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RESEARCH PAPER

An Acoustic Analysis of Stop Consonants in Gojri Language

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ABSTRACT

The purpose of the study is to identify the stop consonants of Gojri language and measure their acoustic properties. Gojri is an Indo- Aryan language, which is spoken by Gujjar community in Azad Jammu and Kashmir. The study is descriptive in nature and used mixed method approach. Data were collected from twenty native speakers of the language. Identified stops are recorded in VCV context for acoustic analysis. The results show that Gojri language contains twelve stop consonant sounds. These sounds are produced from diverse places of articulation; bilabial, dental, retroflex and velar. Voicing contrast shows three way voicing with no voiced aspirated segment. Acoustic analysis reveals that VOT, closure duration and burst and major acoustic cues which vary in terms of place of articulation and voicing. It is the first acoustic analysis of Gojri stop consonants and further researches can be conducted on segmental and supragemental features of the language.

KEYWORDS Acoustic Analysis, Stop Consonants, Gojri Language

Introduction

Gojri is one of the Indo-Aryan languages spoken by Gujjar community. Gojri is considered a dialect of Rajastani language, spoken in Rajastan, India (Masica, 1991). According to Losey (2002), Gojri language originated from Sanskrit, famous Indo- Aryan language. In Gojri-speaking regions, some other regional languages from Indo Aryan family are commonly used, due to which Gojri is highly influenced by these regional languages as well including, Urdu, Hindko, Pahari, etc. (Bukhari et.al., 2007).

The Gujjar community commonly reside in mountainous region of Azad Jammu and Kashmir and Northern areas of Pakistan (Shinwari, 2005). The language is used by more than one million people in Pakistan including Azad Jammu and Kashmir (Kalis & Zaidi, 2017). Gojri is vibrant as an oral language in many Gujjar communities, but its presence in formal domains is very limited. Moreover, Gojri language is not much explored by the researchers. Very limited work has been done in the field of syntax, morphology and historical development of the language.

Literature Review

Phonetically, consonants differ from one another in various intrinsic and extrinsic acoustic properties. According to Kent and Read (1996), consonant groups vary significantly in their acoustic cues. It is difficult to describe them in a single set of acoustic characteristics. Some consonant sounds are produced with complete obstruction of the airflow, while others are produced with partial obstruction or even with friction. These

differences distinguish several categories of consonants, such as stops, fricatives, affricates, and others. Each consonant category holds distinct acoustic characteristics.

Kent and Read (1996) further explain that the differences of stop consonants relies on both intrinsic and extrinsic acoustic cues. Intrinsic cues include voice onset time (VOT), closure duration, and burst characteristics, on the other hand extrinsic cues involve transitions in adjacent vowels. These acoustic features help to identify and classify the stops in natural speech. Similarly, Ladefoged (2001) emphasizes that stop consonants vary in multiple acoustic characteristics, including VOT, the spectral properties of release bursts, and formant transitions of proceeding and following vowels. It highlighting the complex nature of acoustic structure of the stop consonants.

According to Davenport and Hannahs (2005), at the time of articulation, stops have complete closure at the vocal tract and an abrupt release of air from different places of articulation. VOT follows different trends for different place of articulations (Habib & Saeed, 2016). Rashid & Akhtar (2014), suggested that VOT can be categorized into three categories as positive, negative and zero VOT. In a positive VOT, the vocal cord's vibration is delayed after the stop is released. When vocal cord vibration is followed by the release of stop, then it is negative VOT. Zero VOT means that there is overlapped in stop release and vocal cord vibration.

Raphael (2021) discussed the acoustic cues to the perception of segmental sounds. He elaborates the features of manner and place of stop sounds. He suggested that the auditory elements that determine the manner signals of stops are very important for their perception. Release burst is considered as a key indicator, observed as a vertical spike in spectrograms, which signifies the abrupt release of air pressure (Cooper et al., 1976). The first formant (F1) transition is a major indicator for stop perception when it is in ascending path following the release of voiced stops even without the burst (Liberman, Delattre, & Cooper, 1952). Kent and Read (1996) relate the spectral fluctuation with temporary noise burst is affected by resonance properties dictated by particular articulatory configurations. The plosive burst is represented as a short vertical noise pulse with a specific center of frequency.

The initial investigations of the acoustic cues of the place of articulation of stop consonants identified in the 1950s. Research at Haskins Laboratories discovered significant acoustic characteristics, such as burst frequency and the transitions of the second and third formants which help to differentiate the stop consonants (Liberman et al., 1952). The investigations revealed that stop burst perception based upon context. /t/ is taken as high frequency burst, while /p/ is taken as low frequency burst. Moreover, a mid-frequency burst is /p/ preceding /i/ and /u/, but as /k/ before /a/. As this data is failed to identify a consistent cue inside the stop burst, researchers again paid their attention to formant transitions, particularly second formant (F2), to determine the place of articulation.

Different studies are conducted to explore the stop consonants of different languages. Kiani, et. Al, (2012) conducted acoustic analysis of stop sounds, present in Hindko language. Results show that there are 12 consonant stops in Hindko having three way voicing contrast. They argued that closure duration and VOT are different for each stops according to its place of articulation and voicing.

Chohan, Habib & Bhatti (2019) explore Majhi stops, a dialect of Punjabi language, acoustically. They focused on VOT and closure duration of Punjabi stops. Study shows that Punjabi has three way voicing contrast like other Indo Aryan languages. Voiceless unaspirated and aspirated stops possess positive VOT while voiced stops have negative

VOT. The research verifies the ide that Voice Onset Time (VOT) increases when the articulators shift posteriorly in the oral cavity. Aspirated stops exhibit a longer VOT as compared to their unaspirated counterparts. Malik, et. al, (2020), studied the acoustic features of velar stops present in two different dialects of Punjabi language. They claimed that VOT is different in both the dialects, but velar stops have higher one. Moreover, velar voiceless aspirated and unaspirated stops have longer closure duration as compared to velar voiced stop.

Alsiraih (2021) conducted a thorough acoustic analysis of Iraqi Arabic stop consonants, with a particular emphasis on their manifestation in word-initial and word-final positions. The research claims that voiced stops have negative VOT, while voiceless stops possess positive VOT. Consequently, Iraqi Arabic and Palestinian Arabic are classified under the same typological category. Additionally, the analysis revealed that stop consonants consistently affect the F1 and F2 of adjacent vowels, which suggests that both are language-specific and cross-linguistic phonetic patterns.

Sharma (2003) conducted the acoustic study of Hindi stop consonants in CVC contexts and systematically measured parameters such as VOT, burst duration and frequency, formant transitions, and gap duration across voiced and voiceless stops. His research demonstrated that voiced stops in Hindi are distinguished by substantial negative VOT values, while voiceless stops exhibit small positive VOT values. Additionally, he discovered that burst frequency and formant transitions are predictable in relation to the place of articulation and context of vowel as well. It is crucial to note that the study illustrated that these acoustic features can be effectively utilized for the automatic recognition of Hindi stops. The classification results demonstrated a high level of accuracy for velar and dental stops. Najam-ul-Hassan, Anjum, and Hayat (2023) conducted a systematic acoustic analysis of the Ghebi dialect, which is considered as a variety of Hindko spoken in Attock, Pakistan. It is identified as understudied variety of the language. They identified sixteen stop consonants showing a four-way contrast, voiceless unaspirated, voiceless aspirated, voiced unaspirated, and voiced aspirated. The places of articulation involved bilabial, dental, retroflex, and velar. By using Praat for analysis, they found that voiceless stops exhibited shorter VOT values, with /ʈ/ showing the shortest and /ɖ/ the longest durations, alongside consistent differences in closure and burst patterns. These findings align with earlier studies on Indo Aryan languages like Hindi, Punjabi, and Sindhi, which highlight VOT, closure duration, and burst spectrum as key acoustic cues for distinguishing stops. However, despite such researches on different Indo-Aryan languages, Gojri language remains unexplored acoustically, which indicate the need for systematic investigation of its stop consonant system of the language.

Material and Methods

Participants

The present study was conducted with native speakers of the Gojri language residing in District Muzaffarabad, Azad Jammu and Kashmir (AJK), Pakistan. Twenty native speakers of Gojri language participated in the study, including ten male and ten female. All the participants were more than 35 years old. Moreover, participants were multilingual as they can speak different regional languages other than Gojri as well. It is interesting to note that they have not received any formal instruction on English language, therefore they are considered as non-EFL Gojri speakers.

Research Tools

Two primary tools, the *North Wind and the Sun* passage and the Indo-Iranian Swadesh word list comprising 207 lexical items, were taken as research tools for initial data collection. These tools were used for the identification and classification of phonemes in the Gojri language and helped to provide a phonetic baseline for subsequent analyses.

For the acoustic analysis of stop consonants, a set of non-words was used as experimental stimuli as there is limited availability of appropriate lexical items in the language. The target consonants were recorded in a *VCV* context, with the low vowel /ɑ/ preceding and following the target segment. It helps to minimize the contextual variability and to ensure consistent articulatory environments across tokens as well.

Data Collection Procedure

Data was collected in different phases. Initially, the Swadesh list and the *North Wind and the Sun* passage were recorded from each participant to establish the phonemic inventory of Gojri. On the basis of these recordings, minimal pairs were identified, and the distributional characteristics of phonemes in word-initial, medial, and final positions were examined. Voicing contrast was also discussed across different stop consonants.

In order to measure the acoustic cues, stops were recorded in *VCV* context. Each participant produced every target sound three times, yielding a total of 36 stimuli per speaker. In total, 720 tokens (12 segments × 3 repetitions × 20 participants) were recorded. Prior to recording, participants were briefed on the procedure and allowed a short rehearsal session to ensure accurate and consistent production.

All recordings were conducted in a quiet, noise-free environment using a high-quality microphone to ensure optimal sound quality and minimize background interference.

Result and Discussions

In Gojri language, there are twelve distinct stop consonants. These stops are systematically distributed across four different places of articulation, which means they are produced by obstructing the airflow at four specific points in the vocal tract. The places of articulation include **bilabial, dental, alveolar and velar.** Table shows the Gojri stops with their place of articulation and voicing contrast.

Table 1
Gojri stop consonants

	Bilabial	Dental	Retroflex	Velar
Voiceless Unaspirated	p	ʈ̪	ʈ	K
Voiceless aspirated	pʰ	ʈ̪ʰ	ʈʰ	kʰ
Voiced	b	ɖ̪	ɖ	g

Table 2
Minimal pairs of Gojri stops

Phoneme	Word	Meaning	Phoneme	Word	Meaning
p	pʊl	bridge	pʰ	pʰʊl	Flower
pʰ	pʰɪni	small (F)	p	pɪni	Piece of dough
B	bɑl	Hair	p	pɑl	to grow up
ʈ̪	ʈ̪əl	Fry	ɖ̪	ɖ̪əl	to grind
ʈ̪ʰ	ʈ̪ʰəli	Small rack	ʈ̪	ʈ̪əli	Palm
ɖ̪	ɖ̪ər	Door	ʈ̪	ʈ̪ər	to swim
ʈ	ʈəp	Tub	ʈʰ	ʈʰəp	to fold

ʈʰ	ʈʰel	split	ɖ	ɖel	Clod of soil
d	kʰʌɖ	Pit	p	kʰʌp	mark
K	kɑ̃ɳi	blind girl	g	gɑ̃ɳi	Bracelets
kʰ	kʰəl	Skin	g	gəl	Melted

Gojri stops have three way voicing contrast such as voiceless, voiced and voiceless aspirated. This three way categorization is commonly existed in Indo-Aryan languages, like Hindko, Pahari, Punjabi, etc. Whereas, Urdu has four way categorization including voiceless, voiced, aspirated voiceless and aspirated voiced (Hussain, 2018).

In Gojri language, there are four voiceless, four voiced and four voiceless aspirated stops. Tables below show the details of voicing contrast.

Table 3
Voicing contrast of Gojri stops as voiced and voiceless phonemes

Voiceless			Voiced		
p	pæʈo	Bad	b	bĩ	Seed
	kʰəpo	Whole		kʰəbo	Left
	sʌp	Snake		ʧəb	Bite
ʈ	ʈrɛʈ	Crack	ɖ	ɖili	A type of wood
	pəʈo	Thin		məndʈ	Bad
	pəreʈ	To turn		kənɖ	Wall
ʈ	ʈəli	Bell	ɖ	ɖəndi	Small stick
	soʈo	Large stick		ʊɖʊr	Fly
	bʌʈ	To twist		kʰənɖ	Sweet/ sugar
k	keʈi	Who	g	gɑl	Abusive talk
	ʧəki	Grinder		kiŋgɑ	Where
	ʧʌk	Bite		sʌg	Make Wet

Table 4
Voicing contrast of Gojri stops as aspirated and unaspirated

Unaspirated			Aspirated		
p	pəʈər	Leaf	pʰ	pʰʊlko	Bread
	kəpo	To cut		bəpʰəli	Many people
	ʈʰəp	To fold			
ʈ	ʈʊ	You	ʈʰ	ʈʰɑli	Plate
	kʊʈo	Dog		gʊʈʰi	A little bag
	rəʈ	Blood		hʌʈʰ	Hand
ʈ	ʈʊro	Walk	ʈʰ	ʈʰeli	Large wood
	ʧiʈo	White		ʧɑʈʰi	Shrub
	kʰəmleʈ	Wings		ʤɛʈʰ	Brother in law
k	koʈʰi	Room	kʰ	kʰɑ	Eat
	sʊki	Weak		pəkʰi	Hand fan
	sɛk	To roast		dekʰ	See

Gojri stops have three way voicing contrast, where all voiceless stops have their voiced counterpart. Moreover, voiceless stops have their aspirated voiceless counterpart as well. Voiced stops do not have any aspirated matching part. It is interesting to note that bilabial voiceless unaspirated /p/ and its aspirated counterpart /pʰ/ have contrast at word initial and middle position but not at final position of the word as /pʰ/ does not exist at word final position in Gojri. This three way categorization of voicing is common in Indo Aryan languages like Pahari, (Khan, 2012), Hindko (Rashid, 2015) and Dawoodi (Khalid and Kiyani, 2022).

Table 5
Word level distribution of Gojri stop consonants

Initial	Middle	Final

Phoneme	Word	Meaning	Word	Meaning	Word	Meaning
p	pɑ̃ɳi	Water	kʰəpi	Veil	kʌp	to cut
pʰ	pʰu:k	Blow	dʒəpʰi	Hug		
B	bəʈo	Stone	kʰəbo	Left	ʧəb	bite
ʈ̪	ʈ̪ræ	Three	pəʈ̪o	Thin	ləʈ̪	leg
ʈ̪ʰ	ʈ̪ʰoɽo	Few	həʈ̪ʰi	Handel	hʌʈ̪ʰ	hand
ɖ̪	ɖ̪ɐkʰ	See	sɪɖ̪o	Smooth	ʈ̪ɔ̃nɖ̪	fog
ʈ	ʈɪɖ	Belly	beʈki	Woman	kʰəmleʈ	wing
ʈʰ	ʈʰelo	Push	nəʈʰɑ	Ran	ʈʰɛʈʰ	pure, real
ɖ	ɖoɣo	Field	kʰəndi̯	Broken	kʌɖ	to take out
K	kɑ	Grass	səko	real (relation)	nʌk	nose
kʰ	kʰʊɲo	to dig	ɖɐkʰ	to see	ʌkʰ	eye
g	gæl	Plain	kɪŋgɑ	Where	ʌg	fire

Acoustic Properties of Gojri Consonants

In terms of phonology, consonant sounds are different from each other in their acoustic properties extrinsically and intrinsically (Rashid, 2015). Stops are measured in terms of closure duration, VOT and burst (Kent & Read, 1996). For acoustic analysis, stops are recorded in VCV context where /ɑ/ is V and C is the target stop.

Table 6
Gojri stops in ɑCɑ context

Place of articulation	Voiceless unaspirated	Voiced unaspirated	Voiceless aspirated
Bilabial	ɑpɑ	ɑbɑ	ɑpʰɑ
Dental	ɑʈ̪ɑ	ɑɖ̪ɑ	ɑʈ̪ʰɑ
Alveolar	ɑʈɑ	ɑɖɑ	ɑʈʰɑ
Velar	ɑkɑ	ɑgɑ	ɑkʰɑ

Voiced Onset Time (VOT)

VOT (Voice Onset Time) is said to be a major acoustic cue in phonetics that denotes the duration between the release of a stop consonant and the initiation of vocal cord vibration (voicing). It also serves to differentiate between voiced and voiceless stop consonants in various languages. It is noticed that VOT would be longer when closure duration is further back (Peterson & Lehiste, 1960) and it would be shortest if articulators move fast (Stevens et al, 1986). For the measurements of VOT for Gojri stops, total 60 tokens were recorded and analyzed. Results are shown in table below:

Table 7
VOT of Gojri Stops

Place of articulation	Phoneme	No. of Tokens	VOT
Bilabial	p	60	0.01698
	pʰ	60	0.0416
	B	60	-0.0133
Dental	ʈ̪	60	0.0207
	ʈ̪ʰ	60	0.0618
	ɖ̪	60	-0.0154
Retroflex	ʈ	60	0.0155
	ʈʰ	60	0.0566
	ɖ	60	-0.0126
Velar	K	60	0.0304
	kʰ	60	0.0848
	g	60	-0.0813

Table 8
VOT according to voicing

	Unaspirated Voiced	Aspirated Voiceless	Unaspirated Voiceless
Bilabial	-0.0133	0.0416	0.01698
Dental	-0.0154	0.0618	0.0207
Retroflex	-0.0126	0.0566	0.0155
Velar	-0.0813	0.0848	0.0304

It is observed that Gojri language has three types of stops according to voicing including aspirated voiceless, unaspirated voiced and unaspirated voiceless. In terms of voicing aspirated stops have higher VOT ranging from 0.04s-0.09s, and unaspirated voiced stops have lowest VOT ranging from -0.08s- -0.01s. VOT of Unaspirated voiceless stops lie between the two ranging from 0.01s-0.03s.

The figure above shows the mean VOT of Gojri stops according to voicing type. It is observed that aspirated stops have highest VOT and unaspirated voiced stops have lowest VOT. Unaspirated voiceless stops lie between the two. It shows the following trend:

Aspirated voiceless > Unaspirated voiced > Unaspirated voiced

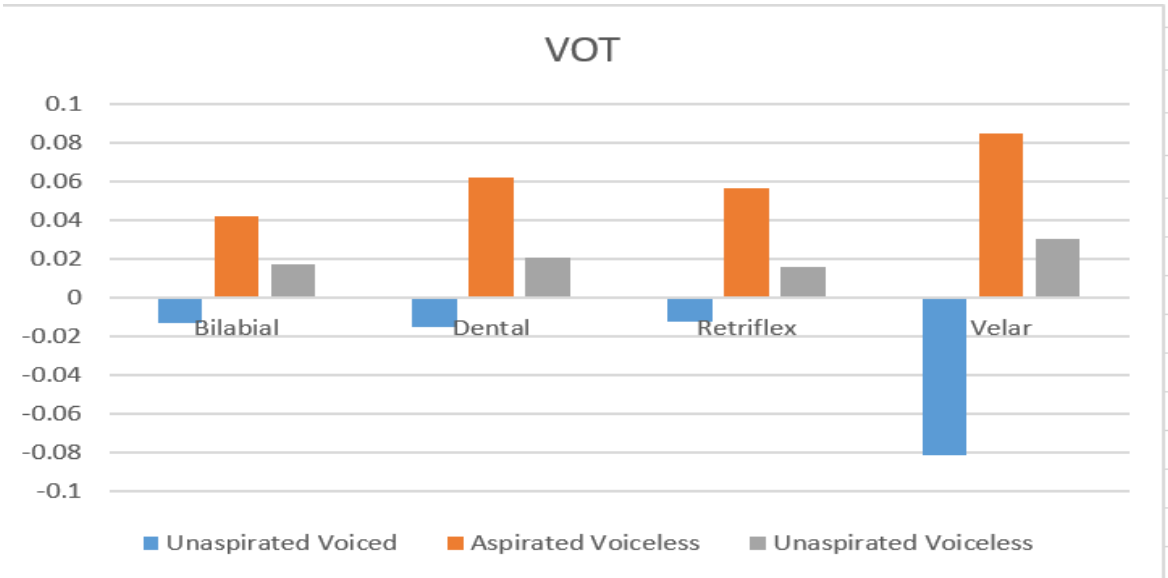

Fig.1. Mean VOT according to place of articulation

Fig.2. above shows the VOT of Gojri stops according to place of articulation. It is clearly shown that velar stops have highest VOT among all the places of articulation. Gojri follows different trends than other regional languages. According to Cho & Ladefoged (1999), VOT is increasing with backness of place of articulation of the stop. Hindko language follow this trend (Rashid, 2015). However, Gojri language does not support the claim. It has difference in retroflex and dental, where dental stops have higher VOT than retroflex. It is interesting to note that Hindko does not have retroflex stops and Gojri does not have alveolar stops, which may create difference in VOT trend as well.

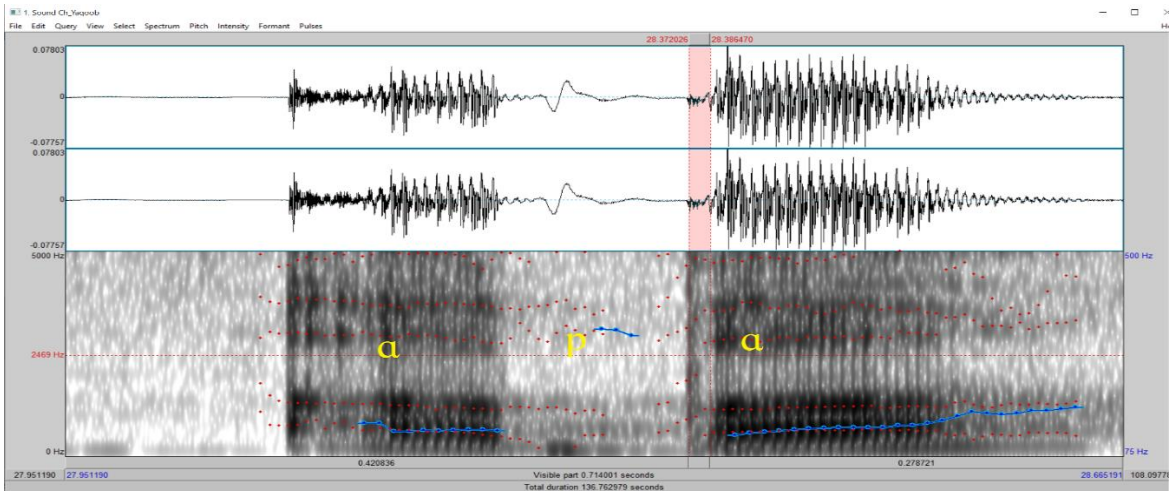

Fig.2. Spectrogram of bilabial /p/

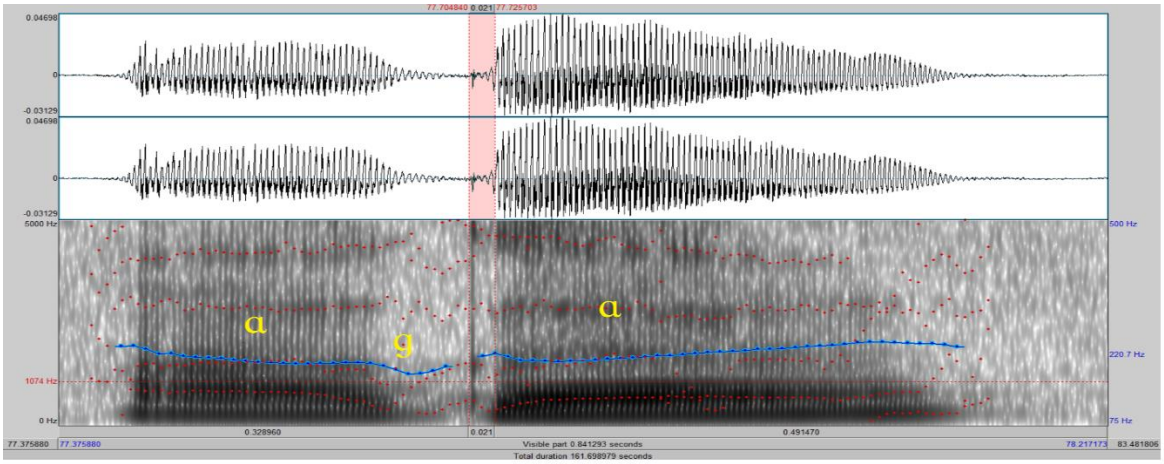

Fig.3. VOT of velar voiced stop

The discussion on VOT shows that:

- Velar stops have highest VOT whereas bilabial has shorter VOT
- VOT is highest in aspirated voiceless stops and lowest in voiced stops, while voiceless unaspirated lie between the two with average VOT.
- The study does not support the cross linguistics finding that VOT is increasing with backness of place of articulation.
- Gojri follows the same trend as other regional languages have in terms of VOT according to voicing but it is different in terms of VOT according to place of articulation.

Closure Duration

According to Davenport and Hannahs (2005), closure duration denotes the interval when the vocal tract is entirely blocked in the production of stop segments. The closure is a characteristic attribute of stop consonants. In this phase, pressure accumulates behind the closure point, subsequently discharged in a sound burst. The closure duration is identified as major acoustic cue, which can help to differentiate between different stops, including

voiced versus voiceless. It is essential for the timing and perception of speech sounds, enhancing the intelligibility and rhythm of spoken language.

Closure Duration of Gojri Stops

The closure duration of Gojri stops is given below

Table 9
Closure duration of Gojri Stops

Bilabial	p	0.143
	pʰ	0.125
	b	0.152
Dental	t̪	0.124
	t̪ʰ	0.106
	d̪	0.085
Retroflex	ʈ	0.114
	ʈʰ	0.102
	ɖ	0.082
Velar	k	0.119
	kʰ	0.115
	g	0.069

It is shown that /b/ has highest closure duration and /g/ has shortest closure duration and other stops lie between the two. The table reveals that closure duration of Gojri stops lie between 0.069-0.0152s.

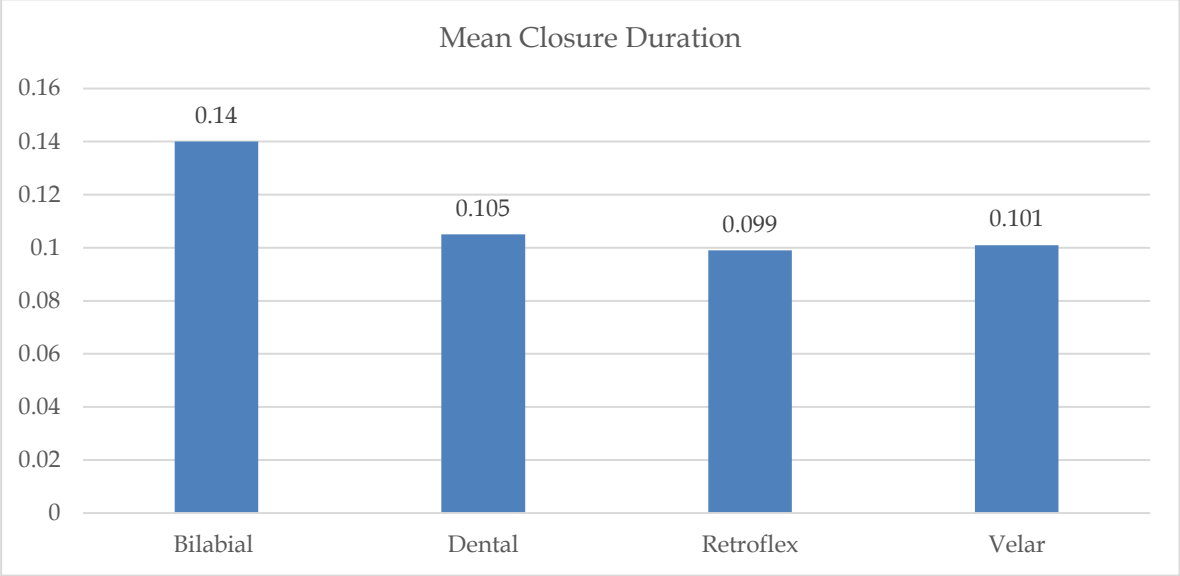

Fig.4. Mean closure duration of stops

The figure above shows the closure duration of Gojri stops according to place of articulation. It is observed that bilabial stops have highest VOT and retroflex stops have lowest VOT. Dental and velar stops have average VOT lie between the bilabial and retroflex. Maddieson (1991) claimed that the closure duration of a stop is decrease with the backness of the tongue, which is also observed in Hindko language (Rashid, 2015). However, some other indo Aryan languages do not support this claim and follow different trends in closure duration according to place of articulation as closure duration in Dawoodi language has alveolar stops have higher closure duration than bilabial (Khalid & Kiyani, 2022). Moreover, in Punjabi dental stops has higher closure duration than bilabial (Chohan

et al., 2019). Therefore, Gojri also does not support this claim. Although bilabial stops have the highest closure duration, velar stops have a higher closure duration than retroflex stops, which have the lowest among all places of articulation.

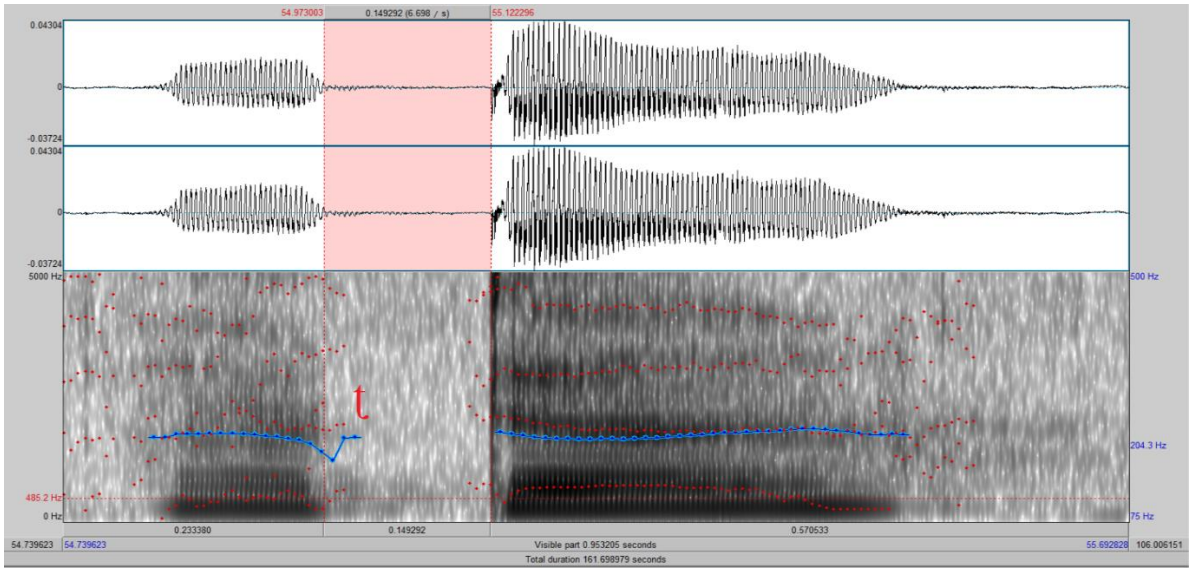

Fig.5. Spectrogram showing closure duration

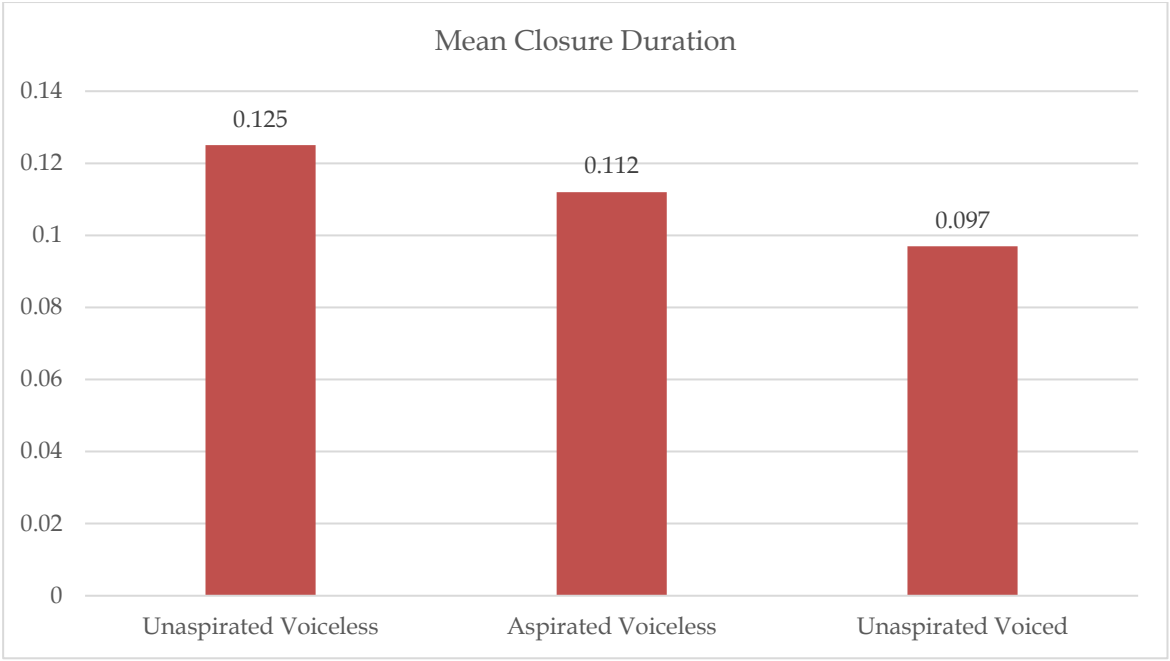

Fig.6. Mean closure duration according to voicing

According to voicing, unaspirated voiceless stops have highest closure duration and unaspirated voiced stops have lowest one. Aspirated voiceless stops have average closure duration as shown in the figure above. It reveals that in terms of closure duration unaspirated voiceless > Aspirated voiceless > unaspirated voiced. This is very common in other regional languages as well.

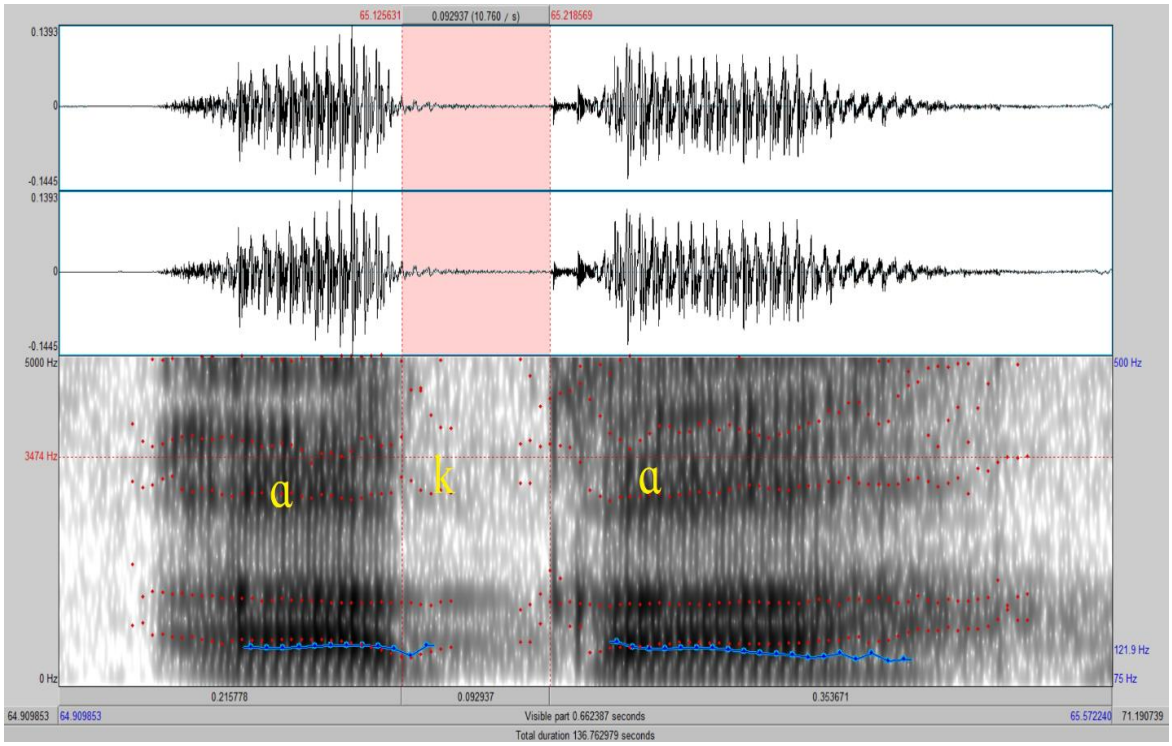

Fig.7. closure duration of /k/

Burst as Acoustic Cue

Burst is also an important acoustic cue for the stop, which is observed according to place of articulation. Bilabial stops contain lower frequency but alveolar stops have higher frequency. However, velar stops lie between the two having average frequency (Halle et al., 1957). According to Stevens & Blumstein (1978) bilabial stops have falling burst spectrum, alveolar have rising and velar have compact spectrum. The figures below show the burst characteristics of Gojri stops in terms of their place of articulation.

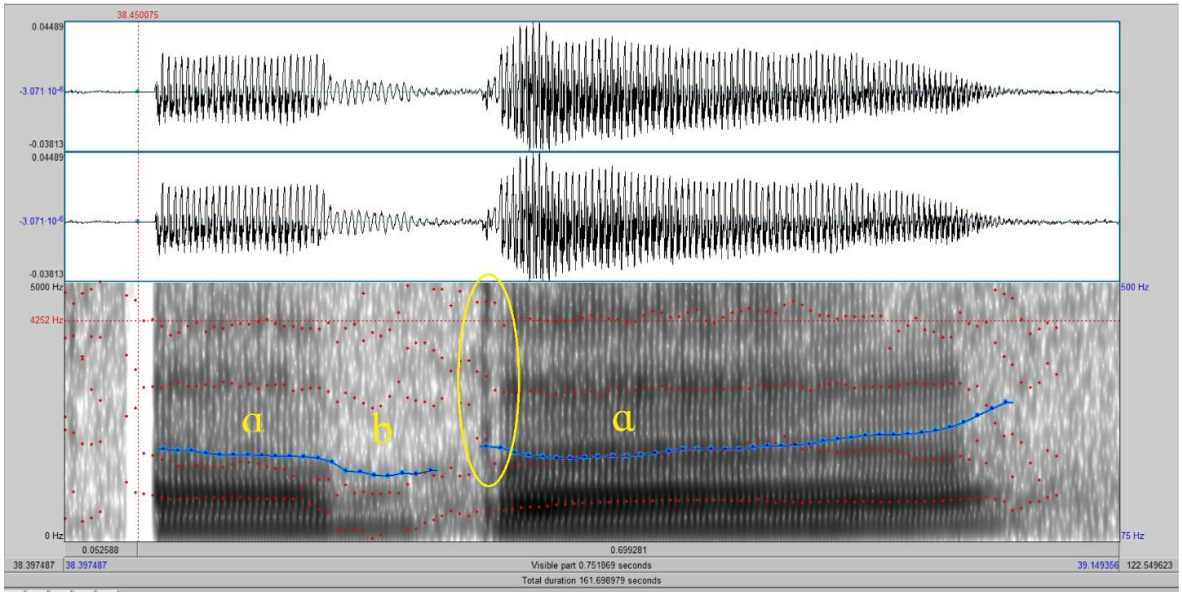

Fig.8. Burst spectrum of bilabial

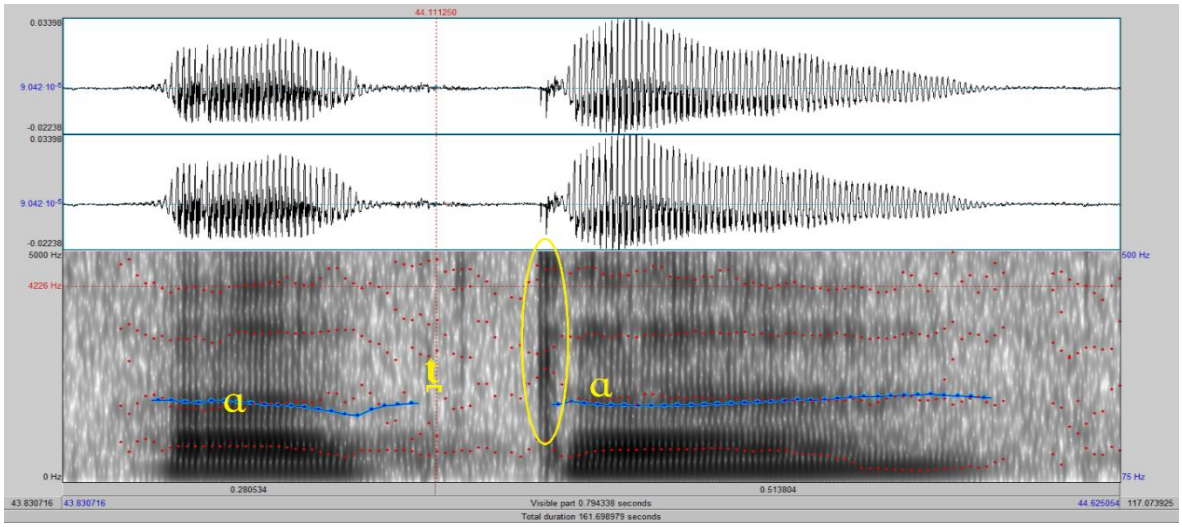

Fig.9. Burst spectrum of dental stop

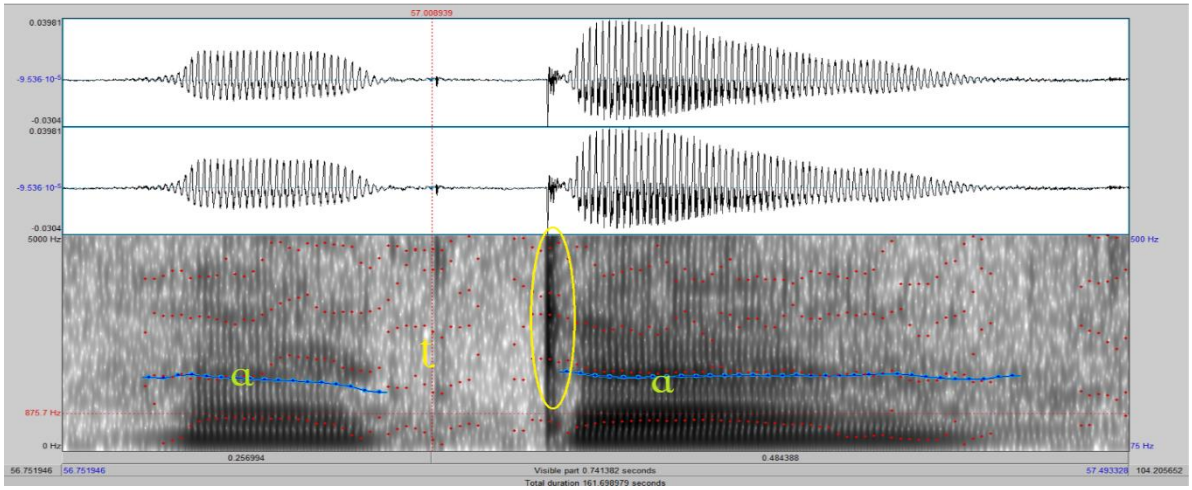

Fig.10. Burst spectrum of retroflex stop

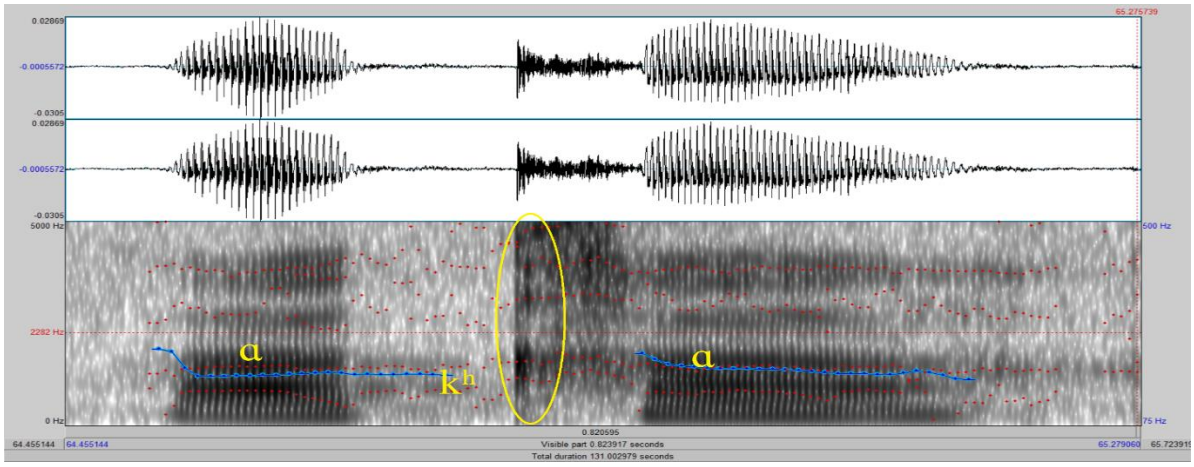

Fig.11. Burst spectrum of velar stop

Table 10
Burst spectrum of Gojri stops

Stops	Burst Spectrum
Bilabial	Falling

Dental	Rising
Retroflex	Compact
Velar	Compact

Table 10 shows the burst spectrum of Gojri stops. It is shown that bilabial has falling but dental has rising burst. Retroflex and velar has compact burst with a difference as retroflex has lower frequency than velar. Johnson (2011), described that retroflex have lower and more compact burst than velar stop. Ladefoged (1996) had the same view that retroflex always have more compact burst than velar. Gojri language supports the claim where velar has less compact burst than retroflex, shown in spectrograms.

Description of Gojri Stops

Acoustic analysis of Gojri stops shows the following results:

- VOT is higher in aspirated stops as compared to unaspirated.
- Voiced unaspirated stops have lower VOT as compared to voiceless unaspirated stops.
- According to place of articulation, velar has highest VOT and bilabial stops have lowest one. It follows the trend as velar > dental > retroflex > bilabial.
- Closure duration is also higher in unaspirated voiceless stops and lowest in unaspirated voiced. However, aspirated voiceless stops lie between the two.
- In terms of place of articulation, bilabial has highest closure duration among all. It follows the trend as bilabial > dental > velar > retroflex.
- Bilabial has falling burst, dental has rising and burst is compact in velar and retroflex. Retroflex has more compact than velar stops.

Conclusion

The study presents a detailed acoustic analysis of Gojri stop consonant sounds, which is based on original and empirical data. The results determines that there are twelve stops in Gojri, which are articulated from four different places of articulation including bilabial, dental, retroflex and velar. It also shows a three way voicing contrast as voiced, voiceless and aspirated voiceless, which is common in Indo Aryan languages. It is interesting to observe that, Gojri follows the common trend of Indo Aryan languages in terms of voicing, however it shows different behavior in terms of place of articulation. Acoustic analysis reveals that velar stops possess highest VOT, while it is lowest in bilabial. However, it shows different patterns than cross linguistics, which claims that VOT is increased with backness, which is not found in dental and retroflex. Moreover, closure duration is longest in bilabial stops but findings of closure duration also deviates from the common trends. Burst spectrum follows the trends according to different places of articulation. Overall, the results determine the typological similarities and some unique trends of Gojri language. Moreover, it also highlights the relationship with other regional languages in Indo Aryan family.

Recommendations

The study enhances the documentation of language phonetically and it provides bases for future researches in the field. Future researches can be conducted to explore the segmental and suprasegmental features of the language. Further studies can also be carried out on diverse population as Gojri is spoken in different regions with different regional languages in a society in order to identify the dialectal variations. Moreover, detailed studies can be conducted to explore the structural and functional aspects of the language.

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