

## Voice Onset Time (VOT) in Hindko Stop Sounds

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### Abstract

The study aimed to examine voice onset time (VOT) of stop sounds of Hindko dialect spoken in Tanawal, Mansehra, Pakistan. Hindko has 12 stop sounds /p/, /b/, /p<sup>h</sup>/, /t̪/, /d̪/, /t̪<sup>h</sup>/, /t/, /d/, /t<sup>h</sup>/, /k/, /g/, /k<sup>h</sup>/. A list was prepared in vowel-consonant-vowel context, e.g. /apa/, /aba/, /ata/ for VOT measurement. The data were collected from 12 native speakers including equal numbers of male and female respondents. The measurement of VOT was determined by the segmental differences among stops by voicing and places of articulation. A total of 432 tokens (12 stops x 3 repetitions x 12 informants) were recorded and analyzed quantitatively. The statistical measurement was taken into account by visually examining the spectrograms in Praat software and placed the values in terms of seconds (sec). On the basis of average calculation of stops, their standard deviation and coefficient of variation were taken into account. The measured values were further tested by ANOVA to verify differences within segments. The level of significance is set as 0.01 and 0.05. Then, the Least Significant Difference test was, further, applied for the analysis (where required) to detect which pair was actually different. It was found that Hindko has three ways of voicing, i.e. the voiced, the unaspirated and the aspirated sounds articulated at the bilabial, the dental, the alveolar and the velar positions. Hindko aspirated VOT mean values ranging from 0.0489 to 0.0693 (sec), unaspirated sounds also allow positive VOT ranging from 0.0176 to 0.0298 (sec) while voiced sounds VOT refer to negative values ranging from -0.0835 to -0.0953 (sec). It revealed that Hindko unaspirated stops have shorter duration than that of the aspirated sounds. The voiced segments were uttered with pre-voicing. Overall, Hindko allows the following patterns in voicing: aspirated > unaspirated > voiced. The VOT of the velar and the bilabial were found longer than those of the dental and the alveolar stops respectively. It was also found that unlike Urdu and Hindi but like Punjabi and Paharri, the sister languages, Hindko lacks voiced aspirated sounds. Khan and Bukhari (2011) measured the VOT of Paharri language and found the following hierarchy: velar > bilabial > alveolar > dental. It can be concluded that Hindko and Pahari do not follow the general concept of the places of articulation that VOT of stops is increased as its goes further in the back part of the oral cavity, from the bilabial to the velar.

**KEYWORDS:** VOT; Hindko; Tanawal; stops; place; voicing; feature.