INTONATIONAL PHONOLOGY IN INFANT-DIRECTED SPEECH

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INTRODUCTION

Across languages, there are characteristic changes in fundamental frequency (f0) when speaking to infants.

Infant-directed speech (IDS) involves:
- Higher f0 max, mean
- More variability in f0 contour
- Shorter prosodic units

Recent evidence from Thai, Mandarin, and Japanese suggests that this f0 variation is constrained by lexical tone/pitch accent phonology.

We investigate the extent to which f0 variation in IDS is constrained by intonational phonology in two typologically-divergent lgs: English, Bengali.

1. Can IDS intonation be described using intonational models from non-IDS?
2. Do tone choice, frequency change in IDS?
3. What linguistic meanings might be conveyed by the choices of particular tones?

MAINSTREAM AMERICAN ENGLISH INTONATION

MAE_TooBI model (K&L, LAR, SQU)

- Pitch accents (Ps) mark stressed syllables of prominent words
  - H*, L* default
  - Rising L+H*, L+H* non-default (see below)
- Words group into intermediate phrases (ips), which group into intonation phrases (IPs)
  - ips end in L-, H-
  - Ips end in L-L%, H-H%, H-H%, L-H%, L-L%, reflecting sentence type, nonfinality (L-H%), etc.
- Focus typically marked by L+H* or L+H* followed by deletion/compression of PAs

BANGLADESHI STANDARD BENGALI INTONATION

B-ToBI model (GA, GJ)

- Repeating rising sequences of low PAs and high accentual phrase (AP) boundary tones (L*...Ha)
  - L*...Ha default
  - H*...La sarcasm, surprise
- L+4fH, H+4fH, L*...Ha mark focus (see below)
- APs group into ips, which group into IPs
  - ips end in L-, H-
  - Ips end in L-L%, H-H%, L-H%, H-L%, L-L%, reflecting sentence type, topicalization (HL%), etc.
- Focus marked by H*, L+4fH, or fHa, followed by deletion/compression of PAs and AP tones

METHODS

Phonetic:
- f0 max, mean higher
- f0 min not sig different

Phonological: pitch accents
- No sig change in # of pitch accents (β=-0.64, p=7e-8)
- Increase in L+H* proportion (β=-0.31, p=7.2e-3)
- Decrease in L% proportion (β=1.44, p=4.17e-5)

Phonological: phrasing, boundary tones
- Overall 32% increase in IPs (β=1.9, p=0.003)
- Overall 35% increase in IPs (β=1.2, p=3.1e-4)
- No sig change in proportions of boundary tones

RESULTS: ENGLISH IDS

f0 range, mean across conditions

PA use across conditions

RESULTS: BENGALI IDS

f0 range, mean across conditions

IPS use across conditions

IP use across conditions

DISCUSSION AND CONCLUSIONS

- We find that many of the prosodic changes seen in IDS are mediated by the lg-specific intonational grammar.
- All IDS tones are seen in non-IDS intonation.
- Bengali H*, H* proportions increase, while L* proportion decreases.
- Bengali HL%, HLH% proportions increase, which expand f0 range over large domain.
- English L+H*, L+H* also expand f0 range.
- Greater f0 variability induced by more bitonal PAs and complex boundary tones.
- English L+H*, L+H* increases.
- Bengali HL%, HLH% proportions increase.
- Shorter units: more ips, IPs

CURRENT EXTENSIONS

1. More transcribers for each lg.
2. Phonetic investigation of f0 contour.
3. Linguistic information being conveyed by greater use of certain intonational tones (see below)

- Why are HL%, HLH% used more in Bengali IDS (while L%, LH%, H% are not)?
- Phonetic use: increase both f0 max, variability.
- Phonological use: HL% conveys topicalization, HLH% conveys non-finality.
- Why are L+H*, L+H* used more in English IDS and fH*, H* used more in Bengali IDS?
- Phonetic use: increase f0 max.
- Phonological use: mark focus.

- Are these tones used for their phonetic properties or pragmatic meaning associations?
- Preliminary investigation suggests both: tones are used pragmatically and phonetically.
- Further supports that prosodic manipulation for IDS is governed by the lg-specific grammar.

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