Towards Focus Typology in Turkish

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Abstract— **This paper presents first results of a pilot study conducted in order to classify Turkish with respect to focus typology. The production study gives motivation to discuss the prosodic marking of contrastive in-situ focus in Turkish in the framework of prosodic alignment. Outcomes are based on a phonological analysis of information structure modified target sentences of six monolingual Turkish speakers which reveal that prosodic cues are not crucial to mark in-situ focus in Turkish, but they may be used to contextualize information structure. If focused constituents are marked at all by prosodic means they do not show an increased pitch like most Germanic languages, but can be classified according to the features of boundary languages. The analysis exposes that Turkish is a radical splitting language where each constituent forms its own φ in simple all-new SOV declaratives marked by a high phrase tone (H-) aligned to each ω. The language´s preference for radical splitting can be modified into a moderate prosodic wrapping in favor of focus alignment: A focused constituent is aligned to prosodic boundaries in the sense of being wrapped into its own φ whereas given constituents are wrapped together in a further φ going in hand with the deletion or compression of phrase tones assigned by default.** *(Abstract)*

Keywords- Information Structure; Alignment; Prosodic Phrasing; Turkish

I.   INTRODUCTION

Turkish is claimed to have two distinct focus marking strategies: syntactic movement and prosodic focus marking in-situ [2, 5, 8]. Previous studies on prosodic focus marking in Turkish describe focus in the original meaning of prominence as an increase of acoustic parameters and the modulation of pitch accents [9]. Correspondingly, different tunes are described for different information structural parts: e.g. H*L- for focused and L*H- for given constituents [13]. H- boundary tones are assumed for pre-nuclear phrases, and an H* nuclear pitch accent is designated to align to the immediately pre-verbal position in syntactically un-marked sentences [10]. All tones are usually aligned to the last syllable of a ω, since Turkish word stress is final [11]. However, a recent acoustic analysis [7] reveals that Turkish shows no on-focus pitch accent modification for in-situ focus. Despite the lack of pitch range expansion a change in the *f0* contour is observed for final and initial focus: A focused verb in SOV declaratives shows an *immediately pre-focal rise* on the preceding constituent and post-focal compression (PFC) is observed after initial focus.

With respect to cross-linguistic realizations of focus typological studies [1, 3] show that information structure does not necessarily have a prosodic expression and that focus prominence is not necessarily expressed by an increase of acoustic parameters such as *f0*, duration and intensity as in most Germanic languages. Focus can also be realized by means of prosodic alignment. The alignment of focus is understood as correspondence of the edge of a syntactic and/or phonological constituent and the focused part of a sentence [12, 14]. In the prominence theory of focus [15] focus needs to be maximally prominent which can be achieved by the swapping of pitch accents or by the introduction and/or deletion of prosodic boundaries. In focus as alignment theory [3] focus alignment may be obtained even in the absence of prominence as shown for French [4].

With regard to previous prosodic classifications of Turkish information structure the current study offers an alternative approach considering cross-linguistic realization of focus by means of focus alignment. Furthermore, it contributes new data for a general description of Turkish intonation in favor of a classification as a phrase language.

II.   HYPOTHESES

Considering the outcomes of previous studies which do not identify pitch increase as a focus marker in Turkish, but reveal a modification of *f0* by means of PFC and *immediately pre-focal pitch increase*, the claim of the present study is that the prosodic realization of Turkish information structure can be described in the framework of prosodic alignment and that Turkish can be classified as a boundary language in the sense of inserting and/or deleting prosodic boundaries in order to align focus. Turkish is expected to mark focus by prosodic alignment and not by pitch accent implementation as assumed by previous studies. More precisely the research question is:

- Is the observed *immediately pre-focal rise* in [7] the result of a boundary insertion in order to align focus in verb focus conditions in simple SOV declaratives?

- Is PFC as observed in [7, 13] realized in order to align subject focus by means of tonal deletion?

III. EXPERIMENT

A. Methodology

A production experiment was conducted using the same methodology as in [7] established by [16] to elicit in-situ focus on different constituents.

Target sentences with identical syntactic structure, but different focused constituents were presented in writing on a power point slide accompanied by a picture illustrating the action. Each target sentence was preceded by a question eliciting contrastive in-situ focus on a different constituent: subject-, object-, and verb. As a baseline a broad focus condition of the same target was elicited first. The contrastively focused constituent in the question-answer pairs was always presented as the first alternative in the questions and underlined in the following target sentence to reduce errors and positional effects.

B. Target sentences

Five target sentences, represented in Table I, with a simple SOV structure containing an accusative object were constructed for the experiment opting for type- instead of token repetitions to ensure diversity. To systematically control comparability across the different targets each sentence contained the same segmental design (sonorant CV whenever possible) and number of segments: a three syllabic subject, a four syllabic object, and a three syllabic verb. To elicit the expected insertion of boundary tones, only subjects and objects with non-final lexical word stress were considered in order to avoid that pitch accents and/or boundary tones would fall on the same segment.

TABLE I.   TARGET SENTENCES

(1) Fahıre Naca`sını seviyor.
Fahıre Nacı-POSS-ACC love-PRS (3SG).
Fahıre loves her Nacı.

(2) Nasrettin babasını üzüyor.
Nasrettin father-POSS-ACC sadden-PRS (3SG).
Nasrettin saddens his father.

(3) Macide kardeşini çiziyor.
Macide sibling-POSS-ACC draw-PRS (3SG).
Macide draws her sibling.

(4) Nadide ablasını özlüyor.
Nadide sister-POSS-ACC miss-PRS (3SG).
Nadide misses her sister.

(5) Yasemin aynacıyı dinliyor.
Yasemin mirror dealer-ACC listen-PRS (3SG).
Yasemin listens to the mirror dealer.

C. Participants

Six native Turkish speakers, three females and three males, from Ege Universitesi in Izmir participated in the experiment. At recording time they were aged between 20 and 27, had no previous specific linguistic knowledge and no speaking or reading disabilities. All of them were monolingual speakers; most of them had some basic foreign language skills in English.
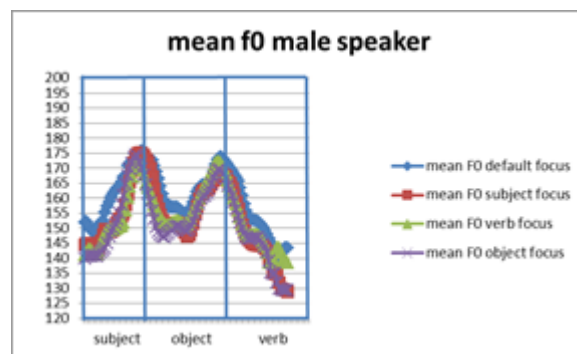
IV. ANALYSIS

Analysis concentrated on $f0$ as a correlate to prosodic focus marking on the sentence level. In a first step all target sentences were segmented manually into syllables. The $f0$ analysis was done time-normalized by the introduction of 10 measure points per syllable using a general purpose PRAAT script *Prosody Pro* [18] in order to enable comparison across all target sentences, focus conditions, and speakers. Each sentence was corrected manually with respect to spurious pitch values. In a first step, the $f0$ values were averaged across the five target sentences and four focus conditions for each speaker separately. In a second step, a phonological annotation of the $f0$ contour among the different focus conditions of the whole ιp was done for each target sentence and speaker. Supra-segmental labeling basically follows [10], but is adapted and modified with respect to the features observed in the data using general ToBi labeling advices, since Turkish lacks a conventionalized annotation system. Special attention was paid on boundary tone insertion/ deletion under the changing foci. Analyses of the pilot study include a total of 120 sentences: 5 target sentences x 4 focus conditions x 6 speakers.

V. RESULTS

The production experiment revealed unexpected features concerning the general tonal implementation and phrasing structure of Turkish. Two different groups were identified concerning phonological $f0$ modification with respect to information structure.

The averaged pitch tracks of Turkish SOV declaratives indicate that speakers do not necessarily modify overall $f0$ under manipulated focus conditions. Five out of the six speakers implemented the same $f0$ contour in each focus condition as well as in the all-new context for all target sentences. Figure I represents the averaged $f0$ contour across the five target sentences for each focus condition of male speaker 2. A high tone is implemented on the last syllable of each ω in each focus condition. Accordingly, overall $f0$ did not change for subject, object, verb and broad focus for the remaining speakers except for speaker 4.

FIGURE I.   MEAN F0 CONTOUR IN FOUR FOCUS CONDITIONS

The phonological analysis of all target sentences revealed that speakers implement a high tone (H-) on each non-final constituent in simple Turkish SOV declaratives. The high tone is implemented on the final syllables of each non-final ω: namely the subject and object in all broad- and narrow contrastive focus conditions for five speakers. None of the six participants implemented pitch accents on the designated syllables for ω-stress corresponding to the initial syllables of subjects and objects. The final constituent corresponding to the verb was obligatorily aligned to an ιp-final low boundary tone (L%) implemented in all target sentences independent of the information structure by all speakers. No boundaries were introduced or deleted in different focus conditions to align focus when the default phrasing would not grant focus prominence for five speakers. Table II illustrates the default intonation contour implemented in all conditions by five speakers and for the broad- and object focus condition by speaker 4 respectively.

TABLE II.   DEFAULT INTONATION CONTOUR OF TURKISH SOV

H-	H-	L%
(SUBJECT)φ	(OBJECT)φ	(VERB)φ.

For female speaker 4 *f0* modification was observed in different focus conditions. Like the remaining speakers she implemented no pitch accents on stressed syllables in the default and object focus condition, but a high tone (H-) on the rightmost syllable of each non-final ω. For subject focus she continued implementing H- on the subject, but deleted the following H- of the object. De-accentuation continued until the ιp-final low boundary tone (L%). For verb focus she deleted the high tone on the subject, but implemented the high tone on the object. The following verb was aligned with a low boundary tone as in all remaining focus conditions. Figure 2 and 3 show the modified *f0* contour in verb and subject focus of speaker 4 where the only high tone of the ιp is aligned to the focused constituent and further high tones are deleted or compressed.

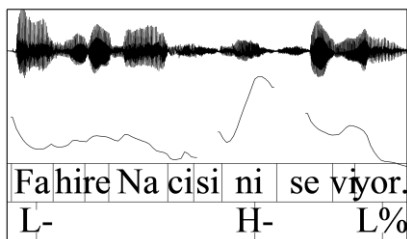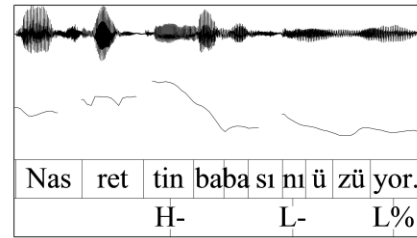FIGURE II.   F0 OF SUBJECT FOCUS FOR SPEAKER 4.

FIGURE III.   F0 OF SUBJECT FOCUS FOR SPEAKER 4.

VI.   DISCUSSION

The data analysis of the present production study reveals that *f0* is not necessarily modified in Turkish to mark information structure prosodically. This finding only partly fulfills the initial hypothesis so far. The expected change of the phrasing structure to align focus was only observed for one speaker and only by means of boundary deletion. Nonetheless, the results of the *f0* analysis contribute important new information with respect to a general tonal description of Turkish, supporting a typological classification as a phrase language [6]. Furthermore, first hints are given that prosodic focus marking can be captured and successfully described in the framework of focus alignment.

The data showed that a high tone (H-) on the last syllable is implemented by most of the speakers on each subject and object in each target independent of the focus condition. This result contrasts with respect to the expected boundary insertion referring to the *immediately pre-focal rise* on the object in verb focus as observed in [7] which was supposed to contrast with the generally assumed nuclear pitch accent (H*) implementation in broad focus conditions [10]. The observed high tone on each non final ω cannot be interpreted as a usual pitch accent and not as boundary tone inserted to align focus prosodically neither, since its implementation is not aligned to the metrically strong syllable designated for word stress and is implemented independent of the focus condition. Alternatively, the function of the observed high tone (H-) is interpreted here as domain delimiting in the sense of indicating a φ. On the base of the data analysis each ω forms its own φ in simple SOV declaratives, for which a phrasal level can be assumed in Turkish. In addition to this, the observed high tone can be assigned with the demarcative function of indicating ω on the word level for which a double function of H- in the sense of the PENTA model of speech [17] is assumed here. The two functions of H- refer to two different prosodic levels: the word level and the phrase level. Concerning the phrasal structure observed in the data, Turkish can be described as a radical splitting language on the prosodic level in contrast to syntactical phrasing which requires a straight forward phrasing of verb and object into one vp [10].

The analysis furthermore points out that despite the non-representation of information structure generally found in the prosodic representation of contrastive in-situ focus, Turkish shows a tendency towards an optional prosodic alignment of focus by a modification of the default phrasing structure. The language´s preference for radical prosodic splitting on the

phrase level can be modified by tonal deletion as previously expected and based on prior observations of PFC in the case of subject focus by [7]. Furthermore, the strategy of tonal deletion or compression to align focus can be expanded to the strategy of pre-focal deletion as observed in the present data for verb focus. The deletion of post-focal H- in the case of subject focus as well as the deletion of pre-focal default H- in the case of verb focus motivates the claim that contrastively focused constituents form their own φ, whereas remaining adjacent constituents are moderately wrapped together into a further φ. Table III summarizes the different phrasing strategies according to information structure modification of simple SOV declaratives as found in the study:

TABLE III.   PHRASING OF INFORMATION STRUCTURE MODIFIED SOV DECLARATIVES IN TURKISH

Broad/object focus phrasing: (S)φ (O)φ (V)φ.

Subject focus phrasing: (S_F)φ(OV)φ.

Verb focus phrasing: (SO)φ(V_F)φ.

The outlined analysis shows that the prosodic representation of information structure can successfully be discussed in the framework of prosodic alignment and that Turkish can be classified as a boundary language concerning its focus typology since default phrasing changes. Nonetheless, a few important limitations have to be made at this point: (i) the preferred prosodic structure in the study is radical splitting, since it is implemented by the majority of the participants independent of the information structure condition. This observation indicates that Turkish has no obligatory prosodic representation of information structure by means of *f0*. (ii) The present alignment approach is based on the *f0* values observed for one speaker which highly deviate from the remaining speakers in the *f0* representation dependent on the information structure context. A subsequently conducted analysis of a further monolingual female speaker with the same linguistic background corroboratively supports the present alignment approach by demonstrating the same modified phrasing structure as outlined in Table III. (iii) Both main findings: prosodic non-marking and prosodic marking by alignment are based on the analysis of simple SOV declaratives. Further research on more complex syntactic representations such as modified noun phrases has to be done to confirm the implementation of the supposed phrase delimiting high tones.

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