No de-accenting in (or of) phrases: Evidence from Arabic for cross-linguistic and cross-dialectal prosodic variation

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Prosodic marking of information status varies. Ladd (1996) suggests that Germanic languages de-accent given information within both phrases and sentences whereas Italian only de-accents given phrases within a sentence. Swerts, Krahmer and Avesani (2002) demonstrated cross-linguistic variation within noun phrases in a comparative study of Dutch and Italian. This paper re-creates the experiment with speakers of Cairene Arabic (CA) and extends the methodology to examine whether phrases are de-accented within a sentence. Production and function test results are reported, and both suggest that information status is not encoded prosodically in CA: speakers did not de-accent given elements within a phrase, nor given phrases in a sentence; monolingual CA listeners were unable to retrieve the discourse function of phrases or sentences from prosody alone.

1 Introduction

Languages vary as to how information status is prosodically marked. Ladd (1996:177–8) for example suggests that whilst Germanic languages de-accent given information within both phrases and sentences, Italian speakers only de-accent whole phrases within a sentence. Swerts, Krahmer and Avesani (2002) successfully demonstrated cross-linguistic variation with respect to de-accenting of given information within noun phrases in a comparative analysis of Dutch and Italian.

Descriptions of the prosody of Arabic dialects are scarce, however Mitchell (1993:235–40) and Chahal (2001:171–176) report de-accenting of given information in sentences in Jordanian and Lebanese Arabic, respectively. In contrast, failure to de-accent (within sentences) is reported as common in Tunisian Arabic (Cruttenden in press). Based on an earlier pilot study on Cairene Arabic (CA) in which placement of focus early in a sentence

similarly failed to provoke de-accenting of post-focal items (Hellmuth ms.), our hypothesis is that speakers of CA also do not de-accent given information. Indeed whilst in Italian de-accenting of given information may not occur within a noun phrase (except in cases of metalinguistic correction Ladd 1996:177) but is thought to be possible within a sentence, in CA failure to de-accent was observed within sentences. Specifically then, we hypothesise that the domain within which de-accenting of given items is resisted is larger in CA than in Italian.

This paper seeks to establish whether de-accenting of given information is a strategy employed by speakers of CA either within and/or among phrases. To do this the experimental methodology of Swerts, Krahmer and Avesani (2002) for within-phrase de-accenting is re-created, and the experimental paradigm extended so that potential de-accenting of whole phrases in a longer utterance can also be examined.

2 Background to the study

2.1. Cross-linguistic prosodic variation

De-accenting denotes "the absence of an accent on a word which might otherwise be expected to be accented" (Swerts, Krahmer and Avesani 2002:630). Following Ladd (1996) and working within the autosegmental-metrical (AM) framework, the term *stress* is used here to denote a word-level prominence (lexical stress); *accent* denotes a phrase- or utterance-level prominence, whereby the main stressed syllable of one or more words in a phrase or utterance are additionally marked by a movement in pitch.

The *nucleus* is the main prominence in an utterance, defined by some authors more strictly as the final accent in a phrase (Beckman & Pierrehumbert 1986). In such an analysis, de-accenting falls out as the result of early placement of the nucleus in a phrase, for example under focus conditions. The presence of accents after an early nucleus presupposes then the insertion of a phrasal boundary after the focussed item, the post-focal accents falling within a new phrase (though other authors suggest post-nuclear accents may occur within the same phrase, for example: Frota 2000, Selkirk & Chen 1990). Although AM analyses of Arabic sentence phonology are few main prominence has been proposed to be rightmost in neutral declarative sentences in Lebanese Arabic and Moroccan Arabic (Chahal 2001:44, Benkirane 1998:349 respectively).

Nucleus placement is one means by which languages signal focus condition and information status (Cruttenden 1997:73–85). A broad focus utterance carries 'all new' information – the whole constituent is in focus. In a narrow focus utterance just some part is new or informative (Ladd 1980), and this is set against a background of 'old' or given information, often repeated from earlier in the discourse. Contrastive focus involves "explicit contrast between an extremely limited set of two discourse elements" (Face 2002:4), and this can arise either from context or via insertion of an explicit continuation. These conditions are exemplified in (1) below for English, with nuclear accent placement indicated in capitals. In English, placement of the nucleus alone is sufficient to locate narrow focus in distinct positions in a sentence, as in (1b) vs. (1c). Given or 'old' items positioned after an early nucleus are generally de-accented in English, as in the (1c) response, in which most speakers would produce the repeated section *hid Helen from Igor* without pitch movements.

(1) broad focus
   a. *What happened?* *Bill hid Helen from IGOR.*
   narrow focus
   b. *Who did Bill hide Helen from?* *Bill hid Helen from IGOR.*
   c. *Who hid Helen from Igor?* *BILL hid Helen from Igor.*
   contrastive focus
   d. *Did Bill hide Helen from Ivan?* *Bill hid Helen from IGOR (not Ivan).*

An alternative strategy for marking a non-final nucleus is reported in Norlin's (1989) pilot study of CA intonation which found evidence of gradient rather than categorical marking of focus condition. In particular he found pitch range compression on pre- and post-focal pitch accents. Similar effects have also been reported by Chahal (2001:ch.3, 2003) for Lebanese Arabic (LA) involving F0, intensity and vowel formant values: the contrast between focussed and out-of-focus elements in a sentence was enhanced by both increasing acoustic cues in focus position (enlarging F0 excursion, for example) and decreasing cues in out-of-focus positions.

Marking of nuclear position is however not the only means by which languages signal information status and focus condition. Swerts, Krahmer and Avesani (2002:632) identify the lack of de-accenting within NPs in Italian as a ban on "*moving* accents inside syntactic constituents in order to convey contextual givenness" [emphasis mine]. They point out that an alternative

strategy by which Italian could mark information status prosodically would be to use a different nuclear accent shape or contour, albeit in the same position. A distinction between broad focus and narrow focus nuclear accents has been reported, for example in Bengali, Palermo Italian and European Portuguese (Hayes and Lahiri 1991, Grice 1995, Frota 2000) and whilst distinct focal pitch movements have not been reported in descriptions of CA intonation (Mitchell 1993, Norlin 1989) it is possible that a similar distinction is used in CA as an alternative to de-accenting.

Nucleus location or pitch accent type are grouped together as *stress/accent effects* in Frota's (2000) typology of prosodic marking of focus. Other kinds of focus-marking strategies are also found cross-linguistically, involving syntactic marking of focus by means of changes in word order (to put the focussed item in a special focus position), clefting or the use of special emphatic morphemes. Frota classifies the prosodic consequence of these strategies as *phrasing effects* rather than stress/accent effects. Since sentences are elicited with fixed word order in the present study, its scope is necessarily limited to investigation of stress/accent effects of focus in CA. However, as well as investigating the hypothesis that CA speakers do not categorically de-accent given information within or among phrases, the possibility that alternative categorical or gradient stress/accent effects are found in CA is explored by means of a functional perception test.

2.2. Swerts, Krahmer and Avesani (2002)

Swerts, Krahmer and Avesani (2002) used a game to elicit semi-spontaneous utterances in an environment where information status could be realistically but reliably manipulated; these utterances were then used as input to production and perception tests. The experimental paradigm was explicitly designed to be transferable and thereby permit direct comparison between data from typologically different languages. Pairs of speakers were screened from each other and thus had to state aloud each turn in a card-matching game: the cards bore pictures of coloured shapes that varied in either colour or shape or both (there was no written text on any of the cards). The game creates a simple yet robust context where a colour or shape mentioned in one turn becomes given information in the turn of the next player. So if player 1 lays a 'blue triangle' and player 2 a 'red triangle', the second item ('triangle') in the phrase uttered by player 2 is 'textually given' by virtue of having been already mentioned (Halliday 1967) whereas the first item ('red') is contrasted.

Table 1: Target utterances for Dutch & Italian in four focus contexts.

		Dutch	Italian
NN		*(beginning of the game)*	*(beginning of the game)*
all new	→	*blauwe vierkant*	*triangolo nero*
CC		*rode cirkel*	*rettangolo rosa*
double contrast	→	*blauwe vierkant*	*triangolo nero*
CG		*gele vierkant*	*rettangolo nero*
contrastive-given	→	*blauwe vierkant*	*triangolo nero*
GC		*blauwe driehoek*	*triangolo viola*
given-contrastive	→	*blauwe vierkant*	*triangolo nero*

By manipulating the order of cards in the deck supplied to players a target utterance can be elicited in one of the four contexts illustrated in Table 1, according to which card precedes it (if any); target utterances elicited in Dutch and Italian, together with the previous turn in the game that creates the context, are shown (Swerts, Krahmer and Avesani 2002:636). At the beginning of a game, the first player produces a phrase in an all new context, and thereafter one of three contexts may arise: CC (both first and second item contrasted), CG (first item only contrasted) and GC (second item only contrasted).

Swerts, Krahmer and Avesani (2002) report results for Dutch and Italian target utterances which were analysed at three levels: production, perception and function. Production analysis comprised auditory transcriptions of pitch accent distribution as well as an acoustic analysis of peak excursion size. Perception analysis used a listening task to test for a correlation between listeners' perception of prominence and focus context. Function analysis used a dialogue history reconstruction task to see whether listeners could retrieve the original discourse function of a target utterance from its prosody alone (listeners heard target utterances and were asked what they thought the previous turn in the game had been). The purpose of the perception and function tests was to ascertain whether gradient means of prosodic marking (rather than categorical presence or absence of an accent) was being employed by speakers to mark information status.

At all three levels of analysis the authors found a clear distinction between Dutch and Italian. In transcriptions of the Dutch targets given nouns often did not bear an accent, whilst in Italian speakers invariably accented both words; acoustically, there was no significant variation of peak excursion size with focus context in the Italian data whereas there were clear discourse

effects in the Dutch data. Dutch listeners' revealed a positive correlation of perceived prominence with a contrast context (especially single contrast) whereas Italian listeners tended to simply associate prominence with word 1 in a phrase (due to downstep of word 2). Finally, and crucially, in a high proportion of cases Dutch listeners were able to correctly classify target utterances according to their original discourse function, whereas Italian listeners' classification scores did not differ significantly from chance. The authors conclude that Dutch and Italian differ fundamentally in their prosodic marking of information status.

The experimental methodology developed by Swerts, Krahmer and Avesani (2002) is useful for the present study for a number of reasons. Firstly, the game elicitation technique creates a robust context which successfully elicits semi-spontaneous utterances yet under controlled focus conditions. The game methodology means that production utterances can be inserted into a dialogue history reconstruction test for listeners which is an unambiguous yet realistic task, and which can be used to diagnose whether marking of information status of any kind is encoded by speakers. As we have seen, in the original experiment Italian listeners were unable to classify the discourse function of utterances, which suggested that there is no prosodic marking of NPs in Italian of any kind, whether categorical or gradient. The literature on CA prosody is limited, and alternative means of prosodic marking (by pitch accent choice, phrasing, or gradient means) cannot be excluded a priori, so a functional test of this sort can be used to decide whether further investigation of these possibilities is warranted.

In addition, the game paradigm is particularly useful for the study of spoken Arabic since picture prompts with no written text are used. Diglossia in the Arab world means that native speakers of Arabic acquire a spoken dialectal variety at home, which generally has no agreed written form, before learning to read and write the standard form of the language at school (often described as Modern Standard Arabic). Use of written Arabic in experimental materials carries with it the risk of eliciting not the dialectal form but a more standardised register of speech, and use of picture prompts eliminates this potential source of variation.

In order to test the hypothesis that CA resists de-accenting of whole phrases, as well as of words within phrases, it was necessary to devise a means of extending the game paradigm to elicit longer utterances, whilst still maintaining the methodological advantages of the original design (robust context, transferability, picture prompts). The resulting two experiments and findings are described in the following sections.

3 Investigating de-accenting in Cairene Arabic (CA)

3.1. Methodology

Two experiments were carried out in order to test the following hypotheses:

i) CA speakers do not de-accent given information within phrases; and,
ii) CA speakers do not de-accent given phrases within sentences.

The first experiment reproduced the elicitation methodology of Swerts, Krahmer and Avesani (2002). Pairs of speakers sat back-to-back from each other to play a shape/colour matching game using picture cards. The phrase length target utterance in (2), stressed syllables shown underlined, was elicited in four focus contexts as shown in Table 2.

(2) *hi<u>laal</u> <u>?azra?</u>*
crescent blue
'blue crescent'

Table 2: Within-phrases target utterances for CA in four focus contexts.

NN all new		CC double contrast		CG contrast-given		GC given-contrast	
(start of game)		*musallas*	*?aHmar*	*musallas*	*?azra?*	*hilaal*	*?aHmar*
hilaal	*?azra?*	*hilaal*	*?azra?*	*hilaal*	*?azra?*	*hilaal*	*?azra?*
–		triangle	red	triangle	blue	crescent	red
crescent	blue	crescent	blue	crescent	blue	crescent	blue

The second experiment used a new interactive game design in which one player picks cards from a deck to create a murder scenario trio of person, weapon and place. The other player, the detective, turns over cards one by one from a prepared deck and places them on a game board in person/weapon/place positions (to elicit the target utterance with fixed word order). The two players cannot see each others' cards so the detective must make a series of murder scenario 'guesses' using three phrases (person, weapon and place) to yield a NP-PP-PP target sequence as in (3):

(3) *il-mu<u>diir</u>* *bis-<u>simm</u>* *fil-<u>ma9</u>mal*
the-manager with-the-poison in-the-laboratory
'The manager, with the poison, in the laboratory'

Table 3: Among-phrases target utterances for CA in four focus contexts.

NNN	beginning of the game			– –
all new	*il-mudiir*	*bis-simm*	*fil-ma9mal*	manager/poison/laboratory
CGG	*il-?amiir*	*bis-simm*	*fil-ma9mal*	prince/poison/laboratory
focus on NP	*il-mudiir*	*bis-simm*	*fil-ma9mal*	**manager**/poison/laboratory
GCG	*il-mudiir*	*bil-Habl*	*fil-ma9mal*	manager/rope/laboratory
focus on PP1	*il-mudiir*	*bis-simm*	*fil-ma9mal*	manager/**poison**/laboratory
GGC	*il-mudiir*	*bis-simm*	*fil-maTbax*	manager/poison/kitchen
focus on PP2	*il-mudiir*	*bis-simm*	*fil-ma9mal*	manager/poison/**laboratory**

By manipulating the deck order the target sequence can be placed either at the beginning of the game (an all new context) or so that the previous 'guess' differs in one only of either person or weapon or place. This elicits contrastive focus on the first, second or third phrase only, while all other phrases are repeated from the previous turn and therefore (textually) given. Examples of the four focus contexts elicited are provided in Table 3 above.

The members of each set of contrasting items (people, weapons or places) were selected to be of the same prosodic weight, in order to control for the possible influence of constituent length on accent placement or prosodic phrasing. Note also that the confined context of the game eliminates the possibility of interpreting the prepositional phrases (PP1 and PP2), as modifiers of the first (noun) phrase (NP). This interpretation would be available only if there were more than one 'manager' present in the discourse context (e.g. 'The manager with the poison in the laboratory, not the manager with the rope in the kitchen'). The murder game provides a strictly limited set of possible discourse elements, and thus ensures that the PPs are interpreted as adjuncts of an 'understood' verb of which the NP is an argument: [e [NP][PP][PP]]$_{S}$ (not *[N [PP][PP]]$_{NP}$). The target sequence is therefore assumed to be a sentence.

Both games were played by three pairs of speakers sitting back-to-back in a quiet room. Recordings were made via Electret condenser lapel microphones directly to digital format at 44100Hz on an HP ALI audio soundcard using Goldwave. Target utterances were segmented and analysed using Praat 4.05/4.1 (Boersma and Weeninck 1992 –2003). The six speakers of CA who participated (two male, four female) were all raised in Cairo and were temporarily resident in London as students but had not previously lived in the UK. The recordings yielded 48 tokens (6 speakers x 4 focus contexts x 2 games), a dataset comparable in size to the original study (8 speakers per language).

There were no major disfluencies but tokens of poor recording quality were nonetheless included in view of the limited size of the corpus, and hand measurements taken in cases of pitch doubling/halving. The results of production and function analyses of the data from both games are presented below.

3.2. Production analysis

The 48 tokens were examined auditorily by the author and with reference to the F0 pitch track produced using Praat 4.05 to determine accent distribution within each utterance (presence or absence of an accent on words/phrases). Sample pitch tracks are provided in Appendix 1.

A typical CA declarative intonation contour, as described by Mitchell (1993) and Norlin (1989) and as observed in pilot studies by the author, shows an overall falling pattern. A rising pitch accent is associated with the stressed syllable of each prosodic word. The start of each rise is closely aligned with the onset of the stressed syllable whilst the alignment of the end of the rise seems to be less fixed. It is however beyond the scope or purpose of the present investigation to determine the exact phonological specification of pitch accents in CA and for this reason these bitonal pitch accents will here be notated simply as LH, without making any claim about the associative properties of either pitch target. The height of the peaks and valleys of pitch accents on subsequent words fall steadily throughout the utterance. This is assumed here to be a downstep effect under the independent control of CA speakers (Ladd 1996) and downstepped pitch accents are notated !LH. Both rising and falling phrase- and boundary-tone combinations are observed, notated H-H% and L-L% respectively (Beckman & Pierrehumbert 1986). Phrase tones (H- or L-) are observed in non-final position in some tokens in the corpus, often accompanied by a short pause, and in these cases a phrase boundary is transcribed.

In the within-phrases dataset a LH pitch accent is observed to be associated with each word in the noun phrase under all focus conditions as illustrated in Table 4 (capitals denote the presence of an accent, figures record how many speakers used an accentuation pattern). There appears to be no variation of accent distribution with information status.

Comparing these results with those reported by Swerts, Krahmer and Avesani (2002:638) (reproduced in Table 5), CA speakers are patterning with Italian speakers who invariably accented both words in the noun phrase, in contrast to Dutch speakers.

Table 4: Within-phrases accent distribution for CA (6 speakers in total).

	HILAAL ?azra?	hilaal ?AZRA?	HILAAL ?AZRA?
NN	0	0	6
CC	0	0	6
CG	0	0	6
GC	0	0	6

Table 5: Within-phrases accent distribution for Dutch & Italian (8 each).

Dutch	BLAUWE vierkant	blauwe VIERKANT	BLAUWE VIERKANT
NN	0	0	8
CC	0	4	4
CG	8	0	0
GC	0	6	2
Italian	TRIANGOLO nero	triangolo NERO	TRIANGOLO NERO
NN	0	0	8
CC	0	0	8
CG	0	0	8
GC	0	0	8

In the among-phrases 'murder' game we find a similar pattern: a pitch accent was observed to be associated with the head noun in each phrase in the sequence (ie with every Prosodic Word), except in one token. In all but one instance then, CA speakers accent all three phrases in the NP-PP-PP sequence, as shown in Table 6 (accented phrases in capitals).

Table 6: Among-phrases accent distribution for CA.

	NP-pp-pp	NP-PP-pp	NP-pp-pp	np-PP-pp	np-pp-PP	NP-PP-PP
NNN	0	0	0	0	0	6
CGG	0	0	0	0	0	6
GCG	0	1	0	0	0	5
GGC	0	0	0	0	0	6

The exceptional case is in a GCG context where contrastive focus is on the first PP and the final phrase is de-accented (see Appendix 1 Fig E; this may have arisen due to influence from the speaker's knowledge of English).

The nearest available data for comparison to these among-phrases results are for Lebanese Arabic (LA) shown in Table 7. Chahal (2001:156–159)

reports observed renditions of an S-VO-PP sentence ('X protected Y from Z' where X/Y/Z are all proper names). The sentence was elicited via wh-questions with narrow focus on particular phrases (B = broad focus; N1 = narrow focus on S; N2 = narrow focus on VO; N3 = narrow focus on O).

Table 7: Among-phrases accent distribution for LA.

	S – vo – O	S – VO –o	S – vo – o	s – V – o	s – v – O	S – V – O
B	✓	×	×	×	×	✓
N1	×	×	✓	×	×	✓
N2	×	✓	×	✓	×	×
N3	✓	×	×	×	✓	✓

observed [✓] vs. not observed [×] (speaker numbers not reported)

Whilst the accent distribution patterns of CA speakers cluster on the right of the table, with all three phrases bearing an accent, LA speakers in contrast employ a variety of accent distribution patterns. This confirms the results of the small pilot study already mentioned (Hellmuth ms.), which was an exact replication of Chahal's focus-manipulation experiment with one CA speaker, but which yielded identical utterances in all contexts.

It was hoped to perform an acoustic analysis of pitch excursion size also, in order to determine whether the relative excursion size of pitch accents is perhaps used to mark information status. Norlin (1989) found that post- and pre-focal pitch accents in CA were produced in a compressed pitch range, thus we might expect to find similar patterns in the present data. However in a high proportion of the tokens speakers employed a rising boundary tone (35 out of 48). The high pitch of the H-H% boundary tone combination makes it virtually impossible to gauge whether a preceding LH pitch accent is produced in a compressed pitch range or not. Whilst measurements of pitch maxima and minima within each word/phrase in the remaining L-L% tokens were taken, they provide too few data points (13 out of 48) to allow comparison across speakers.

3.3. Function analysis

The results reported thus far suggest that CA does not use categorical prosodic marking to distinguish the information status of given and new lexical

items, and the presence or absence of gradient effects on pitch excursion size could not be determined from the production data.

It is possible that information status is marked in other ways such as by pitch accent choice or other gradient acoustic cues, as outlined in §2.1. Rather than make detailed acoustic measurements to ascertain whether other forms of prosodic marking occur, and so as to avoid asking non-linguist listeners to make judgements about the prominence of utterances, it was decided to proceed with a functional dialogue history reconstruction test. this is base on the assumption that any prosodic marking of information status in the dataset would manifest its presence in the ability of listeners to identify the function of a particular utterance with some degree of accuracy. If listeners are able to classify utterances according to their function then further investigations as to the nature of the cues to information status would be worth undertaking.

A dialogue reconstruction history test was performed, adopting the methodology of Swerts, Krahmer and Avesani (2002). The aim was to find out whether Cairene listeners are able to identify the original function of a target utterance from its prosodic structure (in any way). Listeners were briefly familiarised with the two game scenarios before the experiment ('shape/colour' game vs. 'murder' game). They were then told that they would hear an utterance produced by player 2 in a particular game and that their task was to decide what they thought the previous turn in the game had been. Target utterances from the beginning of a game (NN or NNN) were not included in this part of the test since the task would be unrealistic.

Each game was presented in a separate test. In the 'shape/colour' test subjects heard target utterances from the within-phrases dataset from all six speakers in three contrastive contexts (CG, GC and CC). Subjects listened to renditions of *hilaal ʔazra?* (crescent blue), then in a three-way forced choice were asked to decide what the previous turn in the game had been. In the 'murder' test subjects heard the target utterances of all six speakers from the among-phrases dataset in three contrastive contexts (CGG, GCG and GGC) and again were asked to decide what the previous turn in the game had been in a three-way forced choice task. The forced choice options and interpretations for each test are given in Table 8.

Stimuli were presented four times each in balanced randomized sets, after an initial training session, and the order of the two tests was determined by coin toss. Subjects heard each stimulus only once but were not limited in how long they could take to make their choice; no feedback was given on the 'correctness' of responses. The experiment was designed and implemented using Praat 4.1 and took 25 minutes per subject to complete. The four Cai-

rene listeners who participated in the experiment (one male, three female) were all resident in London but had lived in Cairo until the age of 18. Each stimulus was presented four times each to four subjects resulting in 16 judgements per token (compare 25 judgments per token in the original study).

Table 8: Dialogue history reconstruction task forced choice options.

stimulus	options	code
hilaal ?azra? crescent blue	*hilaal ?aHmar* crescent red	GC
	murabba9 ?azra? square blue	CG
	hilaal aHmar crescent red	CC
il-mudiir bis-simm fil-ma9mal the-manager ...poison ...lab.	*iT-Tabiib bis-simm fil-ma9mal* the-doctor with-the-poison in-the-lab.	CGG
	il-mudiir bil-Habl fil-ma9mal the-manager with-the-rope in-the-lab.	GCG
	il-mudiir bis-simm fil-maTbax the-manager w-the-poison in-the-kitchen	GGC

The within-phrases function test results (Appendix 2 Figure A) indicate that subjects' classifications of 'hilaal' target utterances do not differ significantly from chance (Pearson's chi-squared = 0.136, α=0.05). In the among-phrases function test (Appendix 2 Figure B) classification scores are close to being significantly different from chance (Pearson's chi-squared = 0.053, α=0.05); both CGG and GCG utterances appear often to be correctly classified by listeners. However, subject-specific adjusted residuals indicate that in fact one subject (SS) is the source of this apparent correlation, and she proved to have a near-native command of English having attended English medium schools. If this speaker is removed from the among-phrases dataset the classification scores of the remaining subjects no longer differ significantly from chance (Pearson's chi-squared = 0.309, α=0.05). This is an intriguing result since the implication is that some form of prosodic marking is redundantly present, perceived by the bilingual CA-English speaker, but not interpreted by monolingual CA listeners as a cue to information structure. This is true in the among-phrases dataset only. Overall however, CA listeners were not able to retrieve the original discourse function of the target utterances from the prosody alone, either within-phrases or among-phrases.

4 Discussion

Auditory analysis of the semi-spontaneous utterances elicited using the two game scenarios indicated that accent distribution (ie categorical de-accenting) is not used to mark information status in CA within either phrases or sentences. Function test results showed that monolingual CA listeners are unable to retrieve the original discourse function of target utterances from their prosodic structure alone.

The fact that a bilingual CA-English listener was better able to classify utterances implies that CA speakers' productions may contain redundant cues to information structure that CA listeners do not interpret. Norlin's (1989) study did not assess how the pitch range compression effects that he observed were perceived by listeners. This result underlines the importance of perception tests in understanding cues to information status, and potentially undermines the assumption, made both here and by Swerts, Krahmer and Avesani (2002), that lack of correlation in the function test necessarily implies a lack of prosodic marking in production.

However the results from both levels of analysis in the present study, for monolinguals at least, support our hypotheses that CA speakers do not mark information status prosodically by de-accenting either given words within phrases or given phrases within sentences. The methodology of Swerts, Krahmer and Avesani (2002) was crucial in achieving this and was successfully extended to longer utterance lengths. Methodological issues related to the among-phrases test and implications of the results are explored in the following sections.

4.1. Methodological issues

A possible critique of the present study is in the choice of NP-PP-PP target sequences rather than, say, SVO sentences. As highlighted in §3.1, the possibility that the NP-PP-PP sequence is analysed as a heavy NP (where the PPs modify the NP) is excluded due to the tightly controlled discourse context provided by the game scenario. Nonetheless an alternative dataset was designed and recorded with one speaker of CA. The SVO target sentence *muniir biyitkallim yunaani* (Munir speaks Greek) was elicited using symbol prompts, in a guessing game with the author as interlocutor. Auditory analysis of the resulting small dataset showed no de-accenting of given items repeated from previous 'guesses' in the game, and a future study with

an expanded database of SVO targets could be used to confirm the absence of de-accenting in SVO sequences in CA.

Another possible critique of the new 'murder' game would be to ask whether it really creates as robust a context as the original shape/colour game. The shape-colour game is played in pairs with both speakers' utterances being recorded. In the original experiment (Swerts, Krahmer and Avesani 2002) the authors note that speakers' choice of boundary tone seems to be influenced by their partner's, so that within each pair of players either a H% was used by both or a L% by both. A similar pattern emerges among the three pairs of Cairene speakers who participated in the present shape/colour game (see Table 9): except in one game played by pair 1, matched boundary tones within pairs of speakers are observed.

Table 9: Final boundary tone choices in the within-phrases dataset.

	speaker	NN	CC	CG	GC
Pair 1	CAM	L%	H%	H%	H%
	CMH	L%	H%	H%	L%
Pair 2	CIH	H%	H%	H%	L%
	CRZ	H%	H%	H%	L%
Pair 3	CNX	H%	H%	H%	H%
	CNY	H%	H%	H%	H%

In the new 'murder' game however only one speaker (the 'guesser') is recorded producing full sentences, the partner only responds with yes [*?aywa*] or no [*la?*]. Players' utterances within a pair did not pattern together here, and this is probably due to the limited spoken interaction. Utterances within pairs vary in both choice of boundary tone (H% or L%) and in phrasing options (the three syntactic phrases produced in 1, 2, or 3 prosodic phrases): only the first pair happened to use matching tones and phrasing in every case (see Table 10 below).

Note however that there is no correlation between choice of boundary tone (rising vs. falling) and focus condition: three speakers use the same edge tone in all cases, whether rising or falling (CAM/CNY/CRZ); the other three speakers show one exception each, but there is no pattern to the choice of target which is singled out for different treatment (NNN by CIH, CGG by CNX, GGC by CMH). Similarly there is no correlation between choice of phrasing pattern and focus condition; instead the occurrence of phrase boundaries (in-

dicated by insertion of phrase tones) correlates with particularly deliberate speech, and in one case with a slight disfluency (GGC-CNY).

Table 10: Boundary tone & phrasing choices in the within-phrases dataset.

	NNN	CGG	GCG	GGC
CAM	H%	H%	H%	H%
	(NP PP PP)	(NP PP PP)	(NP) (PP PP)	(NP PP PP)
CMH	H%	H%	H%	L%
	(NP PP PP)	(NP PP PP)	(NP PP PP)	(NP PP PP)
CIH	L%	H%	H%	H%
	(NP)(PP)(PP)	(NP PP PP)	(NP PP PP)	(NP PP PP)
CRZ	L%	L%	L%	L%
	(NP) (PP) (PP)	(NP) (PP) (PP)	(NP) (PP) (PP)	(NP) (PP PP)
CNX	L%	H%	L%	L%
	(NP) (PP) (PP)	(NP PP PP)	(NP PP pp)	(NP PP PP)
CNY	H%	H%	H%	H%
	(NP PP PP)	(NP PP PP)	(NP PP PP)	(NP P) (-P PP)

4.2. Towards explanations

The results of the present study indicate that CA speakers do not mark information status prosodically by de-accenting given words within phrases, or given phrases within sentences. A possible explanation for the 'post-focal accents' observed in the present CA dataset is that they are not pitch accents associated with the particular words themselves but instead the result of secondary association of boundary phrase tones to post-nuclear stressed syllables (Grice, Ladd and Arvaniti 2000). A similar analysis has been suggested to account for the presence of post-focal accents in Maltese, a language heavily influenced by Arabic (Vella 2003). Further investigation would be needed to either verify or exclude such an account for CA. However even if the observed pitch movements on given items are not pitch accents but the result of secondary association we can assume that the distinction is not interpreted by CA listeners as a cue to information status, in the light of the function test results.

If we continue to assume instead that given items in CA bear pitch accents, how is information status marked in this language? In languages which de-accent given information (eg the Germanic languages) the context most prone to de-accenting is where a given item follows a contrastive focus (eg

CG, CGG or GCG), exactly as elicited in the present study. In English however the presence or absence of a pitch accent on post-focal given items is as much a function of their given status as of their post-nuclear position: a 'new' item in the same position is accented (Selkirk 2000). This is true in English whether the early contrastive focus is expressed in-situ or by means of a cleft. The present study elicited given items after an in-situ focus only but nonetheless establishes for the first time the fact that in CA, unlike in English, given items are not de-accented after an in-situ contrastive focus.

The status of given items after a fronted or clefted focus was not investigated here. Gary and Gamal-Eldin (1981:126) report that 'contrastive pitch levels' are used in CA only when the contrasted elements are made explicit, such as in (4). However note that their example of an explicit contrast is in fact expressed not in-situ but syntactically, by means of a cleft (introduced by the relative clause marker *lli*).

(4) *humma-lli-ʔinsaHabu-miš-iHna*
they-who-withdrew-NEG-us
'They were the ones who withdrew not us'

Post-hoc elicitation of utterances parallel to those in the present study, but with an explicit contrast (achieved by interspersing 'struck through' symbol cards with the original set of cards, with a single CA speaker) showed that explicit contrast could only be expressed using a cleft. The speaker found it impossible to formulate a response to the symbols when a fixed word order was requested. This suggests that contrastive focus may not be expressible in-situ in CA, in which case the function test results reported here are to be expected since they relate to in-situ focus only. In a typology such as that proposed by Frota (2000), the present study provides evidence to support classification of CA within the group of languages which mark contrastive focus by syntactic means.

Finally, if this classification of CA is correct then in a language of this type we might expect any 'redundant' prosodic marking, where found, to be insufficient of itself to convey a focus interpretation (c.f. Hungarian, Frota 2000:22). Recall that in the among-phrases dataset there was one case of de-accenting. If CA is a language of the Hungarian type, then we expect CA listeners to find it equally difficult to classify the discourse function of the de-accented exception compared to that of the other utterances, and this was indeed the case (of 16 judgements of this target only half were correct). Having established the facts for CA regarding in-situ focus the present study

raises the question whether in CA information status is prosodically marked after a clefted-focus. Investigation of whether given items are more prone to de-accenting or pitch range compression after a clefted-focus than after an in-situ focus must however remain the subject of future research.

5 Conclusions

The present study, although limited in size, provides evidence to support the hypothesis that CA speakers do not de-accent post-focal given information within phrases nor given phrases within sentences. Specifically the production results demonstrate that given items positioned after an in-situ focus are not de-accented. This suggests that contrastive focus is not expressed in-situ in CA, and the results of the functional perception tests support this explanation, since CA listeners were unable to retrieve the discourse function of utterances containing an in-situ focus from their prosody alone. One English-CA bilingual listener was able to classify utterances better than her monolingual counterparts, indicating that there may be some prosodic marking present in production but which is not however interpreted as an indication of information status by CA listeners.

The study also provides evidence of cross-linguistic prosodic variation. In CA de-accenting appears to be resisted within both phrases and sentences, whilst in Italian de-accenting has been reported to apply to phrases but not within them (Ladd 1996:177–8). Similarly, cross-dialectal prosodic variation is to be found among Arabic dialects, since de-accenting appears to occur within sentences in LA but not in CA (Chahal 2001:171–176). To complete our understanding of this variation it would be useful to discover whether de-accenting occurs in LA within phrases. The experimental methodology outlined and developed in this study has been shown to be highly transferable, such that its application to LA and to other Arabic dialects in future may well yield typologically revealing information.

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rette, Laura Downing, the editors and two anonymous reviewers. All errors of course remain mine. This study was supported by UK Arts & Humanities Research Board Award 59198.

Appendix

Appendix 1: Sample pitch tracks.

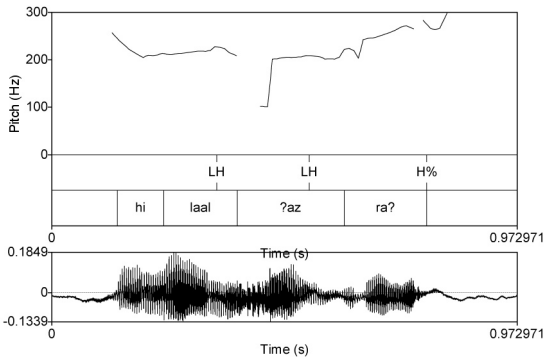

Figure A: NN context (NN-CNX)

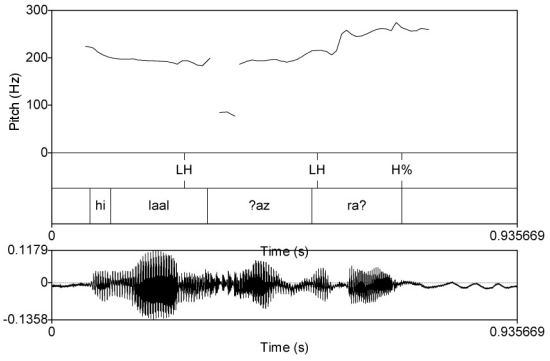

Figure B: CG context (CG-CNX)

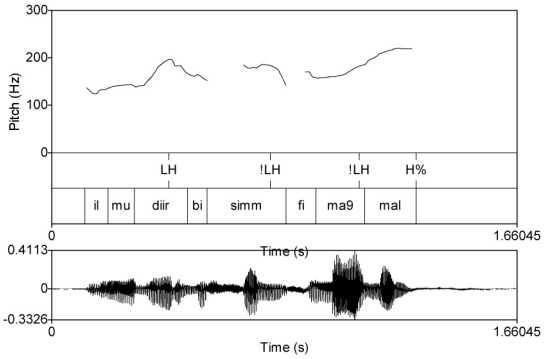

Figure C: NNN context (NNN-CMH)

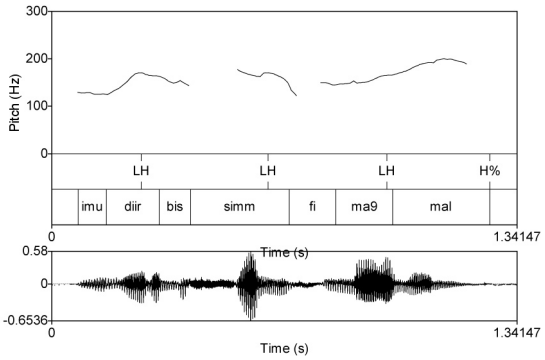

Figure D: GCG context (GCG-CMH)

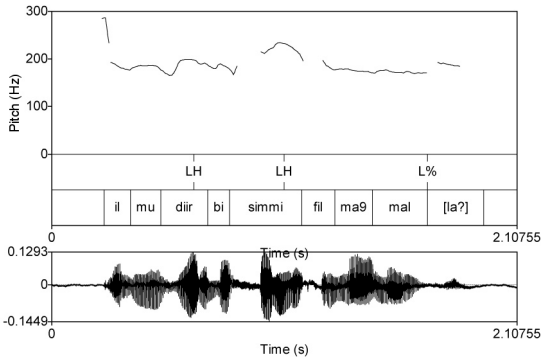

Figure E: GCG context (GCG-CNX) (exceptional use of deaccenting)

Appendix 2: Dialogue history reconstruction classification scores.

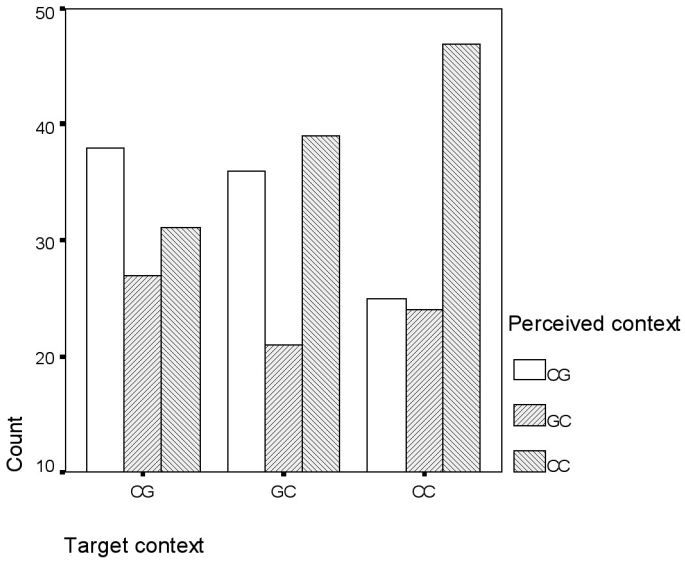

Figure A: within-phrases dataset.

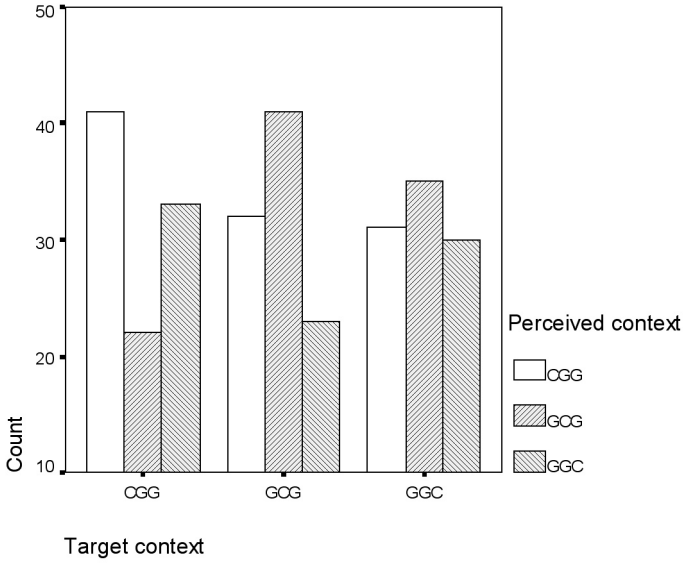

Figure B: among-phrases dataset.

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