Towards a phonological analysis of the rising contours in Urdu/Hindi

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In Urdu/Hindi, the intonation associated with any out-of-the-blue sentence consists of a sequence of rising F0 contours (LH). These LH contours are claimed to be the default intonation pattern and are described as associated with a basic prosodic unit which has been analyzed either as a foot (Moore, 1965) or as a phonological phrase (Patil et al., 2008). The existing analyses of Urdu/Hindi intonation treat all the rising contours as one and the same. Based on an analysis of basic prosodic units realized with a double rise (LHLH), we negate the current view in this contribution and claim that there are different kinds of rising contours in Urdu/Hindi, the differences being encoded both in phonology and the phonetic implementation.

For our analysis, we assume that a LH rising contour is associated with a Minor Phrase (MiP), the prosodic word being the domain of other segmental phonological processes. The low and the high tones of the contour are boundary tones (Jabeen, 2019) indicating the left and right edges of an MiP respectively. In (2) the intonation contour of a simple declarative sentence in Urdu/Hindi is presented: each argument, regardless of its mopho-syntactic form (nominal as in (1a) or pronominal as in (1b)), forms an MiP and carries a rising LH contour. In the sentence final MiP, the high boundary tone is usually replaced by a low Intonational Phrase boundary tone in declaratives, and, rather infrequently, the high MiP boundary tone may be retained and realized just before the low IP boundary tone on the IP final syllable. As no distinction is made between nominal and pronominal arguments, all SOV sentences are usually realized as shown in (2).

(1)   a.   əli=ne   nomi=ko   mara
               Ali=Erg Nomi=Acc hit.Perf.M.Sg.
               'Ali hit Nomi'

        b.   ṭʊm=ne ʊs=ko/ʊse   mara
               you=Erg Dem=Acc/3rd.Sg. hit.Perf.M.Sg.
               'You hit him/her'

(2)   S   O   V
       ( )$_{MiP}$ ( )$_{MiP}$ ( )$_{MiP}$
       LH   LH   L(H̶)L%

We have observed in our data that an MiP consisting of morphologically complex words may optionally carry two rising contours. They appear only in words with derivational morphemes, both prefixes and suffixes, and respect morpheme boundaries in their phonetic realization as (3) shows.

(3)   be$_{LH}$-ṭəhaʃa$_{LH}$
      'uncountable'

To our mind, the apparition of these double rises allows the avoidance of rhythmic lapses in Urdu/Hindi. Indeed, these LHLH contours occur in morphologically complex words consisting of six or more moras. The first low tone (L1) and the last high tone (H2) in these double rises have similar temporal alignment from the beginning of syllable as the alignment of low and high tones in noun phrases with single rises (Table 1). We therefore assume that the first and the last tones in the LHLH sequence form the LH contour that is also associated with an MiP realized with a single rising contour. The appearance of the extra high (H1) and low (L2) tones can be explained in two ways: (i) one can posit that H1 is inserted at the right edge of the first morpheme and L2 is added on the left edge of the second morpheme; (2) a second analysis involves the application of an OCP constraint. The proposal then is that only H1 is inserted in polymorphemic words due to the rhythmic constraint. However, OCP forbids the appearance of two consecutive high tones in an MiP and thereby leads to the insertion of L2 between the two consecutive F0 peaks. At this stage, none of these analyses is superior to the other, so we refrain

from selecting one over the other.

	Tone	Beg_syll. (sd)	Tone	Beg_Syll. (sd)
Double rises	L1	0.148 (0.32)	H1	0.228 (0.33)
	L2	0.08 (0.03)	H2	0.154 (0.07)
Single rise	L	0.131 (0.07)	H	0.165 (0.07)

Table 1: Mean temporal alignment (sec.) of tones in polymorphemic words. The standard deviation is given in parentheses.

Apart from the default LH and the "rhythmic" rises observed in Urdu/Hindi, a third type of rising contour, induced by focus, is also found. A noun phrase consisting of a noun followed by a case marker carries a double rise if the case marker is contrastive-correctively focused. The realization of the focus-induced rise results from the promotion of the case marker to an MiP. As a consequence, the alignment of low and high tones in both the default and the focus-induced rise is similar. Table 2 shows that the temporal alignment of default low (L1) and high (H1) tones on the noun is not different from the focus-induced low (L2) and high (H2) tones. Therefore each of these rises forms an MiP on its own. Note, however, that the F0 range of focus-induced rises is wider than that of the default rises (Genzel and Kügler, 2010).

	Tone	Beg_syll. (sd)	Tone	Beg_syll. (sd)
Noun	L1	0.125 (0.05)	H1	0.186 (0.08)
Case marker	L2	0.09 (0.06)	H2	0.197 (0.08)

Table 2: Mean temporal alignment (sec.) of tones in double rises in noun phrases. The standard deviation is given in parentheses.

The resulting prosodic structure of focus-induced rising contours is shown in (4).

(4) (Noun)$_{MiP}$ (Focused case marker)$_{MiP}$

A distinction between the F0 range of a focus-induced and a default rise has also been observed in other South Asian languages such as Bengali (Khan, 2014) and Tamil (Keane, 2014). Our research confirms the presence of this focus-induced LH by promotion of the case marker to an MiP, and provides further evidence for the existence of rhythm-induced rising contours in Urdu/Hindi.

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