Leading, linking, and closing tones and tunes in Egyptian Arabic - what a simple intonation system tells us about the nature of intonation

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1 Background and goal

The approach taken in this paper is that intonation is essentially a largely iconic language component whose basic meanings can be derived by a very simple mechanism, namely the rising and falling of pitch, yielding a small set of oppositions that fulfil essential communicative functions. Bolinger (1986) notes that:

> intonation is fundamentally the *opposition of up and down*, with meanings clustering around the poles of the opposition in accord with metaphorical extension [...],the system is coherent, to the extent *that most if not all manifestations can be ultimately traced to the primary metaphor* (Bolinger 1986:221f., *emphasis mine*)

This view on intonation was developed predominantly on the basis of English, a language well known for the complexity of the tones it uses (cf. the richness of the "finite-state grammar" as suggested by Pierrehumbert 1980). If we look at a language such as Egyptian Arabic (EA) which has repeatedly been claimed to possess an utterly simple intonational structure (Rastegar-El Zarka 1997, Rifaat 2005, Hellmuth 2006), can we expect Bolinger's fundamental insight to become even more evident?

In this paper, I argue that the traditional understanding of intonation that identifies main functional categories and their formal realization is superior to the assumption of an abstract intonational grammar consisting of pitch accents. I follow Bolinger in the view that "the

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overintellectualization of speech [...] has obscured the true nature of intonation." (Bolinger 1986:202). I also argue that it is the trade-off between prosodic features that is responsible for the prosodic encoding of information structure, one of the most important linguistic functions of prosody. The actual prosodic strategy employed ultimately depends on the speaker's choice. It is, however, possible to identify basic tonal contours that convey certain rather "global" meanings which will be dealt with here.

The paper is organized as follows: Section 2 offers some basic facts of EA intonation. In Section 3, the problems with identifying abstract pitch accents are briefly stated and an alternative approach based on natural preferences of tonal movement and the preferred association of tonal contours with textual units is suggested. Section 4 establishes three intonational categories: leading, linking, and closing configurations and provides the functional justification and applications of these intonational categories in relation to information-structural categories, viz. topic and focus, presenting data from a corpus of EA that consists of spontaneous and semi-spontaneous speech and experimental data[1]. Finally, Section (5) provides an outlook for further research and comments on the question of methodology in the study of prosody and the phonological status of prosodic features.

2.   Some basic facts of EA intonation

One of the characteristics of EA prosody is the succession highs and lows within an intonation contour. This largely differs from the familiar melodies of West-Germanic languages, such as German and English, with their long sequences of accentless syllables that only serve as a link between prominent positions within a contour. Mitchell's sketchy but insightful description of Arabic intonation as "up-and-down" or "see-saw" (Mitchell 1993:222) already points to that fact. This tendency to accent all words has also been recognized by Rifaat (1991) in his investigation of the neutral declarative sentence in Classical Arabic (Egyptian pronunciation), by Rastegar-El Zarka (1997) in her study of Modern Standard Arabic (MSA; Egyptian pronunciation) and by Hellmuth (2006). In her corpus of EA, there were only 2-4% of unaccented content words (p. 66).

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[1] Part of the data was collected by Sam Hellmuth for the Project on Information Structure SFB632/D2, University of Potsdam, funded by the DFG, using the questionnaire on information structure QUIS (Skopeteas et al. 2006).

These successive accents frequently display a certain downdrift within intonation phrases and even across them.

In EA intonation phrases, the peak of the last accent is frequently downstepped. Downstep has been attributed to the phonetic tendency of final lowering and conveys greater finality or assertion. Final downstep is probably more common in broad focus, early focus conditions, and thetic utterances as opposed to narrow focus on an argument in final position. Figure 1 shows a typical contour of a neutral declarative utterance with downdrift throughout the whole contour and total downstep of the last accent.
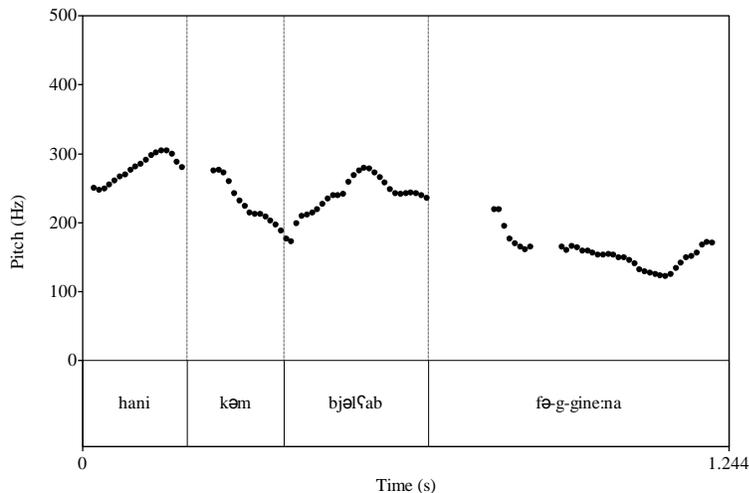

Figure 1 Pitch track of the utterance *haani kaan bijilʕab fi l-gineena* 'Hany was playing in the garden.'

3.   An alternative representation of EA intonation

In recent studies, the ups and downs exhibited by the above pitch track have commonly been analyzed as pitch accents within an autosegmental metrical (AM) framework (Rifaat 1991, 2005, Rastegar-El Zarka 1997, Hellmuth 2006). In Standard AM Theory (Pierrehumbert 1980, Beckman & Pierrehumbert 1986), these pitch accents can be either left-headed or right-headed, thus the theory differentiates between H+L*, H*+L, L+H*, and L*+H pitch accents. The important finding by Arvaniti, Ladd and Mennen (1998) that tonal targets are closely aligned with specific segmental landmarks has inspired a great number of alignment studies in different languages (cf. Hellmuth 2006, 2007 and Hellmuth & El Zarka 2007 for EA).

The common basic assumption in Standard AM Theory has been that the exact position and the stability of the alignment of the individual targets constitute the basis for the analysis of a pitch accent as either rising to or from an accented syllable (L+H* and L*+H) or falling to and from an accented syllable (H+L* and H*+L). Thus various analyses of essentially the same contour, e.g. a rising-falling movement, have been ventured by different students of intonation, depending on the theoretical assumptions they embrace (cf. for example the different analyses of Spanish dialects, summarized in Tevis McGory & Díaz-Campos (2002) and the different analyses of the prenuclear pitch accent in Modern Greek (Arvaniti, Ladd & Mennen 2000).

Likewise, the most common pitch accent type of EA, a rise-fall just as in Spanish and Greek, has been analyzed in three different ways: as LH for prenuclear accents vs. HL for nuclear accents (Rifaat 1991), as H*L (Rastegar-El Zarka 1997), as predominantly H for prenuclear accents and HL for nuclear accents (Rifaat 2005), and finally as LH* (Hellmuth 2006). This was at least partly due to differences in the theoretical frameworks applied, but it also raises the question of whether these differences also reflect differences in the data, especially since the three studies investigated three different varieties of Arabic in Egypt, namely Classical Arabic (Rifaat 1991), Modern Standard Arabic (MSA) (Rastegar-El Zarka 1997, Rifaat 2005) and EA (Hellmuth 2006).

Hellmuth (2006, 2007) presents a quantitative study of phonetic alignment of intonational targets in EA pitch accents and comes to the conclusion that the sole pitch accent in EA is a rise LH*, showing that the L is stably aligned with the beginning of the stressed syllable while the position of the H is less reliable. In general, the H seems to be aligned later in Hellmuth's EA data than was observed by Rastegar-El Zarka (1997) in the MSA data as pronounced by Egyptians. In Hellmuth's data, the H is aligned outside a stressed CV-syllable (cf. Figure 2a), a fact that has neither been reported by Rastegar-El Zarka (1997) nor by Rifaat (2005). The following schematized graphic representation of alignment in CV-syllables in the different accounts illustrates that point.
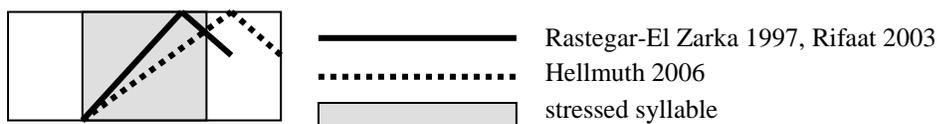

———————	Rastegar-El Zarka 1997, Rifaat 2003
····················	Hellmuth 2006
▢	stressed syllable

Figure 2 Schematised peak alignment in CV syllables, as observed in prior studies; adapted from Hellmuth & El Zarka (2007)

To find out whether this observed difference was due to register differences, Hellmuth & El Zarka (2007) conducted a small scale experiment that investigated a parallel corpus of MSA and EA sentences. The results of the experiment suggest that the differences are speaker-dependent and probably due to speech style, but not to the different registers involved. It seems that an early alignment of the high peak is correlated with a more deliberate and careful pronunciation of either MSA or EA materials. Interestingly, the occurrence of another low target between a peak and the onset of the next accented syllable creating a flat low stretch between two successive accents was observed in this experimental data (cf. also Figure 6). This can be explained by the fact that the inter-accentual interval was designed to cover four to six syllables in order to avoid tonal repulsion from an upcoming tonal event.

There are various reasons to reject the analyses suggested so far. Firstly, the occurrence of two successive L-tones has to be accounted for, and an analysis involving a bi-tonal accent, whether it is a fall HL or a rise LH, does not provide descriptive adequacy. If the late alignment is to be taken as the basis for identifying the accent as a rise LH, it would be necessary to invoke the existence of a low boundary tone to account for the actually observed contour, a rather ad-hoc stipulation, at least in those cases where there are no other phonetic boundary cues present. The second more general reason not to analyze the tonal contours in question as either a rise or a fall when the tonal contour is perceptually ambiguous is the arbitrariness of this decision, as the data do not seem to be uniform. In the following subsection, it will be demonstrated that there are contours that are clearly rising and others that are clearly falling, but there is also something in between. In the remainder of the paper, I will refer to the basic pitch configurations as accents, suggesting that they could be analyzed as tritonal pitch accents (Grice 1995) or as accentual phrases as, e.g., in Japanese (Beckman & Pierrehumbert 1986). Such accents are frequently characterized by a high peak flanked by two low tones, one immediately preceding the H, roughly at the beginning of the stressed syllable, thus constituting a rise across that syllable whose main function seems to be creating prominence by highlighting the stressed syllable in a word. The position of the second L is highly variable, but given that there is enough segmental material available between the H and the beginning of the next accented word, it will often seek the beginning of this lexical item and/or the end of the first one serving a delimiting function. The existence (or non-existence) and position of that L seems to carry an ostensibly higher functional load than the first L, participating in signalling focus position (Rastegar-El Zarka 1997) or at least

influencing the degree of cohesion or separateness between two successive accents (cf. Bolinger 1986).

The tonal units are assigned to semantic textual units, not to phonologically defined constituents like syllables or feet. The association of the peak (or in rare cases the valley) with a stressed syllable can be viewed as the default case. Given the phonetic shape of the accent as outlined above, we might venture an analysis of the smallest intonational unit in EA along the following lines: The default pattern of the accent is LHL (cf. Figure 3), brought about by the preference of maximal tonal contrast, following a general Gestalt principle of "figure against ground". This tonal shape can be modified in certain ways. The first L-tone of a closing accent may be missing at the beginning of an intonation phrase as an instance of truncation when there is not enough segmental material available. If it is present in such cases, this will add to the salience of the accented item. The second L-tone of a rising accent will normally not be present or merged with the first L of the following accent, if there is not enough syllabic material available for its realization. To account for this observation I adopt Gussenhoven's (1983) "tone-linking rule".
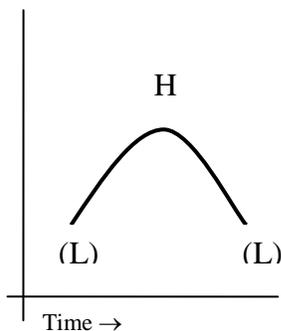

Figure 3   Schematized basic accent type of EA intonation

In addition, the position of the individual tonal targets can be moved along the vertical and horizontal axes as illustrated in Figure 4. This can be represented by the use of features such as [delayed] or [early], noted here as 'T$^{>}$' and 'T$^{<}$' or [upstep] and [downstep], noted here as 'T↑' and 'T↓' to represent the relative height of the tones or of the tunes with respect to each other. Another feature is [tonal spreading], represented as 'T^{-}' to represent suspended pitch contours. Such contours frequently, but not exclusively, occur at the end of an intonation unit to signal continuation. A similar idea is expressed in Rifaat (2005). Rifaat's default H accent is described as a rising-falling gesture which can be modified by intonational features. In his account the

falling and rising accents (HL, LH) are derived by leftward or rightward movement on the horizontal axis, while his L accent is derived by vertical movement. Rifaat's modifications thus only seem to affect the alignment and scaling of the peak. A further difference to this account is his assumption that falling and rising accents only occur phrase- or tune-finally. It is thus possible to view them as involving boundary phenomena while the suggestion made here assumes the conceptual separation between tonal phenomena and phrasing and a direct semantic effect on tonal contours without recourse to the rhythmic component.

Furthermore, the contrast between figure and ground may be minimized resulting in a flat contour with only a very small excursion or even complete absence of the H-tone. These compressed accents are used for downtoning the informationally given lexical material they are associated with. Phonological features were originally introduced into AM Theory by Ladd (1983) and independently by Gussenhoven (1983). As pointed out by Ladd, they provide a powerful means for cross-classification of certain contour types and functional generalizations without abandoning the possibility of expressing phonetic detail (Ladd 1983:721).
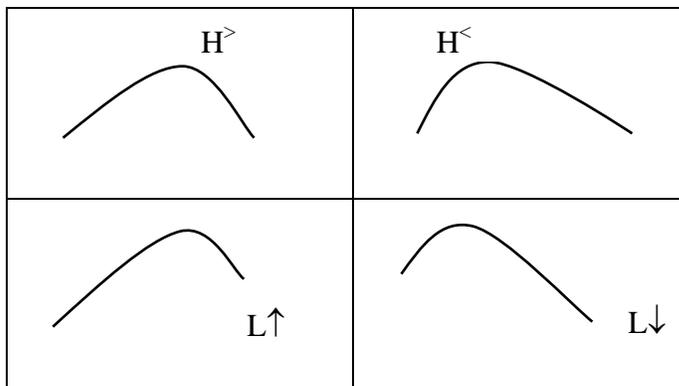

Figure 4   Some logically possible phonetic shapes of the accent in EA represented by features.

One intonation phrase consists of one or more accents. When these are concatenated, unaccented function words are usually attached to the left accent and integrated in the fall. Concatenated accents may exhibit loose or tight cohesion (cf. Gussenhoven's tone linking), depending on the position of the second L tone. If the final L is associated with the boundary of the content word, this enhances separation between two successive items (cf. the examples in Figure 6 that exhibit more separateness of the individual accents when compared to the one in Figure 1). The above

outlined possibilities of phonetic modifications of the basic accent shape can be used to express functional differences. This question will be dealt with in the next section after the fundamental contours have been identified on the basis of the iconic functions of pitch.

4.   Tones and tunes and the iconic meaning of intonation

In the remainder of this paper I will present data from EA that provide evidence for a very simple analysis based on essentially three different tonal contours. Two of them stand in opposition to each other, whereas the third contour is more of a neutral tone that does not carry any meaning, but functions simply as a link between the meaningful units.

The basic claim is that EA intonation can be ultimately reduced to leading, closing and linking configurations that are functionally conditioned. Their phonetic expression can be derived from a biological code, namely the frequency code (Ohala 1983, Gussenhoven 2002). This natural code, as conceived by Ohala, is innate in humans and non-humans alike and derives from the simple fact that high pitch is associated with smaller sized creatures and low pitch with larger sized ones, based on the size of the larynx and the resulting height of the voice pitch. The fact that large and strong creatures by virtue of their size are conceived as threatening and small creatures as non-threatening has given rise to a number of secondary meanings of high and low frequencies, both paralinguistic and linguistic. Thus high pitch is associated with friendliness, uncertainty and incredulity, which can be conventionalized to express modal and informational (or discoursal) meanings like questioning, opening a topic, and continuation. Low pitch, on the other hand, conveys authoritative notions like power, decisiveness and certainty, which can be fossilized in the linguistic expression of assertion and finality (cf. Gussenhoven 2002).

A second code, as proposed by Gussenhoven (2002), is the effort code. It rests on the assumption that to get a message across, a speaker will raise his/her effort level. The manifestation of stronger effort is more salience or prominence. Such prominence can either result in higher overall pitch range or in wider pitch excursion on individual items. Gussenhoven only deals with tone, but the notion can be extended to include intensity and duration increase as well. The effort code is relevant to the articulation of focus, especially narrow focus. If a focussed item is not in sentence final position, it is frequently marked in opposition to the the surrounding accents by a wider pitch range (cf. also Norlin 1989).

4.1.   *Leading versus closing tonal contours*

The ideas expressed here are by no means new. Navarro Tomás (1974 [1944]), in his account of Spanish intonation, already divides his 'frase enunciativa' into two parts: one that builds up tension, 'rama tensiva' or 'anticadencia', and a second one that relieves the tension, the 'rama distensiva' or 'cadencia'. Brazil (1975, 1997) proposes two main tonal contours that are primarily used to express discoursal meanings, described as referring (fall-rise and rise) and proclaiming (fall and rise-fall). These meanings are tied to a pragmatic distinction that Brazil (1997:68f.) describes as the opposition of "what we are talking about" and what has been "freshly introduced into the conversation", thus hinting at the opposition of given vs. new on the one hand and topic vs. focus on the other. Gussenhoven (1983) in his treatment of English intonation essentially adopts this approach, distinguishing between 'selection' for the first meaning and 'addition' for the latter. The same is true for Bolinger's profile B and A. Bolinger identifies the difference between B and A along the dimension of connectedness-separateness (Bolinger 1986:166) and attributes to B a sense of predictability and incompleteness and a lack of assertiveness and separate pointing (p. 177).

EA intonation contours show that these basic notions are pervasive in the language. Following the ideas outlined above, it is possible to identify rising contours that carry the functions of opening a discourse or leading to a climax, or offering the turn to an interlocutor, and closing contours that terminate a discourse unit or part of it and convey a sense of finality. Leading tones are thus associated with linguistic material that poses a question or a problem or identifies a starting point; hence they represent the proper intonation for questions and topics, but it may also signal continuation and connectedness in accordance with Bolinger's ideas. Closing contours are associated with assertions and express finality and separateness, thus characterizing focal constituents.

The following example (Figure 5) from a narrative (Abdel Massih 1975:269f.) exhibits a leading and a closing tune associated with a topic-comment sentence. The rise is realized across two accents with the second one upstepped in relation to the first. The closing contour is realized by three successive downdrifting accents over the comment part of the sentence.
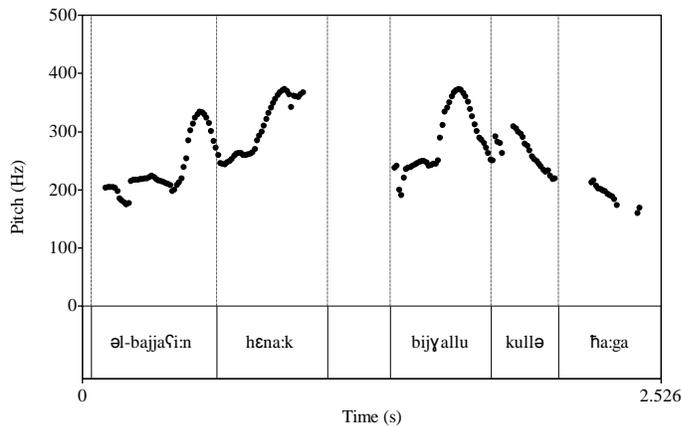
Figure 5   _{TOP}[*il-bajjaʕiin hinaak*]_{TOP FOC}[*bijɣallu kull ħaaga*]_{FOC} 'the vendors there and the 'make everything expensive'.

It is commonly accepted that whole tunes carry a specific meaning, while individual pitch accents are supposed to be abstract phonological units. But in fact, the distinction between tune and tone (i.e., accent) is difficult to draw. Following Bolinger and others, I therefore hold the view that what I have called accent here and which is largely equivalent to Bolinger's profile may itself carry the intended meaning. In Figure 6 we see how the individual accents of the subject constituent *il-miʕza bitaaʕit kamaal* 'Kamal's goat' under topic and focus conditions exhibit the characteristics of a leading tune in one tone. Therefore, it does not seem appropriate to resort to an accent-boundary tone analysis for the characterization of a tune. Such an analysis fails to account for the generalization present in both tonal shapes. The distinct prosodic encodings are of course not realized by the behaviour of the tones alone, but also involve other features, such as intensity and durational features resulting in perceivable boundaries (e.g. after *kamaal* in 6b), but one main correlate of the focal tone is the early and low realization of the L-tone at the boundary of the lexical items.
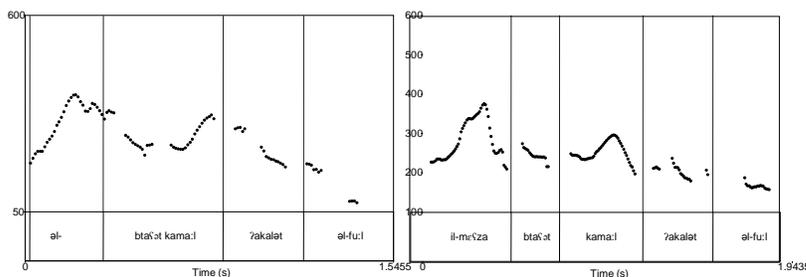

Figure 6   *il-miʕza bitaaʕit kamaal* 'Kamal's goat' as a topic expression (panel 6a) and as a focus expression (panel 6b).

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The leading contour associated with a topic demonstrably serves as a starting point for the information to be delivered. Scene-setting frames constitute another type of starting point that has frequently been regarded as a type of topic (Chafe 1976). The pitch track in Figure 7 depicts a left-dislocated frame, typically associated with a leading tone.
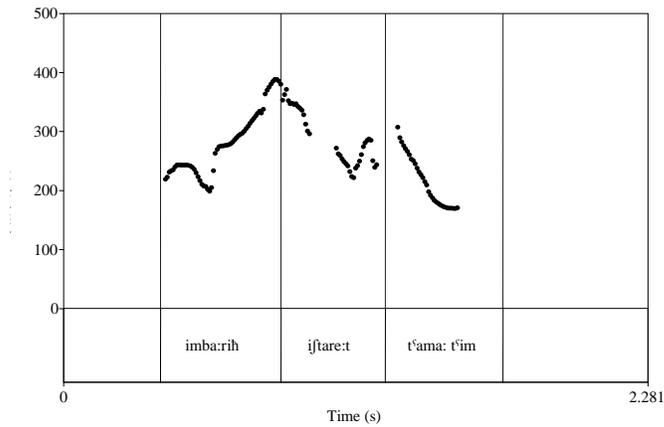

Figure 7   FRAME[*imbaariħ*]FRAME [*iʃtareet tˤamaatˤim*] 'Yesterday, I bought tomatoes.'

In all-new sentences where the whole utterance is in focus when answering a question such as 'what happened?' or 'what do you see?' the tones may be of a closing nature, just as in the above illustrated narrow focus case (Figure 6b). In the following utterance (Figure 8), the existential construction that bears the main functional load in signalling sentence focus is supported by a sequence of closing tones.
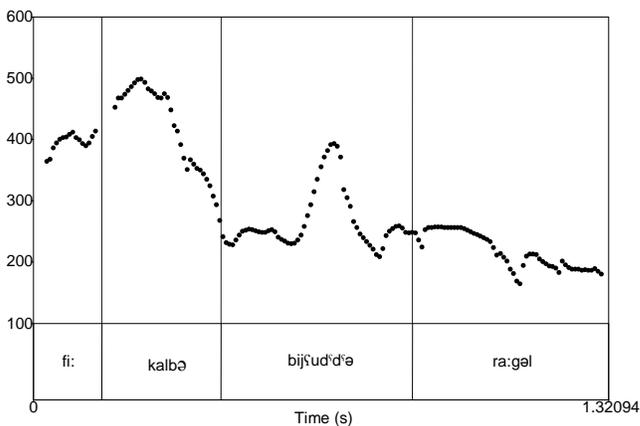

Figure 8   *fii kalb bij ʕudˤdˤ raagil* 'There is a dog biting a man'.

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4.2.   Leading versus linking tones

The third tonal contour that I claim to be a link between meaningful units is characterized by a flat or virtually flat contour that is used for downtoning or backgrounding the textual materials it is associated with. It is similar to deaccenting, which is held to be the most common realization for given information (Cruttenden 2006). But it may exhibit a slight rise (and fall) instead of being completely flat as is the case in English deaccented material. Accordingly, there is often some ambiguity between real deaccenting and and readily perceptible accents that are not or almost not made prominent by tonal obtrusion, but rather by duration or intensity (cf. Kohler's 1991 duration accents). The underlying theoretical stance here is the conceptual separation between accent as prominence and accent as tone, namely to acknowledge that there may be accents that are not marked by tonal events. In any case, this contour diminishes the prominence of the textual items in comparison to the surrounding accents with wider excursions. This has also been observed by Chahal (2001) for Lebanese. Figure 9 shows pitch tracks of two structurally identical sentences with a focussed adjunct phrase. The sentence on the left shows a linking tone at the beginning with very low prominence on the verb introducing the topical constituent 'Maryam' with a linking tone. The sentence on the right assigns more weight to the verbal constituent and makes it prominent by a fully-fledged accent.
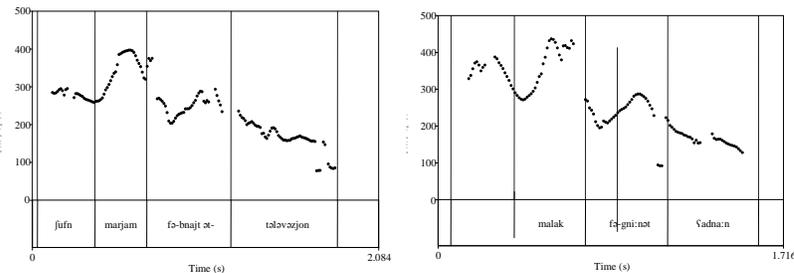

Figure 9   *ʃuʃna marjam fi binaajit it-tilivizjoon* 'We saw Maryam in the television building.' and *ʃuʃna malak fi giniinit* ʕadnaan 'We saw Malak in Adnan's garden.' with Maryam and Malak as topics.

4.3.   The phonetic realization of leading and closing tones

As outlined in Section 3, there are prosodic features that may be varied to bring about a modification of the accent in order to match the intended meanings. I will concentrate here only on tonal features, neglecting for the time being intensity and duration which might be of no less importance than the intonational ones.

The one feature I am going to discuss here is the alignment of the individual target points of the accent as identified in Section 3. In the following, I will present some quantitative data from a controlled production experiment with three speakers that shall give some preliminary evidence for the suggested analysis. As I have repeatedly pointed out, linguistic functions of the perceptually defined holistic categories rely on the interplay of several phonetic features. If we look only at one of them, e.g. alignment, we are probably ignoring other important features. It will therefore not be claimed that any features create phonological categories on their own. But it can be shown that alignment is at least one correlate of the categorical units identified.

It has been observed in a number of languages that peak alignment tends to be earlier under focus condition. The distinction has in fact been claimed to be categorical in some languages and interpreted as involving two different pitch accents (e.g. Frota 2000 for Portuguese, Face 2001 for Spanish). The EA data also show a remarkable difference in peak alignment, at least with some speakers. In the above experiment designed to test different phonetic cues in focus vs. non-focus or topic conditions, I found that all three speakers tended to align the peak earlier under focus, but the results were highly significant for only one speaker across all different syllable shapes of the tested target words. This suggests that peak alignment is but one strategy to signal focus and is highly speaker-dependent.

The main hypothesized cue to the closing tone is the fall realized within the semantic unit the accent is associated with. I have assumed that the right flanking L-tone will tend to be aligned with the word boundary or in cases of special emphasis even earlier at the end of the stressed syllable (Rastegar-El Zarka 1997), whereas the fall continues into the following meaningful item under topic condition. As an effect, the topical item is on the whole perceived as predominantly rising. This was tested by calculating the difference between the f0 value at the peak and the f0 value at the following boundary of the target word, both in topic and focus conditions. The significance of the results was checked by a one way ANOVA. The results turned out to be highly significant for two speakers (speaker M0: $F_{(1,76)} = 34{,}66$, $p < .0000001$; speaker F0: $F_{(1, 96)} = 16{,}49$, $p < .0001$) and are graphically displayed in Figure 10.
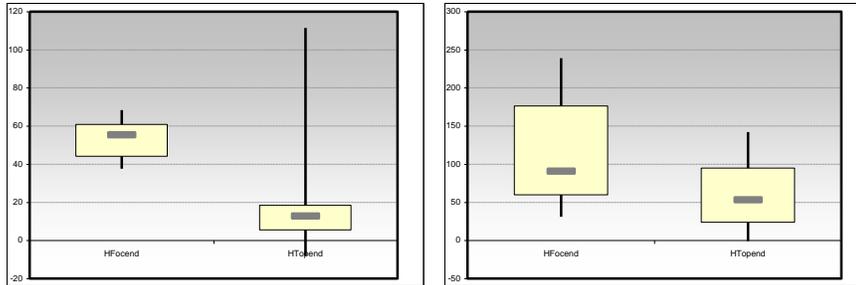
Figure 10 Median and interquartile values of the difference between the f0 value at the peak (H) and the f0 value at the end of the target word for speaker M0 (10a) and speaker F0 (10b); f0 values measured in Hz.

Figure 11 shows an example of a topical (11a) and a focal (11b) target word. The figure not only shows the significantly lower pitch at the end of the focussed word, it also illustrates the later peak alignment in the topic constituent and the longer duration of the focussed item.
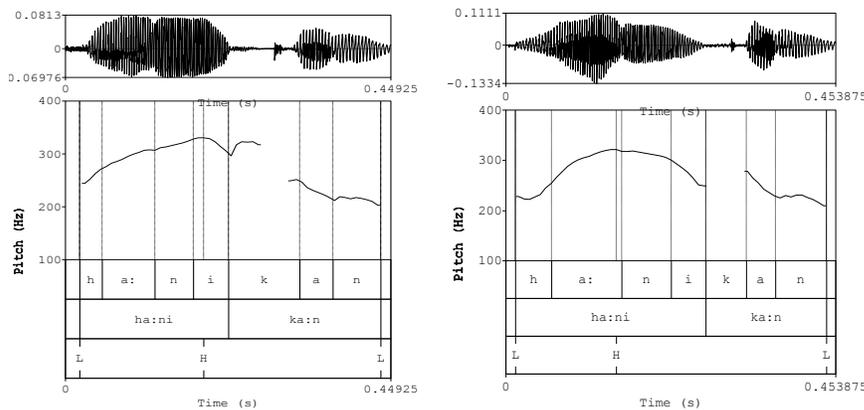

Figure 11 *haani* as a topic (11a) and as a focus (11b) in *haani kaan bijilʕab fi l-gineena* 'Hany was playing in the garden.'

The tentative linguistic interpretation of these results is that the variable peak alignment might only be a derived feature of rising vs. falling tones, while the contribution of valley alignment is more significant and could be the primary phonological feature (cf. Figure 6). This would be in line with the observations made in Rastegar-El Zarka (1997), who also suggests that in emphatic articulation of focal accents the L is even aligned with the end of the stressed syllable. The present data also contain such cases, but more research is needed to support or falsify these hypotheses and to test the contribution and phonological status of other prosodic features as well.

In closing, some words regarding the above mentioned in-between cases are called for. Frequently, a tonal contour can neither be identified as unambiguously leading or closing. There

is ample evidence that in a number of languages, e.g. Spanish, Dutch, English, Greek, Japanese, and Mandarin Chinese, L-tones of prenuclear accents are located at the beginning of the stressed syllable, while the H is mostly aligned around the end of that syllable or even later (cf. Ladd 2004). EA is no exception in that respect, as has been convincingly shown by Hellmuth (2006). It seems therefore justified to identify something similar to a default neutral case of the accentual unit in which the first L is always located at the beginning of an accented syllable and, all else being equal, the rise more often than not continues until the end of that syllable or a little further. In the default accent, the fall happens slowly and automatically without any effort, whereas a focal accent will be characterized by an abrupt fall that is willingly induced and demands more effort on the part of the speaker. This may also result in earlier alignment of the H to provide the time for the falling gesture to be carried out. If neither a focal nor a topical accent is chosen by the speaker, the accentual gesture will be something in between. As most experiments are carried out using detached reading of so-called neutral declaratives, the results of these studies mostly rely on such 'neutral' prenuclear (i.e. non-last, non-focal and non-topical) accents and thus more or less describe the neutral accent shape.[2] If this assumption is correct, the 'default prenuclear' accent can be viewed as the prominent version of the linking tone described above.

5.   Summary, conclusion and outlook

In this paper, I have tried to show how the simple intonation system of EA reflects the iconic nature and simple mechanisms of intonation. I have suggested that EA intonation can ultimately be reduced to three tonal types, identified predominantly on a perceptual basis and established as functional categories by correlating these tonal contours with basic information-structural constituents. It has been further suggested that the tonal contours rely on the iconic principle of the frequency code.

The theoretical position defended here is basically a holistic approach that views intonational units as unitary contours that might even be meaningful themselves. This is in contradiction with the tenets of Standard AM theory that views pitch contours as a concatenation of atomistic pitch events by splitting up functionally relevant contours into pitch accents, phrase and boundary tones. Methodologically, the approach taken in this paper entails a top-down analysis that, based

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[2] A methodological caveat, however, has to be taken into account in quantitative studies. If a speaker has to repeat the same sentences time and again, he/she is very likely to impose different information structures for the sake of variation.

on functional categories, identifies holistic configurations and then looks into their phonetic realization. Nevertheless, the fundamental idea of tune-text-association that distinguishes between a metrical and a tonal component for prosody and a textual component is adopted from the autosegmental-metrical approach, and so is the notational convention of labelling L and H target tones for its various virtues. Besides its convenience and simplicity, it seems that, in conjunction with the suggested features, this notation provides a powerful system of achieving descriptive adequacy and the basis for cross-classification as a prerequisite for typological comparison. Even if it is not individual targets, but gestures that are taken as intonational primes, their description in terms of endpoints allows for quantitative investigation.

It must be emphasized that our current knowledge about the intonation of Arabic in general, and EA in particular, is still very scanty when compared, for example, to well-studied European languages. It is therefore premature to establish an elaborate phonological system for EA prosody – a fact that was also stated by Rifaat (2005) –, particularly as the functional categories are far from being clear. The interplay of paralinguistic and linguistic meanings as well as their fuzziness and the gradience of tonal and prominence variation make it extremely difficult to identify categorical prosodic units and discrete prosodic features, a prerequisite for phonological classification. So we must await further research including well-designed production and perception experiments as well as qualitative and quantitative work on spontaneous data before we will perhaps be able to establish all features that are relevant to the prosodic encoding of communicative functions in EA and to make decisions as to their phonological status. In the meantime we might be well advised to keep in mind Dwight Bolinger's words: "In the gradient world of intonation, everything that is detectable is potentially significant." (1986:225)

References

Abdel-Massih, E.T. 1975. *An introduction to Egyptian Arabic*. Ann Arbor, University of Michigan.
Arvaniti, A., D. R. Ladd & I. Mennen. 1998. "Stability of tonal alignment: the case of Greek prenuclear accents". *Journal of Phonetics* 26:3-25.
Arvaniti, A., D. R. Ladd & I. Mennen. 2000. "What is a starred tone? Evidence from Greek". *Papers in Laboratory Phonology* V, ed. by J. Pierrehumbert & M. Broe, 119-131. Cambridge: Cambridge University Press.
Beckman, M.E. & J. B. Pierrehumbert. 1986. "Intonational structure in Japanese and English". *Phonology Yearbook* 3:255-309.
Bolinger, D. 1986. *Intonation and its parts. Melody in spoken English*. Standford: Stanford Univ. Press.
Brazil, D. 1975. *Discourse Intonation*. University of Birmingham: English Language Research.
Brazil, D. 1997. *The communicative value of intonation in English* (1st ed. 1985). Cambridge: Cambridge Univ. Press.

Chahal, D. 2001. *Modeling the intonation of Lebanese Arabic using the autosegmental-metrical framework: a comparison with English*. PhD dissertation, University of Melbourne.

Chafe, W. L. 1976. "Givenness, contrastiveness, definiteness, subjects, topics, and point of view". *Subject and Topic*, ed. by C. Li, 25-55. New York: Academic Press.

Cruttenden, A. 2006. "The de-accenting of given information: A cognitive universal?" *Pragmatic organization of discourse in the languages of Europe*, ed. by G. Bernini & M. L. Schwartz, 311-355. Berlin: Mouton de Gruyter.

Face, T. 2001. "Focus and early peak alignment in Spanish intonation". *Probus* 13:223-346.

Frota, S. 2000. *Prosody and Focus in European Portuguese*. New York: Garland Publishing.

Grice, M. 1995. *The intonation of interrogation in Palermo Italian. Implications for intonation theory*. Tübingen: Niemeyer.

Gussenhoven, C. 1983. *A semantic analysis of the nuclear tones of English*. Bloomington (Indiana): Indiana University Linguistics Club. Published as ch.6 in Gussenhoven. 1984. *On the grammar and semantics of sentence accents*. Dordrecht: Foris Publications.

Gussenhoven, C. 2002. "Intonation and interpretation: phonetics and phonology". *Proceedings of the First International Conference on Speech Prosody Aix-en-Provence,* 47-57.

Hellmuth, S. 2006. *Pitch accent distribution in Egyptian Arabic*. Ph.D. dissertation, SOAS.

Hellmuth, S. 2007. "The foot as the domain of tonal alignment of intonational pitch accents". *Proceedings of The 16th International Congress of Phonetic Sciences*. Saarbrücken, 6-10 August 2007, 669-672.

Hellmuth, S. & D. El Zarka. 2007. "Variation in phonetic realization or in phonological categories?: intonational pitch accents in Egyptian Colloquial Arabic and Egyptian Formal Arabic". *Proceedings of The 16th International Congress of Phonetic Sciences*. Saarbrücken, 6-10 August 2007, 147-153.

Kohler, K. 1991. "A model of German Intonation". AIPUK 25:295-360.

Ladd, R.D. 1983. "Phonological features of intonational peaks". *Language* 59:721-59.

Mitchell, T.F. 1993. *Pronouncing Arabic II*. Oxford: Clarendon Press.

Navarro Tomás, T. 1974. *Manual de entonación española* (1st ed. 1944). Madrid: Guadarrama.

Norlin, K. 1989. "A preliminary description of Cairo Arabic intonation of statements and questions". *Speech Transmission Quarterly Progress and Status Report* 1:47-49.

Ohala, J. 1983. "Cross-language use of pitch: An ethological view". *Phonetica* 40:1-18.

Pierrehumbert, J. 1980. *The phonology and phonetics of English intonation*. Ph.D. dissertation, Massachussetts Institute of Technology.

Rastegar-El Zarka, D. 1997. *Prosodische Phonologie des Arabischen*. Ph.D. dissertation, University of Graz.

Rifaat, K. 1991. *The Intonation of Arabic: An Experimental Study*. Ph.D. dissertation, University of Alexandria.

Rifaat, K. 2005. "The Structure of Arabic Intonation: A Preliminary Investigation". *Perspectives on Arabic Linguistics* XVII-XVIII. *Papers from the Seventeenth and Eighteenth Annual Symposia on Arabic Linguistics*, ed. by M. T. Alhawary & E. Benmamoun, 49-69. Amsterdam: John Benjamins.

Tevis McGory, J. & M. Díaz-Campos. 2002. "Declarative intonation patterns in multiple varieties of Spanish". *Structure, Meaning, and Acquisition in Spanish. Papers from the 4th Hispanic Linguistics Symposium*, ed. by J.F. Lee, K.L. Geeslin & J. Clancy Clements. Somerville (Cascadilla), 73-92.