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Comparative Phonology of Multani and Majhi Punjabi: A Sociolinguistic Study

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ABSTRACT

Significant changes are occurring in the Punjabi language, especially in the phonological and lexical domains. The effects of these alterations are emphasized by Arslan (2021) and Hasan (2021), with Arslan emphasizing the possible loss of distinguishing sounds and Hasan on the vocabulary variations between the Majhi and Dhani dialects. Social and political variables further compound these changes, as demonstrated by Alizai's (2021) study on the linguistic shift of Punjabi speakers in the province of Baluchistan. This paper aims to investigate Multani Punjabi's phonological modifications to the Punjabi lexicon. Multani Punjabi is spoken in Faridabad, Ballabhgarh, Palwal, and a few more areas (Jain, V. 2019). Purposive sampling of 20 speakers, 10 from each dialect will be used in the process to gather information on phonemic and phonological variances. Particularly, the Multani Punjabi dialect is losing tonality, which has an impact on the meaning variances of words that have tonality (Rafi, 2010). The intricate interaction of sociolinguistic and phonological elements in the development of the Punjabi vocabulary is reflected in these modifications. The purpose of this research is to clarify Multani Punjabi's changing phonological characteristics, the phonemic comparison between Multani and Mahji using the Levensthein algorithm, and their consequences in the larger context of language development through a qualitative examination of the data.

Keywords : Punjabi language, Phonological changes, Lexical alterations, Dialectal variations, Multani Punjabi, Sociolinguistic factors, Phonological modifications

1. Introduction

The Indo-Aryan branch of the Indo-Iranian language family, which is a branch of the larger Indo-European language family, is where the Multani Punjabi language is found. One of the largest language families in the world, Indo-European is thought to have originated. Vedic Sanskrit, which was spoken in ancient India 1500 BCE, is the earliest known ancestor of Multani Punjabi within the Indo-Iranian branch. Over time, contact with other languages and regional dialects had an impact on the development of the Old Punjabi language. Punjabi had further divided into various regional dialects by the Middle Ages, one of which was Multani Punjabi, which is spoken in the Multan area of modern-day Pakistan.

Like other Punjabi dialects, Multani Punjabi has its own unique vocabulary, phonetics, and grammar. It is quite similar to other Punjabi dialects, but it also has distinct characteristics that are shaped by the linguistic, cultural, and historical background of the area.

1.1 Background of the Study

Linguistic groups' dynamic contacts and impacts are reflected in phonological changes in languages. Language contact scenarios give rise to loanwords, which are a prime example of how languages change by borrowing from other linguistic sources. Loanwords are lexical terms imported from one language into another, frequently due to necessity or prestige, according to Trudgill (1992) and Crystal (2008). Words from other languages are adopted by speakers due to the need to bridge lexical gaps and the desire for linguistic status (Mahmood, Hussain, & Mahmood, 2011).

With six major languages and fifty-nine minor languages, Pakistan is a linguistically diverse country (Rahman, 2006). Seventy-three languages are spoken in Pakistan, according to Simons and Fennig (2017), who documented them in the Ethnologue: Languages of the World. Among these languages, Urdu, English, Punjabi, Sindhi, Pashto, and Balochi are particularly well-known. English, an official language, and Urdu, the nation's language, are essential in the fields of law, journalism, and education. of the meantime, about 39% of Pakistan's population speaks Punjabi, a regional language that is the main language of the Punjab province (Population Census, 2017).

Investigating Multani Punjabi's phonological changes and their sources in the Punjabi vocabulary is the goal of this study. There have been noticeable tone changes in Multani Punjabi, which is spoken in places like Faridabad, Ballabhgarh, and Palwal. These changes have affected the subtle meanings of words that are sensitive to tonal shifts (Rafi, 2010). This study will clarify the changing phonological traits of Multani Punjabi and their wider consequences in the context of language development by utilizing selective sampling and qualitative methods like interviews and audio recordings.

The phonemic inventory of the Multani Punjabi :

Consonants

	Bilabial	Dental	Alveolar	Retroflex	Palatal	Velar	Glottal
Plosive	p, b		t, d	ʈ, ɖ		k, g	
Nasal	m		n			ŋ	
Trill			r				
Tap/Flap							
Fricative		f, v	s, z		ʃ	x	h
Lateral Fricative			ɬ				
Approximant			ɹ		j	w	
Lateral Approximant			l				

Vowels

Front	Central	Back
i		u
e		o
ɛ	ə	ɔ
	a	

1.2 Statements of the Problem:

There are many major phonological changes occurring to Punjabi, especially in the Multani dialect that is spoken in Palwal, Ballabhgarh, Faridabad, and the adjacent districts. The Punjabi vocabulary is affected by these modifications, which are caused alterations to lexical and semantic elements. Comprehending and recording these phonological changes in Multani Punjabi is crucial in order to appreciate the wider consequences for language evolution and maintenance in the face of sociolinguistic influences. The goal of this study is to ascertain the, phonological changes, the phonemic comparison, cause and effects of the phonological alterations that have been noted in Multani Punjabi.

The study's special objective, which is to evaluate and explain Multani Punjabi's evolving phonological characteristics and the phonemic comparison within the framework of broader language development, sociolinguistic dynamics, and the preservation of linguistic legacy, is highlighted in this problem statement.

1.3 Aims and Objectives:

This study delves into the intricate phonological changes occurring in Multani Punjabi within the framework of sociolinguistics, aiming to discern the influential factors shaping these changes and their implications for the evolution and unique identity of this dialect within the Punjabi language family. The research methodology involves a multifaceted approach, starting with a phonemic comparison between Multani Punjabi and the standard Majhi dialect using the Levenshtein algorithm. This quantitative analysis will provide insights into the specific phonological variations distinguishing Multani Punjabi from the established standard. Additionally, the study will conduct an extensive review of existing literature to contextualize these observed phonological alterations within the broader linguistic landscape. By synthesizing findings from previous studies, the research aims to establish a comprehensive understanding of the historical and sociocultural underpinnings influencing the phonetic evolution of Multani Punjabi. Empirical data collection will be carried out through purposive sampling of Multani Punjabi speakers in targeted regions such as Faridabad, Ballabhgarh, Palwal, and adjacent areas. Qualitative research techniques including audio recordings and structured interviews will be employed to document and analyze spontaneous speech patterns and phonological features unique to Multani Punjabi. Through this approach, the study seeks to capture the nuanced phonetic nuances that contribute to the dialect's distinctiveness and resilience. The ultimate goal of this research is to pinpoint and record significant phonological changes taking place within Multani Punjabi, thus contributing valuable insights to the field of linguistic evolution and variation within the Punjabi language. By elucidating the sociolinguistic dynamics influencing phonetic shifts and preservation of dialectal identity, this study will enrich our understanding of language change processes in diverse sociocultural contexts. Moreover, the findings may have implications for language revitalization efforts and policies aimed at preserving linguistic diversity within the Punjabi-speaking community.

1.4 Research Questions

(1) Which phonological changes are prevalent in the Multani Punjabi?
(2) Do the phonological alterations in Multani Punjabi exhibit any recognizable patterns, such as the merging or splitting of phonemes?
(3) What is the index of phonemic comparison between Multani Punjabi and standard Punjabi (Mahji)?
(4) What sociolinguistic variables and underlying causes are influencing the phonological changes in Multani Punjabi?
(5) What environmental elements affect Multani Punjabi word phonological changes, differentiating between conditioned and unconditioned changes?

In summary, there are notable phonological changes in the Punjabi Lexicon of Multani Punjabi, which may be ascribed to several linguistic and historical reasons. various changes show how various dialects differ from one another and illustrate how intricate language change and evolution are.

1.5 Significance of the study

This work is important because it adds to our understanding of Multani Punjabi's changing linguistic environment, especially in light of the phonological alterations that have been noted. The research contributes important insights into language development, preservation, and identity within the Punjabi language family by recording these changes. The results could guide language planning and policy actions as well as attempts to preserve linguistic diversity.

1.6 Limitations of the study

-Geographic Scope: Speakers of Multani Punjabi in Faridabad, Ballabhgarh, Palwal, and the surrounding areas are the primary focus of this study. The results might not accurately reflect phonological differences in Multani Punjabi in all areas of the world where the dialect is spoken.

-Sample Size and Representativeness: The study's intentional sampling of speakers from particular regions may restrict the applicability of its conclusions to the larger community of Multani Punjabi speakers.

-Time Restrictions: Enough time must be allotted for the gathering, processing, and interpretation of data in order to conduct a comprehensive study of phonological alterations. The study's scope and depth may be impacted by time restrictions.

1.7. Literature Review

The dynamic process of language evolution is shaped by a number of sociolinguistic, historical, and geographic variables. The purpose of this

review of the research is to summarize the main conclusions from pertinent studies that provide insight into the phonological changes seen in Multani Punjabi, with an emphasis on tone loss and its consequences. Spoken in areas like as Palwal, Ballabhgarh, and Faridabad, Multani Punjabi is distinguished from other Punjabi dialects by its distinct phonetic characteristics. Pitch contour variations are a major factor in differentiating between lexical meanings in traditional Punjabi dialects. (Rafi, 2010). Recent research, however, suggests that Multani Punjabi gradually loses tone, which begs the question of what forces this phonological change. Multani Punjabi phonological alterations are shaped in large part by language contact. Multani Punjabi's phonetic patterns and tonal variations have probably evolved as a result of historical interactions with nearby languages and cultures, such as Hindi and Haryanvi (Rafi, 2010). Understanding the intricate dynamics of Multani Punjabi phonological evolution can be gained by following the historical trajectory of language interaction. Understanding the observed phonological alterations requires an understanding of the sociolinguistic context of Multani Punjabi. Multani Punjabi speakers' language use and identity are influenced by urbanization, migration trends, and changing demography (Alizai, 2021).

Sociolinguistic research emphasizes how societal changes affect phonological characteristics and how important it is to place phonological changes in the context of larger sociocultural processes. The lexicon and semantics of Multani Punjabi are significantly impacted by the lack of tone. Research indicates that tone leveling influences word meanings and subtleties, which may result in lexical variances and semantic ambiguity within the dialect (Rafi, 2010). Investigating the lexical effects of tone loss offers important new understandings of how Multani Punjabi phonological traits interact with linguistic semantics. Research comparing Multani Punjabi to Majhi and Dhani, two other Punjabi dialects, provides a more complex knowledge of the phonetic differences among the Punjabi language family. The vocabulary distinctions between Majhi and Dhani dialects are emphasized by Hasan (2021), underscoring the significance of dialectal variances in forming phonological traits and lexical richness within Punjabi dialects.

The recording of phonological alterations in Multani Punjabi has important ramifications for policy interventions and language preservation. Language planning activities that aim to preserve linguistic diversity and support the survival of endangered dialects such as Multani Punjabi can benefit from an understanding of the variables influencing phonological alterations. Protecting Multani Punjabi culture and identity requires policy interventions centered on language revitalization and community involvement.

These study frameworks make it easier to gather and analyze data, allowing scientists to investigate phonological changes and their implications in certain sociolinguistic contexts in a methodical manner.

2 Methodology

2.1 Nature of the Research

This comprehensive study adopts a mixed-methods approach to investigate phonological changes in Multani Punjabi, aiming to capture both the linguistic intricacies and sociolinguistic contexts of the dialect. The qualitative research methods employed enable a nuanced exploration of phonetic subtleties and cultural influences that shape language use within the Multani Punjabi-speaking community.

2.2 The Sample and Population

The study focuses on Multani Punjabi speakers residing in Faridabad, Ballabhgarh, Palwal, and surrounding areas, situated in the southern region of Punjab. A purposive sampling technique is employed to select 20 participants, evenly divided between Multani Punjabi speakers and those who speak standard Majhi Punjabi, which is considered a representative form of the Punjabi language. This sampling strategy ensures representation from various linguistic backgrounds within the Punjabi language family, allowing for a comprehensive analysis of phonological variations. The participants chosen were close relatives, friends, neighbours and family. This was to avoid the “observers’ paradox” (Labov 1972) and elicit the naturalistic speech.

Data collection methods include participant interviews, observations, and analysis of historical glossary information sourced from the "Glossary of the Multani Language in Comparison with Punjabi and Sindhi." Through a combination of conversational exchanges and archival data, the study aims to capture linguistic patterns and phonetic subtleties inherent in Multani Punjabi speech, with a particular focus on regional variants and unique linguistic traits.

2.3 Framework

The research framework emphasizes the identification and examination of Multani Punjabi's regional variants, focusing on language development and rule formation specific to the dialect's geographical context. By integrating qualitative data collection methods, fieldwork strategies, and an extensive literature review, the study aims to elucidate phonological changes and unique linguistic traits characteristic of Multani Punjabi.

For Phonemic Comparison, the Levenshtein algorithm will be used to determine the index, and further examine the data. Audio recordings of natural speech are transcribed and meticulously analyzed to identify noteworthy phonological changes, intonation patterns, and linguistic usage variations distinctive to Multani Punjabi. Comparative analysis is conducted by contrasting fieldwork findings and archival data with existing literature on the evolution of the Punjabi language, thereby contextualizing linguistic transformations within broader language studies.

2.4 Instruments and Data Collection

Voice samples are collected using phone recorders to capture a range of phonological elements from both Majhi and Multani Punjabi speakers. Participants engage in conversational tasks designed to elicit natural speech

patterns, facilitating the examination of phonetic features and language variation.
Praat software, a powerful tool for phonetic analysis, is utilized for audio transcription and detailed phonetic examination. This software enables researchers to study Multani Punjabi pronunciation nuances, including intonation, stress patterns, and linguistic variations. The analysis of audio data using Praat facilitates the identification of phonological changes and linguistic innovations unique to the Multani Punjabi dialect.

2.5 Coding and Transcription
Phonetic transcription and thorough annotation of audio recordings are conducted using Praat software. Phonetic coding involves labeling phonological features, segmenting speech into phonetic units, and identifying rule formations and linguistic patterns in Multani Punjabi. Through systematic coding and transcription, the study aims to identify change patterns and rule formations underlying phonological modifications in Multani Punjabi. This methodological approach integrates qualitative data analysis techniques with phonetic coding to advance our understanding of language variation and development within the Punjabi language family.

2.6 Comparative Analysis and Setting
The study conducts a comparative analysis of fieldwork findings, archival data, and existing literature on Punjabi language evolution to contextualize linguistic changes observed in Multani Punjabi. By contrasting linguistic data with historical records and contemporary scholarship, the research aims to deepen insights into the phonological dynamics of the Multani Punjabi dialect and its relation to broader language trends.

2.7 Ethical Considerations
Ethical considerations are paramount in this study, ensuring participant confidentiality, informed consent, and cultural sensitivity throughout the research process. The research adheres to ethical guidelines and protocols established by academic institutions and research organizations to protect the rights and well-being of study participants.

2.8 Data Analysis
Data analysis involves a multifaceted approach that integrates qualitative data interpretation with phonetic coding and rule formation analysis. The study employs thematic analysis to identify recurring patterns and themes in linguistic data, supplemented by detailed phonetic analysis using Praat software.

2.9 Limitations and Challenges
The study acknowledges potential limitations and challenges, including sample size constraints, language barriers, and logistical considerations in data collection. Strategies are implemented to address these challenges and ensure the rigor and validity of the research findings.
2.10 Significance and Contributions

This research contributes to the field of linguistics by providing a detailed examination of phonological changes in Multani Punjabi and their implications for language variation and development within the Punjabi language family. The study offers valuable insights into regional dialectal variations, sociolinguistic factors, and language contact phenomena, advancing our understanding of language diversity and evolution in multicultural societies.
In summary, this methodology outlines a rigorous research approach that integrates qualitative methods, linguistic analysis, and comparative studies to investigate phonological changes in Multani Punjabi. By leveraging advanced technologies and interdisciplinary frameworks, the study aims to generate meaningful insights into the dynamic nature of language variation and development within regional Punjabi dialects.

3. Data Collection and Analysis

3.1 Levensthein algorithm

The phonemic comparison of the Multani Punjabi and Mahji will be performed based on the Levensthein algorithm. By calculating the number of insertions and substitutions required to change one string into another, an algorithm can be used to quantify the difference between two strings. In 1965, Russian scientist Vladimir Levenshtein developed this technique. Greater differences between strings are indicated by a higher Levenshtein distance. For instance, think about changing the word "house" to "mouse":

Replace "h" with "m" to make "house" become "mouse".
To finish the transformation, no more insertions or substitutions are needed.

The Levenshtein distance in this case between "house" and "mouse" is 1, indicating that only one substitution is required to change one word into the other. This algorithm offers a methodical approach to quantify the degree of variation between strings, making comparisons and analyses easier in a variety of information retrieval and computational linguistics applications.

3.2 Data Collected

Words that are common in speech of the individuals from both dialect and showed some differences in pronunciation have been selected from the data collected from listening to the audios of the participants:

Table 1.0 The words selected from the collected data from the audios

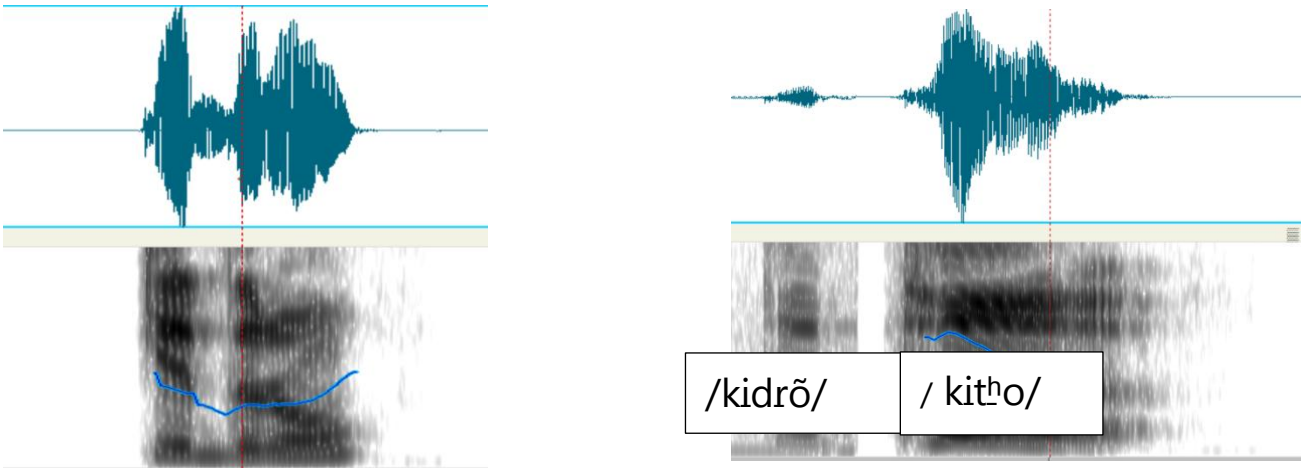
Mahji Words	Mutlani Words	English Gloss
Tussin	Tussan	You
Ki	Ke	What
Karda	Karende	Doing
Ain	E	Is
Kidron	Kitho	Where
Mera	Mainda	Mine
Nay	Naa	No
Saan	Saa	Breath

Chahida	Chaida	Desire
Karna	Karan	To do
Maran	Marenda	Seeking
Saran	Sarenda	To seek
Golan	Ghulenda	To burn
Balan	Balenda	Kindling
Kapan	Kaphijan	To cut
Dand	dand	Teeth
Din	Den	Day
Dena	Devan	To give

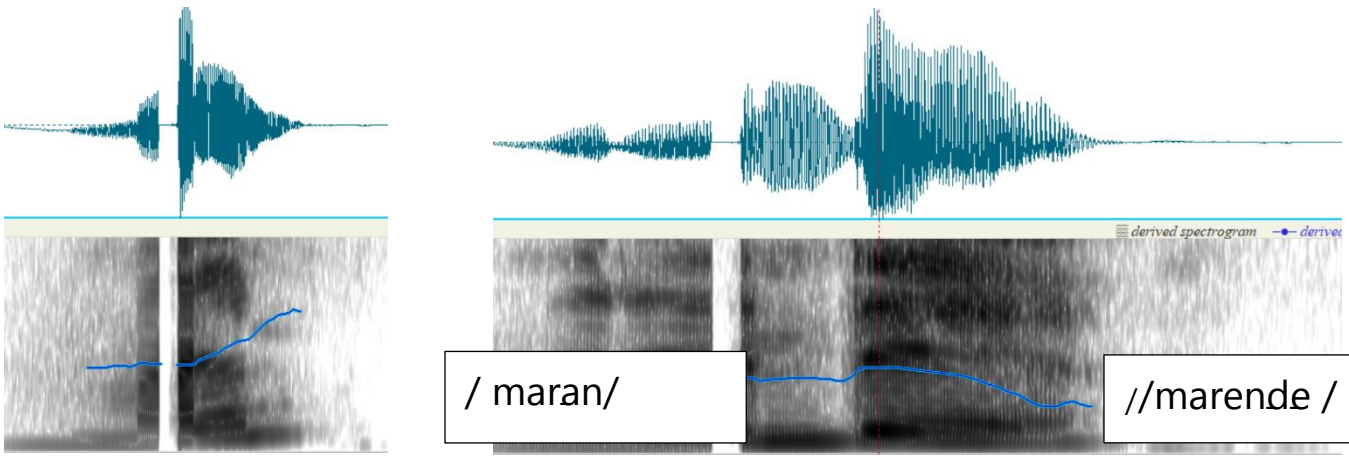
PRAAT software was used to transcribe the audios, and examine the pronunciation differences between the speech samples. For example, these are the frames of the word "Kidron", Kithon", "maran", "marende", "tussi" and "tussan".

3.3 PRAAT transcriptions examples

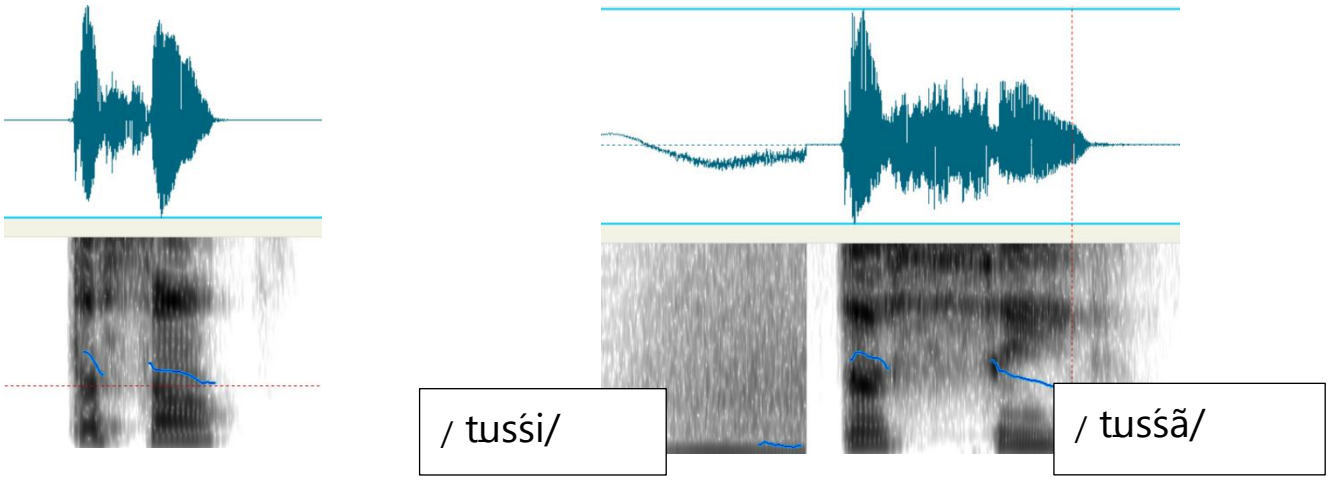
(figure1 of speech sample)



(figure 2 of speech sample)



(figure 3 of speech sample)



3.4 Application of the Algorithm

The Levensthein algorithm's formula:
(figure 4 of the formula)

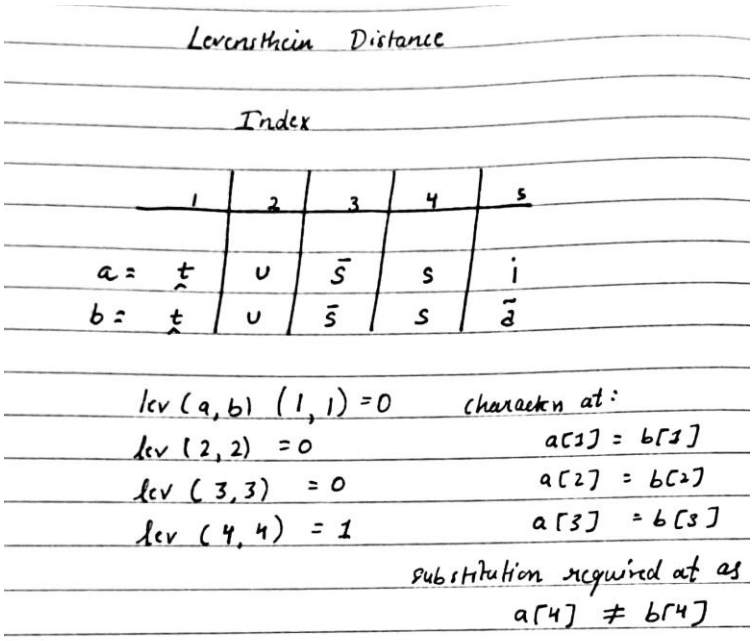
$$\operatorname{lev}(a,b) = \begin{cases} |a| & \text{if } |b| = 0, \\ |b| & \text{if } |a| = 0, \\ \operatorname{lev}\left(\operatorname{tail}(a), \operatorname{tail}(b)\right) & \text{if } \operatorname{head}(a) = \operatorname{head}(b), \\ 1 + \min \begin{cases} \operatorname{lev}\left(\operatorname{tail}(a), b\right) \\ \operatorname{lev}\left(a, \operatorname{tail}(b)\right) \end{cases} & \text{otherwise} \end{cases}$$

Image taken from https://en.wikipedia.org/wiki/Levenshtein_distance

Implementing the algorithm, the phonemic comparison has been made between the two dialects. An example to understand how the algorithm is applied:
The word of Mahji "tussin" and the word of Multani "tussan", the Levensthein distance is 1 since there is substitution of / ĩ/ "in" with /ã/ "an".

To understand, how the index is calculated, here is the calculation based on the formula of the word "tussin" and "tussan"

(figure 5 the application of formula)



The following analysis focuses on the phonetic sounds (consonants) extracted from the provided data comparing Multani and Majhi dialects of Punjabi, using the Levenshtein distance algorithm to quantify similarities and differences.

Similar Consonant Sounds (Levenshtein Distance 0)

(table 1.2)

Phoneme in Punjabi	Phoneme in Multani	Levensthein distance
/t̪/	/t̪/	0
/m̄/	/m̄/	0
/k̄/	/k̄/	0
/s̄/	/s̄/	0
/tʃ/	/tʃ/	0
/b̄/	/b̄/	0

Consonant Sounds with One Character Difference (Levenshtein Distance 1)
(table 1.3)

Phoneme in Punjabi	Phoneme in Multani	Levensthein distance
/d̪/	/d/	1
/d/	/tʰ/	1

/r̥/	/r/	1
/p/	/pʰ/	1
/n/	/w/	1

Vowels Sounds with One Character Difference (Levenshtein Distance 0)

(table 1.4)

Phoneme in Punjabi	Phoneme in Multani	Levensthein distance
/a/	/a/	0
/o/	/o/	0

Vowels Sounds with One Character Difference (Levenshtein Distance 1)
(table 1.5)

Phoneme in Punjabi	Phoneme in Multani	Levensthein distance
/æ/	/ə/	1
/e/	/a/	1
/ã/	/a/	1
/i/	/a/	1
/i/	/ə/	1
/e/	/ə/	1

3.5 Calculation

Similar Consonant Sounds (Levenshtein Distance 0):

- Total sounds with zero Levenshtein distance: 6

Consonant Sounds with One Character Difference (Levenshtein Distance 1):

- Total sounds with Levenshtein distance of 1: 5

Vowel Sounds Analysis:

Vowel Sounds with Zero Character Difference (Levenshtein Distance 0):

- Total vowel sounds with zero Levenshtein distance: 2

Vowel Sounds with One Character Difference (Levenshtein Distance 1):

- Total vowel sounds with Levenshtein distance of 1: 6

Calculation of Similarity and Difference Indices:

1. Similarity Index:
    - Total Similar Sounds (Levenshtein Distance 0): 8 (6 consonants + 2 vowels)
    - Total Possible Sounds (consonants + vowels): 13 (6 consonants + 7 vowels)
    - Similarity Index = (Total Similar Sounds / Total Possible Sounds) * 100
    - Similarity Index = (8 / 13) * 100 ≈ 61.54%
2. Difference Index:

- Total Different Sounds (Levenshtein Distance 1): 11 (5 consonants + 6 vowels)
- Difference Index = (Total Different Sounds / Total Possible Sounds) * 100
- Difference Index = (11 / 13) * 100 ≈ 84.62%

Phonemic Comparison Ratio:

- Phonemic Similarity Ratio: 61.54%
- Phonemic Difference Ratio: 84.62%

These indices and ratios provide a quantitative measure of the linguistic variation between Majhi and Multani dialects of Punjabi based on the Levenshtein distances of consonant and vowel sounds. The similarity index indicates the proportion of identical sounds, while the difference index highlights the proportion of sounds with slight variations between the dialects.

3.6 Phonological Rules

The upcoming section will explain the phonological rules governing word formation in Multani Punjabi. It will explore how phonetic shifts and rule patterns shape the dialect's linguistic structure. The analysis will focus on systematic transformations like assimilation, deletion, and modification in Multani Punjabi, shedding light on language variation and change. The phonological changes that took place in the Multani Punjabi, follow certain rule formation patterns. These alternations can be divided into few phonological processes' categories such as vowel raising, vowel lowering, assimilation, addition, deletion, and substitution. Based on the changes recorded from the data collection of this study, following are the rule formations.

3.6.1 Vowel Lowering, nasalization, phonemic length addition

#/i/ → /ã/ -vowel lowering
-nasalization
/ʈusīsi/ → /ʈusīsã/
'you'

/ʈusīsi/ ('you') undergoes two changes to become /ʈusīsã/:

1. The high front vowel /i/ in /ʈusīsi/ is lowered to /a/ in /ʈusīsã/.
2. The vowel /a/ is nasalized, resulting in /ã/.

This analysis shows how specific phonetic rules apply to modify the structure of words within a language. The processes of vowel lowering and nasalization work together to change the vowel sound in the word 'you' from /ʈusīsi/ to /ʈusīsã/

#/i/ → /ə/ -vowel lowering
/ki/ → /ə/
'what'

/ki/ ('what') undergoes a vowel change to become /ke/:

The high front vowel /i/ in /ki/ is lowered to the mid-front vowel /e/ in /ke/.The process of vowel lowering changes the vowel sound in the word 'what' from /ki/ to /ke/

#/e/ → /a:/ -vowel lowering -Phonemic length addition
/n̄e/ → /n̄a:/
'no'

The process of vowel lowering changes the vowel sound in the word 'what' from /ki/ to /kə/,

/nə/ ('no') undergoes two changes to become /na:/:

1. The mid-front vowel /e/ in /ne/ is lowered to the low-back vowel /a/ in /na/.
2. The vowel /a/ is lengthened, resulting in /a:/ in /na:/.

The processes of vowel lowering and phonemic length addition work together to change the vowel sound in the word 'no' from /n̄e/ to /n̄a:/

3.6.2 Vowel raising, addition, assimilation, declusterization

#/a/ → #/ə/
/k̄ərda:/ → /k̄ərd:ende -vowel raising -addition -assimilation -declusterization
'doing'

/k̄ərda:/ ('doing') undergoes four changes to become /k̄ərdende/:

1. The low central vowel /a/ in /k̄ərda:/ is raised to the mid-front vowel /ə/ in /k̄ərdende/.
2. The segment /nd/ is added to the original word.
3. The newly added segments assimilate to the existing vowel sounds /e/, creating a cohesive phonological structure.

The processes of vowel raising, addition, and assimilation work together to change the vowel sound and overall structure of the word 'doing' from /k̄ərda:/ to /k̄ərdende/

3.6.3 Denasalization, vowel lowering

#/æ̃/ → /e/ ["Ain" and "E"] - Vowel raising -denasalization
'is'

'æ̃' ('is') undergoes two changes to become 'e':

1. The low front nasalized vowel /æ̃/ is raised to the mid-front vowel /e/.
2. The nasalization is removed, resulting in the non-nasal vowel /e/.

The processes of vowel raising and denasalization work together to change the vowel sound in the word 'is' from 'æ̃' to 'e'

#/a:̃/ → /a:/ -denasalization
/sa:̃/ → /sa:/
'breath'

/sa:̃/ ('breath') undergoes one change to become /sa:/:

The nasalized vowel /a:̃/ in /sa:̃/ is denasalized, resulting in the non-nasal vowel /a:/ in /sa:/.

3.6.4 Deletion, aspiration

#/kīdrõ/ → /kīt̪ʰõ -deletion -dental plosive conversion -aspiration

'Where'

/kīdrõ/ ('where') undergoes three changes to become /kīt̪ʰõ/:

1. The sound /r/ is deleted from /kidrõ/, resulting in /kīdõ/.
2. The plosive /d/ in /kīdõ/ is converted to the dental plosive /t̪/, resulting in /kīt̪õ/.
3. The dental plosive /t̪/ is aspirated, resulting in /kīt̪ʰõ/.

The processes of deletion, dental plosive conversion, and aspiration work together to change the sound in the word 'where' from /kīdrõ/ to /kīt̪ʰõ/

#tʃ͡āhid̪a ↘ tʃ͡āid̪a -deletion

'want'

/tʃ͡āhid̪a/ ('want') undergoes one change to become /tʃ͡āid̪a/:

1. The sound /h/ is deleted from /tʃ͡āhid̪a/, resulting in /tʃ͡āid̪a/.

The process of deletion changes the word 'want' from /tʃ͡āhid̪a/ to /tʃ͡āid̪a/

3.6.5 Metathesis

#/kāra͞na/ → /kāra͞n/ -metathesis

The sounds /n/ and /a/ are transposed. In /kāra͞na/, the sequence /na/ is changed to /an/, resulting in /kāra͞n/.

This analysis demonstrates how a specific phonetic rule applies to modify the structure of words within a language. The process of metathesis changes the word 'to do' from /kāra͞na/ to /kāra͞n/

#/den̄a/ /devan̄/ -metathesis -addition

1. "n̄a" changed to "an̄", where the transposition of two phonemes that took place.

2. There is the addition of /v/ in the word median position, resulting the change, /den̄a/ to /devan̄/.

3.6.6 Addition (Conditioned Change)

The pattern that was noticed in the phonological alteration was that, in case of intervocalic words, the addition of the segment "da" gets added at the word final position. The pattern is noticed in the following words that were collected during the speech analysis. Along with the addition of "da", there are other patterns also noticed in the word change.

The addition of "da" is applicable to the following listed formations.

#/mərən̄/ → /məren̄da -dissimilation

/ə/ changed due to the neighbouring influence into the phoneme /ə/, the phoneme got dissimilar to the existing vowel / ə/ at the word median position.

Same formation happened with the word:

#/bəl̄ən̄/ /bəl̄enn̄a/

#/golən̄/ → /gʰul̄en̄da/ -vowel lowering -aspiration

→ 1. /g/ /gʰ/ aspiration process took place
2. /o/ → /u/ vowel lowering process
3. /ə/ → /e/

#/kəp̄ən̄/ /kəp̄id͡ʒan̄/ -dissimilation -addition

→ 1. The phoneme /ə/ changed to /i/, under the influence of the

neighbouring phoneme, dissimilarity was invoked.
2. The addition of /d͡ʒ/ took place in the word median position.
3. The phoneme /ə/ changed to /a/, under the influence of the neighbouring phoneme, and dissimilarity was

4 Analysis of the phonological changes

4.1 Vowel Lowering, Nasalization, Phonemic Length Addition

1. Vowel Lowering and Nasalization:
   - Change: /i/ → /ã/
   - Example: /ʈusīsi/ → /ʈusīsã/ (‘you’)
   - Explanation: The high front vowel /i/ is lowered to a low central vowel /a/, and then nasalized to /ã/. This change can be attributed to a natural tendency in phonetic evolution where high vowels are sometimes lowered for ease of articulation, and nasalization can occur due to the influence of nasal consonants or phonetic context.
2. Vowel Lowering:
   - Change: /i/ → /e/
   - Example: /ki/ → /ke/ (‘what’)
   - Explanation: The high front vowel /i/ is lowered to the mid-front vowel /e/. Vowel lowering might be driven by the need to create a more open vowel sound, which is often easier to articulate and can be influenced by surrounding phonetic contexts.
3. Vowel Lowering and Phonemic Length Addition:
   - Change: /ə/ → /a:/
   - Example: /nə̄/ → /nā:/ (‘no’)
   - Explanation: The mid-front vowel /ə/ is lowered to a low-back vowel /a/ and then lengthened to /a:/. Lengthening can occur to maintain rhythmic balance in speech or to distinguish between words (phonemic contrast).

4.2 Vowel Raising, Addition, Assimilation, Declusterization

1. Vowel Raising, Addition, Assimilation:
   - Change: /a/ → /e/ and Addition of /nd/
   - Example: /kərda:/ → /kərdende/ (‘doing’)
   - Explanation: The low central vowel /a/ is raised to the mid-front vowel /e/. Additionally, the segment /nd/ is added and assimilates to the existing vowel sounds, creating a phonologically cohesive structure. These changes can be attributed to the tendencies for creating more varied vowel sounds (raising) and enhancing syllable structure through addition and assimilation.

4.3 Denasalization, Vowel Raising

1. Denasalization and Vowel Raising:
   - Change: /æ̃/ → /e/
   - Example: ‘æ̃’ → ‘e’ (‘is’)

- Explanation: The nasalized vowel /æ̃/ is raised to the mid-front vowel /e/ and denasalized. Denasalization removes the nasal quality, possibly due to a loss of a nasal environment or simplification in speech.

2. Denasalization:
   - Change: /a̰ː/ → /aː/
   - Example: /sa̰ː/ → /saː/ (‘breath’)
   - Explanation: The nasalized vowel /a̰ː/ loses its nasal quality, resulting in /aː/. This change often occurs in the absence of nasal consonants that initially caused the nasalization.

4.4 Deletion, Aspiration

1. Deletion, Dental Plosive Conversion, Aspiration:
   - Change: /kidrõ/ → /kiṯʰõ/
   - Example: /kidrõ/ → /kiṯʰõ/ (‘where’)
   - Explanation: The sound /r/ is deleted, the plosive /d/ is converted to a dental plosive /ṯ/, and then aspirated. Deletion simplifies the word structure, dental conversion might reflect dialectal influences, and aspiration can enhance the perceptual distinctiveness of the consonant.

4.5 Metathesis

1. Metathesis:
   - Change: /karn̄a/ → /karān/
   - Example: /karn̄a/ → /karān/ (‘to do’)
   - Explanation: The sounds /n/ and /a/ are transposed. Metathesis often occurs due to ease of articulation or perceptual factors, where speakers naturally transpose sounds to produce a more fluent speech pattern.

4.6 Metathesis, Addition

1. Metathesis and Addition:
   - Change: /den̄a/ → /devañ̄/
   - Example: /den̄a/ → /devañ̄/ (‘give’)
   - Explanation: The sequence /n̄a/ is transposed to /añ̄/, and /v/ is added. These changes could reflect analogical processes where a pattern of adding /v/ became regularized, or due to phonological environments that favoured such transitions.

4.7 Addition (Conditioned Change)

1. Addition and Dissimilation:
   - Change: /mərən̄/ → /mərenīda/
   - Example: /mərən̄/ → /mərenīda/ (‘to die’)
   - Explanation: The addition of /da/ occurs in intervocalic words, with dissimilation where /ə/ changes to /e/ due to neighboring influences. These changes might be driven by analogical processes and phonological conditioning where a specific suffix (/da/) is added to conform to a morphological pattern.
2. Addition, Aspiration, Vowel Lowering:
   - Change: /goɭən̄/ → /gʰuɭenīda/
   - Example: /goɭən̄/ → /gʰuɭenīda/ (‘to swallow’)
   - Explanation: The changes include aspiration (/g/ to /gʰ/), vowel lowering (/o/ to /u/), and /ə/ changing to /e/. These

alterations may be attributed to analogical influences, assimilation, and conditioned phonological environments.

3. Addition and Dissimilation:
    - Change: /kəpə̄nə̄/ → /kəpɪ̄d͡ʒanə̄/
    - Example: /kəpə̄nə̄/ → /kəpɪ̄d͡ʒanə̄/ (‘to jump’)
    - Explanation: The changes involve /ə/ to /i/ and /a/ (dissimilation), and the addition of /d͡ʒ/. This might reflect a pattern where complex syllable structures favor the addition of new segments to maintain a phonological balance.

5 Sociolinguistics factor behind the phonological changes

5.1Historical Sound Shifts' Impact

When compared to Majhi Punjabi, Multani Punjabi's phonological traits have been significantly shaped by historical sound shifts. These shifts show how pronunciation patterns have changed systematically over time, frequently as a result of social and linguistic influences.

Vowel reduction or elision is a common phenomenon observed in many languages, including Punjabi, and is a key component of historical sound shifts. The shift from "karda" (to do) to "karende" in Multani Punjabi is an example of this phenomenon. When conjugated in a specific grammatical context, the final vowel "a" in "karda" is reduced or elided, creating the form "karende". This kind of phonological alteration is related to historical linguistic processes in which vowels are changed to fit into grammatical structures or linguistic patterns.

Furthermore, assimilation or pronunciation modifications of consonants may be part of historical sound shifts. For example, the change from "Din" (day) (Majhi) to "den" (Multani) indicates a change in consonant articulation over time. Punjabi dialects frequently experience assimilation or simplification of consonant clusters over time, resulting in regional differences in pronunciation.

Furthermore, interaction with other languages or dialects can impact historical shifts in sound, leading to phonological innovations. Because Multani Punjabi is spoken in an area with many different linguistic influences, phonetic changes may have occurred as a result of contact with nearby languages or older dialectal forms. Multani Punjabi has a unique phonetic profile due in part to the adoption of new phonological traits or the modification of preexisting ones brought about by this interaction.

Studies in Punjabi linguistics, like those by Gupta (2011), offer important new perspectives on the historical shifts in sound that have been noted in various Punjabi dialects. These studies illustrate the dynamic nature of language change and adaptation within the Punjabi language family by charting the evolution of phonological patterns over time.

5.2 Regional and Dialectal Variation

The phonological characteristics and linguistic diversity between Multani Punjabi and Majhi Punjabi are largely shaped by regional dialectal variation. The pronounced variations in phonological traits among these dialects are indicative of the impact of geographical dynamics and historical regional factors. Words like "Kidron" (where) (Majhi) become "Kitho" (Multani), demonstrating the influence of regional dialectal variation on phonological characteristics. Compared to the standard Majhi Punjabi spoken in central Punjab, Multani Punjabi, which is spoken in the southern part of the state, has distinct phonetic characteristics. The linguistic divergence that has occurred over time can be ascribed to historical migrations, settlement patterns, and geographic isolation.

Take the switch from "Tussin, (you) assin" (I/us) (Majhi Punjabi) to "Tussan, assan" (Multani Punjabi) as an example. The change from "i" to "a" in the pronouns "Tussin" and "assin" is indicative of a shared phonological pattern impacted by nearby dialects. This shift may be explained by phonetic assimilation, in which Multani Punjabi takes on vowel sounds more typical of nearby dialects like Saraiki or Sindhi, which frequently use the sound "a" rather than "i" in specific situations. Hussain's (2011) study of Saraiki linguistic characteristics may shed light on these phonological parallels.

The change from "Karna" (to do) (Majhi Punjabi) to "Karan" (Multani Punjabi) is another example of how nearby dialectal characteristics influence phonetic adaptation. In Multani Punjabi, the final vowel in the verb "Karna" changes from "a" to "an" at the end. This change in pronunciation may be due to phonological influences from neighboring dialects like Haryanvi.

Furthermore, lexical assimilation and phonological adaptation are highlighted by the evolution of words like "Golan" (to kindle) (Majhi) to "Gulenda" (Multani). Words in Multani Punjabi may have changed consonant clusters and vowel sounds due to influences from nearby dialects, such as Sindhi, which also shows phonetic shifts.

5.3 Language Contact

The observed word differences between other Punjabi dialects and Multani Punjabi can be explained by the phenomenon of language contact, which is impacted by interactions with nearby languages like Doabri, Hindi, Pahari, and Potohari. In the past, these interactions have helped Punjabi-speaking areas adapt their language and undergo phonological changes.

(figure 6 of types of language contact processes)

Type	Process	Description	Speakers/bilingualism	Language attitudes
A	Phonological adaptation of word-forms	Replicated word-forms are adjusted to match the sound patterns of the recipient language	Semi-bilinguals or monolinguals	Strong loyalty towards, and stability of the recipient language; superficial contact
B	Borrowing of phonological features along with word-forms	Borrowed and inserted word-forms maintain (fully or partly) the original sound patterns of the donor language ('authentication')	Fairly widespread bilingualism	Flexibility in the use of the recipient Language, prestigious bilingualism
C	Convergence of systems during second-language acquisition	Word-forms of the target language are systematically adjusted to match the sound patterns of the native language	Emerging bilingualism; stable minority bilingualism; emergence of ethnolect or language shift	Strong group identity coupled with a need (pressure) to acquire the target language
D	Convergence of systems in stable, intensive bilingualism	Sound patterns of the native language are adjusted to match those of the second language	Intensive and widespread bilingualism	Second language is 'prestige' language

Text taken from Phonological changes in the Hindi

Phonological Assimilation and Language Contact: The change of words such as "Tussin, assin" (Majhi Punjabi) to "Tussan, assan" (Multani Punjabi) is an example of how language contact influences phonological assimilation. Multani Punjabi may take on vowel sounds that are more typical of nearby languages like Hindi, where "a" is frequently used in place of "i" in some pronouns. Scholars have studied Punjabi and Hindi language contact and have shown how cross-linguistic influences affect phonological features.
Word Evolution from "Golan" (to burn) (Majhi) to "Gulenda" (Multani): This shows how nearby dialects like Pahari and Potohari have influenced both lexical borrowing and phonological adaptation. Because these dialects are geographically close to Multani Punjabi-speaking areas, phonetic patterns and sounds have been incorporated into Multani vocabulary.

5.4 Loans and Borrowings

The phonological structure of Multani Punjabi has been significantly impacted by the intermingling of loanwords from other languages. Loanwords are lexical terms that are adopted from one language into another, frequently to fill lexical gaps or for reasons of linguistic prestige, as noted by Trudgill (1992) and Crystal (2008). Owing to its location in an area with a wide range of linguistic influences, Multani Punjabi has undergone phonological changes as a result of absorbing phonetic elements from languages such as Hindi, English, Arabic and even Urdu.

For example, words borrowed from Haryanvi or Hindi may change the phonetic patterns of Multani Punjabi or introduce new phonemes. As a result of the adoption of these loanwords, phonemic distribution and pronunciation may alter, reflecting the dynamics of ongoing language contact in the area (Rahman, 2006). "Paradise" or "heaven" is Jannat (جنت),

pronounced as /d͡ʒənīnəʈ/ in Multani Punjabi, with the first /d͡ʒ/ sound being pronounced with Arabic influence. Namaz (نماز) is an Arabic word that means "prayer" in reference to Islamic prayer. In Multani Punjabi, the word is pronounced as /nəmā:z/. Hukam (حکم) has the meaning "order" or "command" and is pronounced as hukam in Multani Punjabi, with the initial "h" sound being influenced by Urdu. Shayari (شاعری) is a word that means "poetry" and is pronounced in Multani Punjabi as /ʃāʿirī/, which is how the word is pronounced in Urdu. School, pronounced as /skūl/ in Multani Punjabi, is a word meaning "school" that reflects the phonological simplification of English loanwords. This word illustrates how Punjabi phonology has adapted English loanwords.

5.5 Media Consumption

The conversion of pronouns like "Tussin, assin" (Majhi Punjabi) to "Tussan, assan" (Multani Punjabi) is one prominent example of phonological change brought about by media in Multani Punjabi. Pronoun usage may change from "i" to "a" as a result of exposure to local media broadcasts or entertainment shows that feature speakers of a particular language. Regular media consumption by Multani Punjabi speakers may cause them to subconsciously absorb the phonetic patterns of celebrities or actors in the media, changing their pronunciation over time.

Similar to how vocabulary and pronunciation can change due to media exposure, this can also be observed in variants such as "Karna" (Majhi Punjabi) becoming "Karan" (Multani Punjabi). Multani Punjabi speakers' language usage may be influenced by the adoption of specific phonetic patterns, such as the pronunciation of final vowels, which correspond with popular media representations.

Language accommodation and the prestige attached to particular speech patterns that are promoted by media outlets are the causes of media-induced phonological changes. Certain linguistic elements heard in media content may be interpreted by Multani Punjabi speakers as prestigious or modern, prompting the adoption of these elements into everyday speech.

Studies on the relationship between language and media, like those by Gershon, I. & Manning, Paul. (2014) investigate the ways in which media exposure affects language change and variation in multilingual settings. Gupta's research demonstrates how media consumption influences the linguistic patterns and phonetic modifications that speakers of regional dialects, such as Multani Punjabi, make.

The well-known Multani Punjabi film "Choorian," helmed by Syed Noor, is one example of a work that has improved linguistic representation. Audiences are exposed to the phonetic features of Multani Punjabi dialect through this film's soundtrack, which includes songs and dialogue performed in the dialect. The popularity of the movie has affected viewers' phonological preferences and language usage in addition to spreading

awareness of Multani culture.

Similar phonological characteristics and pronunciation patterns can be heard in Multani Punjabi songs particularly in those sung by regional performers like Arif Lohar and Attaullah Khan Esakhelvi. These songs serve as cultural artifacts that preserve and promote Multani Punjabi linguistic heritage because they frequently employ regional vocabulary and phonetic patterns.

6 Discussion

In this section, the answers to projected research questions will be answered.

(1) Which phonological changes are prevalent in the Multani Punjabi?

Phonological changes in Multani Punjabi reflect the dynamic nature of spoken language as it evolves through social and environmental influences. Prevalent changes include vowel lowering, where high vowels like /i/ are often lowered to mid or low vowels such as /a/ and /ə/. Nasalization and denasalization indicate shifts between nasal and non-nasal vowel forms. Other common changes involve phonemic length addition, aspiration of consonants, deletion of sounds for simplification, addition of segments in intervocalic positions, and metathesis, where sounds within words are transposed. These changes highlight the fluidity and adaptability of Multani Punjabi's phonological system.

The prevalent phonological changes in Multani Punjabi include vowel lowering, nasalization, denasalization, phonemic length addition, aspiration, deletion, addition, and metathesis.

The prevalent phonological changes in Multani Punjabi include:

- Vowel Lowering: High front vowels like /i/ are lowered to mid or low vowels such as /a/ and /ə/ (e.g., /ki/ → /ke/).
- Nasalization: Vowels undergo nasalization in specific phonetic contexts (e.g., /ʈusːsi/ → /ʈusːsə̃/).
- Denasalization: Nasal vowels become non-nasal (e.g., /sə̃ː/ → /saː/).
- Phonemic Length Addition: Vowels are lengthened to distinguish meaning or for rhythmic balance (e.g., /nē/ → /nāː/).
- Aspiration: Consonants become aspirated, particularly dental plosives (e.g., /d/ → /tʰ/).
- Deletion: Certain sounds are deleted to simplify word structure (e.g., /r/ in /kīdrõ/ → /kīʈʰõ/).
- Addition: New segments are added, often to intervocalic positions (e.g., /mərənˉ/ → /mərenˉda/).
- Metathesis: Transposition of sounds within a word (e.g., /kārˉna/ → /kārˉan/).

(2) Do the phonological alterations in Multani Punjabi exhibit any recognizable patterns, such as the merging or splitting of phonemes?

Understanding phonological patterns in Multani Punjabi involves identifying systematic alterations in sound structure. These changes often follow recognizable patterns such as merging phonemes, which simplifies the

phonetic inventory, and splitting phonemes, which creates new distinctions. Assimilation, where phonemes change to become more like neighboring sounds, is another significant pattern. Conditioned changes occur in specific phonetic environments, demonstrating the influence of surrounding sounds on phoneme alteration. These patterns provide insights into the structural evolution of the dialect and its adaptation to linguistic and social contexts.
The phonological alterations in Multani Punjabi exhibit recognizable patterns, including merging and splitting of phonemes, assimilation, and conditioned changes.

The phonological alterations in Multani Punjabi exhibit recognizable patterns, such as:

- Merging of Phonemes: Some phonemes are merged, simplifying the phonetic inventory. For instance, the distinction between nasalized and non-nasalized vowels can be reduced.

Original: /ã/ (nasalized vowel) and /a/ (non-nasalized vowel)
Merged: /a/
Explanation: The nasalized and non-nasalized versions of the vowel /a/ merge into a single phoneme, simplifying the phonetic inventory. This can happen due to a lack of phonemic distinction needed in everyday speech.

- Splitting of Phonemes: In some contexts, phonemes are split, creating new distinctions, particularly with vowel length or aspiration.

Original: /a/
Split: /a/ (short vowel) and /a:/ (long vowel)
Explanation: The original short vowel /a/ splits into two distinct phonemes, /a/ and /a:/, based on vowel length. This distinction helps in differentiating meanings of words in certain contexts.

- Assimilation: Phonemes assimilate to neighboring sounds to maintain phonological cohesion (e.g., /nd/ addition in /kə̄rdəndə/).

Original: /kə̄rda:/ (‘doing’)
Assimilated: /kə̄rdende/
Explanation: The addition of /nd/ results in assimilation to the existing vowel sounds, creating a more cohesive phonological structure. This process helps maintain phonological harmony within the word.

- Conditioned Changes: Specific environments condition certain changes, such as vowel lowering in the presence of nasal consonants.

Addition and Dissimilation
Example:

Original: /mərən̄/ (‘to die’)
Changed: /mərenda/
Explanation: The addition of /da/ occurs intervocalically with dissimilation where /ə/ changes due to neighboring influences. This is driven by analogical processes and phonological conditioning to conform to morphological patterns.
(3) What is the index of phonemic comparison between Multani Punjabi and standard Punjabi (Mahji)?

Quantifying phonemic similarities and differences between Multani and Majhi dialects helps in understanding their linguistic relationship. Using the Levenshtein distance algorithm, the similarity index for phonemes shows that approximately 61.54% of the sounds are identical, while the difference index indicates that 84.62% of the sounds differ by one character. These indices reveal a moderate level of phonemic similarity, highlighting the distinct phonological characteristics of each dialect. This comparative analysis is crucial for linguists studying dialectal variation and language change.

The phonemic comparison between Multani Punjabi and standard Punjabi (Majhi) shows a similarity index of 61.54% and a difference index of 84.62%.

The phonemic comparison between Multani Punjabi and standard Punjabi (Majhi) is quantified using the Levenshtein distance algorithm:

- Similarity Index: 61.54% (based on 8 out of 13 sounds being identical).
- Difference Index: 84.62% (based on 11 out of 13 sounds differing by one character).

These indices indicate a moderate level of phonemic similarity with substantial phonological variation.

(4) What sociolinguistic variables and underlying causes are influencing the phonological changes in Multani Punjabi?

Sociolinguistic variables play a crucial role in shaping phonological changes in Multani Punjabi. Factors such as language contact, geographic isolation, social stratification, and cultural identity drive these changes. Interaction with neighboring languages and dialects leads to borrowing and assimilation of phonological features. Geographic isolation can result in unique phonological developments within the dialect. Social class, education, and occupation influence speech patterns, while a strong cultural identity promotes the retention of distinct phonological traits. These variables highlight the complex interplay between social factors and language evolution.

Sociolinguistic variables influencing phonological changes in Multani Punjabi include language contact, geographic isolation, social stratification, and cultural identity.

Sociolinguistic variables and underlying causes influencing phonological changes in Multani Punjabi include:

- Language Contact: Interaction with neighboring languages and dialects influences phonological changes through borrowing and assimilation.
- Geographic Isolation: Regional isolation can lead to dialect-specific phonological developments.
- Social Stratification: Differences in social class, education, and occupation might influence speech patterns and phonological changes.

- Cultural Identity: A strong regional identity can promote the maintenance of distinct phonological features as a marker of cultural heritage.

(5) What environmental elements affect Multani Punjabi word phonological changes, differentiating between conditioned and unconditioned changes?
Environmental elements impacting phonological changes in Multani Punjabi can be divided into conditioned and unconditioned changes. Conditioned changes occur in specific phonetic environments, such as intervocalic positions leading to segment addition or vowel lowering influenced by neighboring sounds. Unconditioned changes, like simplification through deletion or transposition of sounds (metathesis), occur independently of surrounding phonetic context. Analyzing these changes helps linguists understand how phonetic context and structural ease drive phonological evolution, revealing the adaptability of the dialect.
Environmental elements affecting phonological changes in Multani Punjabi include conditioned changes, influenced by specific phonetic environments, and unconditioned changes, which occur independently of surrounding contexts.

Environmental elements affecting phonological changes in Multani Punjabi can be classified into conditioned and unconditioned changes:
Conditioned Changes:

- Intervocalic Environments: Addition of segments like "da" in word-final positions when surrounded by vowels (e.g., /mərən̄/ → /mərenda/).
- Influence of Neighboring Phonemes: Changes like vowel lowering or dissimilation due to the influence of adjacent sounds (e.g., /ə/ to /ə/ in /kəpən̄/ → /kəpid͡ʒan̄/).

Unconditioned Changes:

- Simplification Processes: Deletion of sounds to simplify word structure (e.g., /r/ deletion in /kidrõ/ → /kiʈʰõ/).
- Metathesis: Transposition of sounds that occurs independently of specific phonetic contexts (e.g., /kārna/ → /kārān/).

These changes are driven by both phonological ease and social influences, reflecting the dynamic nature of language evolution in Multani Punjabi.

6.1 Conclusion

The phonological analysis of Multani Punjabi, compared to standard Punjabi (Majhi), reveals significant insights into the linguistic dynamics at play. This study, grounded in the comparison of consonant and vowel sounds using the Levenshtein distance algorithm, highlights the prevalent phonological changes, recognizable patterns, phonemic comparisons, and the sociolinguistic and environmental factors influencing these changes.

Multani Punjabi exhibits several notable phonological changes. Vowel lowering is a prominent trend, where high vowels such as /i/ are lowered to mid or low vowels like /ə/ and /a/, as seen in /ki/ becoming /kə/ (‘what’).

Nasalization and denasalization also play significant roles, transforming vowels to and from nasalized forms, respectively. For instance, /ʈusi̅/ changes to /ʈusi̅sə̃/ (‘you’). Additionally, phonemic length addition, where vowels are lengthened (e.g., /nə̅/ to /nā:/ for ‘no’), enhances rhythmic balance and phonemic distinction.

The phonological alterations in Multani Punjabi follow discernible patterns such as merging and splitting of phonemes. Merging simplifies the phonetic inventory by combining distinct phonemes, while splitting creates new distinctions, adding complexity. Assimilation, where phonemes change to become more like neighboring sounds (e.g., /kə̅rda:/ to /kə̅rdende/), creates cohesive phonological structures. These patterns underscore the structured yet adaptable nature of phonological evolution in the dialect.

The phonemic comparison between Multani and Majhi dialects, measured through the Levenshtein distance, reveals a similarity index of approximately 61.54%. This indicates that a significant portion of sounds are identical between the two dialects. However, the difference index of 84.62% highlights the extent of phonemic variation, with many sounds differing by one character. These indices provide a quantitative measure of the linguistic variation, illustrating both shared features and distinct characteristics.

Sociolinguistic variables significantly influence phonological changes in Multani Punjabi. Language contact introduces new phonological features, while geographic isolation fosters unique traits. Social stratification and cultural identity also shape speech patterns, reflecting the community’s heritage and social dynamics. Environmental factors further drive phonological changes. Conditioned changes occur in specific phonetic contexts, influenced by neighbouring sounds, while unconditioned changes, such as deletion and metathesis, occur independently of phonetic context.

In conclusion, the phonological analysis of Multani Punjabi demonstrates a dynamic interplay of phonetic evolution, sociolinguistic influences, and environmental factors. The systematic changes and recognizable patterns highlight the dialect's adaptability and evolution. This study not only underscores the phonological richness of Multani Punjabi but also contributes to a deeper understanding of dialectal variation and language change within the Punjabi linguistic landscape.

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