Breathy phonation in Gujarati:
an acoustic and electroglottographic study

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Background

Breathy phonation is characterized by a lateral constriction in the vocal tract, leading to a distorted path for the airflow, resulting in a breathy voice quality. This phenomenon is observed in various languages and is associated with a range of acoustic and perceptual features.

Methods

In the present study, we aimed to investigate the acoustic and electroglottographic properties of breathy phonation in Gujarati. A total of 10 native Gujarati speakers were recruited, and their speech was recorded. The acoustic and electroglottographic signals were then analyzed to identify the distinctive features of breathy phonation.

Acoustic results: H1-H2

H1-H2 is the difference in loudness of the first two harmonics.

Acoustic correlates of open quotient (OQ) (FuJ67, H27, M27)

Breathy voices are higher than H1-H2 cross-linguistically.

Current findings:

Breathy vowels showed a higher H1-H2 than modal vowels.

EGG results: Closing quotient (CQ)

CQ is the ratio of the duration of the closing phase to the overall vowel duration.

Current findings:

Breathy vowels had lower CQ than modal vowels.

Additional findings:

- Acoustic results: H1-A3
- Acoustic results: RMS energy
- Electroglottographic results: Peak increase in closure (PIC)

Summary of findings:

1. Two spectral measures distinguish breathy & modal vowels.
   - H1-H2 and CQ are both higher in breathy vowels.

2. One EGG measure also distinguishes the two:
   - Closing quotient (CQ) is lower in breathy vowels.

3. Other cues were restricted to the middle of the vowel:
   - Greater intensity rise across middle of breathy vowels.
   - Less periodicity at midpoints of breathy vowels.

4. Unexpectedly, PIC was not correlated with H1-A3.

References


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