

B.3.2 Sentence Focus vs. Information Focus

Gender	**Subject** Code	*Rāmi*	*mar*	*Lı̄na*	*ʔams*
Male	A1	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	A2	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	L+H* (2) H* (3)	H* (5)	L+H* (5)	H* (5)
	A4	L+H* (4) H* (1)	H* (5)	L+H* (5)	H* (5)
	A5	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	A6	L+H* (3) H* (2)	H* (5)	L+H* (5)	H* (5)
	A7	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	A8	L+H* (5)	H* (5)	L+H* (5)	H* (5)
Female	B1	L+H* (3) H* (2)	L+H* (2) H* (3)	L+H* (5)	H* (5)
	B2	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	B3	L+H* (5)	H* (5)	Ł+H* (5)	H* (5)
	B4	H* (5)	H* (5)	L+H* (5)	H* (5)
	B5	L+H* (5)	H* (5)	L+H*(5)	H* (5)
	B6	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	B7	L+H* (5)	H* (5)	L+H*(5)	H* (5)
	B8	L+H* (5)	H* (5)	L+H* (5)	H* (5)

Table B.96: Transcription results for sentence /Rāmi mar [Lı̄na]$_F$ ʔams/. The sentence-medial item /Lı̄na/ carries information focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rana*	*sawwat*	*maryūl*	*li-Manāl*
Male	A1	L+H* (3) H* (2)	H* (5)	L+H* (5)	H* (5)
	A2	H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	H* (5)	H* (5)	L+H* (5)	H* (5)
	A4	L+H* (3) H* (2)	H* (5)	L+H* (5)	H* (5)
	A5	L+H* (1) H* (4)	H* (5)	L+H* (5)	H* (5)
	A6	L+H* (4) H* (1)	H* (5)	L+H* (5)	H* (5)
	A7	L+H* (4) H* (1)	H* (5)	L+H* (5)	H* (5)
	A8	H* (5)	H* (5)	L+H*(5)	H* (5)
Female	B1	L+H* (1) H* (4)	H* (5)	L+H* (5)	H* (5)
	B2	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	B3	H* (5)	H* (5)	L+H* (5)	H* (5)
	B4	H* (5)	H* (5)	L+H* (5)	H* (5)
	B5	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	B6	H* (5)	H* (5)	L+H* (2) H* (3)	H* (5)
	B7	H* (5)	H* (5)	L+H* (5)	H* (5)
	B8	L+H* (5)	H* (5)	L+H* (5)	H* (5)

Table B.97: Transcription results for the information-focus sentence /Rana sawwat [maryūl]$_{\mathrm{F}}$ li-Manāl/. The sentence-medial item carries information focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rāmi*	*hājar*	*li-landan*	*al-bāriḥ*
Male	A1	L+H* (1) H* (4)	H* (5)	L+H* (2) H* (3)	H* (5)
	A2	L+H* (1) H* (4)	H* (5)	L+H* (5)	H* (5)
	A3	H* (5)	H* (5)	L+H* (5)	H* (5)
	A4	L+H* (2) H* (3)	H* (5)	L+H* (5)	H* (5)
	A5	H* (5)	H* (5)	L+H* (5)	H* (5)
	A6	H* (5)	H* (5)	L+H* (5)	H* (5)
	A7	L+H* (3) H* (2)	H* (5)	L+H* (5)	H* (5)
	A8	L+H* (1) H* (4)	H* (5)	L+H* (4) L+H* (1)	H* (5)
Female	B1	L+H* (1) H* (4)	H* (5)	L+H* (5)	H* (5)
	B2	H* (5)	H* (5)	L+H* (5)	H* (5)
	B3	H* (5)	H* (5)	L+H* (5)	H* (5)
	B4	H* (5)	H* (5)	L+H* (5)	H* (5)
	B5	L+H* (5)	H* (5)	L+H* (5)	H* (5)
	B6	H* (5)	H* (5)	L+H* (5)	H* (5)
	B7	H* (5)	H* (5)	L+H* (5)	H* (5)
	B8	L+H* (3) H* (2)	H* (5)	L+H* (5)	H* (5)

Table B.98: Transcription results for the sentence /Rāmi hājar [li-landan]$_{\mathrm{F}}$ al-bāriḥ/. The sentence-initial item carries contrastive focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

B.3.3 Sentence Focus vs. in-situ Contrastive Focus

Gender	**Subject** Code	*Rāmi*	*mar*	*Līna*	*ʔams*
Male	A1	L+H* (1) H* (4)	H* (5) H* (5)	L+H* (5) L+H* (5)	H* (5) H* (5)
	A2	H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	H* (5)	H* (5)	L+H* (5)	H* (5)
	A4	H* (5)	H* (5)	L+H* (5)	H* (5)
	A5	H* (5)	H* (5)	L+H* (5)	H* (5)
	A6	L+H* (1) H* (4)	H* (5)	L+H* (5)	H* (5)
	A7	H* (5)	H* (5)	L+H* (5)	H* (5)
	A8	H* (5)	H* (5)	L+H* (5)	H* (5)
Female	B1	H* (5)	H* (5)	L+H* (5)	H* (5)
	B2	H* (5)	H* (5)	L+H* (5)	H* (5)
	B3	H* (5)	H* (5)	L+H* (5)	H* (5)
	B4	H* (5)	H* (5)	L+H* (5)	H* (5)
	B5	H* (5)	H* (5)	L+H* (5)	H* (5)
	B6	H* (5)	H* (5)	L+H* (2) H* (3)	H* (5)
	B7	H* (5)	H* (5)	L+H* (5)	H* (5)
	B8	H* (5)	H* (5)	L+H* (5)	H* (5)

Table B.99: Transcription results for sentence /Rāmi mar [Līna]$_{\mathrm{CF}}$ ʔams/. The sentence-medial item /Līna/ carries contrastive focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rana*	*sawwat*	*maryūl*	*li-Manāl*
Male	A1	L+H* (2) H* (3)	H* (5)	L+H* (5)	H* (5)
	A2	H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	H* (5)	H* (5)	L+H* (5)	H* (5)
	A4	H* (5)	H* (5)	L+H* (5)	H* (5)
	A5	H* (5)	H* (5)	L+H* (5)	H* (5)
	A6	H* (5)	H* (5)	L+H* (5)	H* (5)
	A7	H* (5)	H* (5)	L+H* (5)	H* (5)
	A8	H* (5)	H* (5)	L+H* (5)	H* (5)
Female	B1	H* (5)	H* (5)	L+H* (5)	H* (5)
	B2	H* (5)	H* (5)	L+H* (5)	H* (5)
	B3	H* (5)	H* (5)	L+H* (5)	H* (5)
	B4	H* (5)	H* (5)	L+H* (5)	H* (5)
	B5	L+H* (2) H* (3)	H* (5)	L+H* (5)	H* (5)
	B6	H* (5)	H* (5)	L+H* (5)	H* (5)
	B7	H* (5)	H* (5)	L+H* (5)	H* (5)
	B8	L+H* (4) H* (1)	H* (5)	L+H* (5)	H* (5)

Table B.100: Transcription results for the sentence /Rana sawwat [maryūl]$_{\mathrm{CF}}$ li-Manāl/. The sentence-medial item carries contrastive focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rāmi*	*hājar*	*li-landan*	*al-bāriḥ*
Male	A1	H* (5)	H* (5)	L+H* (5)	H* (5)
	A2	H* (5)	H* (5)	L+H* (5)	H* (5)
	A3	H* (5)	H* (5)	L+H* (5)	H* (5)
	A4	H* (5)	H* (5)	L+H* (5)	H* (5)
	A5	H* (5)	H* (5)	L+H* (5)	H* (5)
	A6	H* (5)	H* (5)	L+H* (5)	H* (5)
	A7	H* (5)	H* (5)	L+H* (5)	H* (5)
	A8	H* (5)	H* (5)	L+H* (5)	H* (5)
Female	B1	H* (5)	H* (5)	L+H* (5)	H* (5)
	B2	H* (5)	H* (5)	L+H* (5)	H* (5)
	B3	H* (5)	H* (5)	L+H* (5)	H* (5)
	B4	H* (5)	H* (5)	L+H* (5)	H* (5)
	B5	L+H* (1) H* (4)	H* (5)	L+H* (5)	H* (5)
	B6	H* (5)	H* (5)	L+H* (5)	H* (5)
	B7	H* (5)	H* (5)	L+H* (5)	H* (5)
	B8	H* (5)	H* (5)	L+H* (5)	H* (5)

Table B.101: Transcription results for the sentence /Rāmi hājar [li-landan]$_{\mathrm{CF}}$ al-bāriḥ/. The sentence-initial item carries contrastive focus at the time of discourse. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

B.3.4 Phonological Realization of Focus Preposing: ex-situ contrastive focus

Gender	**Subject** Code	*Līna*	*Rāmi*	*mar*	*ʔams*
Male	A1	L+H* (5)	L* (5)	L* (5)	L* (5)
	A2	L+H* (5)	L* (5)	L* (5)	L* (5)
	A3	L+H* (5)	L* (5)	L* (5)	L* (5)
	A4	L+H* (5)	H* (1) L* (4)	H* (1) L* (4)	L* (5)
	A5	L+H* (5)	L* (5)	L* (5)	L* (5)
	A6	L+H* (5)	H* (1) L* (4)	L* (5)	L* (5)
	A7	L+H* (5)	L* (5)	L* (5)	L* (5)
	A8	L+H* (5)	L* (5)	L* (5)	L* (5)
Female	B1	L+H* (5)	H* (3) L* (2)	H* (3) L* (2)	H* (3) L* (3)
	B2	L+H* (5)	H* (5)	H* (3) L* (2)	H* (3) L* (2)
	B3	L+H* (5)	L* (5)	L* (5)	L* (5)
	B4	L+H* (5)	L* (5)	L+H* (1) H* (4)	L* (5)
	B5	L+H* (5)	L* (5)	L* (5)	L* (5)
	B6	L+H* (5)	H* (5)	L+H* (1) H* (4)	L* (5)
	B7	L+H* (5)	H* (5)	L+H* (5)	L* (5)
	B8	L+H* (5)	L* (5)	L* (5)	L* (5)

Table B.102: Transcription results for sentence /[Līna]$_{\mathrm{CF}}$ Rāmi mar Līna ʔams/. The item /Līna/ carries contrastive focus at the time of discourse and it is realized at the left perphery of the clause. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*maryūl*	*Rana*	*sawwat*	*li-Manāl*
Male	A1	L+H* (5)	H* (2) L* (3)	H* (1) L* (4)	L* (5)
	A2	L+H* (5)	H* (1) L* (4)	H* (1) L* (4)	L* (5)
	A3	L+H* (5)	L* (5)	L* (5)	L* (5)
	A4	L+H* (5)	H* (4) L* (1)	H* (2) L (3)	L* (5)
	A5	L+H* (5)	H* (1) L* (4)	H* (1) L* (4)	L* (5)
	A6	L+H* (5)	L* (5)	L* (5)	L* (5)
	A7	L+H* (5)	L* (5)	L* (5)	L* (5)
	A8	L+H* (5)	L* (5)	L* (5)	L* (5)
Female	B1	L+H* (5)	L+H* (1) H* (3) L* (1)	L+H* (3) H* (1) L* (1)	L* (5)
	B2	L+H* (5)	L* (5)	L* (5)	L* (5)
	B3	L+H* (5)	L* (5)	L* (5)	L* (5)
	B4	L+H* (5)	L* (5)	L* (5)	L* (5)
	B5	L+H* (5)	H* (5)	H* (5)	H* (2) L* (3)
	B6	L+H* (2) H* (3)	H* (5)	H* (5)	H* (1) L* (4)
	B7	L+H* (5)	H* (5)	H* (5)	H* (1) L* (4)
	B8	L+H* (5)	L+H* (2) H* (3)	H* (5)	H* (5)

Table B.103: Transcription results for the sentence /[maryūl]$_{CF}$ Rana sawwat li-Manāl/. The item /maryūl/ carries contrastive focus at the time of discourse and it is realized at the left periphery of the clause. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*li-landan*	*Rāmi*	*hājar*	*al-bāriḥ*
Male	A1	L+H* (5)	L* (5)	L* (5)	L* (5)
	A2	L+H* (5)	L* (5)	L* (5)	L* (5)
	A3	L+H* (5)	L* (5)	L* (5)	L* (5)
	A4	L+H* (5)	L* (5)	L* (5)	L* (5)
	A5	L+H* (5)	L* (5)	L* (5)	L* (5)
	A6	L+H* (5)	L* (5)	L* (5)	L* (5)
	A7	L+H* (5)	L* (5)	L* (5)	L* (5)
	A8	L+H* (5)	L* (5)	L* (5)	L* (5)
Female	B1	L+H* (5)	L+H* (3) H* (2)	L+H* (3) H* (1) L* (1)	L* (5)
	B2	L+H* (5)	H* (5)	H* (5)	L* (5)
	B3	L+H* (5)	L* (5)	L* (5)	L* (5)
	B4	L+H* (5)	H* (1) L* (4)	L* (5)	L* (5)
	B5	L+H* (5)	H* (3) L* (2)	H* (3) L* (2)	H* (2) L* (3)
	B6	L+H* (1) H* (4)	H* (5)	H* (5)	L* (5)
	B7	L+H* (5)	H* (5)	H* (5)	H* (2) L* (3)
	B8	L+H* (5)	H* (5)	H* (5)	H* (5)

Table B.104: Transcription results for the sentence /[li-landan]$_{\mathrm{F}}$ Rāmi hājar al-bāriḥ/. The item /li-landan/ carries contrastive focus at the time of discourse and it is realized at the left periphery of the clause. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

B.3.5 Phonetic Analyses

B.3.5.1 Excursion Size (st.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.377	12.676	2	.002	.616	.694	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.105: Mauchly's Test of Sphericity: excursion size of the stressed syllable of on-focus region (in st.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	47.742	2	23.871	24.385	.000
	Greenhouse-Geisser	47.742	1.232	38.739	24.385	.000
	Huynh-Feldt	47.742	1.388	34.402	24.385	.000
	Lower-bound	47.742	1.000	47.742	24.385	.000
Focus * Gender	Sphericity Assumed	.481	2	.240	.246	.784
	Greenhouse-Geisser	.481	1.232	.390	.246	.676
	Huynh-Feldt	.481	1.388	.346	.246	.703
	Lower-bound	.481	1.000	.481	.246	.628
Error(Focus)	Sphericity Assumed	27.410	28	.979		
	Greenhouse-Geisser	27.410	17.254	1.589		
	Huynh-Feldt	27.410	19.429	1.411		
	Lower-bound	27.410	14.000	1.958		

Table B.106: Tests of Within-Subjects Effects: excursion size of the stressed syllable of on-focus region (in st.)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-.653*	.161	.004	-1.091	-.215
	Contrastive Focus	-2.365*	.419	.000	-3.504	-1.226
Information Focus	Sentence Focus	.653*	.161	.004	.215	1.091
	Contrastive Focus	-1.712*	.407	.003	-2.818	-.607
Contrastive Focus	Sentence Focus	2.365*	.419	.000	1.226	3.504
	Information Focus	1.712*	.407	.003	.607	2.818

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.107: Pairwise Comparisons: excursion size of the stressed syllable of on-focus region (in st.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.835	2.351	2	.309	.858	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.108: Mauchly's Test of Sphericity: excursion size of post-focus region (in st.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	6.469	2	3.234	3.733	.037
	Greenhouse-Geisser	6.469	1.716	3.770	3.733	.045
	Huynh-Feldt	6.469	2.000	3.234	3.733	.037
	Lower-bound	6.469	1.000	6.469	3.733	.074
Focus * Gender	Sphericity Assumed	.873	2	.436	.504	.610
	Greenhouse-Geisser	.873	1.716	.509	.504	.583
	Huynh-Feldt	.873	2.000	.436	.504	.610
	Lower-bound	.873	1.000	.873	.504	.490
Error(Focus)	Sphericity Assumed	24.264	28	.867		
	Greenhouse-Geisser	24.264	24.025	1.010		
	Huynh-Feldt	24.264	28.000	.867		
	Lower-bound	24.264	14.000	1.733		

Table B.109: Tests of Within-Subjects Effects: excursion size of the stressed syllable of on-focus region (in st.)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-.158	.263	1.000	-.873	.556
	Contrastive Focus	-.846	.332	.070	-1.749	.057
Information Focus	Sentence Focus	.158	.263	1.000	-.556	.873
	Contrastive Focus	-.687	.381	.279	-1.724	.349
Contrastive Focus	Sentence Focus	.846	.332	.070	-.057	1.749
	Information Focus	.687	.381	.279	-.349	1.724

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Table B.110: Pairwise Comparisons: excursion size of post-focus region (in st.)

B.3.5.2 Max F_0 (Hz.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.685	4.917	2	.086	.761	.895	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.111: Mauchly's Test of Sphericity: Max F_0 of stressed syllable of on-focus region (in Hz.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	6347.322	2	3173.661	18.193	.000
	Greenhouse-Geisser	6347.322	1.521	4173.120	18.193	.000
	Huynh-Feldt	6347.322	1.790	3546.210	18.193	.000
	Lower-bound	6347.322	1.000	6347.322	18.193	.001
Focus * Gender	Sphericity Assumed	1744.334	2	872.167	5.000	.014
	Greenhouse-Geisser	1744.334	1.521	1146.833	5.000	.024
	Huynh-Feldt	1744.334	1.790	974.549	5.000	.018
	Lower-bound	1744.334	1.000	1744.334	5.000	.042
Error(Focus)	Sphericity Assumed	4884.368	28	174.442		
	Greenhouse-Geisser	4884.368	21.294	229.377		
	Huynh-Feldt	4884.368	25.058	194.919		
	Lower-bound	4884.368	14.000	348.883		

Table B.112: Tests of Within-Subjects Effects: Max F_0 of stressed syllable of on-focus region (in Hz.)

Tests of Between-Subjects Effects

Measure:MEASURE_1
Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	3213987.57	1	3213987.57	394.823	.000
Gender	137303.198	1	137303.198	16.867	.001
Error	113964.411	14	8140.315		

Table B.113: Tests of Between-Subjects Effects: Max F_0 of stressed syllable of on-focus region (in Hz.)

Statistics

Gender			Sentence Focus	Information Focus	Contrastive Focus
1 Male	N	Valid	8	8	8
		Missing	0	0	0
	Mean		186.16925	201.17363	228.49442
	Std. Error of Mean		11.407951	13.522456	12.706941
	Median		183.54500	193.69350	220.12933
	Std. Deviation		32.266558	38.247281	35.940656
	Range		108.078	112.243	94.840
	Minimum		141.411	155.215	180.943
	Maximum		249.489	267.458	275.783
2 female	N	Valid	8	8	8
		Missing	0	0	0
	Mean		305.87379	311.58800	319.27642
	Std. Error of Mean		21.643986	23.238664	25.285124
	Median		312.97600	313.12900	324.81900
	Std. Deviation		61.218436	65.728868	71.517132
	Range		170.687	167.195	187.173
	Minimum		208.249	214.383	210.080
	Maximum		378.936	381.578	397.253

Table B.114: Max F_0 of stressed syllable of on-focus region (in Hz.) separated by gender

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Gender	Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
1 Male	Focus	.646	2.623	2	.269	.738	.889	.500
2 female	Focus	.759	1.656	2	.437	.806	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.115: Mauchly's Test of Sphericity: Max F_0 of stressed syllable of on-focus region (in Hz.) separated by gender

Tests of Within-Subjects Effects

Measure:MEASURE_1

Gender	Source		Type III Sum of Squares	df	Mean Square	F	Sig.
1 Male	Focus	Sphericity Assumed	7367.938	2	3683.969	15.670	.000
		Greenhouse-Geisser	7367.938	1.477	4988.724	15.670	.001
		Huynh-Feldt	7367.938	1.777	4145.928	15.670	.001
		Lower-bound	7367.938	1.000	7367.938	15.670	.005
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	3291.412	14	235.101		
		Greenhouse-Geisser	3291.412	10.338	318.367		
		Huynh-Feldt	3291.412	12.440	264.582		
		Lower-bound	3291.412	7.000	470.202		
2 female	Focus	Sphericity Assumed	723.718	2	361.859	3.180	.073
		Greenhouse-Geisser	723.718	1.611	449.157	3.180	.088
		Huynh-Feldt	723.718	2.000	361.859	3.180	.073
		Lower-bound	723.718	1.000	723.718	3.180	.118
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	1592.957	14	113.783		
		Greenhouse-Geisser	1592.957	11.279	141.232		
		Huynh-Feldt	1592.957	14.000	113.783		
		Lower-bound	1592.957	7.000	227.565		

Table B.116: Tests of Within-Subjects Effects: Max F_0 of stressed syllable of on-focus region (in Hz.) separated by gender

Pairwise Comparisons

Measure:MEASURE_1

Gender	(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
1 Male	Sentence Focus	Information Focus	-15.004	5.118	.066	-31.011	1.002
		Contrastive Focus	-42.325*	9.278	.008	-71.343	-13.307
	Information Focus	Sentence Focus	15.004	5.118	.066	-1.002	31.011
		Contrastive Focus	-27.321*	8.003	.034	-52.350	-2.291
	Contrastive Focus	Sentence Focus	42.325*	9.278	.008	13.307	71.343
		Information Focus	27.321*	8.003	.034	2.291	52.350
2 female	Sentence Focus	Information Focus	-5.714	3.946	.573	-18.055	6.627
		Contrastive Focus	-13.403	6.291	.212	-33.079	6.274
	Information Focus	Sentence Focus	5.714	3.946	.573	-6.627	18.055
		Contrastive Focus	-7.688	5.494	.613	-24.872	9.495
	Contrastive Focus	Sentence Focus	13.403	6.291	.212	-6.274	33.079
		Information Focus	7.688	5.494	.613	-9.495	24.872

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

*. The mean difference is significant at the

Table B.117: Pairwise Comparisons: Max F_0 of stressed syllable of on-focus region (in Hz.) separated by gender

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.650	5.597	2	.061	.741	.867	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.118: Mauchly's Test of Sphericity: Max F_0 of post-focus region (in Hz.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	717.855	2	358.928	3.949	.031
	Greenhouse-Geisser	717.855	1.482	484.488	3.949	.046
	Huynh-Feldt	717.855	1.734	413.986	3.949	.038
	Lower-bound	717.855	1.000	717.855	3.949	.067
Focus * Gender	Sphericity Assumed	663.712	2	331.856	3.651	.039
	Greenhouse-Geisser	663.712	1.482	447.946	3.651	.055
	Huynh-Feldt	663.712	1.734	382.762	3.651	.047
	Lower-bound	663.712	1.000	663.712	3.651	.077
Error(Focus)	Sphericity Assumed	2545.234	28	90.901		
	Greenhouse-Geisser	2545.234	20.743	122.700		
	Huynh-Feldt	2545.234	24.276	104.845		
	Lower-bound	2545.234	14.000	181.802		

Table B.119: Tests of Within-Subjects Effects: Max F_0 of post-focus region (in Hz.)

Tests of Between-Subjects Effects

Measure:MEASURE_1
Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1587531.60	1	1587531.60	1152.437	.000
Gender	99532.468	1	99532.468	72.254	.000
Error	19285.601	14	1377.543		

Table B.120: Tests of Between-Subjects Effects: Max F_0 of post-focus region (in Hz.)

Statistics

Gender			Sentence Focus	Information Focus	Contrastive Focus
1 Male	N	Valid	8	8	8
		Missing	0	0	0
	Mean		137.56330	132.27970	139.13109
	Std. Error of Mean		2.886060	3.544845	4.363868
	Median		138.64864	133.26844	138.98581
	Std. Deviation		8.163009	10.026336	12.342883
	Range		25.453	29.026	37.788
	Minimum		125.404	117.598	123.885
	Maximum		150.857	146.624	161.673
2 Female	N	Valid	8	8	8
		Missing	0	0	0
	Mean		236.99123	224.70907	220.49412
	Std. Error of Mean		12.495965	9.908967	9.775528
	Median		236.97931	223.76229	220.33439
	Std. Deviation		35.343928	28.026790	27.649369
	Range		111.674	79.816	90.041
	Minimum		184.654	187.078	173.617
	Maximum		296.328	266.894	263.658

Table B.121: Max F_0 of post-focus region (in Hz.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Gender	Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
1 Male	Focus	.897	.655	2	.721	.906	1.000	.500
2 Female	Focus	.412	5.316	2	.070	.630	.704	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.122: Mauchly's Test of Sphericity: Max F_0 of post-focus region (in Hz.) separated by gender

Tests of Within-Subjects Effects

Measure:MEASURE_1

Gender	Source		Type III Sum of Squares	df	Mean Square	F	Sig.
1 Male	Focus	Sphericity Assumed	206.176	2	103.088	1.633	.230
		Greenhouse-Geisser	206.176	1.813	113.744	1.633	.234
		Huynh-Feldt	206.176	2.000	103.088	1.633	.230
		Lower-bound	206.176	1.000	206.176	1.633	.242
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	883.768	14	63.126		
		Greenhouse-Geisser	883.768	12.688	69.652		
		Huynh-Feldt	883.768	14.000	63.126		
		Lower-bound	883.768	7.000	126.253		
2 Female	Focus	Sphericity Assumed	1175.392	2	587.696	4.952	.024
		Greenhouse-Geisser	1175.392	1.260	933.091	4.952	.048
		Huynh-Feldt	1175.392	1.407	835.309	4.952	.041
		Lower-bound	1175.392	1.000	1175.392	4.952	.061
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	1661.466	14	118.676		
		Greenhouse-Geisser	1661.466	8.818	188.423		
		Huynh-Feldt	1661.466	9.850	168.678		
		Lower-bound	1661.466	7.000	237.352		

Table B.123: Tests of Within-Subjects Effects: Max F_0 of post-focus region (in Hz.) separated by gender

Pairwise Comparisons

Measure:MEASURE_1

Gender	(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
1 Male	Sentence Focus	Information Focus	5.284	4.377	.800	-8.406	18.973
		Contrastive Focus	-1.568	4.168	1.000	-14.603	11.468
	Information Focus	Sentence Focus	-5.284	4.377	.800	-18.973	8.406
		Contrastive Focus	-6.851	3.288	.227	-17.136	3.433
	Contrastive Focus	Sentence Focus	1.568	4.168	1.000	-11.468	14.603
		Information Focus	6.851	3.288	.227	-3.433	17.136
2 Female	Sentence Focus	Information Focus	12.282	5.548	.187	-5.070	29.634
		Contrastive Focus	16.497	6.985	.151	-5.348	38.342
	Information Focus	Sentence Focus	-12.282	5.548	.187	-29.634	5.070
		Contrastive Focus	4.215	3.072	.637	-5.393	13.823
	Contrastive Focus	Sentence Focus	-16.497	6.985	.151	-38.342	5.348
		Information Focus	-4.215	3.072	.637	-13.823	5.393

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Table B.124: Pairwise Comparisons: Max F_0 of post-focus region (in Hz.) separated by gender

B.3.5.3 Mean F_0 (Hz.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.656	5.479	2	.065	.744	.872	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.125: Mauchly's Test of Sphericity: Mean F_0 of stressed syllable of on-focus region (in Hz.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	1674.815	2	837.407	7.030	.003
	Greenhouse-Geisser	1674.815	1.488	1125.398	7.030	.008
	Huynh-Feldt	1674.815	1.743	960.744	7.030	.005
	Lower-bound	1674.815	1.000	1674.815	7.030	.019
Focus * Gender	Sphericity Assumed	2910.777	2	1455.388	12.217	.000
	Greenhouse-Geisser	2910.777	1.488	1955.907	12.217	.001
	Huynh-Feldt	2910.777	1.743	1669.743	12.217	.000
	Lower-bound	2910.777	1.000	2910.777	12.217	.004
Error(Focus)	Sphericity Assumed	3335.470	28	119.124		
	Greenhouse-Geisser	3335.470	20.835	160.091		
	Huynh-Feldt	3335.470	24.405	136.669		
	Lower-bound	3335.470	14.000	238.248		

Table B.126: Tests of Within-Subjects Effects: Mean F_0 of stressed syllable of on-focus region (in Hz.)

Tests of Between-Subjects Effects

Measure:MEASURE_1
Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	2564606.78	1	2564606.78	647.592	.000
Gender	86032.905	1	86032.905	21.724	.000
Error	55443.119	14	3960.223		

Table B.127: Tests of Between-Subjects Effects: Mean F_0 of stressed syllable of on-focus region (in Hz.)

Statistics

Gender			Sentence Focus	Information Focus	Contrastive Focus
1 Male	N	Valid	8	8	8
		Missing	0	0	0
	Mean		174.04029	185.49313	206.90146
	Std. Error of Mean		9.846581	11.779993	11.266757
	Median		173.27800	177.35667	200.21367
	Std. Deviation		27.850335	33.318852	31.867201
	Range		92.196	97.981	87.427
	Minimum		134.254	143.765	163.686
	Maximum		226.450	241.746	251.113
2 Female	N	Valid	8	8	8
		Missing	0	0	0
	Mean		274.24808	275.91942	270.28446
	Std. Error of Mean		15.436744	16.356677	13.458102
	Median		276.69700	276.60417	272.07417
	Std. Deviation		43.661705	46.263670	38.065260
	Range		127.933	132.481	110.046
	Minimum		200.141	203.129	200.472
	Maximum		328.074	335.610	310.518

Table B.128: Mean F_0 of stressed syllable of on-focus region (in Hz.) separated by gender

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

						Epsilon[a]		
Gender	Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
1 Male	Focus	.633	2.742	2	.254	.732	.876	.500
2 Female	Focus	.681	2.306	2	.316	.758	.924	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.129: Mauchly's Test of Sphericity: Mean F_0 of stressed syllable of on-focus region (in Hz.) separated by gender

Tests of Within-Subjects Effects

Measure:MEASURE_1

Gender	Source		Type III Sum of Squares	df	Mean Square	F	Sig.
1 Male	Focus	Sphericity Assumed	4451.574	2	2225.787	14.675	.000
		Greenhouse-Geisser	4451.574	1.463	3042.362	14.675	.002
		Huynh-Feldt	4451.574	1.753	2539.519	14.675	.001
		Lower-bound	4451.574	1.000	4451.574	14.675	.006
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	2123.376	14	151.670		
		Greenhouse-Geisser	2123.376	10.242	207.313		
		Huynh-Feldt	2123.376	12.270	173.048		
		Lower-bound	2123.376	7.000	303.339		
2 Female	Focus	Sphericity Assumed	134.017	2	67.009	.774	.480
		Greenhouse-Geisser	134.017	1.516	88.388	.774	.451
		Huynh-Feldt	134.017	1.847	72.550	.774	.472
		Lower-bound	134.017	1.000	134.017	.774	.408
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	1212.094	14	86.578		
		Greenhouse-Geisser	1212.094	10.614	114.202		
		Huynh-Feldt	1212.094	12.931	93.738		
		Lower-bound	1212.094	7.000	173.156		

Table B.130: Tests of Within-Subjects Effects: Mean F_0 of stressed syllable of on-focus region (in Hz.) separated by gender

Pairwise Comparisons

Measure:MEASURE_1

Gender	(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1 Male	Sentence Focus	Information Focus	-11.453	4.063	.077	-24.160	1.255
		Contrastive Focus	-32.861*	7.471	.009	-56.228	-9.494
	Information Focus	Sentence Focus	11.453	4.063	.077	-1.255	24.160
		Contrastive Focus	-21.408*	6.436	.038	-41.537	-1.280
	Contrastive Focus	Sentence Focus	32.861*	7.471	.009	9.494	56.228
		Information Focus	21.408*	6.436	.038	1.280	41.537
2 Female	Sentence Focus	Information Focus	-1.671	3.082	1.000	-11.310	7.967
		Contrastive Focus	3.964	5.377	1.000	-12.854	20.781
	Information Focus	Sentence Focus	1.671	3.082	1.000	-7.967	11.310
		Contrastive Focus	5.635	5.150	.930	-10.472	21.741
	Contrastive Focus	Sentence Focus	-3.964	5.377	1.000	-20.781	12.854
		Information Focus	-5.635	5.150	.930	-21.741	10.472

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

*. The mean difference is significant at the

Table B.131: Pairwise Comparisons: Max F_0 of stressed syllable of on-focus region (in Hz.) separated by gender

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.595	6.743	2	.034	.712	.826	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.132: Mauchly's Test of Sphericity: Mean F_0 of post-focus region (in Hz.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	314.233	2	157.116	2.109	.140
	Greenhouse-Geisser	314.233	1.424	220.698	2.109	.157
	Huynh-Feldt	314.233	1.652	190.167	2.109	.150
	Lower-bound	314.233	1.000	314.233	2.109	.168
Focus * Gender	Sphericity Assumed	246.408	2	123.204	1.654	.209
	Greenhouse-Geisser	246.408	1.424	173.062	1.654	.218
	Huynh-Feldt	246.408	1.652	149.120	1.654	.215
	Lower-bound	246.408	1.000	246.408	1.654	.219
Error(Focus)	Sphericity Assumed	2085.592	28	74.485		
	Greenhouse-Geisser	2085.592	19.933	104.628		
	Huynh-Feldt	2085.592	23.134	90.154		
	Lower-bound	2085.592	14.000	148.971		

Table B.133: Tests of Within-Subjects Effects: Mean F_0 of post-focus region (in Hz.)

B.3.5.4 Mean Intensity (dB)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.424	11.146	2	.004	.635	.719	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.134: Mauchly's Test of Sphericity: Mean intensity of stressed syllable of on-focus region (in dB)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	24.127	2	12.063	8.287	.001
	Greenhouse-Geisser	24.127	1.269	19.009	8.287	.007
	Huynh-Feldt	24.127	1.438	16.777	8.287	.005
	Lower-bound	24.127	1.000	24.127	8.287	.012
Focus * Gender	Sphericity Assumed	2.135	2	1.067	.733	.489
	Greenhouse-Geisser	2.135	1.269	1.682	.733	.435
	Huynh-Feldt	2.135	1.438	1.484	.733	.450
	Lower-bound	2.135	1.000	2.135	.733	.406
Error(Focus)	Sphericity Assumed	40.762	28	1.456		
	Greenhouse-Geisser	40.762	17.770	2.294		
	Huynh-Feldt	40.762	20.133	2.025		
	Lower-bound	40.762	14.000	2.912		

Table B.135: Tests of Within-Subjects Effects: Mean intensity of stressed syllable of on-focus region (in dB)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-.536	.249	.148	-1.213	.141
	Contrastive Focus	-1.699*	.549	.024	-3.190	-.207
Information Focus	Sentence Focus	.536	.249	.148	-.141	1.213
	Contrastive Focus	-1.163*	.427	.050	-2.324	-.001
Contrastive Focus	Sentence Focus	1.699*	.549	.024	.207	3.190
	Information Focus	1.163*	.427	.050	.001	2.324

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table B.136: Pairwise Comparisons: Mean intensity of stressed syllable of on-focus region (in dB)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.753	3.693	2	.158	.802	.954	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.137: Mauchly's Test of Sphericity: Mean intensity of post-focus region (in dB)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	22.319	2	11.159	10.572	.000
	Greenhouse-Geisser	22.319	1.603	13.919	10.572	.001
	Huynh-Feldt	22.319	1.908	11.696	10.572	.000
	Lower-bound	22.319	1.000	22.319	10.572	.006
Focus * Gender	Sphericity Assumed	3.127	2	1.564	1.481	.245
	Greenhouse-Geisser	3.127	1.603	1.950	1.481	.247
	Huynh-Feldt	3.127	1.908	1.639	1.481	.245
	Lower-bound	3.127	1.000	3.127	1.481	.244
Error(Focus)	Sphericity Assumed	29.556	28	1.056		
	Greenhouse-Geisser	29.556	22.448	1.317		
	Huynh-Feldt	29.556	26.715	1.106		
	Lower-bound	29.556	14.000	2.111		

Table B.138: Tests of Within-Subjects Effects: Mean intensity of post-focus region (in dB)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	1.257*	.341	.007	.330	2.185
	Contrastive Focus	1.581*	.441	.009	.381	2.781
Information Focus	Sentence Focus	-1.257*	.341	.007	-2.185	-.330
	Contrastive Focus	.323	.291	.854	-.466	1.113
Contrastive Focus	Sentence Focus	-1.581*	.441	.009	-2.781	-.381
	Information Focus	-.323	.291	.854	-1.113	.466

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.139: Pairwise Comparisons: Mean intensity of post-focus region (in dB)

B.3.5.5 Mean Duration (st.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.958	.551	2	.759	.960	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.140: Mauchly's Test of Sphericity: Mean Duration of stressed syllable of /Līna/ (in ms.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	2088.721	2	1044.360	3.867	.033
	Greenhouse-Geisser	2088.721	1.920	1087.705	3.867	.035
	Huynh-Feldt	2088.721	2.000	1044.360	3.867	.033
	Lower-bound	2088.721	1.000	2088.721	3.867	.069
Focus * Gender	Sphericity Assumed	37.163	2	18.581	.069	.934
	Greenhouse-Geisser	37.163	1.920	19.353	.069	.928
	Huynh-Feldt	37.163	2.000	18.581	.069	.934
	Lower-bound	37.163	1.000	37.163	.069	.797
Error(Focus)	Sphericity Assumed	7562.046	28	270.073		
	Greenhouse-Geisser	7562.046	26.884	281.282		
	Huynh-Feldt	7562.046	28.000	270.073		
	Lower-bound	7562.046	14.000	540.146		

Table B.141: Tests of Within-Subjects Effects: Mean Duration of stressed syllable of /Līna/ (in ms.)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-7.910	5.431	.502	-22.670	6.850
	Contrastive Focus	-16.157	6.369	.071	-33.467	1.152
Information Focus	Sentence Focus	7.910	5.431	.502	-6.850	22.670
	Contrastive Focus	-8.247	5.587	.486	-23.432	6.938
Contrastive Focus	Sentence Focus	16.157	6.369	.071	-1.152	33.467
	Information Focus	8.247	5.587	.486	-6.938	23.432

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Table B.142: Pairwise Comparisons: Mean Duration of stressed syllable of /Līna/ (in ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.245	18.270	2	.000	.570	.631	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.143: Mauchly's Test of Sphericity: Mean Duration of stressed syllable of /maryūl/ (in ms.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	2769.817	2	1384.908	3.338	.050
	Greenhouse-Geisser	2769.817	1.140	2430.129	3.338	.082
	Huynh-Feldt	2769.817	1.263	2193.849	3.338	.077
	Lower-bound	2769.817	1.000	2769.817	3.338	.089
Focus * Gender	Sphericity Assumed	869.809	2	434.905	1.048	.364
	Greenhouse-Geisser	869.809	1.140	763.137	1.048	.332
	Huynh-Feldt	869.809	1.263	688.937	1.048	.338
	Lower-bound	869.809	1.000	869.809	1.048	.323
Error(Focus)	Sphericity Assumed	11618.125	28	414.933		
	Greenhouse-Geisser	11618.125	15.957	728.092		
	Huynh-Feldt	11618.125	17.676	657.300		
	Lower-bound	11618.125	14.000	829.866		

Table B.144: Tests of Within-Subjects Effects: Mean Duration of stressed syllable of /maryūl/ (in ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.810	2.738	2	.254	.840	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.145: Mauchly's Test of Sphericity: Mean Duration of stressed syllable of /landan/ (in ms.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	14558.510	2	7279.255	47.674	.000
	Greenhouse-Geisser	14558.510	1.681	8661.537	47.674	.000
	Huynh-Feldt	14558.510	2.000	7279.255	47.674	.000
	Lower-bound	14558.510	1.000	14558.510	47.674	.000
Focus * Gender	Sphericity Assumed	319.741	2	159.871	1.047	.364
	Greenhouse-Geisser	319.741	1.681	190.229	1.047	.355
	Huynh-Feldt	319.741	2.000	159.871	1.047	.364
	Lower-bound	319.741	1.000	319.741	1.047	.324
Error(Focus)	Sphericity Assumed	4275.307	28	152.690		
	Greenhouse-Geisser	4275.307	23.532	181.684		
	Huynh-Feldt	4275.307	28.000	152.690		
	Lower-bound	4275.307	14.000	305.379		

Table B.146: Tests of Within-Subjects Effects: Mean Duration of stressed syllable of /landan/ (in ms.)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Sentence Focus	Information Focus	-18.056*	3.559	.001	-27.729	-8.384
	Contrastive Focus	-42.500*	4.209	.000	-53.939	-31.060
Information Focus	Sentence Focus	18.056*	3.559	.001	8.384	27.729
	Contrastive Focus	-24.443*	5.184	.001	-38.532	-10.354
Contrastive Focus	Sentence Focus	42.500*	4.209	.000	31.060	53.939
	Information Focus	24.443*	5.184	.001	10.354	38.532

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table B.147: Pairwise Comparisons: Mean Duration of stressed syllable of /landan/ (in ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.937	.847	2	.655	.941	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.148: Mauchly's Test of Sphericity: Mean Duration of post-focus item /ʔams/ (in ms.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	7637.515	2	3818.757	8.101	.002
	Greenhouse-Geisser	7637.515	1.881	4059.626	8.101	.002
	Huynh-Feldt	7637.515	2.000	3818.757	8.101	.002
	Lower-bound	7637.515	1.000	7637.515	8.101	.013
Focus * Gender	Sphericity Assumed	444.388	2	222.194	.471	.629
	Greenhouse-Geisser	444.388	1.881	236.209	.471	.618
	Huynh-Feldt	444.388	2.000	222.194	.471	.629
	Lower-bound	444.388	1.000	444.388	.471	.504
Error(Focus)	Sphericity Assumed	13199.484	28	471.410		
	Greenhouse-Geisser	13199.484	26.339	501.144		
	Huynh-Feldt	13199.484	28.000	471.410		
	Lower-bound	13199.484	14.000	942.820		

Table B.149: Tests of Within-Subjects Effects: Mean Duration of post-focus item /ʔams/ (in ms.)

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Sentence Focus	Information Focus	-4.932	8.215	1.000	-27.260	17.395
	Contrastive Focus	-28.881*	8.068	.009	-50.808	-6.955
Information Focus	Sentence Focus	4.932	8.215	1.000	-17.395	27.260
	Contrastive Focus	-23.949*	6.648	.009	-42.016	-5.882
Contrastive Focus	Sentence Focus	28.881*	8.068	.009	6.955	50.808
	Information Focus	23.949*	6.648	.009	5.882	42.016

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table B.150: Pairwise Comparisons: Mean Duration of post-focus item /ʔams/ (in ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.966	.450	2	.799	.967	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.151: Mauchly's Test of Sphericity: Mean Duration of post-focus item /li-Manāl/ (in ms.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	7089.273	2	3544.637	4.762	.017
	Greenhouse-Geisser	7089.273	1.934	3665.144	4.762	.018
	Huynh-Feldt	7089.273	2.000	3544.637	4.762	.017
	Lower-bound	7089.273	1.000	7089.273	4.762	.047
Focus * Gender	Sphericity Assumed	11823.821	2	5911.911	7.941	.002
	Greenhouse-Geisser	11823.821	1.934	6112.898	7.941	.002
	Huynh-Feldt	11823.821	2.000	5911.911	7.941	.002
	Lower-bound	11823.821	1.000	11823.821	7.941	.014
Error(Focus)	Sphericity Assumed	20844.170	28	744.435		
	Greenhouse-Geisser	20844.170	27.079	769.743		
	Huynh-Feldt	20844.170	28.000	744.435		
	Lower-bound	20844.170	14.000	1488.869		

Table B.152: Tests of Within-Subjects Effects: Mean Duration of post-focus item /li-Manāl/ (in ms.)

Tests of Between-Subjects Effects

Measure:MEASURE_1
Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	9528145.09	1	9528145.09	977.707	.000
Gender	76587.609	1	76587.609	7.859	.014
Error	136435.541	14	9745.396		

Table B.153: Tests of Between-Subjects Effects: Mean Duration of post-focus item /li-Manāl/ (in ms.)

Statistics

Gender			Sentence Focus	Information Focus	Contrastive Focus
1 Male	N	Valid	8	8	8
		Missing	0	0	0
	Mean		408.63796	400.26931	407.86911
	Std. Error of Mean		11.914852	15.901463	14.077926
	Median		410.31108	389.30638	405.33144
	Std. Deviation		33.700290	44.976130	39.818388
	Range		102.148	141.409	125.427
	Minimum		359.354	360.430	357.246
	Maximum		461.502	501.839	482.673
2 Female	N	Valid	8	8	8
		Missing	0	0	0
	Mean		475.54759	523.41289	457.48382
	Std. Error of Mean		30.104194	26.932955	24.164261
	Median		451.67341	493.03696	440.62890
	Std. Deviation		85.147519	76.177899	68.346851
	Range		244.100	203.309	206.183
	Minimum		391.336	442.197	370.312
	Maximum		635.437	645.505	576.495

Table B.154: Mean Duration of post-focus item /li-Manāl/ (in ms.) separated by gender

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

						Epsilon[a]		
Gender	Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
1 Male	Focus	.835	1.079	2	.583	.859	1.000	.500
2 Female	Focus	.862	.889	2	.641	.879	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.155: Mauchly's Test of Sphericity: Mean Duration of post-focus item /li-Manāl/ (in ms.) separated by gender

Tests of Within-Subjects Effects

Measure:MEASURE_1

Gender	Source		Type III Sum of Squares	df	Mean Square	F	Sig.
1 Male	Focus	Sphericity Assumed	342.353	2	171.177	.299	.746
		Greenhouse-Geisser	342.353	1.717	199.339	.299	.715
		Huynh-Feldt	342.353	2.000	171.177	.299	.746
		Lower-bound	342.353	1.000	342.353	.299	.601
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	8007.257	14	571.947		
		Greenhouse-Geisser	8007.257	12.022	666.044		
		Huynh-Feldt	8007.257	14.000	571.947		
		Lower-bound	8007.257	7.000	1143.894		
2 Female	Focus	Sphericity Assumed	18570.741	2	9285.370	10.127	.002
		Greenhouse-Geisser	18570.741	1.758	10564.267	10.127	.003
		Huynh-Feldt	18570.741	2.000	9285.370	10.127	.002
		Lower-bound	18570.741	1.000	18570.741	10.127	.015
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	12836.913	14	916.922		
		Greenhouse-Geisser	12836.913	12.305	1043.212		
		Huynh-Feldt	12836.913	14.000	916.922		
		Lower-bound	12836.913	7.000	1833.845		

Table B.156: Tests of Within-Subjects Effects: Mean Duration of post-focus item /li-Manāl/ (in ms.) separated by gender

Pairwise Comparisons

Measure:MEASURE_1

Gender	(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
1 Male	Sentence Focus	Information Focus	8.369	13.298	1.000	-33.221	49.958
		Contrastive Focus	.769	12.917	1.000	-39.630	41.168
	Information Focus	Sentence Focus	-8.369	13.298	1.000	-49.958	33.221
		Contrastive Focus	-7.600	9.235	1.000	-36.481	21.282
	Contrastive Focus	Sentence Focus	-.769	12.917	1.000	-41.168	39.630
		Information Focus	7.600	9.235	1.000	-21.282	36.481
2 Female	Sentence Focus	Information Focus	-47.865	15.969	.060	-97.810	2.080
		Contrastive Focus	18.064	12.088	.536	-19.743	55.871
	Information Focus	Sentence Focus	47.865	15.969	.060	-2.080	97.810
		Contrastive Focus	65.929*	16.928	.018	12.987	118.871
	Contrastive Focus	Sentence Focus	-18.064	12.088	.536	-55.871	19.743
		Information Focus	-65.929*	16.928	.018	-118.871	-12.987

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

*. The mean difference is significant at the

Table B.157: Pairwise Comparisons: Mean Duration of post-focus item /li-Manāl/ (in ms.) separated by gender

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.733	4.042	2	.133	.789	.936	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table B.158: Mauchly's Test of Sphericity: Mean Duration of post-focus item /al-bāriḥ/ (in ms.)

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	1766.397	2	883.199	2.511	.099
	Greenhouse-Geisser	1766.397	1.578	1119.232	2.511	.114
	Huynh-Feldt	1766.397	1.872	943.669	2.511	.104
	Lower-bound	1766.397	1.000	1766.397	2.511	.135
Focus * Gender	Sphericity Assumed	5733.315	2	2866.657	8.149	.002
	Greenhouse-Geisser	5733.315	1.578	3632.765	8.149	.004
	Huynh-Feldt	5733.315	1.872	3062.931	8.149	.002
	Lower-bound	5733.315	1.000	5733.315	8.149	.013
Error(Focus)	Sphericity Assumed	9849.902	28	351.782		
	Greenhouse-Geisser	9849.902	22.095	445.795		
	Huynh-Feldt	9849.902	26.206	375.868		
	Lower-bound	9849.902	14.000	703.564		

Table B.159: Tests of Within-Subjects Effects: Mean Duration of post-focus item /al-bāriḥ/ (in ms.)

Appendix C

Chapter seven

C.1 Sentence-Focus Structure: Base Line

Gender	**Subject** Code	*marwān*	*māt*
Male	A1	L+H* (5)	H* (5)
	A2	L+H* (5)	H* (2) L* (3)
	A3	L+H* (1) H* (4)	H* (4) L* (1)
	A4	L+H* (5)	H* (5)
	A5	L+H* (5)	H* (5)
	A6	L+H* (5)	H* (3) L* (2)
	A7	L+H* (5)	H* (5)
	A8	L+H* (5)	H* (5)
Female	B1	L+H* (5)	H* (5)
	B2	L+H* (5)	H* (5)
	B3	L+H* (5)	H* (5)
	B4	L+H* (5)	H* (5)
	B5	L+H* (5)	H* (5)
	B6	L+H* (5)	H* (4) L* (1)
	B7	H* (5)	H* (5)
	B8	L+H* (5)	H* (5)

Table C.1: Transcription results for the sentence-focus structure /Marwān māt/. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rāmi*	*šayyab*
Male	A1	H* (5)	L+H* (5)
	A2	H* (5)	L+H* (5)
	A3	H* (5)	L+H* (5)
	A4	H* (5)	L+H* (3) H* (2)
	A5	H* (5)	L+H* (4) H* (1)
	A6	H* (5)	L+H* (2) H* (3)
	A7	H* (5)	L+H* (4) H* (1)
	A8	H* (5)	L+H* (5)
Female	B1	H* (5)	H* (5)
	B2	H* (5)	H* (5)
	B3	H* (5)	L+H* (5)
	B4	H* (5)	L+H* (4) H* (1)
	B5	L+H* (2) H* (3)	L+H* (4) H* (1)
	B6	H* (5)	L+H* (1) H* (4)
	B7	H* (5)	H* (5)
	B6	H* (5)	L+H* (2) H* (3)

Table C.2: Transcription results for the sentence-focus structure /Rāmi šayyab/. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

C.1.1 Sentence Focus vs. Information Focus

Gender	**Subject** Code	*marwān*	*māt*
Male	A1	L+H* (5)	L* (5)
	A2	L+H* (5)	L* (5)
	A3	L+H* (1) H* (4)	H* (2) L* (3)
	A4	L+H* (5)	L* (5)
	A5	L+H* (5)	L* (5)
	A6	L+H* (3) H* (2)	L* (5)
	A7	L+H* (5)	L* (3) H* (2)
	A8	L+H* (5)	L* (5)
Female	B1	L+H* (5)	H* (2) L* (3)
	B2	L+H* (5)	H* (1) L* (4)
	B3	L+H* (5)	H* (1) L* (4)
	B4	L+H* (5)	L* (5)
	B5	L+H* (5)	L* (5)
	B6	H* (5)	H* (1) L* (4)
	B7	L+H* (5)	H* (2) L* (3)
	B8	L+H* (5)	L* (5)

Table C.3: Transcription results for the target sentence /[Marwān]$_{\mathrm{F}}$ māt/. The sentence-initial item carries information focus. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rāmi*	*šayyab*
Male	A1	L+H* (2) H* (3)	H* (5)
	A2	L+H* (1) H* (4)	H* (5)
	A3	H* (5)	H* (5)
	A4	L+H* (1) H* (4)	H* (5)
	A5	L+H* (2) H* (3)	H* (5)
	A6	L+H* (2) H* (3)	H* (2) L* (3)
	A7	L+H* (4) H* (1)	H* (5)
	A8	H* (5)	L* (5)
Female	B1	L+H* (1) H* (4)	H* (5)
	B2	H* (5)	H* (5)
	B3	L+H* (2) H* (3)	H* (5)
	B4	L+H* (1) H* (4)	H* (5)
	B5	L+H* (4) H* (1)	H* (5)
	B6	H* (5)	H* (5)
	B7	H* (5)	H* (5)
	B8	L+H* (4) H* (1)	H* (5)

Table C.4: Transcription results for the target structure /[Rāmi]$_{\mathrm{F}}$ šayyab/. The sentence-initial item carries information focus. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

C.1.2 Sentence Focus vs. In-situ Contrastive Focus

Gender	**Subject** Code	*marwān*	*māt*
Male	A1	L+H* (5)	L* (5)
	A2	L+H* (5)	H* (1) L* (4)
	A3	L+H* (5)	L* (5)
	A4	L+H* (5)	H* (2) L* (3)
	A5	L+H* (5)	L* (5)
	A6	L+H* (5)	L* (5)
	A7	L+H* (5)	H* (3) L* (2)
	A8	L+H* (5)	L* (5)
Female	B1	L+H* (5)	H* (5)
	B2	L+H* (1) H* (4)	L* (5) L* (5)
	B3	L+H* (5)	H* (5)
	B4	L+H* (5)	H* (1) L* (4)
	B5	L+H* (5)	L* (5)
	B6	H* (5)	H* (2) L* (3)
	B7	L+H* (4) H* (1)	H* (1) L* (4)
	B8	L+H* (5) H* (1)	H* (4) L* (1)

Table C.5: Transcription results for the target sentence /[Marwān]$_{CF}$ māt/. The sentence-initial item carries contrastive focus. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rāmi*	*šayyab*
Male	A1	L+H* (1) H* (4)	H* (5)
	A2	L+H* (5)	H* (5)
	A3	L+H* (5)	L* (5)
	A4	L+H* (2) H* (3)	L* (5)
	A5	L+H* (1) H* (4)	H* (1) L* (4)
	A6	L+H* (3) H* (2)	L* (5)
	A7	L+H* (4) H* (1)	H* (4) L* (1)
	A7	L+H* (4) H* (1)	H* (1) L* (4)
Female	B1	L+H* (3) H* (2)	H* (5)
	B2	H* (5)	H* (4) L* (1)
	B3	L+H* (4) H* (1)	H* (3) L* (2)
	B4	H* (5)	H* (3) L* (2)
	B5	L+H* (5)	H* (4) L* (1)
	B6	H* (5)	H* (2) L* (3)
	B7	H* (5)	H* (1) L* (4)
	B8	L+H* (3) H* (2)	H* (2) L* (3)

Table C.6: Transcription results for the target structure /[Rāmi]$_{\mathrm{CF}}$ šayyab/. The sentence-initial item carries contrastive focus. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

C.1.3 Phonetic Analyses

C.1.3.1 Excursion Size (st.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.819	2.592	2	.274	.847	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.7: Mauchly's Test of Sphericity: excursion size of stressed syllable of on-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	27.020	2	13.510	10.426	.000
	Greenhouse-Geisser	27.020	1.694	15.953	10.426	.001
	Huynh-Feldt	27.020	2.000	13.510	10.426	.000
	Lower-bound	27.020	1.000	27.020	10.426	.006
Focus * Gender	Sphericity Assumed	5.505	2	2.753	2.124	.138
	Greenhouse-Geisser	5.505	1.694	3.250	2.124	.147
	Huynh-Feldt	5.505	2.000	2.753	2.124	.138
	Lower-bound	5.505	1.000	5.505	2.124	.167
Error(Focus)	Sphericity Assumed	36.284	28	1.296		
	Greenhouse-Geisser	36.284	23.713	1.530		
	Huynh-Feldt	36.284	28.000	1.296		
	Lower-bound	36.284	14.000	2.592		

Table C.8: Tests of Within-Subjects Effects: excursion size of stressed syllable of on-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-1.494*	.318	.001	-2.359	-.629
	Contrastive Focus	-1.674*	.405	.003	-2.775	-.573
Information Focus	Sentence Focus	1.494*	.318	.001	.629	2.359
	Contrastive Focus	-.180	.470	1.000	-1.456	1.097
Contrastive Focus	Sentence Focus	1.674*	.405	.003	.573	2.775
	Information Focus	.180	.470	1.000	-1.097	1.456

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table C.9: Pairwise Comparisons: excursion size of stressed syllable of on-focus region

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.658	5.438	2	.066	.745	.873	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.10: Mauchly's Test of Sphericity: excursion size of post-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	.370	2	.185	.043	.958
	Greenhouse-Geisser	.370	1.490	.248	.043	.918
	Huynh-Feldt	.370	1.746	.212	.043	.941
	Lower-bound	.370	1.000	.370	.043	.838
Focus * Gender	Sphericity Assumed	6.060	2	3.030	.707	.502
	Greenhouse-Geisser	6.060	1.490	4.066	.707	.465
	Huynh-Feldt	6.060	1.746	3.470	.707	.484
	Lower-bound	6.060	1.000	6.060	.707	.414
Error(Focus)	Sphericity Assumed	119.924	28	4.283		
	Greenhouse-Geisser	119.924	20.867	5.747		
	Huynh-Feldt	119.924	24.451	4.905		
	Lower-bound	119.924	14.000	8.566		

Table C.11: Tests of Within-Subjects Effects: excursion size of post-focus region

C.1.3.2 Max F_0 (Hz.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.589	6.888	2	.032	.709	.822	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.12: Mauchly's Test of Sphericity: Max F_0 of stressed syllable of on-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	12724.187	2	6362.093	11.333	.000
	Greenhouse-Geisser	12724.187	1.417	8978.932	11.333	.001
	Huynh-Feldt	12724.187	1.643	7744.418	11.333	.001
	Lower-bound	12724.187	1.000	12724.187	11.333	.005
Focus * Gender	Sphericity Assumed	1580.782	2	790.391	1.408	.261
	Greenhouse-Geisser	1580.782	1.417	1115.493	1.408	.261
	Huynh-Feldt	1580.782	1.643	962.123	1.408	.262
	Lower-bound	1580.782	1.000	1580.782	1.408	.255
Error(Focus)	Sphericity Assumed	15719.123	28	561.397		
	Greenhouse-Geisser	15719.123	19.840	792.310		
	Huynh-Feldt	15719.123	23.002	683.375		
	Lower-bound	15719.123	14.000	1122.794		

Table C.13: Tests of Within-Subjects Effects: Max F_0 of stressed syllable of on-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-29.007*	5.244	.000	-43.259	-14.754
	Contrastive Focus	-38.207*	10.193	.006	-65.909	-10.504
Information Focus	Sentence Focus	29.007*	5.244	.000	14.754	43.259
	Contrastive Focus	-9.200	8.895	.956	-33.375	14.974
Contrastive Focus	Sentence Focus	38.207*	10.193	.006	10.504	65.909
	Information Focus	9.200	8.895	.956	-14.974	33.375

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table C.14: Pairwise Comparisons: Max F_0 of stressed syllable of on-focus region

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.892	1.492	2	.474	.902	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.15: Mauchly's Test of Sphericity: Max F_0 of post-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	1654.657	2	827.329	1.124	.339
	Greenhouse-Geisser	1654.657	1.804	917.026	1.124	.335
	Huynh-Feldt	1654.657	2.000	827.329	1.124	.339
	Lower-bound	1654.657	1.000	1654.657	1.124	.307
Focus * Gender	Sphericity Assumed	148.388	2	74.194	.101	.904
	Greenhouse-Geisser	148.388	1.804	82.238	.101	.886
	Huynh-Feldt	148.388	2.000	74.194	.101	.904
	Lower-bound	148.388	1.000	148.388	.101	.756
Error(Focus)	Sphericity Assumed	20604.771	28	735.885		
	Greenhouse-Geisser	20604.771	25.261	815.668		
	Huynh-Feldt	20604.771	28.000	735.885		
	Lower-bound	20604.771	14.000	1471.769		

Table C.16: Tests of Within-Subjects Effects: Max F_0 of post-focus region

C.1.3.3 Mean F_0 (Hz.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.619	6.226	2	.044	.724	.844	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.17: Mauchly's Test of Sphericity: Mean F_0 of stressed syllable of on-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	8957.827	2	4478.913	9.818	.001
	Greenhouse-Geisser	8957.827	1.449	6183.469	9.818	.002
	Huynh-Feldt	8957.827	1.687	5308.740	9.818	.001
	Lower-bound	8957.827	1.000	8957.827	9.818	.007
Focus * Gender	Sphericity Assumed	954.438	2	477.219	1.046	.365
	Greenhouse-Geisser	954.438	1.449	658.836	1.046	.347
	Huynh-Feldt	954.438	1.687	565.635	1.046	.356
	Lower-bound	954.438	1.000	954.438	1.046	.324
Error(Focus)	Sphericity Assumed	12773.785	28	456.207		
	Greenhouse-Geisser	12773.785	20.281	629.827		
	Huynh-Feldt	12773.785	23.623	540.730		
	Lower-bound	12773.785	14.000	912.413		

Table C.18: Tests of Within-Subjects Effects: Mean F_0 of stressed syllable of on-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-25.853*	5.168	.001	-39.898	-11.807
	Contrastive Focus	-31.325*	9.362	.014	-56.768	-5.883
Information Focus	Sentence Focus	25.853*	5.168	.001	11.807	39.898
	Contrastive Focus	-5.473	7.532	1.000	-25.942	14.997
Contrastive Focus	Sentence Focus	31.325*	9.362	.014	5.883	56.768
	Information Focus	5.473	7.532	1.000	-14.997	25.942

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table C.19: Pairwise Comparisons: Mean F_0 of stressed syllable of on-focus region

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.666	5.286	2	.071	.750	.879	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.20: Mauchly's Test of Sphericity: Mean F_0 of post-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	4421.042	2	2210.521	7.379	.003
	Greenhouse-Geisser	4421.042	1.499	2949.015	7.379	.007
	Huynh-Feldt	4421.042	1.759	2513.662	7.379	.004
	Lower-bound	4421.042	1.000	4421.042	7.379	.017
Focus * Gender	Sphericity Assumed	26.910	2	13.455	.045	.956
	Greenhouse-Geisser	26.910	1.499	17.950	.045	.916
	Huynh-Feldt	26.910	1.759	15.300	.045	.940
	Lower-bound	26.910	1.000	26.910	.045	.835
Error(Focus)	Sphericity Assumed	8387.911	28	299.568		
	Greenhouse-Geisser	8387.911	20.988	399.648		
	Huynh-Feldt	8387.911	24.623	340.650		
	Lower-bound	8387.911	14.000	599.136		

Table C.21: Tests of Within-Subjects Effects: Mean F_0 of post-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	20.346*	5.852	.011	4.442	36.250
	Contrastive Focus	20.371	7.588	.053	-.253	40.995
Information Focus	Sentence Focus	-20.346*	5.852	.011	-36.250	-4.442
	Contrastive Focus	.025	4.529	1.000	-12.283	12.333
Contrastive Focus	Sentence Focus	-20.371	7.588	.053	-40.995	.253
	Information Focus	-.025	4.529	1.000	-12.333	12.283

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table C.22: Pairwise Comparisons: Mean F_0 of of post-focus region

C.1.3.4 Mean Intensity (dB)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.496	9.114	2	.010	.665	.761	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.23: Mauchly's Test of Sphericity: Mean intensity of stressed syllable of on-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	46.902	2	23.451	10.215	.000
	Greenhouse-Geisser	46.902	1.330	35.270	10.215	.003
	Huynh-Feldt	46.902	1.521	30.827	10.215	.002
	Lower-bound	46.902	1.000	46.902	10.215	.006
Focus * Gender	Sphericity Assumed	5.870	2	2.935	1.279	.294
	Greenhouse-Geisser	5.870	1.330	4.414	1.279	.287
	Huynh-Feldt	5.870	1.521	3.858	1.279	.290
	Lower-bound	5.870	1.000	5.870	1.279	.277
Error(Focus)	Sphericity Assumed	64.283	28	2.296		
	Greenhouse-Geisser	64.283	18.617	3.453		
	Huynh-Feldt	64.283	21.300	3.018		
	Lower-bound	64.283	14.000	4.592		

Table C.24: Tests of Within-Subjects Effects: Mean intensity of stressed syllable of on-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Sentence Focus	Information Focus	-.859	.454	.238	-2.093	.374
	Contrastive Focus	-2.390*	.700	.013	-4.291	-.489
Information Focus	Sentence Focus	.859	.454	.238	-.374	2.093
	Contrastive Focus	-1.531*	.407	.006	-2.636	-.425
Contrastive Focus	Sentence Focus	2.390*	.700	.013	.489	4.291
	Information Focus	1.531*	.407	.006	.425	2.636

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table C.25: Pairwise Comparisons: Mean intensity of stressed syllable of on-focus region

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.757	3.615	2	.164	.805	.958	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.26: Mauchly's Test of Sphericity: Mean intensity of post-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	34.343	2	17.172	7.232	.003
	Greenhouse-Geisser	34.343	1.609	21.340	7.232	.006
	Huynh-Feldt	34.343	1.917	17.918	7.232	.003
	Lower-bound	34.343	1.000	34.343	7.232	.018
Focus * Gender	Sphericity Assumed	21.351	2	10.675	4.496	.020
	Greenhouse-Geisser	21.351	1.609	13.267	4.496	.029
	Huynh-Feldt	21.351	1.917	11.139	4.496	.022
	Lower-bound	21.351	1.000	21.351	4.496	.052
Error(Focus)	Sphericity Assumed	66.484	28	2.374		
	Greenhouse-Geisser	66.484	22.531	2.951		
	Huynh-Feldt	66.484	26.834	2.478		
	Lower-bound	66.484	14.000	4.749		

Table C.27: Tests of Within-Subjects Effects: Mean intensity of post-focus region

Tests of Between-Subjects Effects

Measure:MEASURE_1
Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	139833.326	1	139833.326	2546.406	.000
Gender	.061	1	.061	.001	.974
Error	768.796	14	54.914		

Table C.28: Tests of Between-Subjects Effects: Mean intensity of of post-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I–J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Sentence Focus	Information Focus	1.887*	.524	.009	.464	3.310
	Contrastive Focus	1.684	.658	.068	-.105	3.473
Information Focus	Sentence Focus	-1.887*	.524	.009	-3.310	-.464
	Contrastive Focus	-.203	.428	1.000	-1.366	.960
Contrastive Focus	Sentence Focus	-1.684	.658	.068	-3.473	.105
	Information Focus	.203	.428	1.000	-.960	1.366

Based on estimated marginal means

*. The mean difference is significant at the

a. Adjustment for multiple comparisons: Bonferroni.

Table C.29: Pairwise Comparisons: Mean intensity of of post-focus region

C.1.3.5 Mean Duration (ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.735	4.001	2	.135	.791	.938	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.30: Mauchly's Test of Sphericity: Mean Duration of stressed syllable of on-focus item /Rāmi/

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	7767.084	2	3883.542	12.133	.000
	Greenhouse-Geisser	7767.084	1.581	4912.323	12.133	.001
	Huynh-Feldt	7767.084	1.876	4140.147	12.133	.000
	Lower-bound	7767.084	1.000	7767.084	12.133	.004
Focus * Gender	Sphericity Assumed	610.602	2	305.301	.954	.397
	Greenhouse-Geisser	610.602	1.581	386.178	.954	.381
	Huynh-Feldt	610.602	1.876	325.474	.954	.393
	Lower-bound	610.602	1.000	610.602	.954	.345
Error(Focus)	Sphericity Assumed	8962.000	28	320.071		
	Greenhouse-Geisser	8962.000	22.136	404.861		
	Huynh-Feldt	8962.000	26.265	341.220		
	Lower-bound	8962.000	14.000	640.143		

Table C.31: Tests of Within-Subjects Effects: Mean Duration of stressed syllable of on-focus item /Rāmi/

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Sentence Focus	Information Focus	-24.701*	5.038	.001	-38.392	-11.010
	Contrastive Focus	-28.799*	5.897	.001	-44.826	-12.772
Information Focus	Sentence Focus	24.701*	5.038	.001	11.010	38.392
	Contrastive Focus	-4.098	7.738	1.000	-25.128	16.931
Contrastive Focus	Sentence Focus	28.799*	5.897	.001	12.772	44.826
	Information Focus	4.098	7.738	1.000	-16.931	25.128

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table C.32: Pairwise Comparisons: Mean Duration of stressed syllable of on-focus item /Rāmi/

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.989	.143	2	.931	.989	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.33: Mauchly's Test of Sphericity: Mean Duration of post-focus item /šayyab/

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	19817.318	2	9908.659	12.145	.000
	Greenhouse-Geisser	19817.318	1.978	10016.994	12.145	.000
	Huynh-Feldt	19817.318	2.000	9908.659	12.145	.000
	Lower-bound	19817.318	1.000	19817.318	12.145	.004
Focus * Gender	Sphericity Assumed	4331.776	2	2165.888	2.655	.088
	Greenhouse-Geisser	4331.776	1.978	2189.569	2.655	.089
	Huynh-Feldt	4331.776	2.000	2165.888	2.655	.088
	Lower-bound	4331.776	1.000	4331.776	2.655	.126
Error(Focus)	Sphericity Assumed	22843.842	28	815.851		
	Greenhouse-Geisser	22843.842	27.697	824.772		
	Huynh-Feldt	22843.842	28.000	815.851		
	Lower-bound	22843.842	14.000	1631.703		

Table C.34: Tests of Within-Subjects Effects:Mean Duration of post-focus item /šayyab/

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	8.124	10.015	1.000	-19.095	35.343
	Contrastive Focus	46.587*	9.680	.001	20.280	72.895
Information Focus	Sentence Focus	-8.124	10.015	1.000	-35.343	19.095
	Contrastive Focus	38.463*	10.580	.008	9.708	67.217
Contrastive Focus	Sentence Focus	-46.587*	9.680	.001	-72.895	-20.280
	Information Focus	-38.463*	10.580	.008	-67.217	-9.708

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table C.35: Pairwise Comparisons: Mean Duration of post-focus item /šayyab/

C.2 Sentence-final position

C.2.1 Sentence Focus vs. Information Focus

Gender	**Subject** Code	*marwān*	*māt*
Male	A1	H* (5)	H* (5)
	A2	H* (5)	H* (5)
	A3	H* (5)	H* (5)
	A4	H* (5)	H* (5)
	A5	H* (5)	H* (5)
	A6	H* (5)	H* (5)
	A7	H* (5)	H* (5)
	A8	H* (5)	H* (5)
Female	B1	H* (5)	H* (5)
	B2	H* (5)	H* (5)
	B3	H* (5)	H* (5)
	B4	H* (5)	H* (5)
	B5	H* (5)	H* (5)
	B6	H* (5)	H* (5)
	B7	H* (5)	H* (5)
	B8	H* (5)	H* (5)

Table C.36: Transcription results for the target sentence /Marwān [māt]$_{\mathrm{F}}$/. The sentence-final item carries information focus. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rāmi*	*šayyab*
Male	A1	H* (5)	L+H* (5)
	A2	H* (5)	L+H* (5)
	A3	H* (5)	L+H* (2) H* (3)
	A4	H* (5)	L+H* (5)
	A5	H* (5)	L+H* (5)
	A6	H* (5)	L+H* (5)
	A7	H* (5)	L+H* (2) H* (3)
	A8	H* (5)	L+H* (5)
Female	B1	H* (5)	H* (5)
	B2	H* (5)	L+H* (2) H* (3)
	B3	H* (5)	L+H* (5)
	B4	H* (5)	L+H* (5)
	B5	H* (5)	L+H* (5)
	B6	H* (5)	L+H* (1) H* (4)
	B7	H* (5)	L+H* (1) H* (4)
	B8	H* (5)	L+H* (5)

Table C.37: Transcription results for the target structure /Rāmi [šayyab]$_{\mathrm{F}}$ /. The sentence-final item carries information focus. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

C.2.2 Sentence Focus vs. In-situ Contrastive Focus

Gender	**Subject** Code	*marwān*	*māt*
Male	A1	H* (5)	H* (5)
	A2	H* (5)	H* (5)
	A3	H* (5)	H* (5)
	A4	H* (5)	H* (5)
	A5	H* (5)	H* (5)
	A6	H* (5)	H* (5)
	A7	H* (5)	H* (5)
	A8	H* (5)	H* (5)
Female	B1	H* (5)	H* (5)
	B2	H* (5)	H* (5)
	B3	H* (5)	H* (5)
	B4	H* (5)	H* (5)
	B5	H* (5)	H* (5)
	B6	H* (5)	H* (5)
	B7	H* (5)	H* (5)
	B8	H* (5)	H* (5)

Table C.38: Transcription results for the target sentence /Marwān [māt]$_{\text{CF}}$/. The sentence-final item carries contrastive focus. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*Rāmi*	*šayyab*
Male	A1	H* (5)	L+H* (4) H* (1)
	A2	H* (5)	L+H* (5)
	A3	H* (5)	L+H* (5)
	A4	H* (5)	L+H* (4) H* (1)
	A5	H* (5)	L+H* (5)
	A6	H* (5)	L+H* (3) H* (2)
	A7	H* (5)	L+H* (5)
	A8	H* (5)	L+H* (5)
Female	B1	H* (5)	L+H* (5)
	B2	H* (5)	L+H* (5)
	B3	H* (5)	L+H* (5)
	B4	H* (5)	L+H* (5)
	B5	H* (5)	L+H* (4) H* (1)
	B6	H* (5)	H* (5)
	B7	H* (5)	H* (5)
	B8	H* (5)	L+H* (5)

Table C.39: Transcription results for the target structure /Rāmi [šayyab]$_{\mathrm{CF}}$ /. The sentence-final item carries contrastive focus. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

C.2.3 Phonological Realization of Focus Preposing

Gender	**Subject** Code	*māt*	*marwān*
Male	A1	L+H* (5)	L* (5)
	A2	L+H* (5)	L* (5)
	A3	H* (5)	L* (5)
	A4	L+H* (5)	L* (5)
	A5	L+H* (5)	L* (5)
	A6	H* (5)	L* (5)
	A7	L+H* (5)	L* (5)
	A8	L+H* (5)	L* (5)
Female	B1	L+H* (5)	L* (5)
	B2	H* (5)	L* (5)
	B3	L+H* (5)	L* (5)
	B4	L+H* (1) H* (4)	L* (5)
	B5	L+H* (5)	L* (5)
	B6	H* (5)	L* (5)
	B7	L+H* (3) H* (2)	H* (2) L* (3)
	B8	L+H* (5)	L* (5)

Table C.40: Transcription results for the target sentence /[māt]$_{\mathrm{CF}}$ Marwān/. The verb /māt/ is contrastive focus which is structurally realized at the left-periphery of the clause. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

Gender	**Subject** Code	*šayyab*	*Rāmi*
Male	A1	L+H* (2) H* (3)	L* (5)
	A2	L+H* (4) H* (1)	L* (5)
	A3	L+H* (2) H* (3)	L* (5)
	A4	L+H* (3) H* (2)	L* (5)
	A5	H* (5)	L* (5)
	A6	L+H* (1) H* (4)	L* (5)
	A7	L+H* (3) H* (2)	L* (5)
	A8	L+H* (1) H* (4)	L* (5)
Female	B1	L+H* (5)	L* (5)
	B2	H* (5)	L* (5)
	B3	L+H* (5)	L* (5)
	B4	H* (5)	L* (5)
	B5	L+H* (5)	L* (5)
	B6	H* (5)	L* (5)
	B7	L+H* (2) H* (3)	H* (1) L* (4)
	B8	L+H* (5)	L* (5)

Table C.41: Transcription results for the target structure / [šayyab]$_{\mathrm{CF}}$ Rāmi/. The verb item /šayyab/ is contrastive focus which is structurally realized at the left-periphery of the clause. The number between parenthesis indicates the number of tokens out of 5 tokens (5 repetitions).

C.2.4 Phonetic Analysis

C.2.4.1 Excursion Size (in st.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.617	6.282	2	.043	.723	.842	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.42: Mauchly's Test of Sphericity: excursion size of the stressed syllable of the on-focus region.

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	33.733	2	16.867	7.134	.003
	Greenhouse-Geisser	33.733	1.446	23.330	7.134	.008
	Huynh-Feldt	33.733	1.683	20.038	7.134	.005
	Lower-bound	33.733	1.000	33.733	7.134	.018
Focus * Gender	Sphericity Assumed	.980	2	.490	.207	.814
	Greenhouse-Geisser	.980	1.446	.678	.207	.743
	Huynh-Feldt	.980	1.683	.582	.207	.777
	Lower-bound	.980	1.000	.980	.207	.656
Error(Focus)	Sphericity Assumed	66.201	28	2.364		
	Greenhouse-Geisser	66.201	20.243	3.270		
	Huynh-Feldt	66.201	23.569	2.809		
	Lower-bound	66.201	14.000	4.729		

Table C.43: Tests of Within-Subjects Effects: excursion size of the stressed syllable of the on-focus region.

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-1.704*	.395	.002	-2.778	-.630
	Contrastive Focus	-1.844*	.513	.009	-3.237	-.451
Information Focus	Sentence Focus	1.704*	.395	.002	.630	2.778
	Contrastive Focus	-.140	.684	1.000	-1.999	1.719
Contrastive Focus	Sentence Focus	1.844*	.513	.009	.451	3.237
	Information Focus	.140	.684	1.000	-1.719	1.999

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table C.44: Pairwise Comparisons: excursion size of the stressed syllable of the on-focus region.

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.884	1.596	2	.450	.896	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.45: Mauchly's Test of Sphericity: Excursion Size of post-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	.482	2	.241	.108	.898
	Greenhouse-Geisser	.482	1.793	.269	.108	.878
	Huynh-Feldt	.482	2.000	.241	.108	.898
	Lower-bound	.482	1.000	.482	.108	.747
Focus * Gender	Sphericity Assumed	.159	2	.080	.036	.965
	Greenhouse-Geisser	.159	1.793	.089	.036	.953
	Huynh-Feldt	.159	2.000	.080	.036	.965
	Lower-bound	.159	1.000	.159	.036	.853
Error(Focus)	Sphericity Assumed	62.617	28	2.236		
	Greenhouse-Geisser	62.617	25.100	2.495		
	Huynh-Feldt	62.617	28.000	2.236		
	Lower-bound	62.617	14.000	4.473		

Table C.46: Tests of Within-Subjects Effects: Excursion Size of post-focus region

C.2.4.2 Max F_0 (in Hz.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.550	7.773	2	.021	.690	.795	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.47: Mauchly's Test of Sphericity: Max F_0 of the stressed syllable of the on-focus region.

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	9691.786	2	4845.893	14.521	.000
	Greenhouse-Geisser	9691.786	1.379	7026.833	14.521	.000
	Huynh-Feldt	9691.786	1.590	6095.136	14.521	.000
	Lower-bound	9691.786	1.000	9691.786	14.521	.002
Focus * Gender	Sphericity Assumed	310.510	2	155.255	.465	.633
	Greenhouse-Geisser	310.510	1.379	225.129	.465	.564
	Huynh-Feldt	310.510	1.590	195.279	.465	.590
	Lower-bound	310.510	1.000	310.510	.465	.506
Error(Focus)	Sphericity Assumed	9344.101	28	333.718		
	Greenhouse-Geisser	9344.101	19.310	483.911		
	Huynh-Feldt	9344.101	22.261	419.748		
	Lower-bound	9344.101	14.000	667.436		

Table C.48: Tests of Within-Subjects Effects: Max F_0 of the stressed syllable of the on-focus region.

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-24.501*	3.712	.000	-34.590	-14.412
	Contrastive Focus	-33.660*	7.559	.002	-54.204	-13.116
Information Focus	Sentence Focus	24.501*	3.712	.000	14.412	34.590
	Contrastive Focus	-9.159	7.364	.702	-29.172	10.854
Contrastive Focus	Sentence Focus	33.660*	7.559	.002	13.116	54.204
	Information Focus	9.159	7.364	.702	-10.854	29.172

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table C.49: Pairwise Comparisons: Max F_0 of the stressed syllable of the on-focus region.

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.723	4.216	2	.121	.783	.927	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.50: Mauchly's Test of Sphericity: Max F_0 of post-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	1195.482	2	597.741	3.285	.052
	Greenhouse-Geisser	1195.482	1.566	763.306	3.285	.067
	Huynh-Feldt	1195.482	1.855	644.623	3.285	.057
	Lower-bound	1195.482	1.000	1195.482	3.285	.091
Focus * Gender	Sphericity Assumed	579.151	2	289.575	1.591	.222
	Greenhouse-Geisser	579.151	1.566	369.783	1.591	.227
	Huynh-Feldt	579.151	1.855	312.287	1.591	.223
	Lower-bound	579.151	1.000	579.151	1.591	.228
Error(Focus)	Sphericity Assumed	5095.069	28	181.967		
	Greenhouse-Geisser	5095.069	21.927	232.369		
	Huynh-Feldt	5095.069	25.964	196.239		
	Lower-bound	5095.069	14.000	363.933		

Table C.51: Tests of Within-Subjects Effects: Max F_0 of post-focus region

C.2.4.3 Mean F_0 (in Hz.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.900	1.371	2	.504	.909	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.52: Mauchly's Test of Sphericity: Mean F_0 of the stressed syllable of the on-focus region.

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	5000.516	2	2500.258	13.568	.000
	Greenhouse-Geisser	5000.516	1.818	2750.468	13.568	.000
	Huynh-Feldt	5000.516	2.000	2500.258	13.568	.000
	Lower-bound	5000.516	1.000	5000.516	13.568	.002
Focus * Gender	Sphericity Assumed	638.118	2	319.059	1.731	.195
	Greenhouse-Geisser	638.118	1.818	350.988	1.731	.199
	Huynh-Feldt	638.118	2.000	319.059	1.731	.195
	Lower-bound	638.118	1.000	638.118	1.731	.209
Error(Focus)	Sphericity Assumed	5159.561	28	184.270		
	Greenhouse-Geisser	5159.561	25.453	202.711		
	Huynh-Feldt	5159.561	28.000	184.270		
	Lower-bound	5159.561	14.000	368.540		

Table C.53: Tests of Within-Subjects Effects: Mean F_0 of the stressed syllable of the on-focus region.

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-14.826*	4.319	.012	-26.563	-3.089
	Contrastive Focus	-24.847*	4.493	.000	-37.057	-12.637
Information Focus	Sentence Focus	14.826*	4.319	.012	3.089	26.563
	Contrastive Focus	-10.021	5.501	.270	-24.973	4.931
Contrastive Focus	Sentence Focus	24.847*	4.493	.000	12.637	37.057
	Information Focus	10.021	5.501	.270	-4.931	24.973

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table C.54: Pairwise Comparisons: Mean F_0 of the stressed syllable of the on-focus region.

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.827	2.469	2	.291	.853	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.55: Mauchly's Test of Sphericity: Max F_0 of post-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	1487.003	2	743.501	7.095	.003
	Greenhouse-Geisser	1487.003	1.705	872.101	7.095	.005
	Huynh-Feldt	1487.003	2.000	743.501	7.095	.003
	Lower-bound	1487.003	1.000	1487.003	7.095	.019
Focus * Gender	Sphericity Assumed	96.888	2	48.444	.462	.635
	Greenhouse-Geisser	96.888	1.705	56.823	.462	.605
	Huynh-Feldt	96.888	2.000	48.444	.462	.635
	Lower-bound	96.888	1.000	96.888	.462	.508
Error(Focus)	Sphericity Assumed	2934.051	28	104.788		
	Greenhouse-Geisser	2934.051	23.871	122.912		
	Huynh-Feldt	2934.051	28.000	104.788		
	Lower-bound	2934.051	14.000	209.575		

Table C.56: Tests of Within-Subjects Effects: Max F_0 of post-focus region

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-4.865	2.768	.302	-12.389	2.658
	Contrastive Focus	-13.462*	4.018	.014	-24.382	-2.542
Information Focus	Sentence Focus	4.865	2.768	.302	-2.658	12.389
	Contrastive Focus	-8.597	3.935	.139	-19.292	2.098
Contrastive Focus	Sentence Focus	13.462*	4.018	.014	2.542	24.382
	Information Focus	8.597	3.935	.139	-2.098	19.292

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table C.57: Pairwise Comparisons: Mean F_0 of of post-focus region

C.2.4.4 Mean Intensity (in dB)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.778	3.262	2	.196	.818	.978	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.58: Mauchly's Test of Sphericity: Mean Intensity of the stressed syllable of the on-focus region.

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	72.305	2	36.152	18.448	.000
	Greenhouse-Geisser	72.305	1.637	44.176	18.448	.000
	Huynh-Feldt	72.305	1.956	36.958	18.448	.000
	Lower-bound	72.305	1.000	72.305	18.448	.001
Focus * Gender	Sphericity Assumed	4.650	2	2.325	1.186	.320
	Greenhouse-Geisser	4.650	1.637	2.841	1.186	.315
	Huynh-Feldt	4.650	1.956	2.377	1.186	.320
	Lower-bound	4.650	1.000	4.650	1.186	.294
Error(Focus)	Sphericity Assumed	54.872	28	1.960		
	Greenhouse-Geisser	54.872	22.914	2.395		
	Huynh-Feldt	54.872	27.390	2.003		
	Lower-bound	54.872	14.000	3.919		

Table C.59: Tests of Within-Subjects Effects: Mean Intensity of the stressed syllable of the on-focus region.

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Sentence Focus	Information Focus	-1.772*	.488	.008	-3.100	-.444
	Contrastive Focus	-2.989*	.590	.001	-4.592	-1.386
Information Focus	Sentence Focus	1.772*	.488	.008	.444	3.100
	Contrastive Focus	-1.217*	.385	.021	-2.264	-.170
Contrastive Focus	Sentence Focus	2.989*	.590	.001	1.386	4.592
	Information Focus	1.217*	.385	.021	.170	2.264

Based on estimated marginal means

*. The mean difference is significant at the
a. Adjustment for multiple comparisons: Bonferroni.

Table C.60: Pairwise Comparisons: Mean Intensity of the stressed syllable of the on-focus region.

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.005	67.814	2	.000	.501	.540	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.61: Mauchly's Test of Sphericity: Mean Intensity of post-focus region

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	282341.626	2	141170.813	330.945	.000
	Greenhouse-Geisser	282341.626	1.003	281575.572	330.945	.000
	Huynh-Feldt	282341.626	1.080	261307.030	330.945	.000
	Lower-bound	282341.626	1.000	282341.626	330.945	.000
Focus * Gender	Sphericity Assumed	20758.382	2	10379.191	24.332	.000
	Greenhouse-Geisser	20758.382	1.003	20702.060	24.332	.000
	Huynh-Feldt	20758.382	1.080	19211.872	24.332	.000
	Lower-bound	20758.382	1.000	20758.382	24.332	.000
Error(Focus)	Sphericity Assumed	11943.944	28	426.569		
	Greenhouse-Geisser	11943.944	14.038	850.824		
	Huynh-Feldt	11943.944	15.127	789.580		
	Lower-bound	11943.944	14.000	853.139		

Table C.62: Tests of Within-Subjects Effects: Mean Intensity of post-focus region

Tests of Between-Subjects Effects

Measure:MEASURE_1
Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	668902.656	1	668902.656	882.160	.000
Gender	9574.939	1	9574.939	12.628	.003
Error	10615.573	14	758.255		

Table C.63: Tests of Between-Subjects Effects: Mean Intensity of post-focus region

Statistics

Gender			Sentence Focus	Information Focus	Contrastive Focus
Male	N	Valid	8	8	8
		Missing	0	0	0
	Mean		64.13443	64.66239	182.97799
	Std. Error of Mean		1.461320	1.603251	12.697619
	Median		63.95319	65.00330	170.05381
	Std. Deviation		4.133237	4.534680	35.914289
	Range		12.913	15.380	98.330
	Minimum		58.037	56.537	143.205
	Maximum		70.950	71.917	241.535
Female	N	Valid	8	8	8
		Missing	0	0	0
	Mean		63.05547	63.41662	270.04471
	Std. Error of Mean		1.811685	1.787155	15.180152
	Median		60.74028	61.82073	252.54390
	Std. Deviation		5.124218	5.054837	42.935952
	Range		13.869	12.999	110.294
	Minimum		58.286	58.889	217.359
	Maximum		72.155	71.888	327.653

Table C.64: Descriptive Data: among gender

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Gender	Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Male	Focus	.005	32.260	2	.000	.501	.502	.500
Female	Focus	.006	30.710	2	.000	.502	.502	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.65: Mauchly's Test of Sphericity: Max F_0 of post-focus region: separated by gender

Tests of Within-Subjects Effects

Measure:MEASURE_1

Gender	Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Male	Focus	Sphericity Assumed	74993.741	2	37496.870	104.837	.000
		Greenhouse-Geisser	74993.741	1.002	74820.390	104.837	.000
		Huynh-Feldt	74993.741	1.003	74733.915	104.837	.000
		Lower-bound	74993.741	1.000	74993.741	104.837	.000
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	5007.342	14	357.667		
		Greenhouse-Geisser	5007.342	7.016	713.681		
		Huynh-Feldt	5007.342	7.024	712.856		
		Lower-bound	5007.342	7.000	715.335		
Female	Focus	Sphericity Assumed	228106.267	2	114053.133	230.191	.000
		Greenhouse-Geisser	228106.267	1.003	227423.594	230.191	.000
		Huynh-Feldt	228106.267	1.005	227083.278	230.191	.000
		Lower-bound	228106.267	1.000	228106.267	230.191	.000
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	6936.602	14	495.472		
		Greenhouse-Geisser	6936.602	7.021	987.977		
		Huynh-Feldt	6936.602	7.032	986.499		
		Lower-bound	6936.602	7.000	990.943		

Table C.66: Tests of Within-Subjects Effects: Mean Intensity of post-focus region: separated by gender.

Pairwise Comparisons

Measure:MEASURE_1

Gender	(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
Male	Sentence Focus	Information Focus	-.528	.465	.880	-1.981	.925
		Contrastive Focus	-118.844*	11.529	.000	-154.902	-82.785
	Information Focus	Sentence Focus	.528	.465	.880	-.925	1.981
		Contrastive Focus	-118.316*	11.624	.000	-154.670	-81.962
	Contrastive Focus	Sentence Focus	118.844*	11.529	.000	82.785	154.902
		Information Focus	118.316*	11.624	.000	81.962	154.670
Female	Sentence Focus	Information Focus	-.361	.612	1.000	-2.275	1.553
		Contrastive Focus	-206.989*	13.596	.000	-249.511	-164.467
	Information Focus	Sentence Focus	.361	.612	1.000	-1.553	2.275
		Contrastive Focus	-206.628*	13.652	.000	-249.326	-163.930
	Contrastive Focus	Sentence Focus	206.989*	13.596	.000	164.467	249.511
		Information Focus	206.628*	13.652	.000	163.930	249.326

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table C.67: Pairwise Comparisons: Mean Intensity of of post-focus region: separated by gender

C.2.4.5 Mean Duration (in ms.)

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.711	4.439	2	.109	.776	.917	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.68: Mauchly's Test of Sphericity: Mean Duration of stressed syllable of on-focus item /šayyab/

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	4872.340	2	2436.170	10.864	.000
	Greenhouse-Geisser	4872.340	1.551	3140.819	10.864	.001
	Huynh-Feldt	4872.340	1.833	2657.860	10.864	.001
	Lower-bound	4872.340	1.000	4872.340	10.864	.005
Focus * Gender	Sphericity Assumed	104.569	2	52.284	.233	.794
	Greenhouse-Geisser	104.569	1.551	67.407	.233	.738
	Huynh-Feldt	104.569	1.833	57.042	.233	.775
	Lower-bound	104.569	1.000	104.569	.233	.637
Error(Focus)	Sphericity Assumed	6278.569	28	224.235		
	Greenhouse-Geisser	6278.569	21.718	289.093		
	Huynh-Feldt	6278.569	25.665	244.640		
	Lower-bound	6278.569	14.000	448.469		

Table C.69: Tests of Within-Subjects Effects: Mean Duration of stressed syllable of on-focus item /šayyab/

Pairwise Comparisons

Measure:MEASURE_1

(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Sentence Focus	Information Focus	-9.022	3.869	.105	-19.537	1.492
	Contrastive Focus	-24.404*	5.296	.001	-38.796	-10.012
Information Focus	Sentence Focus	9.022	3.869	.105	-1.492	19.537
	Contrastive Focus	-15.382	6.409	.093	-32.800	2.037
Contrastive Focus	Sentence Focus	24.404*	5.296	.001	10.012	38.796
	Information Focus	15.382	6.409	.093	-2.037	32.800

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table C.70: Pairwise Comparisons: Mean Duration of stressed syllable of on-focus item /šayyab/

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Focus	.692	4.782	2	.092	.765	.901	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.71: Mauchly's Test of Sphericity: Mean Duration of the pre-focus item /rāmi/

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Focus	Sphericity Assumed	1463.575	2	731.787	6.708	.004
	Greenhouse-Geisser	1463.575	1.529	957.021	6.708	.009
	Huynh-Feldt	1463.575	1.802	812.316	6.708	.006
	Lower-bound	1463.575	1.000	1463.575	6.708	.021
Focus * Gender	Sphericity Assumed	1450.036	2	725.018	6.646	.004
	Greenhouse-Geisser	1450.036	1.529	948.168	6.646	.009
	Huynh-Feldt	1450.036	1.802	804.802	6.646	.006
	Lower-bound	1450.036	1.000	1450.036	6.646	.022
Error(Focus)	Sphericity Assumed	3054.620	28	109.094		
	Greenhouse-Geisser	3054.620	21.410	142.671		
	Huynh-Feldt	3054.620	25.224	121.099		
	Lower-bound	3054.620	14.000	218.187		

Table C.72: Tests of Within-Subjects Effects: Mean Duration of the pre-focus item /rāmi/

Tests of Between-Subjects Effects

Measure:MEASURE_1
Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	4223998.40	1	4223998.40	739.031	.000
Gender	26983.216	1	26983.216	4.721	.047
Error	80018.211	14	5715.587		

Table C.73: Tests of Between-Subjects Effects: Mean Duration of the pre-focus item /rāmi/

Statistics

Gender			Sentence Focus	Information Focus	Contrastive Focus
Male	N	Valid	8	8	8
		Missing	0	0	0
	Mean		272.62139	273.32455	272.86858
	Std. Error of Mean		6.123769	11.941495	8.571920
	Median		271.89027	271.86896	275.54514
	Std. Deviation		17.320633	33.775647	24.245050
	Range		54.519	101.500	77.918
	Minimum		243.604	228.139	233.624
	Maximum		298.122	329.639	311.542
Female	N	Valid	8	8	8
		Missing	0	0	0
	Mean		309.38732	316.26603	335.41943
	Std. Error of Mean		19.018898	20.932988	20.735411
	Median		299.19022	301.73593	330.84835
	Std. Deviation		53.793568	59.207432	58.648600
	Range		146.585	162.618	163.668
	Minimum		241.986	241.884	259.872
	Maximum		388.570	404.502	423.541

Table C.74: Descriptive Data: separated by gender.

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

						Epsilon[a]		
Gender	Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Male	Focus	.591	3.160	2	.206	.709	.838	.500
Female	Focus	.710	2.056	2	.358	.775	.954	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept + Gender
Within Subjects Design: Focus

Table C.75: Mauchly's Test of Sphericity: Mean Duration of the pre-focus item /rāmi/ (separated by gender).

Tests of Within-Subjects Effects

Measure:MEASURE_1

Gender	Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Male	Focus	Sphericity Assumed	2.036	2	1.018	.006	.994
		Greenhouse-Geisser	2.036	1.419	1.435	.006	.977
		Huynh-Feldt	2.036	1.676	1.215	.006	.987
		Lower-bound	2.036	1.000	2.036	.006	.940
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	2318.976	14	165.641		
		Greenhouse-Geisser	2318.976	9.933	233.465		
		Huynh-Feldt	2318.976	11.730	197.704		
		Lower-bound	2318.976	7.000	331.282		
Female	Focus	Sphericity Assumed	2911.575	2	1455.787	27.705	.000
		Greenhouse-Geisser	2911.575	1.550	1878.096	27.705	.000
		Huynh-Feldt	2911.575	1.909	1525.370	27.705	.000
		Lower-bound	2911.575	1.000	2911.575	27.705	.001
	Focus * Gender	Sphericity Assumed	.000	0	.	.	.
		Greenhouse-Geisser	.000	.000	.	.	.
		Huynh-Feldt	.000	.000	.	.	.
		Lower-bound	.000	.000	.	.	.
	Error(Focus)	Sphericity Assumed	735.644	14	52.546		
		Greenhouse-Geisser	735.644	10.852	67.789		
		Huynh-Feldt	735.644	13.361	55.058		
		Lower-bound	735.644	7.000	105.092		

Table C.76: Tests of Within-Subjects Effects: Mean Duration of the pre-focus item /rāmi/ (separated by gender).

Pairwise Comparisons

Measure:MEASURE_1

Gender	(I) Focus	(J) Focus	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
Male	Sentence Focus	Information Focus	-.703	7.442	1.000	-23.980	22.573
		Contrastive Focus	-.247	3.863	1.000	-12.330	11.836
	Information Focus	Sentence Focus	.703	7.442	1.000	-22.573	23.980
		Contrastive Focus	.456	7.343	1.000	-22.509	23.421
	Contrastive Focus	Sentence Focus	.247	3.863	1.000	-11.836	12.330
		Information Focus	-.456	7.343	1.000	-23.421	22.509
Female	Sentence Focus	Information Focus	-6.879	4.491	.509	-20.926	7.169
		Contrastive Focus	-26.032*	3.203	.000	-36.048	-16.016
	Information Focus	Sentence Focus	6.879	4.491	.509	-7.169	20.926
		Contrastive Focus	-19.153*	2.997	.001	-28.526	-9.781
	Contrastive Focus	Sentence Focus	26.032*	3.203	.000	16.016	36.048
		Information Focus	19.153*	2.997	.001	9.781	28.526

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.
*. The mean difference is significant at the

Table C.77: Pairwise Comparisons: Mean Duration of the pre-focus item /rāmi/ (separated by gender).