



Duration vs. alignment: Perception of prosodic cues for narrow & corrective focus in Urdu/Hindi

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- Part of a Research Unit (FOR 2111) *Questions at the Interfaces* at Konstanz
- We are projects P4 and P6, working on Urdu/Hindi and German prosody.
- Today: Perception of prosodic cues for narrow and corrective focus in Urdu/Hindi.



- Basic SOV word order. But constituents can scramble.
- Information structure & position (Gambhir 1981)
 - Sentence initial: Topic
 - Preverbal: Focus
 - Postverbal: Background, de-emphasis, after-thought etc.
- Every prosodic word has LH F0 contour.



■ Structural focus

- Preverbal position for narrow (new information) focus
- No specific position for other focus types

■ Prosodic focus

- Wider F0 range in corrective focus than wide focus (Genzel and Kügler 2010)
- Longer syllable duration in corrective than wide & selectional focus (Choudhury and Kaiser 2016)



- Same LH F0 contour on the narrowly & correctively focused constituent
- F0 peak alignment: early (end of noun) vs. late (case marker)

Table 1: *% of early & late H alignment in focused and pre-focal constituents.*

	Focused		Pre-focal	
	Corrective	Narrow	Corrective	Narrow
Early	100	48	0	3
Late	0	52	100	97



- Wider F0 range in corrective vs. narrow focus
 - Focused (avg): Cor = 3.03st, Nar = 2.59st, $p = 0.02$
 - Pre-focal (avg): Cor = 4.44st, Nar = 3.80st, $p = 0.03$
- More frequent downtrend in narrow focus: Cor = 45%, Nar = 70%, $p = 0.01$
- Post focal compression: Greater degree of fall after narrow than corrective focus (avg): Cor = 3.98st, Nar = 2.83st, $p < 0.0001$
- Longer syllable duration in corrective compared to narrow focus
 - 1st syllable (avg.): Cor = 215ms, Nar = 195ms, $p < 0.0001$
 - 2nd syllable (avg.): Cor = 154ms, Nar = 146ms, $p < 0.01$
 - Case marker (avg.): Cor = 133ms, Nar = 143ms, $p = 0.04$



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- Choudhury and Kaiser (2016) found no difference in F0 contour or F0 range between wide, selectional, & corrective focus
- Patil et al. (2008) & Féry et al. (2016): no systematic difference between F0 or duration in broad, new information, selection, and corrective focus



- Can the use of a different paradigm help understand the prosodic realization of different focus types in Urdu/Hindi?
- Production (previous researches) vs. perception (current study) of narrow and corrective focus
- Based on Jabeen and Braun (2018)'s findings, we investigate the perceptual relevance of syllable duration & F0 alignment to identify narrow vs. corrective focus



Stimuli

- 12 sentences, in narrow & corrective contexts, recorded by a female native speaker
- Focused objects at preverbal position
- Focused constituents: disyllabic nouns + case marker (*ko*)
- Syllable duration (sec.) in stimuli: corrective > new information

Table 2: *Average duration (sec.) in narrow and corrective contexts.*

Context	1st syllable	2nd syllable	Case Marker
Narrow	.195	.132	.136
Corrective	.238	.158	.132



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- Original duration vs. PSOLA-manipulated versions (duration of other focus condition)
- 12 sentences * 2 recording contexts (narrow/corrective) * 2 presented contexts (narrow/corrective) * 2 durations (long/short)
- 2 experimental lists: 48 target items + 14 fillers each
- Between-subjects, within-items design
- Web-based Likert scale rating (1 = most unnatural, 5 = most natural) experiment with 29 speakers of Urdu
- Task
 - Read the context.
 - Listen to the sentence.
 - Rate the naturalness of the sentence in the given context.



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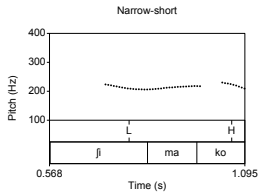


Narrow: Some of your acquaintance met an accident. Many people died but a skilled doctor saved some of the injured. Your sister asks **whom*** the doctor had saved. You reply:

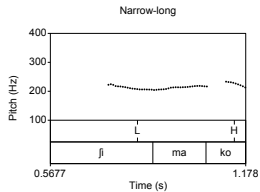
Corrective: Some of your acquaintance met an accident. Many people died but a skilled doctor saved some of the injured. Your sister thinks that the doctor had saved Ayesha. You **correct*** her and say that, in fact:

(1) doctor=ne **fima=ko** bətʃa
 doctor.M.Sg=Erg Sheema.F.Sg=Acc save-Perf
 li.ja t̪^ha
 take-Perf.M.Sg be.Past.M.Sg
 'The doctor had saved **Sheema.**'

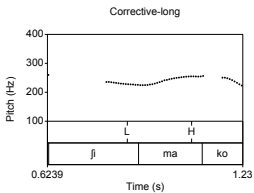
*Not highlighted in stimulus



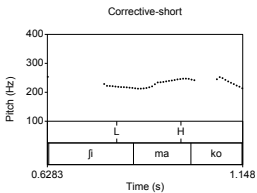
nar-ori



nar-long



cor-ori



cor-short



- Eliminated data with RTs < 5 sec. (relative to onset of contexts)
- LMER of ratings with duration, recorded contexts, presented contexts, and two lists as main effects and their interactions; items and participants as crossed random factors

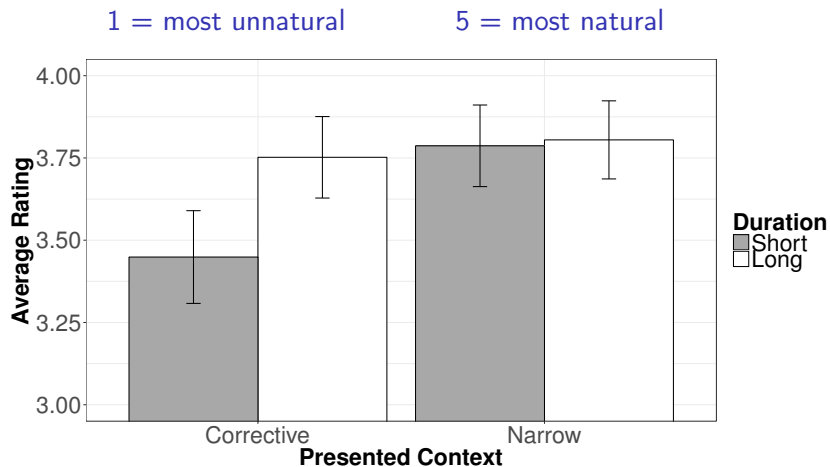
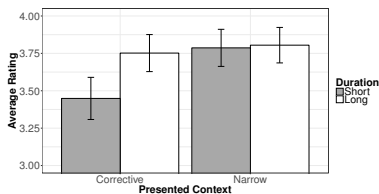


Fig 1: Average ratings for duration manipulation in narrow and corrective contexts. The whiskers indicate CI (95%).



- Interaction between duration and presented context ($p = .004$)
- **Narrow focus:** both long and short durations are equally acceptable
- **Corrective focus:** long durations are rated significantly better than short durations ($p = .0007$)
- Main effect of recording condition: higher ratings for corrective focus ($p = .017$) [not shown here]





Stimuli

- Exactly the same data set as for Exp. 1
- Ambiguous (neither long nor short) syllable duration
- Alignment of tones in
 - Corrective focus: 2nd syllable of noun
 - Narrow focus: Case marker

Table 3: *Relative (vowel onset) alignment of L & H tones.*

Contexts	L	H
Corrective	50%	76%
Narrow	62%	40%

- Alignment manipulation: both the L & H were moved



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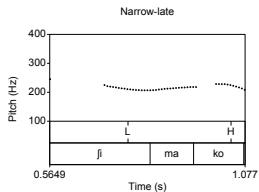
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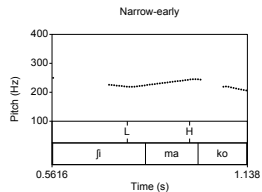
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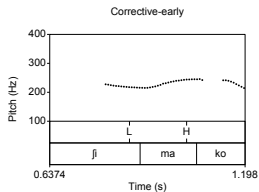
- Narrow original: L in the 1st syllable of noun (62% into the vowel), **H with the case marker** (40% into the vowel)
- Narrow manipulated: L in the 1st syllable of noun (50% into the vowel), **H with the last syllable of noun** (76% into the vowel)
- Corrective original: L in the 1st syllable of noun (50% into the vowel), **H with the last syllable of noun** (76% into the vowel)
- Corrective manipulated: L in the 1st syllable of noun (62% into the vowel), **H with the case marker** (40% into the vowel)



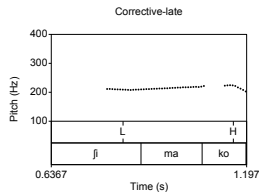
nar-ori



nar-early



cor-ori



cor-late



- 2 lists with 48 target items (original & manipulated) & 14 fillers each
- Between-subjects, within-items design
- 23 participants, participants of list 1 in Exp. 1 responded to list 2 in Exp. 2 and vice versa
- The same web based interface for Likert scale (1-5) ratings of naturalness

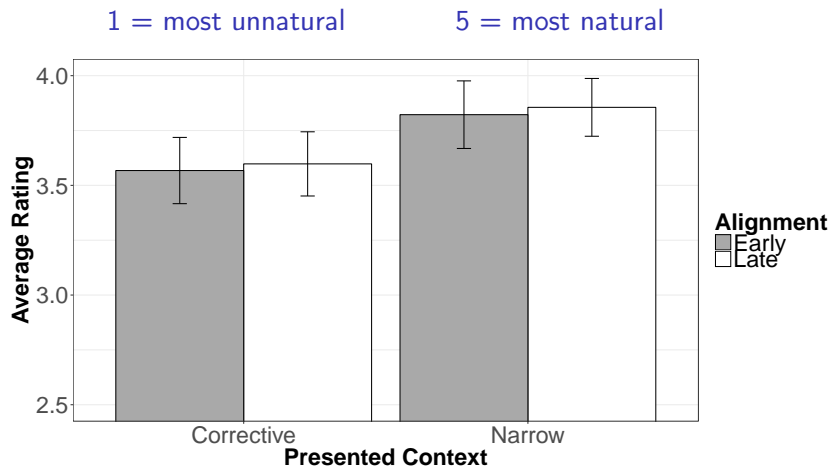


Fig 4: Average ratings for alignment manipulation in narrow and corrective contexts. The whiskers indicate CI (95%).



- Variable alignment of F0 peak is perceptually irrelevant to identify corrective and narrow focus.
- Long syllable duration is used to identify corrective focus.
 - Confirmation of production experiments' finding that longer duration signals corrective focus (Genzel and Kügler 2010, Choudhury and Kaiser 2016, Jabeen and Braun 2018).
- Patil et al. (2008) had measured constituent (noun + case marker) duration while we measured syllable duration.
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- We hypothesize that the asymmetry in duration ratings results from:
 - Structural focus position for new information focus that renders duration marking redundant
 - Higher sensitivity to the correct prosodic realization in marked contexts (corrective) but acceptance of prosodically over marked forms in less marked contexts (narrow) (Braun 2004)



- What about F0 range? Genzel and Kügler (2010) & Jabeen and Braun (2018) found that wider range in corrective focus is achieved by
 - Lowering the L
 - Raising the H
 - Both
- Lots of respondents are needed to tease apart the factors.



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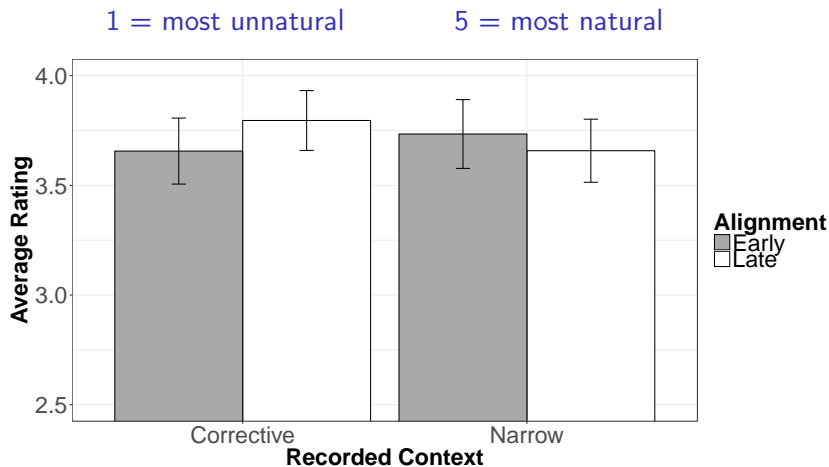


Fig 2: Average ratings for alignment manipulation in narrow and corrective recorded contexts. The whiskers indicate CI (95%).

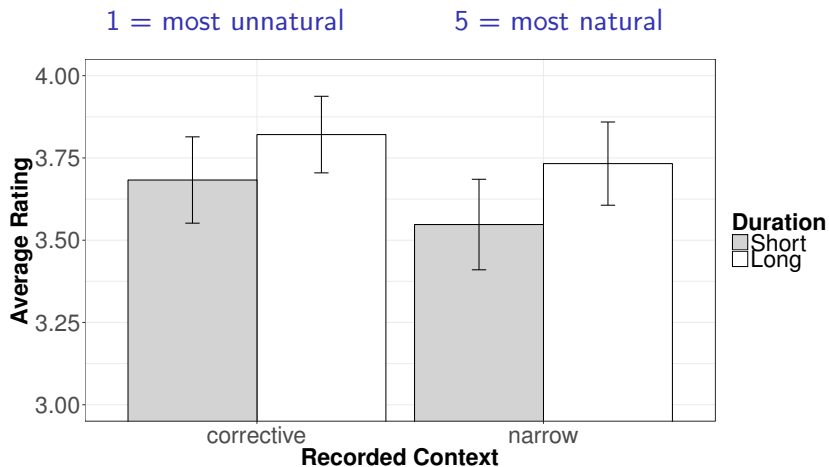


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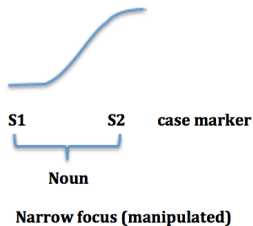
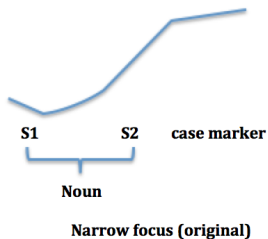


Fig 2: Tone alignment in narrow focus.



Context	1st Syllable	2nd Syllable	Case Marker
Narrow	0.81	0.83	1.02
Correction	1.22	1.19	0.97

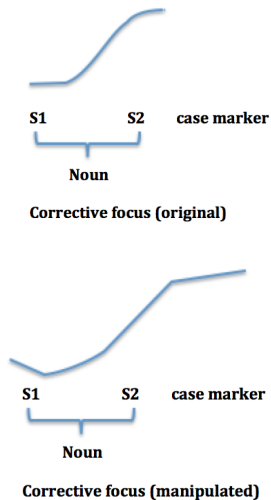


Fig 3: Tone alignment in corrective focus.



Table 3: *Relative (vowel onset) alignment of L & H tones.*

Contexts	L	H
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Table 3.1: *Relative (syllable onset) alignment of L & H tones.*

Contexts	L	H
Corrective	73%	76%
Narrow	80%	84%