Pragmatic functions and the biological codes:

Evidence from the prosody of sentence topic and focus in Egyptian Arabic declaratives

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I argue in this paper that the intonational marking of information structure is mainly based on iconic principles relying on the effects of the frequency code (Ohala 1983, Gussenhoven 2002) and the effort code (Gussenhoven 2002). It will be shown that different information structures can be disambiguated, if, in addition to prominence relations, tonal properties are taken into account. Following Lambrecht (1994), I argue for a distinction between pragmatic relations (topic and rhematic focus), which are realized by tonal shape (high/rising or low/falling) and pragmatic properties (focus of interest) realized by prominence. Specifically, it is suggested that deaccenting is only a special case of downtoning, which is also employed in EA to mark presupposed material.

1   Information structure and intonation

Focalisation has always been one of the major concerns of intonation studies. It is the aim of the present paper to shed some light not only on the intonational encoding of focus, but also on the intonational reflex of topic, and its iconic motivation on the basis of data from Egyptian Arabic (EA).[1] What is meant by topic and focus here is essentially related to their functions in the sentence, and no reference will be made to higher level discourse functions.

It is generally assumed that in intonation languages the focus of an utterance is marked by prominence in the sense of accentuation involving pitch phenomena. The question that constitutes the dividing line between two research traditions is how accentuation is related to focus structure.

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[1] The data on which the present analysis is based consist of a large corpus of spontaneous speech collected by the author and experimental data, partly from own experiments, and partly from the D2 Project on Information Structure (SFB632), University of Potsdam.

The "highlighting-based focus-to-accent approach" (Ladd: 1996: 163) advocated by Bolinger (1958, 1972, 1986) assumes a radically iconic relationship between accent and focus which explains accent exclusively in semantic terms[2]. It conceives of accentuation as a direct reflection of the relative semantic and pragmatic weight of a lexical item and is supposed to be universally valid. The second approach called "structure-based" by Ladd (ibid.) takes the relation between prosodic form and meaning to be mediated by structure and thus concentrates on the language-specific, non-universal aspects of intonation. While early structural accounts of so-called "normal stress" were based on syntactic structure without recourse to semantic and pragmatic meaning (e.g. Bresnan 1971, Chomsky & Halle 1968), later accounts of focus accentuation (e.g. Ladd 1980; Gussenhoven 1983a) resorted to semantic (or pragmatic) definitions of focus domains as a basis for accentuation rules. The virtue of the *structure-based* approach is essentially that it accounts for language-specific differences in prosodic structure, as argued by Ladd (1996: ch.5.2), and that it draws a distinction between accent placement and focus structure, i.e. between form and function.

Although Bolinger's view may be too strong as a universal theory of accentuation, given that accent and focus clearly do not always exhibit one-to-one correspondence, it has the virtue of emphasising that accentuation is ultimately left to the speaker's choice. Thus, even if it is true that broad focus constituents may be signalled by a single *sentence accent* or *nucleus,* as the primary accent has been called in the British tradition (for an overview cf. Ladd 1996: ch.5, Hirst & Di Christo 1998: 28-33), it is equally true that the actual intonational shape of an utterance cannot be fully predicted by its structural make-up. The view endorsed here lies somewhere in-between the structural and the radically iconic approach in that it assumes prosodic structure to be related to information structure as outlined below, but also acknowledges freedom of speakers to interpret the context according to their understanding. At the same time, it allows for other factors, such as semantic weight of individual lexical items and rhythmic considerations to override structure. Consequently, the actual intonational realization of an utterance is conceived of as the outcome of the interplay of various linguistic and non-linguistic factors, of a pragmatic, semantic, syntactic, phonological, or attitudinal kind, and is therefore in a sense unpredictable.

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[2] At least some of the phenomena Bolinger called 'semantic' at the time would nowadays probably be called 'pragmatic'.

The proposal made here is essentially in the spirit of Bolinger's views that "intonation is fundamentally the opposition of up and down, with meanings clustering around the poles of the opposition in accord with metaphorical extension" (Bolinger 1986: 221) and that every accent is individually meaningful. For Gussenhoven (2002: 47) the universal part of intonation is exercised exclusively in the phonetic implementation while language-specific meanings are expressed by phonological and morphological means. Although I will not be concerned with phonological representation here, I doubt that a clear-cut division between the "tamed" and the "untamed" savage in the sense, in which Gussenhoven (2004: 57f.) develops Bolinger's metaphor, is feasible. I rather follow Bolinger in the contention that intonation, although it may acquire a certain degree of arbitrariness, should be analyzed in terms of "meaningful gesture" rather than "abstract phonology" (Bolinger 1986: 140), making no "distinction between the grammatical and the ideophonic except as they represent extremes of a scale" (p. 32). The analysis of the EA data I am going to present actually supports this view. It will be shown how prominence relations and the shape of intonational tones (accents) and tunes in EA follow general iconic principles and that EA intonational contours are a challenge to purely structure-based approaches.

2   Pragmatic properties and pragmatic relations

The vague use of dichotomies such as given/new, topic/comment or theme/rheme, presupposition/assertion, background/focus and also topic/focus has given rise to much confusion in the literature. These labels are not only different names for the same thing but refer to related concepts whose differences and interdependence become evident if we follow Lambrecht (1994: 209) and draw a basic distinction between what he calls pragmatic properties and pragmatic relations. While given and new respectively are properties of the denotata and thus relate to their (assumed) states of representation in the addressee's mind - a fact that has a bearing on their identifiability and activation state - topic and focus, more specifically rhematic focus (see below), are relational categories and refer to the pragmatic roles given and new referents play within a proposition.

The most frequent definition of *topic* in the literature and also the one adopted here is in terms of *aboutness* (Gundel 1976, Dik 1978, Reinhart 1982, Lambrecht 1994). Topic as a relational category may not only refer to Chafe's "subjects", which the latter characterizes as "the hitching post for the new knowledge" (Chafe 1976: 44), but also to his "Chinese style topics" that serve as

"a spatial, temporal, or individual framework within which the main predication holds" (p. 50) as for example in preposed scene-setting adverbial phrases. Following Lambrecht (1994), topic is used here as a cover term for various types of topics proposed in the literature. This characterization establishes topic as a *pragmatic relation* referring to its role as a reference point.

The definition of focus is more controversial. It is generally assumed that the focus of an utterance is the most important part that very often contains new or unknown information. A definition in terms of the *pragmatic property* of "newness" referring to the denotata of focus expressions does not, however, capture all instances of focalisation. At closer inspection, it seems that much of the controversy can be solved if the concepts of focus as the rhematic part of an utterance, i.e. the comment on a topic, and focus as point of information (i.e. Halliday's information focus) are kept separate, notwithstanding that they frequently coincide. In the proposal presented here, I will follow Bolinger's terminological choice and call the latter type *focus of interest*, while I will refer to the first type as the *rhematic focus*. This conceptual division also nicely ties in with the fact that the rhematic part of an utterance may display one or several accents, none of which has to be dubbed *the focus accent* to the exclusion of the others. Parallel to topic as a relational category, rhematic focus is also relational, i.e. rhematic focus is defined as that part of a pragmatically structured proposition[3] that complements the presupposition or what is taken to belong to the common ground (Lambrecht 1994). Rhematic focus can thus be characterized as the unpredictable part that is not recoverable from the context.

3   The prosody of pragmatic relations and properties and the biological codes

According to Gussenhoven (2002) the metaphorical extensions of three biological conditions or "codes" are the basis for what is universal about intonational meaning. Gussenhoven identifies three such codes: the *frequency code*, the *effort code* and the *production code*. The first two of these will be of major concern here: it is suggested that the division of labour between the *frequency code* and - perhaps vacuously - the *production code* on the one hand, and the *effort code* on the other hand, roughly parallels the above mentioned distinction between *pragmatic relations* (3.1.) and *pragmatic properties* (3.2). I will argue that in EA pragmatic relations are preferentially encoded by tonal configurations and pragmatic properties by prominence relations. I will further argue that - at least in EA - it makes no sense to identify one single nucleus that is the designated terminal

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[3] Lambrecht (1994) uses the term assertion, which in my opinion should be avoided because of its ambiguity. The more common understanding of that term is as an illocutionary act and is roughly synonymous with 'declarative statement'.

element of a structurally defined focus domain and functions as its *focus exponent*. I rather take every accent to be meaningful in its own right and to fulfil a specific function in the utterance.

Phonetically speaking, the identification of a nuclear accent may be relatively straightforward in languages like English, but has been doubted for languages with many (identical) pitch accents like e.g. Copenhagen Danish (Grønnum 1998). What EA shares with Danish and other languages of this type, is the high number of pitch accents per phrase which exhibit a downdrifting declination, especially in the type of utterance that is often called 'neutral declarative'. This characteristic makes it difficult and sometimes impossible to identify a nuclear accent, and the identification of the last accent as the most prominent might therefore be nothing but an illusion.[4] If there actually is anything like an unmarked intonation pattern, it must be one associated with a predicate focus (or topic-comment) structure that exhibits a broad focus domain, simply because topic-comment structures are considered to be the unmarked pragmatic structures (Lambrecht 1994: 16). Given that in EA it is not the well known *hat pattern* (a rising-level-falling tune) that is the unmarked tune, but a pattern consisting of a downdrifting series of fully-fledged accents (Fig. 1a) comprising the whole focus domain and the topical constituent alike, it seems that the unmarked intonation pattern in EA is rather the reflection of iconic and rhythmic accentuation principles than the outcome of a structural rule.

The preoccupation with nuclear accent placement in the literature on intonation is to be understood from the dominant role West-Germanic languages played in the early investigations of intonational patterns. Only comparably recently more and more in-depth acoustic studies on other languages have been carried out. This broadening of the data base has for example shown that there are languages that do not all that easily deaccent given information (cf. Cruttenden 2006 for a crosslinguistic survey) and whose intonation patterns – contrary to what has been found in English, German or Dutch – exhibit a dense pitch accent distribution. To this group belong genetically unrelated languages such as Romance languages, Estonian (Asu & Nolan 2007, and references therein) and Egyptian Arabic (Rifaat 1991, Rastegar-El Zarka 1997, Hellmuth 2006a). It happens to be the case that such languages heavily rely on other than prosodic means to convey information structure, e.g. word order. As the following examples

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[4] The variable identification of the most prominent accent of 'neutral declarative' intonation phrase as the first by Rifaat (1991), the last by Hellmuth (2006) and the first or last accent by Rastegar-El Zarka (1997) points to that difficulty.

taken from Lambrecht (1994: 223) show, the prosodic difference between a topic-comment sentence and a thetic or all-focus utterance in English, which is realized by different accent positions, is paralleled by VS word order in Italian and by morphological marking in Japanese.

Predicate focus (topic-comment)	**Sentence focus (thetic)**
What happened to your car?	*What happened?*
Eng.: My car/It broke DOWN.	Eng.: My CAR broke down.
Ital.: (La mia macchina) si è ROTTA.	Ital.: Mi si è rotta la MACCHINA.
Jap.: (Kuruma wa) KOSHOO-shi-ta.	KURUMA-ga KOSHOO-shi-ta

Under the assumption that prosodic marking essentially is marking via accentuation, Vallduví (1991) proposed a typological distinction between *plastic accent* and *non-plastic accent* languages, referring to languages such as English and German as plastic accent languages that exemplify a considerable freedom of nuclear accent placement, whereas many Romance languages fall into the category of *non-plastic accent* languages which are characterized by edge-marking nuclear accents. But as the Japanese example above shows, prosody also seems to be at play in addition to the morphological marking. In the light of the EA data, Vallduvi's claim clearly seems to be too strong.

3.1 Pragmatic relations and the frequency code

The first one of Gussenhoven's biological codes is Ohala's *frequency code* (Ohala 1983) that is derived from the 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 grammaticized 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, 2004: 80-84).[5]

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[5] Gussenhoven ascribes the questioning to the effects of the frequency code and continuation to the effects of the production code. It has to be noted that the effects of the two codes overlap a great deal. Both functions have been characterized by Cruttenden

The correlation between rising f0 and topic or theme on the one hand and falling f0 and comment or rheme on the other has been noted in work dealing with the communicative meaning of intonation (Navarro Tomás 1944, Bolinger 1958, Brazil 1975, Gussenhoven 1983b) and more recently in studies on the interface of information structure and prosody (Steedman 1991, 2000; Büring 1997, 2003). This dichotomy is manifested in the *hat pattern,* which in many languages seems to be the unmarked tune for the unmarked declarative sentence, which, as noted above, is a topic-comment sentence. Hirst and de Christo (1998: 20) note that "[i]n most languages the falling nucleus is generally prepared by a rising pitch occurring on the first stressed syllable of the unit" which they refer to as pitch "onset", which together with the falling "offset" results in the hat pattern if no other accents intervene. In the present account, this rising-falling contour is given a pragmatic interpretation, which is explained by the effect of the *frequency code*. If we think of the functions topic/theme and comment/rheme have in a sentence, the association of a question-answer pair is invoked, as noted by Bolinger:

There's a part that lays the ground-work, that asks the question, that relates to what we already know or can guess, and a part that adds the figure to the ground, that answers the question, that supplies what was not already known. The first part is called the THEME and the second part the RHEME. (Bolinger 1986: 47, *emphasis in the orig*.).

In accordance with the metaphoric interpretation of the frequency code we associate high or rising frequency with the 'question' part and low or falling frequency with the 'answer'. If we relate this to the notion of *pragmatic relations* outlined above, we find that the high/rising pitch signals topicality in the sense of aboutness, while low/falling pitch signals focality in the sense of assertion. Note that we are neither concerned here with the position of the accent for the moment, nor with its height but with its dynamics, i.e. its shape.

### 3.1.1   The prosody of pragmatic relations in EA

As already noted, in EA there is an accent on almost every content word. This obviates or at least reduces the possibility of the occurrence of the hat pattern on a sequence that includes more than two accents. Nevertheless, a basic rising-falling configuration can be observed in EA as well. I have suggested elsewhere (El Zarka 2011) that EA intonation can be described by the assumption of three basic tonal types: the *leading* type that is rising, rising-level or rising-slowly falling, the *closing* type that is (rising-)falling or falling-low and the *linking* type which does not exhibit a major pitch movement, mainly following the ideas expressed by Brazil (1975, 1997) and his distinction between "referring" (leading),


(1986: 125, 168) as 'open', likewise the opposition of leading vs. closing contours, as outlined below in Section 3.1.1, is attributed to the effect of the frequency code.

"proclaiming" (closing) and "neutral" (linking) tones. The suggestion is also in line with Bolinger's notions of thematic B accent vs. rhematic A accent (Bolinger 1958, 1986) or Gussenhoven's (1983b) "selection" vs. "addition". Cruttenden (1986) also distinguishes between the abstract meanings "open" and "closed" for rising and falling tones.

The basic accentual shape of the default accent in EA is a rise-fall with the rise starting at the beginning of the stressed syllable and ending somewhere in the vicinity of its end or slightly later, depending on the syllable type (Hellmuth 2006a). It has been assumed that the f0 then gradually falls from the peak to the low turning point at the beginning of the following accented syllable (Rastegar-El Zarka 1997, Hellmuth 2006a). As recent experimental data show, there is another low target to which the f0 falls in case there is enough intervening material between the two accents (El Zarka & Hellmuth 2009). This low target is usually situated at the beginning of the following lexical word and grammatical items like function words are integrated in the fall. The whole accentual shape thus not only serves the function of culminativity, but also the demarcative function that helps identifying word boundaries in the speech flow. To achieve a perceptionally unambiguous rise on the topic expression that consists of one word only there are several possibilities. First the peak may be aligned later than in the default case as illustrated in Figure 1a. The accent on the subject *Hany* (proper name) corresponding to the topic referent of the clause is not realized with a peak at the end of the heavy first syllable of /haa.ni/ as in the default case, but aligns with the final vowel of the whole constituent. Pitch may also fall slowly after the peak, which in this case may be located in the accented syllable itself or form a high plateau until the end of the topic expression is reached (Fig. 1b).
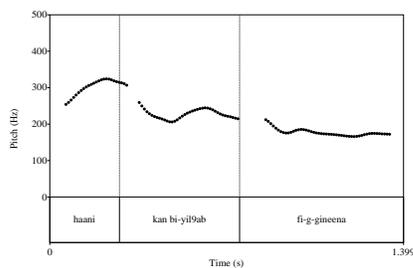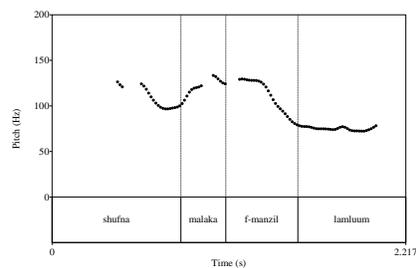
| (1a) | (1b) |

Fig.1: Panel (a) shows the f0 track of the sentence *haani kan bi-yilʕab fi-l-gineena* (Hany was.he playing in-the-garden) "Hany was playing in the garden" as an answer to the question "What was Hany doing?" and panel (b) shows an adjunct focus with the object *malaka* as a topical expression in *ʃufna malaka fi-manzil lamluum* (saw.we Malaka in-home Lamlum) "We saw Malaka in Lamlum's house" as an answer to the question "Where did you see Malaka?" (stressed syllables are underlined).

In the latter tune the topic and focal expressions are conjoined in a small hat pattern, which in EA is quite common when bridging two adjacent accents, but uncommon in longer stretches. Longer topic expressions may be associated with a rising sequence of accents. The resulting rising trend line,

comparable to the rising "grid" of the Lund model (Gårding 1983), gives the overall impression of a rise and thus is apt to convey the *leading* function (Fig. 2).
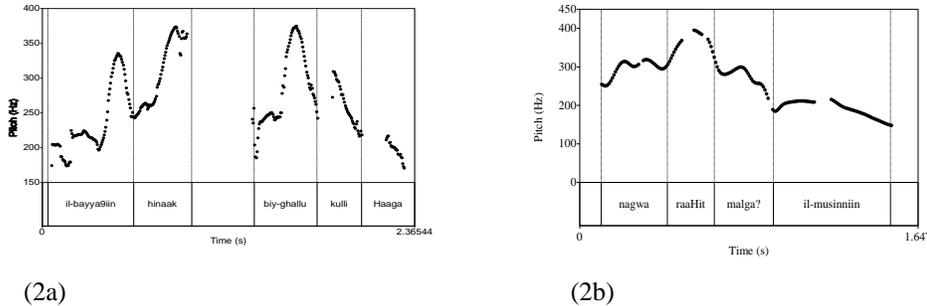

(2a)   (2b)

Fig.2: Panel (a) shows the f0 track of a topic comment sentence /*il-baajjaʕiin hinaak / bi-jɣallu kullə ħaaga*/ (the-vendors there) (they.make.expensive all thing) "The vendors there make everything expensive"; panel (b) shows the f0 track of / *nagwa raaħit / malgaʔ il-musinniin* / (nagwa went.she) (asylum the-old.people) "Nagwa has gone to the old people's home" (stressed syllables are underlined).

Interestingly, the rise in the example in Figure 2b is not only associated with the argument expressing the topical referent *Nagwa* in a topic-comment sentence meaning "Nagwa has gone to the old people's home" but is extended to cover the predicator, thus conveying a subtle difference in the information structure of the sentence, which was a response to the question "Where is Nagwa?" In this rendition the action expressed by the verb is to be understood as presupposed. Imagine someone asking the above question upon entering a room where he expects Nagwa to be present, but does not see her. This implies that *Nagwa* must have gone somewhere. Hence the denotatum of the verb "go" which is semantically weak unlike "travel" or "run" only prepares for the place *Nagwa* has gone to and thus counts as given and belonging to the presupposition. In the above case we could say that the comment is not only about Nagwa, but rather about where *Nagwa* has gone to, which is why the speaker chose to extend the prosodic topicality marking to the verbal constituent. Another possibility would be to mark *Nagwa* alone as the topic and treat "has gone" as backgrounded and only as a link to the focal part in which case the expression would be given a *linking* tone (cf. Fig. 5b for a similar case).

Leading (rising) and *closing* ((rising)-falling) accents may thus be seen as variations of the basic neutral rise-fall, which are in the first place realized by means of tune-text-association. The fact that the very late alignment of the peak or the slow fall after the peak may both result in the perceptional impression of an overall rise suggests that it is not predominantly the accented syllable that carries the meaning of a tone, but also or perhaps mainly the unaccented ones

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following it. A closing tone, by contrast, is characterised by the dominance of the falling or low part of the accent. This can be realized in a number of ways: In broad focus cases the final accent is frequently downstepped resulting in an overall falling or low gesture. Downstepped final accents often exhibit a sharp fall in the last syllable, which adds to the prominence of the word, similar to the sharp rise in the prenuclear accents. The finality or assertiveness may be enhanced by an early peak, either within the lexical item by alignment before the accented syllable and sometimes at the beginning of the whole constituent (Rastegar-El Zarka 1997) or by a gradual fall from the prefinal accented syllable through the final content word to the end. The above figures show closed accents in the focal parts of the utterances. One main feature of the closing type is the importance of the closing L tone, which is often comparably low relative to the second low target in a *leading* accent or in a neutral one, but maybe the more important characteristic is the earlier alignment. Thus the L tone after the peak is not linked to the following lexical item, but rather associated with the focused lexical item itself by being aligned with its end or even earlier, especially in narrow focus cases. Figure 3 shows the difference between a topical (3a) and a focal (3b) long subject in syntactically identical sentences. While there is no noticeable difference in pitch height – neither of the peak nor of the trough – between the two conditions the early low target in the focal accent results in a steep fall, which enhances its prominence.
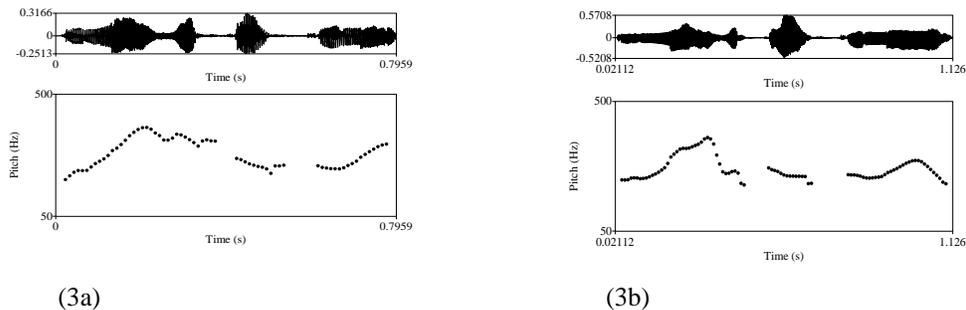

(3a)   (3b)

Fig. 3: The long subject *il-miʕza bitaaʕit kamaal* (the-goat belonging.to Kamal) "Kamal's goat" as a topic expression (panel a) and as a focus expression (panel b) (stressed syllables are underlined).

Note that while it is the terminal of the accent that contains the intonational meaning, this terminal is not brought about by a boundary. Needless to say that topical and focal constituents, especially if they are emphatic, are frequently expressed within a separate phrase, but this is not inevitably so. Importantly, the phrase boundary does not contribute to the shape of the accent, it only may enhance it by making a rise higher and a fall lower. The example in Figure 4a shows a sentence with a topicalized object il-ʔakla di "this dish" and narrow focus on the subject teeta

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"granny" with a break after the topic constituent, but no break after the focal word.6 Another manifestation of the leading and closing contours is illustrated by the sentence in (4b) that has a low falling accent on the last word imbaariħ "yesterday", which is in focus, while the topical constituent maalik id-dukaan illi gambina "the proprietor of the shop next to us" is marked by a high level trend line, i.e. by the suspension of downdrift. This strategy was also observed by Norlin (1989) to be used for questions in EA and is employed in other languages with a high density of pitch accents such as Danish (Grønnum 1998) and Swedish (Gårding 1998). It seems that level or rising trend lines in languages with high pitch accent distribution are the logical equivalent of level or rising contours on unaccented material in languages with lower pitch accent distribution like English or German. Finally, what makes the sentence in Figure 4b not sound like an incidence of argument focus expressed by a reduced accent on the adjunct is the lack of a closing accent on the object – note that the final word in the object phrase gambina does not carry a closing accent – whereas the accent on teeta "granny" in (4a) is a closing one with the last item ʕamalitha "she prepared it" produced in a compressed pitch range (cf. section 3.2). While the rise and the fall respectively can be viewed as the prototypical realizations of leading and closing tones, examples in Figure 4b and Figure 1a show that a high level and low level may be used as a substitute for rise and fall.
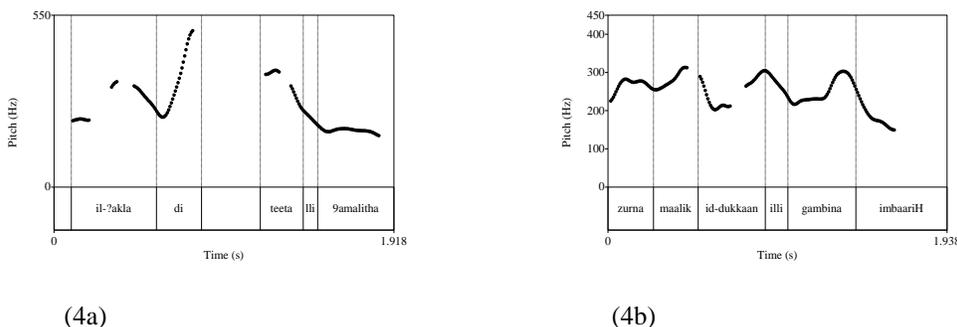

(4a)   (4b)

Fig. 4: Panel (a) shows a left-dislocated topic followed by a clause with subject focus *il-ʔakla di / TEETA lli ʕamalitha* "this dish, GRANNY is the one who made it"; panel (b) shows focus on the adjunct *imbaariħ* "yesterday" in *zurna maalik id-dukkaan illi gambina IMBAARIH* "we visited the proprietor of the shop next to us yesterday." (focus indicated by capital letters)

The bipartite realization of contours with a rising part followed by a falling one is pervasive in the language. It occurs in different kinds of syntactic constructions such as left dislocated topics (whether subjects, objects, or frames) followed by the matrix clause, lists of only two items, modifier-head

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6 Of course, phrasing is gradient and there are perceptionally different degrees of boundaries. Whenever I claim that there is no boundary, this not only rests on impressionistic, but also on acoustic and segmental cues such as the missing lengthening of a final segment or spectral characteristics and deletion or insertion of segments, cf. the phonetic rendition of teeta illi as [te:tɛl:ɨ] as realized here versus [te:tæʔɛl:ɨ] with a break between the noun teeta and the relative marker illi.

constructions like the annexation construction (*Idaafa*) or compound sentences with the subordinate clause preceding the main clause.

3.2   *Pragmatic properties and the effort code*

In section 3.1 we have dealt with focus as a *pragmatic relation* to the entire proposition. We may now turn to the other type of focus mentioned above, namely focus as characterized by the *pragmatic property* of being (one of the) most informative part(s) of an utterance, the notion of *focus of interest* referred to above. At this point some remarks on the notion of pragmatic property as it is conceived here are called for. In section 2 above I briefly alluded to Lambrecht's concept of pragmatic property as referring to the cognitive representation of discourse referents in the interlocutors' minds. The sense in which pragmatic property is used here slightly differs from Lambrecht's concept, as does my whole account of sentence prosody. It has to be noted that Lambrecht only deals with accent location (Lambrecht 1994: ch. 5.7). As already mentioned, the categories of "given" and "new" cannot be equated with background or presupposition and focus although there is a strong correlation between them (for a discussion cf. e.g. Lambrecht 1994: 257ff.). It has repeatedly been pointed out that a denotatum that is in the focus of an utterance does not have to be new. Yet, being the missing or required piece of information, it is the most important one and in that sense constitutes "new information". Furthermore it has been noted that accentuation not necessarily reflects focus, but may also be used for activation of accessible, but inactive referents in general (Chafe 1976, Lambrecht 1994: 323ff.). Given that different pragmatic categories may be expressed by similar formal devices (accentuation), they ought to have something in common. I suggest that this common feature is *interest*, i.e. the hearer's interest in the denotatum of the foregrounded lexical item or constituent, as assumed by the speaker, and consequently, the weight the speaker puts on it considering its informativeness or pragmatic relevance. Whether a referent is given or new relates to a *cognitive* property, which I take to be the basis for the *pragmatic* property of relevance and informativeness. This property may be attributed to topical items that belong to the presupposition or items that belong to the rhematic focus, which presents the new information. This informativeness is usually reflected in more effort that is expended on the articulation of the focused part, hence the widespread conflation of focus and highlighting. As Gussenhoven (2002: 50) points out, expending greater effort results in greater articulatory precision and in wider pitch excursion and - we may add - higher intensity and duration.

3.2.1 The prosody of pragmatic properties in EA

Hellmuth (2005 and subsequent work) observed that EA resists deaccenting, which is true as an overall tendency, but naturalistic data clearly show that deaccenting is not impossible. Thus, in contrast with West-Germanic languages, given items are not obligatorily deaccented in EA. While deaccenting is commonly viewed as categorical and hence phonological, pitch excursion is commonly viewed to be a gradient phonetic cue. But if we accept the idea that deaccenting is just an extreme case of reducing prominence by the use of a compressed pitch range (Xu & Xu 2005), we find that EA makes pervasive use of prominence differences that are exploited for informational purposes. Importantly, such differences are not expressed by tonal features alone. Duration, spectral characteristics and intensity are other important acoustic correlates of prominence. However, pitch height relations in combination with excursion size are a reliable cue to prominence, at least if the accent is not in utterance final position.

Descriptive work on EA suggested that narrow focus may be expressed *in situ* like in English, using prosodic strategies (Olmsted Gary & Gamal-Eldin 1982, Mitchell 1993). Norlin's (1989) instrumental pilot study investigated the f0 reflexes in different focus constituents (subject, verb, object), which correlated with initial, medial and final position in the sentence. Norlin reports pitch range expansion on the focused item together with post-focal compressed pitch range as compared to the neutral declarative. As the example in Figure 4b shows, things are not as simple as that. Nevertheless, the main observation made by Norlin seems to be valid also in my data. Post-focal pitch range compression undoubtedly is one of the main correlates of narrow focus in EA. I will not address the issue of focus types here, but note that Norlin's study does not specify the type of focus investigated. Hellmuth (2006b) who studied the prosodic reflexes of information focus and contrastive focus suggests that pitch range expansion is only used in contrastive focus cases. As the result of an experiment I conducted suggests, narrow information focus – although not marked as consistently by speakers as contrastive focus – is also characterized by *downtoning*, i.e. compressing the postfocal tonal material, while the focal accent itself does not necessarily involve larger excursions. If this observation is correct, *downtoning* can be viewed as categorical. Like pitch range expansion, *downtoning* can be attributed to the effect of the effort code in the sense that less effort is expended on less informative items. Downtoning as suggested here is essentially the same as what Chafe (1976: 31) called "attenuation". The amount of pitch excursion, however, may be a gradient phonetic feature that

only enhances the relative height distinctions. This view, I believe, is essentially in line with a relational concept of prominence, which is a key concept of the autosegmental metrical theory of intonation. The relational nature of deaccenting was also emphasised by Ladd (1980: ch.3). To extend this notion to *downtoning* in general, of which tonal compression is one correlate, makes it possible to account for the EA data and acknowledge the similarity to languages like English claimed by impressionistic descriptions. One explanation could be that languages with high pitch accent distribution heavily rely on tonal obtrusion as a correlate of lexical stress. At the same time, the relatively isochronous up-and-down of pitch is apt to preserve a stricter rhythm than is the case in large-scale deaccenting languages (El Zarka 2005). Thus, if information structure is to be marked by prominence relations in tone languages, pitch accent languages proper and languages that use pitch as a correlate of lexical stress, the concept of deaccenting has to be expanded to include downtoning in general.[7]

Figure 5 shows two segmentally identical utterances with different information structures. The utterance in panel 5b exhibits an early narrow information focus on the object *maari* "Mary" which is followed (and preceded) by compressed accents, whereas in the utterance in panel 5a the final adjunct phrase *fi binaajit ħalaawa* "in the Halawa building" is under focus, which has no effect on the preceding accents. The data show that compression of the prefocal accent is not an obligatory correlate of focus marking in EA, it may, however, occur. When employed, it serves the *gestalt principle* of figure against ground together with the compression of post-focal material, and thus helps to foreground the focal item. In panel 5b the downtoned accent is associated with the predicator *ʃufna* "(we) saw", which is a repetition of the verb that was used in the eliciting question. This backgrounding of given material is optional, however, as the contour in Figure 5a shows where the verb is associated with a full accent.

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[7] In Estonian narrow focus is also marked by increased pitch compared to the other pitch accents (Asu & Nolan 2006: 571)
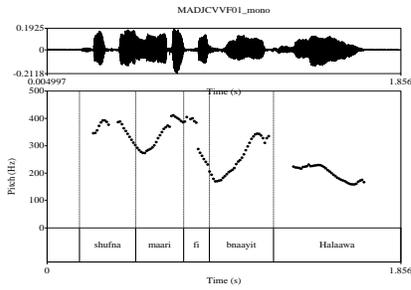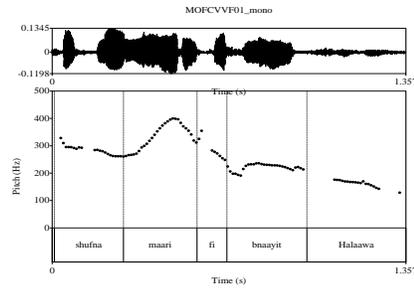
(5a)   (5b)

Figure 5: The utterance *ʃufna maari fi-bnaajit ħalaawa* (saw.we Mary in-building Halawa) "We saw Mary in the Halawa building", once with focus on the adjunct phrase *binaajit ħalaawa* "the Halawa building" (panel a) and once with narrow information focus on the object *maari* "Mary" with compression after (and before) focus in panel (b).

Figure 5 also illustrates the major role of intensity at the end of an utterance. As we have seen in section 3.1, a low level shape of a final accent does not have to imply downtoning as it can be used as a substitute for a fall. To distinguish between occurrences of low level pitch like that in Figure 1 on the one side and that in Figure 4a and Figure 5b on the other side, other cues to prominence than tonal ones have to be relied on. Visual inspection of the intensity differences between the last word *ħalaawa* in Figure 5a and 5b illustrates that point.

To sum up, speakers seem to make a deliberate choice whether they wish to put information in the background or not. EA accentuation facts clearly point to the importance of distinguishing between the *mental representation* of textually or situationally given elements and their *pragmatic property* of informativeness in a specific context. Contrary to English, given items are not deaccented or downtoned only because of their information status, they have to be fully accented if they are part of the focus domain, and they may be fully accented in other cases, especially when they are topical expressions. With Bolinger, I therefore take downtoning to be "a more 'positive' act than accenting" (Bolinger 1986: 99). If a word maintains its full semantic and pragmatic weight, it is accented; only if there is reason to put it in the background, downtoning applies. Bolinger's assumption that a "neutral sentence [...] would be one in which all words, or at least all content words, carry an accent" (ibid.) is even better illustrated by the intonational facts of EA than it is by the intonation of English.

4   Summary

In this paper I have argued for a functional account of pitch contours in Egyptian Arabic. Among other functions, intonation is used to encode information structure. To understand how this works in EA, I have suggested drawing a distinction between *pragmatic relations* and *pragmatic*

properties, which are expressed by the shape and the relative prominence of tonal contours, respectively. Furthermore, it was proposed that the shape of the tonal configurations (rising and falling) and their relative prominences can be attributed to the effects of two biological codes, the *frequency code* and the *effort code*. While contour shape is related to the frequency code, prominence relations with their tonal correlates of pitch excursion and compression can be explained by the effect of expending more or less effort on articulation. While prominence differences serve to single out informative elements and establish their pragmatic status, contour types serve to encode their relation. The facts of EA prosody strongly support a largely iconic view of intonation.

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