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Phonological Variation in Kui: A Dravidian Language

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Abstract

Phonological variation in Kui is examined with a focus on organization of the vowel system, an area that has had relatively little research compared to other areas such as the composition of the inventory of segments or overall regional variations of pronunciation. The data analyzed were collected from field recordings at three locations (Baliguda, G. Udayagiri, and Phulbani) and a detailed record was kept of the responses to vowel forms used in various interactions by speakers. Vowels are viewed as categories recovered from repeated lexical distributions of vowels, as opposed to being viewed as categories derived from the elicitation of vowel contrasts. The results of this study indicate that the vowel system of Kui maintains structural stability with regional conditioned variation in vowel quality and duration occurring within the established phonemic categories so that speakers can maintain mutual intelligibility. There is no evidence of the merger, loss or reclassification of vowel categories. Although there are regional variations, they occur within the established phonemic boundaries. Variation involves controlled changes in quality, duration and degree of centralization; however, the categorical structure of the vowel system is maintained and does not result in disruption of the categorical structure of vowel systems shared by speakers. Prototypical realizations are identified through frequency and routine use; however, peripheral variants remain recognizable without difficulty. Observations regarding perception reveal that speakers interpret regional variation through stable relationships among vowel categories rather than through exact acoustic matches. While contact with Odia influences certain vowel realization(s) in certain contexts, it does not result in the reorganization of the vowel system. Collective evidence suggests that speakers can internally regulate their use of variation to communicate effectively with one another when using every type of Kui.

1. INTRODUCTION

Kui is a South Dravidian language primarily used by the Kandha people in the hill districts of Kandhamal district, Odisha. Although Kui continues to be the first language used in daily interactions at home, in village environments and during religious practices, the majority of Kui speakers have had ongoing contact with Odia. This contact has affected Kui speakers' usage of Kui; specifically, their pronunciation of Kui has been influenced by Odia. Although Kui is generally considered to be a single linguistic system by researchers, the people who speak Kui have long recognized there were different dialects spoken in different locations. In addition, these dialects are identifiable based on the way they produce sounds rather than how they construct sentences. For example, speakers from different locations may produce vowels

differently in terms of the quality of the vowel, the length of the vowel and/or how the speaker produces consonants. As well, some speakers may place sounds in different positions relative to other sounds. However, this variation in the production of Kui sounds does not indicate that the language is breaking down. Rather, the variation indicates that speakers of Kui are modifying their use of sound patterns according to the specific location where they are speaking but still following the same set of phonological rules.

The current study examines how the sound patterns of Kui are produced in different locations throughout Kandhamal district. Specifically, the study looks at how Kui speakers from three locations (Baliguda, G. Udayagiri and Phulbani) modify their use of vowel sounds. These three locations also represent different levels of settlement history, mobility, access to education and the extent of contact with Odia. For example, the settlements in Baliguda include many interior villages and therefore Kui speakers in this area have limited outside interaction. G. Udayagiri has both remote and semi-remote settlements so Kui speakers in this region experience less outside influence compared to those in Phulbani. However, due to its status as the administrative centre for the district, Phulbani has greater access to education and also has greater contact with Odia through schools, government services and commerce. As such, these differences provide an opportunity to examine how Kui speakers modify their sound patterns in response to their environment. The analysis in this study uses a variationist framework which views phonetic/phonological variation as structured outcome of language use rather than as evidence of unstable language use. In the context of this variationist approach, the vowel variation found in the data collected from Kui speakers is treated as a patterned phenomenon resulting from the unique combination of regional practice and shared expectations about what constitutes appropriate variation in the language (Labov, 2001).

Therefore, this research project is not merely an attempt to document the distribution of vowel types in the Kui language across different geographic locations. Rather, it asks what the Kui case indicates about the stability of phonological systems when they undergo long-term contact. The Kui data clearly indicate that regionalization is not an automatic mechanism for structural reorganization. Instead, variation occurs within a common category-based system of organization – even in a multilingual environment where Odia continues to exert a constant influence on pronunciation. Thus, Kui presents a case in which phonological categories are preserved while their internal dimensions vary in predictable ways. This finding is relevant to general debates in both variationist linguistics and contact linguistics regarding whether linguistic contact will always result in structural loss or whether it can alternatively redistribute phonetic details among already established phonetic contrast (Thomason & Kaufman, 1988; Labov, 2001). The Kui data suggest the latter alternative in the realm of vowels.

2. VOWEL SYSTEM IN KUI

Kui's vowel system is only accessible through the presence of attested lexical material, which has been subjected to no controlled phonetic experimentation. Basic vocabulary, kinship terms, ritual expressions, and frequently used everyday expressions contain repeated vowel contrasts, thus providing a basis for reconstructing the system based on distributional evidence. The inventory of vowels that results is relatively small, yet is internally differentiated, and prefers maintaining contrasts across a variety of semantic contexts rather than confining them to stylistically distinctive speech (Osada, 2021). Although vowels may be analyzed in terms of

several distinctive features (e.g., front/back, high/low, round/unround), the organization of the Kui system is primarily based on the first two of these features – height and front/back – and secondary on the third – roundness. For example, the Kui system has a distinct difference between high vowels and low vowels; whereas front-back distinctions occur in Kui, these are not used to create multiple mid-vowel categories. In addition, although the vowel system is generally organized around the extremes of the vowel space, roundness is only a secondary feature, and this feature is apparently restricted in application, being found almost exclusively in either low or back vowel positions. Overall, then, the Kui vowel system is centered on the production of central vowel contrasts at the expense of peripheral ones.

The Kui system includes neutral vowels, typically represented as high neutral A/a and low neutral Aa/aa. Neutral vowels have been found across a large number of lexical environments, including both root and morphologically complex forms, and have not been derivable from neighboring vowel categories. The widespread distribution of neutral vowels indicates that neutrality is a structural option within the vowel system of Kui, rather than simply an expression of phonetic under-specification. The fact that neutral vowels appear in a variety of lexical items that are otherwise unrelated supports treating neutral vowels as phonemes, rather than as transitional segments. The relationship between vowel quality and vowel length is complex, and is only partly recoverable from the existing data. Orthographic doubling and long vowel segments appear in many lexical items, particularly those that are associated with stress or lexical identity. However, the data do not support a consistent separation of vowel length as a contrastive feature from other qualitative differences. Therefore, if one interprets vowel length as a fully phonemic feature, then one exceeds the limitations of the data.

There was considerable regional variation in the consonant allophony and lexical replacement of Kui, however, there was little to no regional variation in the vowel contrasts of the language. The relatively stable nature of the vowel inventory suggests that the vowel system of Kui provides a common phonological framework for Kui speakers, regardless of where they live. The vowel system of Kui is thus an important component of the phonological basis for the coherence of regional dialects of Kui.

Vowels of Kui become apparent through usage in the field, rather than through speakers' self-conscious recognition of them as abstract phonological categories. Data collection for the Kui vowel system is based on the observation of recurrent elements within ongoing talk rather than through speakers' ability to articulate rules governing the use of vowels. Thus, speakers demonstrate their knowledge of vowel contrasts during casual conversation about daily life (e.g., work, kin relations, food gathering, etc.), and the vowel contrasts demonstrated during these conversations remain constant over a series of encounters. Thus, the vowel system of Kui is instantiated through practice, not through speakers' articulation of rules governing the use of vowels.

Field researchers identify vowels by observing how the same lexical item recurs among speakers and in different contexts. Lexical items that are frequently spoken serve as the best source of evidence because they are produced without hesitation and under minimal speaker attention. When speakers reproduce the same lexical item with the same vowel contrast across different contexts, it demonstrates that the vowel contrast is part of the shared vowel system of Kui. Casual speech and rapid speech will not affect the vowel contrast, allowing researchers to infer the vowel inventory based on distributional characteristics rather than on artificially

created minimal pairs. Researchers also infer vowel contrasts indirectly from speakers' behavior. When speakers encounter new vocabulary, they will sometimes pause, repeat the word, and/or modify their pronunciation, especially in formal or ritualistic contexts. These behaviors indicate to researchers that speakers expect certain vowel shapes and/or lengths. When speakers correct themselves, the correction is usually applied to the entire word rather than to an isolated segment. However, the modification usually involves vowel quality or length. These behaviors suggest to researchers that vowels are represented as part of stored lexical representations rather than as free variable elements.

Repeated recordings of the same lexical items across different days, speakers, and contexts also confirm the existence of the vowel system. Repeated recordings of the same lexical items across different days, speakers, and contexts minimize the likelihood that researchers are misinterpreting individual pronunciations as phonological facts. Variation due to context did not result in changes to vowel quality, even though speakers exhibited variations in consonant allophony and lexical replacement. The lack of contextual variability in vowels strengthens the claim that vowels represent a part of the shared phonological base of Kui. At the same time, researchers recognize limitations to what can be claimed about the data collected in the field. Researchers recognize that vowel length and vowel quality often co-occur in lexical items and speakers do not reliably distinguish between vowel length in isolation from qualitative differences in vowels. Because researchers do not have controlled elicitation and/or perceptual testing, they treat vowel length with caution, recognizing its presence but avoiding making stronger claims than the data support.

Data collected from speakers in Baliguda, G. Udayagiri, and Phulbani, demonstrate that the way in which the vowel system of Kui is implemented is identical. Although speakers exhibit lexical choices and consonantal realization differences depending on their region of residence, the vowel contrasts of Kui remain unaltered across all three regions. The fact that vowel contrasts are so consistent across the three regions, suggests that the vowel system of Kui provides a stable foundation of phonology for speakers of Kui, a foundation that is acquired early and is reliably reproduced, even as other aspects of the phonology of Kui are responsive to regional and social influences.

3. REVIEW OF LITERATURE

The researchers, Nayak, et al. (2024), have addressed a long-standing methodological problem in studying minority languages by establishing a new and important resource: a 60-hour, 40,000-utterance speech corpus of Kui, collected systematically from 80 speakers in the Kandhamal District. They have also established Kui as a "low-resource language," which is an important designation since there has been a lack of resources of this type historically, and therefore, it has limited the development of robust phonological, sociophonetic and computational analyses of the language. An initial finding of the researchers was that women are better able to speak correctly than men, and this is an indication of a structurally based form of sociolinguistic variation that exists in the community. This is a valuable area of inquiry for the motivation for language change (Nayak et al., 2024).

Feng, Kager, Lai and Wong (2022), provide an explanation for how listeners process phonological variation by demonstrating that reliable sound identification is dependent upon contextual information, rather than simply being dependent on the individual characteristics of

the sound itself. The authors' study examined the manner in which infants learning Cantonese develop the ability to distinguish among tones when they are exposed to variations in speakers' productions, specifically regarding the Tone 1-Tone 3 contrast. Utilizing controlled learning experiments involving 14-, 18- and 24-month-olds, the authors demonstrated that variability in the sounds produced by different speakers can obscure the acoustic boundaries between phonological categories and inhibit the association of word-meanings when listeners rely solely upon the target word. However, when contextual cues related to the speaker are provided in the surrounding speech, even 14-month-olds demonstrate the capacity to adjust their perception of speaker-specific patterns and maintain phonological consistency. Therefore, this study indicates that phonological categories are not developed nor accessed in isolation from contextual cues in the larger speech environment. Additionally, this study is relevant for research on phonological variation due to the fact that it demonstrates that listeners perceive variation in the same way as speakers, i.e., as structured and interpretable, when adequate contextual information is available. In the context of regional phonological variation, i.e., such as observed in Kui, this study provides support for the position that speakers and listeners utilize local and habitual cues in the surrounding speech to determine the variable sound forms. As a result, regional differences in vowel quality or consonant realization may be maintained as intelligible, as speakers possess expectations derived from repeated exposure to similar speech patterns within a community. As a result, Feng et al. (2022) provide a useful theoretical model for explaining how phonological stability is maintained in the face of variation, and reinforce the importance of contextual cues in both early language acquisition and in adult speech processing; furthermore, the study provides a cognitive basis for analyzing region-based phonological variation in languages spoken across multiple social contexts.

Brunelle, Tấn, Kirby and Giang (2020) provide a comprehensive description of sound change in Chru that provides valuable insights into studies of phonological variation that are based on empirical data from the field. In their study, the authors utilize both production and perception evidence to demonstrate that the distinction between contrasting voiced and voiceless obstruents in Chru has shifted away from a stable segmental contrast to a primarily register-based contrast, with vowel height playing a major role in marking the register difference. Furthermore, the authors demonstrate that speakers of Chru continue to maintain contrast, but redistribute it across different phonetic features, with younger speakers utilizing vowel quality as the sole feature for maintaining contrast, whereas older male speakers utilize secondary cues, such as optional closure voicing, in addition to vowel quality. The age-related pattern of maintenance of contrast demonstrates that variation operates within a shared system during the course of an ongoing change. The study of Brunelle et al. (2020) is relevant to the present study on Kui inasmuch as it provides an example of how phonological contrasts can weaken in one domain while retaining their value through the use of other features, and without undermining the general structure of the language. Moreover, Brunelle et al. (2020) illustrate the importance of relating observed variation to groups of speakers and everyday production practices, and not viewing change as uniformly distributed throughout a given community. Thus, the study of Brunelle et al. (2020) supports the present study's position that regional phonological differences in Kui represent structured consequences of usage and exposure, with some contrasts remaining stable and others undergoing gradual redistribution based on social and regional factors (Brunelle et al., 2020).

The study of Gurusinga (2020) on the phonological dialectal differences in Karonese provides a useful comparative frame of reference for research on regional phonological variation, including the present study on Kui. Focused on Karonese spoken in Medan, the study places its analysis in dialectology and investigates how sound patterns vary among districts via direct field methods (e.g., observation, interviews) supplemented by introspection. Gurusinga (2020) provides a detailed description of vowel, consonant, diphthong and triphthong patterns in Karonese and emphasizes that phonological variation does not occur randomly or uniformly across all areas of a given region, but rather occurs along irregular and location-specific paths. Notably, the study provides an extensive examination of vowel variation resulting in the formation of diphthongs and triphthongs, as well as the presence of clearly articulated but unrepresented vowels, illustrating the potential gap that can arise between spoken forms and written representations. The focus on spoken data in the study of Gurusinga (2020) parallels the present study's focus on naturally occurring speech in order to examine Kui phonology across various regions. Although Gurusinga (2020) remains largely descriptive and does not incorporate the application of statistical or contrast-driven approaches, the study does emphasize the importance of comparing regional dialects to understand how phonological systems evolve within a shared language. With respect to the present study, Gurusinga (2020) supports the position that regional phonological differences represent systematic outcomes of local speech practices and should be viewed as such, rather than as random or idiosyncratic, and thereby reinforces the need for the development of regionalized phonological documentation of languages spoken across diverse social environments grounded in field-based evidence (Gurusinga, 2020).

Krylova's (2019) research provides a critical areal-typological and contact-linguistic framework that clarifies the methodology used to investigate language change in the Kui-speaking communities of South Odisha. Specifically, the author defines the region as an "area of very close communication between speakers of three language families" (Indo-Aryan, Dravidian, and Munda) and states that the observed linguistic changes, including semantic shifts in the meanings of basic vocabulary, occur "in real time immediately" (Krylova, 2019, p. 285). This definition positions the Kui language as part of a dynamic, multi-directional contact situation, and not as an autonomous entity. The primary contribution of Krylova (2019) lies in the establishment of a specific mechanism of change beyond simple borrowing: the "replacement of basic lexicon" through "substrate influence" resulting in "semantic shift" in inherited words.

4. VARIATIONIST SOCIOLINGUISTICS

This research uses the theoretical framework of Variationist Sociolinguistics to demonstrate that phonological variation in Kui is socially motivated and patterned. In the context of Variationist Sociolinguistics, phonological variations are treated as systematic and significant variations in pronunciation, and not as deviations from the norm or irregularities (Labov, 2001; Osada, 2021). With regard to the phonological aspects of Kui, this research examines the variations in the placement of vowels, the ages of speakers, and the frequency of interactions among speakers to determine how these variations affect a shared grammatical structure. The regional differences identified in this study, specifically in terms of location – Baliguda, G. Udayagiri, and Phulbani – have been determined based on the consistent exposure of speakers to their respective locations, the movement of speakers between locations, and the prevailing

speech habits in each location (Osada, 2021). The Variations Sociolinguistics framework allows the researcher to consider what specific sounds occur most frequently, when those sounds occur within words, and how speakers can make distinctions using those sounds during everyday conversations (Bleorţu & Alonso, 2013). This approach will allow the researcher to investigate mid vowels, round vowels, and vowel length in Kui as structurally determined variations that are influenced by regional speech practices, and not as a sign of phonological variability (Labov, 2001; Bleorţu & Alonso, 2013).

The analytic perspective of this study is based on the Labovian paradigm, which is an integral component of variationist sociolinguistic research. The Labovian paradigm focuses on natural speech, repeated observations of speech, and comparisons of speech among various social and regional groups to establish stable patterns of variation (Labov, 2001). The researcher evaluates phonological characteristics of the speech of Kui speakers using the principles of distributional evidence, contrastive behaviour, and the occurrence of phonological features in different positions within words to compare speakers and locations. Furthermore, the Labovian paradigm allows the researcher to interpret contact-induced changes in phonological features as gradual and selective, resulting in reduced functional loads on the affected sounds, while retaining the core structure of the phonological system (Krishnamurti, 2003). Therefore, the researcher will apply the Labovian paradigm to explain why contrasts, such as /a/ and /aa/ are maintained consistently across regions, while vowels, /e/, /o/, and /ɔ/, are subject to region-specific shifts. The researcher believes that the Labovian paradigm provides a solid foundation for linking phonological variation in Kui to everyday speech environments and long-term exposure of speakers, without implying either structural reduction or sudden changes.

This study is important for phonological research on understudied Dravidian languages, including Kui, because it provides regionalized data from current spoken forms. Additionally, this study demonstrates how vowels, vowel length, vowel sequences, and some consonant sounds behave differently in each of Baliguda, G. Udayagiri, and Phulbani, thereby establishing a detailed account of how the same linguistic system behaves in different locations. The study utilizes field-based audio recordings and contrastive analyses, both of which strengthen the descriptiveness of Kui phonology and address gaps in previous studies that did not provide a detailed comparison of the regional speech of Kui speakers. Finally, the results of this study contribute to the body of variationist literature by demonstrating how phonological features can be altered in a predictable manner and are associated with local exposure and daily communication, while the underlying phonological rules remain intact (Labov, 2001; Krishnamurti, 2003). These findings support broader discussions about how regional variation operates within a stable grammatical system in situations of language contact.

Additionally, the findings of this study carry practical implications for language documentation and community-based language development. Specifically, the study's identification of stable sounds and regionally varying sounds will serve as a guide for phonological description, the design of writing systems and other orthographic representations of Kui, and for comparative studies of Kui with other related languages. The documentation of syllable-based vowel sequences and selectively applied vowel length contrasts in Kui will help avoid incorrect representations of the sound system in written forms and educational materials. The demonstration of regionally varied data will also reinforce the necessity of documenting the actual speech patterns of communities rather than relying on standardized models created by

external sources. As the study provides an empirically supported account of the speech of Kui speakers and grounds its analysis in the everyday speech environment of the speakers, it provides a reliable reference source for researchers, teachers, and documentation initiatives interested in representing accurate speech patterns of regional communities while also respecting regional dialects (Nayak et al., 2024; Thomason & Kaufman, 1988).

5. METHODOLOGY

This study uses a methodology combining field-based phonological observation with a limited number of perception-based tasks, adapted to the sociolinguistic and practical realities of the Kui speaking communities. It is not attempting to reproduce laboratory-style phonetic experiments, but rather to investigate how vowel contrasts are created and recognized within a common speech community. The methodologies chosen here reflect the limitations of the data available for Kui and the specific analytic focus on the stability and variation of vowel systems.

5.1 Speaker Selection

Speakers were selected from three Kui-speaking districts of Kandhamal: Baliguda, G. Udayagiri, and Phulbani. The locations were selected since they represented well-established centers of Kui usage with varying levels of contact with Odia-dominant public contexts. All participants identified Kui as their first language and reported using it regularly in interactions at home and in the village. A careful effort was made to select speakers who had acquired Kui in early childhood and continue to use it as their primary language of daily communication.

Both male and female speakers were included in the speaker group, with ages ranging from young adult to older adult. The inclusion of speakers at different stages of the life course allowed for the examination of vowel realization across speakers with different histories of experience, while excluding claims of generationally based change that the data would not provide adequate support for. Speakers who lived out of the Kui-speaking area or whose language transmission was interrupted were not selected, in order to allow comparison across all of the regions. Acknowledging bilingualism in Odia as a common background condition as opposed to treating it as an independent variable to control.

5.2 Recording of Target Vowels

Target vowels were selected based upon the Kui vowel inventory documented in the field and community-based descriptions of Kui. The focus was placed on vowels contained within high-frequency lexical items, including basic vocabulary and culturally significant terms, where vowel contrasts will most likely be preserved. The vowels were not recorded in isolation, but were embedded in words and short phrases to allow for natural articulation.

The recordings took place in familiar settings, such as the speakers' homes and shared village spaces, to minimize the effects of monitoring. Speakers were encouraged to speak naturally, and the same lexical items were recorded across multiple sessions, whenever possible. Repeating these lexical items across speakers and occasions allowed for confirmation of vowel quality and minimized reliance on individual tokens. The analysis emphasized consistency of vowel realization over precise acoustic measurement of the vowels, as a function of the constraints and opportunities of field-based phonological research.

5.3 Perception Tests and Participant Characteristics

A limited set of perception tasks was completed with a subgroup of the speakers of the recorded data to determine if the vowel contrasts identified in the production data were recognizable by the speakers. These perception tasks consisted of having speakers listen to familiar lexical items, including the vowels being tested, and identify/distinguish them based on their meanings as opposed to any phonetic description of the vowels. The perception tasks were designed so as to remain accessible to speakers with no reading/literacy requirements or specialized technical training. The participants in the perception portion of the study were drawn from the same geographic pool of speakers as those participating in the production portion of the study, and possessed equivalent language backgrounds. Rather than to evaluate perceptual acuity in a vacuum, the intention of this task was to assess if speakers recognized the vowel contrasts found to be stable in production. Responses were evaluated conservatively, with consideration to hesitancy and self-correcting behaviours as opposed to response time or accuracy. This evaluation approaches perception as an aspect of general linguistic ability as opposed to an experimental manipulation of perception, separate from actual use.

6. FIELD STUDY

The perception portion of the field study was used to observe how speakers recognize and classify vowels as part of their daily phonological systems instead of simply as acoustic presentations of vowels. Perception is viewed as a socially grounded process based upon normal routines, exposure to familiar vocabulary and conversational patterns, and regional speech patterns. As opposed to evaluating perception as an ability to recognize and identify acoustic distinctions between vowels, the study evaluated speaker's responses to vowels presented as part of familiar vocabulary and conversational patterns. The view of the study regarding phonological variation is that it is based upon use and recognition as opposed to experimentation and isolation.

Participants were selected from the same three geographic areas that formed the bases of the production data, which include Baliguda, G. Udayagiri, and Phulbani. Participants selected for the perception aspect of the study were long term residents of the village of origin and identified Kui as their principal language for daily interaction. The selection of participants provided the opportunity for perceptual evaluations to be developed from consistent exposure to local dialects. Although the study did not restrict participant selection to specific age groups, both older and younger participants participated in interactions, providing the opportunity to assess different levels of exposure to Odia-dominant domains (e.g., schools, administrative centers, market places). Differences were observed in participant exposure to Odia-dominant domains through participant interactions as opposed to being assessed using controlled comparisons.

Perception data were collected during natural interaction using field appropriate activities. During elicitation and conversations, speakers were asked to repeat words, confirm forms, or respond to alternate vowel realizations presented by either the researcher or other speakers. On occasion, speakers voluntarily stated whether a particular pronunciation appeared to be local, from another area, or influenced by outside sources. Those portions of the interaction that represented corrections, hesitations, or explicit recognition were considered the central evidence of perception. The types of tasks employed utilized recognition and evaluation rather than required identification, which is reflective of the spoken and community-based usage of Kui.

Analytical treatment of variation was conducted using patterns of agreement, as opposed to using numerical scores. If speakers from the same region consistently indicated acceptance of a given vowel realization, but indicated a lack of familiarity or consideration of the vowel realization as external, then those responses were considered as evidence of shared perceptual standards. This analytical approach does not isolate perception from social practices and provides continuity to the descriptive and variationist orientations of the study. Thus, the perception data are interpreted in conjunction with the production data to illustrate how phonological variation is not only generated, but also recognized and governed by communities.

The interpretive domain of the perception component is intentionally cautious. The results of this component are not intended to represent the universally applicable perceptual threshold or phonetic sensitivity. Rather, the results demonstrate how vowel contrasts and regional vowel realizations are socially recognized within Kui speaking communities. Reading the perception data in conjunction with lexical and phonological data documented in other components of the study, supports an interpretation of variation as a shared and maintained system of variation, as opposed to variation based upon individual fluctuation.

Table 1. Phonemic Vowel Influence Observed in the Field Study

Phonemic Vowel	Orthographic / Phonemic Representation	Representative Kui Lexical Forms	Observed Perceptions
High front vowel	/i/	pini, giri	Stable across regions; no merger observed
High back vowel	/u/	kuguju, kumugu	Minor durational variation; category intact
Mid front vowel	/e/	meLaa, penge	Slight quality shift in rapid speech
Mid back vowel	/o/	penu, toko	Stable in ritual and everyday domains
Low central vowel (short)	/a/	TakaLi, muhu	Frequent; high functional load
Low central vowel (long)	/aː/ (aa)	tlaa-u, kaaLu	Length co-occurs with emphasis or lexical identity
Neutral vowel (high)	/ɨ/ ~ A	baanaa, penu-Aajaa	Centralized realization; category stable
Neutral vowel (low)	/ɐː/ ~ Aa	Aa-based ritual forms	Restricted distribution; culturally anchored

In addition to compiling the results of the field study on phonology into the table for comparison of vowel categories with their lexical anchors and the way listeners perceive vowels, each of the phonemic vowels is found in a number of lexical items and domains.

Therefore, the vowel categories can be deduced from the distribution of the vowels (the fact that each vowel occurs in several different words) rather than by demonstrating how one vowel contrasts with another vowel through abstract tests. Further, the commonality of the vowel categories shown in the data collected in Baliguda, G. Udayagiri, and Phulbani provides additional support for the view that the same vowel system underlies the regional variations in Kui phonology.

High front and high back vowels have the highest degree of perceptual stability. Words like pini, giri, kuguju, and kumugu were reported to occur across many different speakers without being misrecognized or replaced. There was also slight duration variation among the tokens of certain words; however, this variation did not result in any speaker's categorizing the vowel differently. These characteristics indicate that these vowels are at the center of the vowel system with the realization of each vowel centered very close to a common perceptual target.

Mid vowels had slightly greater internal variability. For example, there were subtle changes in the quality of the mid front vowel in forms such as meLaa and penge in fast speech; however, listeners recognised these forms with no difficulty. Similarly, there was no variation in the quality of the mid back vowel in forms such as penu and toko, whether the form occurred in everyday or ritual contexts. The perceptual evidence suggests that mid vowels permit a limited amount of phonetic variation while retaining the same categorical identity. Thus, the evidence supports the idea that the vowel categories represent internal structure rather than categorical instability.

The short low vowel has a high functional load in the Kui lexicon. The short low vowel occurs frequently in the everyday vocabulary, as evidenced by forms such as TakaLi and muhu. It occurs less frequently in forms of longer duration, as evidenced by forms such as tlaa-u and kaaLu. The perception notes suggest that listeners treat length as a dimension of the vowel that is not free to be contrasted. Rather, listeners tend to associate length with emphasis and/or lexical identity. Therefore, listeners do not generalize length contrasts beyond the contexts of emphasis or lexical identity. Therefore, the presence of length in Kui does not provide sufficient evidence to support the claim of phonemic length, although it does suggest that length plays a role in specific lexical patterns.

Neutral vowels have a unique place in the system. Both the high neutral and low neutral vowels occur with centralized realization and are perceived stably by listeners. Neutral vowels are rare in the Kui vocabulary, however, the occurrence of the vowels in forms such as baanaa and penu-Aajaa is accompanied by consistent vowel quality. Similarly, the Aa-based ritual forms tend to occur with culturally-specific usage. The perceptual stability of the neutral vowels, regardless of their domain, argue against treating them as either marginal or incidental. Rather, neutral vowels function as defined elements of the vowel system, subject to regulation by lexical and cultural contexts.

The table 1 demonstrates that phonological variation in Kui takes place in well-defined phonemic categories that allow for internal differentiation, without loss of contrast. The perceptual observations, therefore, provide further support for the conclusion that speakers recognize and maintain these categories throughout the region, regardless of surface realization. As such, the finding is consistent with the broader findings of the study, which

demonstrate that variation represents a controlled flexibility, rather than a breakdown of the phonological structure.

7. PHONOLOGICAL VARIATION

Table 2. Phonological Features and Observed Patterns in Regions

Phonological Feature	Baliguda Kui	G. Udayagiri Kui	Phulbani	Observed Pattern
Core vowel /a/	aRaa 'goat'	baaLa 'sand'	paaheri 'path'	Stable across regions
Long vowel /aa/	AaNdesi 'heart'	baaDi 'rock'	naaDi 'fire'	Contrast with /a/ maintained
High vowel /i/	iDu 'house'	biLu 'air'	siri 'lineage'	Stable in all positions
High vowel /u/	ungaa 'meat'	DuNu 'heart'	muLu 'brain'	Stable in all positions
Mid vowel /e/	beLaa 'sun'	gedre 'clay'	reRi 'waist'	Increased frequency toward Phulbani
Rounded vowel /ɔ/	kɔra 'bitter'	tɔru 'hill-root'	alternates with /o/	Stable in interior regions
Rounded vowel /o/	rare	rare	goRi 'stone', Dokaa	Higher usage near administrative center
/o/ ~ /ɔ/ contrast	Maintained	Maintained	Weakened	Contact-linked variation
Vowel sequence /ia/	tLaau	gaaTaanju	tLaau	Treated as two syllables
Vowel sequence /ua/	muRu-type	muRu-type	muRu-type	No glide formation
Sibilant /s/	soru 'hill'	sapu 'thorn'	soru 'hill'	Stable across regions
Aspirate /h/	mehmu 'look'	halmu 'go'	mehmu 'look'	Medial position only

The differences in Kui spoken in Baliguda, G. Udayagiri, and Phulbani reflect systemic variations arising from the differing histories of exposure to languages, settlements, and ordinary speech practices of each region. While there are variations in the ways in which particular vowels and consonants are distributed, realized, and stabilized in terms of the degree of their stability, speakers across all three locations possess a common sound system. Yet, speakers from these regions vary in terms of how frequently certain sounds appear and how firmly certain distinctions are held.

Regional variations in vowels are more pronounced than those in consonants. Vowels /a/, /aa/, /i/, and /u/ are found to be consistent in all regions and across all age groups. Speakers from all three locations pronounce these vowels in all word positions in the same way, and no regional variation exists for their quality and length. Their stability is likely due to their fundamental role in the Kui phonology system, and their association with the majority of the inherited vocabulary. Words associated with daily life, kinship, agriculture, and rituals have remained unchanged and continue to exhibit these vowels even in younger speakers. The shared core contributes to mutual intelligibility between regions.

Mid vowels demonstrate greater regional variability. The vowel /e/ exists in all three regions, however, it varies in frequency and positional strength. In Baliguda, /e/ is primarily found in medial syllables and is relatively rare in ordinary speech. It is usually replaced by /i/ or a centralized vowel in rapid speech. In G. Udayagiri, /e/ has a slightly higher frequency of occurrence, particularly in lexical items that are frequently used. However, /e/ still exhibits a high level of restriction. In Phulbani, /e/ has a higher frequency of occurrence, and is utilized in many of the words that are commonly used in market and public contexts. The fact that /e/ gains more prominence in Phulbani than in the other two locations may indicate that /e/ gains more functional value in Phulbani, as /e/ in Odia has a higher functional value. Although /e/ has increased in frequency of occurrence in Phulbani, /e/ does not create strong contrasts with other vowels in the same environment, and therefore its phonological range is reduced.

Rounded back vowels show sharp regional contrast. In both Baliguda and G. Udayagiri, the low-mid rounded vowel /ɔ/ forms the base of the majority of the inherited vocabulary. The speakers of these regions consistently distinguish /ɔ/ from /o/, and they rarely substitute /ɔ/ for /o/ in well-established lexical items. Minimal pairs involving /ɔ/ and /o/ remain consistent in both careful and casual speech. In Phulbani, this distinction has weakened. The speakers of Phulbani often alternate between /o/ and /ɔ/, particularly in rapid speech or in discussions about school, administrative matters, and commerce. Younger speakers in Phulbani utilize /o/ at a higher rate than older speakers in words where older speakers would utilize /ɔ/. The degree to which younger speakers in Phulbani utilize /o/ instead of /ɔ/ reflects an ongoing process of accommodation of the Kui sound system to the Odia sound system, while maintaining the Kui lexical structure. The contrast between /ɔ/ and /o/ does not cease to exist entirely, but it becomes less rigid in the ordinary usage of the speakers.

Length variation for vowels is selectively contrasting. Length variation is contrastively significant in the opposition between /a/ and /aa/ for all three regions. The speakers of all three regions uniformly maintain length differences, and minimal pairs involving /a/ and /aa/ remain distinct across age groups and speech styles. The length contrast between /a/ and /aa/ is lexically weighted and has been unaffected by contact with other languages. In contrast, length variation in /i/ and /u/ lacks contrastive significance. Long realizations of /i/ and /u/ occur sporadically in emphatic or careful speech and do not signal meaning differences. Speakers of all three regions do not hesitate to accept alternations between long and short vowels, which supports treating length variation in /i/ and /u/ as phonetic variation rather than as phonologically significant contrast.

Vowel sequences also behave consistently across regions. Vowel sequences like /ia/, /ua/, and /ai/ occur regularly, and they are always realized as separate syllables. The speakers of all three regions articulate these sequences with clear syllable boundaries and do not realize them as

glides in spontaneous speech. The fact that this behavior is consistent across all three regions suggests a strong structural continuity of Kui.

Variation in consonants is limited relative to vowels. The sibilant /s/ is found to be similarly distributed across all three regions and lexical domains. The speakers of all three regions do not replace /s/ with either a voiced or an aspirated variant, and /s/ can be found in all three positions – initial, medial, and final. The stability of /s/ across regions suggests that /s/ is resistant to contact-induced changes. The aspiration /h/ is also found to be similarly positioned across all three regions. /h/ appears only in medial position in all three regions and never serves to initiate a word. The speakers of all three regions recognize /h/ as dependent upon the surrounding vowels, and /h/ is realized similarly across regions and age groups. There is no indication that /h/ has expanded its position in response to contact.

The phonological variation present across Baliguda, G. Udayagiri, and Phulbani reflects controlled regional variation rather than structural divergences. The core vowels and major contrasts are preserved across regions, whereas the mid vowels and rounded back vowels show varying degrees of patterning that are tied to the intensity of contact and the extent of interaction patterns in daily life. The findings thus suggest that phonological variation in Kui is governed by systematic principles based on the social context and contact experience, similar to variation that approaches theories of sound change and contact-induced adaptation (Labov, 2001; Thomason & Kaufman, 1988). Furthermore, the overall structure of Kui is consistent with the tendency of Dravidian languages to have stable core systems, as well as variable peripheries (Krishnamurti, 2003).

8. ANALYSIS AND STUDY OF KUI PHONOLOGY

The phonological study of Kui undertaken in this research emerges from the need to document and analyse a South-Dravidian language that is both historically significant and increasingly shaped by rapid social change (Rath, 2011). Field data from Phulbani, G. Udayagiri, and Baliguda supports a syllable-based vowel system grounded in Dravidian phonological patterns.

Based on the Vowels Chart

Table 3. Vowel Phonemes

Height	Front	Central	Back
High	i	ɨ / a (A)	u
Mid	e	ə ~ a	o
Low	—	a, aa	—

8.1 Vowel Occurrence in Kui

8.1.1 /i/ and /iː/

The high front unrounded vowel /i/ is frequent and stable in Kui. It occurs in all word positions, though phonemic length /iː/ is marginal and mostly surface-phonetic rather than contrastive.

Examples: miLaa ‘baby’, siri ‘lineage’, kiru ‘ear’, DiTi ‘mirror’, biLu ‘air’. /i/ is widespread; length is not contrastive in the same way as /aː/.

8.1.2 /u/

The high back rounded vowel /u/ is one of the most frequent vowels in Kui and appears productively in nouns, verbs, and derivational morphology. Examples: siru ‘water’, kaju ‘chicken’, ungaa ‘meat’, DuNu ‘heart’, muLu ‘brain’. /u/ occurs freely in initial, medial, and final positions and often alternates phonetically with [ʊ] before retroflexes.

8.1.3 /e/

The mid front unrounded vowel /e/ is phonemically present but distributionally limited. It occurs mainly in medial syllables and certain lexical roots. Examples: beLaa ‘sun’, seperi ‘broom’, Deri ‘elder’, reRi ‘waist’, gedre ‘clay’. me-a should not be cited as evidence for /e/, since it represents a reduced vowel sequence rather than a stable /e/. /e/ is contrastive but less frequent than /i/ or /u/.

8.1.4 /o/

The mid back rounded vowel /o/ is marginal in Kui and occurs in a limited set of lexemes, often showing free variation with /ɔ/. Examples: bohu ‘daughter-in-law’, goRi ‘stone’, Dokaa ‘snore (noun/verb stem)’. /o/ is not a core vowel and is strengthened by Odia contact.

8.1.5 /ɔ/

The low-mid rounded vowel /ɔ/ is phonemically present and is correctly represented in the dataset by the symbol O (low rounded). Examples: Dokaa ~ [dɔkaː], goRi ~ [gɔɾi], bohu ~ [bɔhu]. /ɔ/ often alternates with /o/ and reflects contact-induced variation, but is consistently heard in Baliguda and G. Udayagiri speech.

8.1.6 /a/ and /aː/

The low central unrounded vowels /a/ and /aː/ are the most structurally important vowels in Kui. The length contrast is phonemic and productive. /a/ examples: paTi ‘mouth’, kaDi ‘cow’, baTa ‘road’. /aː/ examples: Aabaa ‘father’, naaDi ‘fire’, baaDi ‘rock’, beLaa ‘sun’. A (high neutral) and Aa (low neutral) correctly represent short vs. long /a/. The contrast is phonemic across all three regions.

In addition to the consonant system, the vowel system of Kui forms the foundation of the structure of phonological rhythm and the clarity of all lexical elements used in everyday conversation and the various interactions (households, weekly markets, community events) that speakers engage in on a regular basis where speakers demonstrate consistent control of vowel quality over vowel length, regardless of how fast or informal the speech may be. In the domain of vowel quality, there are four vowels that make up the core vowel system of Kui. These include the high vowels /i/ and /u/, the low central vowels /a/ and /aː/, and other vowels that form what can be referred to as a “peripheral” or “outer” vowel zone including mid vowels.

While the distinction between short and long /a/ and /aː/ is clearly phonologically meaningful in Kui, the difference between short and long /i/ is marginal and for the most part phonetically conditioned and not phonologically significant. Thus, while the distinctions between /a/ and

/a:/ have phonological significance in Kui, the distinction between /i/ and /i:/ does not have the same type of phonological significance in Kui as /a/ and /a:/. Across all domains of interaction in which speakers regularly demonstrate control over the quality of the vowels they produce, rather than over the length of the vowels they produce, and in both formal and informal contexts, speakers of Kui typically exhibit greater control over vowel quality than vowel length, even when speaking rapidly or informally.

In those same domains of interaction where speakers demonstrate greater control over vowel quality than vowel length, speakers also frequently utilize pragmatic emphasis via either prosodic means or enhanced vowel quality to convey emphasis and/or focus in those domains of interaction. For example, in many cases long /a:/ will carry more functional weight in kinship terms, ritual vocabulary, and ecological nomenclature. Therefore, the continued ability of /a/ and /a:/ to maintain consistency across generations and geographic areas demonstrates their importance to the phonological system of Kui, in spite of continued bilingualism in Odia.

In contrast to the relatively stable /a/ and /a:/ vowels, the mid vowels /e/ and /o/ predict a more restricted and asymmetrical distribution within the phonology of Kui. Specifically, the mid front vowel /e/ is phonemically present in Kui, but it is phonemically rare, occurs primarily in medial positions in words, and occurs in only a subset of the roots of words found in the Kui language. Therefore, it is not possible to treat /e/ as a primary or dominant vowel category, and therefore, instances of reduced vowel sequences, such as /me-a/, cannot be cited as evidence for /e/. Similarly, the mid back rounded vowel /o/ is marginal in Kui and lacks phonemic stability, and is frequently replaced by the low-mid rounded vowel /ɔ/. Alternations between /o/ and /ɔ/ are especially common in high-contact environments, and reflect influence from Odia rather than an internal motivation to expand the vowel system of Kui.

The vowel /ɔ/ has been maintained as a phoneme in Kui, and is consistently attested in traditional lexical items, especially in the Baliguda and G. Udayagiri varieties of Kui. The associations between /ɔ/ and older lexical layers, forest-related terminology, and material culture are especially strong, and /ɔ/ is more commonly utilized by elder speakers. Younger speakers, especially in semi-urbanized settings, exhibit mild convergence towards Odia-like mid vowel realizations in contact-heavy domains; however, this shift is superficial and does not undermine the core vowel contrasts of Kui in intra-community communication. The Kui vowel system represents a stable phonological core consisting of /i/, /u/, and /a/ and /a:/, and a peripheral mid-vowel zone influenced by contact-induced variability. Instead of suggesting systemic erosion, the data support the idea of a dynamic equilibrium between phonological continuity and sociolinguistic accommodation, and reinforce the unique phonological identity of Kui in the context of ongoing cultural and linguistic transition.

9. ANALYSIS OF PHONOLOGICAL VARIATION

Table 4. Vowel Chart and Positional Occurrence in Kui

Vowel	Initial Position	Medial Position	Final Position	Examples from Field
/a/	✓	✓	✓	aRaa ‘goat’, paaheri ‘path’, baaLa ‘sand’

/aa/	✓	✓	✓	AaNdesi ‘heart’, baaDi ‘rock’, naaDi ‘fire’
/i/	✓	✓	✓	iDu ‘house’, biLu ‘air’, siri ‘lineage’
/u/	✓	✓	✓	ungaa ‘meat’, DuNu ‘heart’, muLu ‘brain’
/e/	✓	✓	(Rare)	beLaa ‘sun’, gedre ‘clay’, reRi ‘waist’
/o/	(Rare)	✓	(Rare)	Dokaa, goRi ‘stone’, muRo-type forms
/ɨ/ A/	✓	✓	✓	tLaau, gaaTaanju, pDenu

The vowel chart based on the data collected from the field illustrates that Kui has a stable and positioned vowel system and clearly shows the differences in how each of the vowels /a/, /aa/, /i/, /u/, /e/, /o/, /ɨ/ or /A/, and /ɔ/ distribute over words’ positions. Vowels /a/, /aa/, /i/, and /u/ can be found in initial, medial, and final positions. The ability of these vowels to be used in all three-word positions reinforces the fact that these vowels are basic vowels in Kui’s phonological system. For example, the word aRaa ‘goat’, the word paaheri ‘path’, and the word baaLa ‘sand’ illustrate the productive use of /a/ in different lexical domains. Similarly, /aa/ can be found in all positions as well, e.g., AaNdesi ‘heart’, baaDi ‘rock’, and naaDi ‘fire’. The fact that /aa/ maintains its contrastive properties and is not treated as a longer version of /a/ across all regions, and that there is no evidence of positional weakening of /aa/ in the participants’ natural speech, supports /aa/’s phonological status.

High vowels /i/ and /u/ demonstrate the same level of positional freedom as /a/ and /aa/. For instance, /i/ and /u/ are found at word edges and medial slots in items such as iDu ‘house’, biLu ‘air’, siri ‘lineage’, ungaa ‘meat’, DuNu ‘heart’, and muLu ‘brain.’ Their consistent appearance across word positions and regions supports the fact that /i/ and /u/ are also part of the stable phonological core of Kui. On the other hand, the mid vowel /e/ shows a much more limited distribution. It can be found in initial and medial positions; however, it shows limited evidence of being used in final position. The corpus also indicates that the final position of /e/ occurs very rarely, and when it does occur, /e/ is usually replaced by /i/ or /a/ in rapid or casual speech. This distribution of /e/ supports the idea that /e/ has a lower functional load and a smaller positional range compared to /a/, /aa/, /i/, and /u/.

The rounded mid vowel /o/ shows even more positional constraint than /e/. The rounded mid vowel /o/ is generally located in the medial position and is very rare at word edges. The initial and final uses of /o/ are limited and mostly restricted to speakers from Phulbani. The participants from Baliguda and G. Udayagiri tend to use the low-mid rounded vowel /ɔ/ in environments where the Phulbani participants use /o/. The positional and regional asymmetry of /o/ indicates that /o/ is not a fully developed vowel in all of the Kui varieties.

The central vowel, represented either as /ɨ/ or /A/, is very flexible in terms of positional use. The central vowel can be found in the initial, medial, and final positions in words such as tLaau, gaaTaanju, and pDenu. Participants are able to produce this vowel with consistent quality across regions, and this vowel tends to be found in lexical items that have been inherited and

in ritual vocabulary. The consistent positional use of /ɨ/ or /A/ supports its phonemic status, as described in some of the literature on Kui.

The vowel chart demonstrates that Kui has a clear distinction between core vowels that have unlimited positional use and periphery vowels that have limited positional use. The positional use of vowels provides direct evidence of the classification of /a/, /aa/, /i/, /u/, and /ɨ/ as central to the system, whereas /e/ and /o/ are constrained by both position and region. The pattern exhibited by Kui agrees with the larger body of literature regarding Dravidian phonology, where mid vowels tend to have limited functional loads and are responsive to contact conditions and speech styles (Krishnamurti, 2018). The chart-based analysis further supports the phonemic characterization of Kui vowels by providing phonological evidence of the positional behaviour of vowels rather than relying on impressionistic judgments.

Phonological variation in Kui is structured within a stable framework while exhibiting regional variations in speech. Speakers from Baliguda, G. Udayagiri, and Phulbani utilize the same core vowel inventory and consonant constraints, which supports the conclusion that Kui is a single phonological system rather than a group of divergent varieties. The interpretation of the patterns using a Labovian perspective enables us to understand the organization of vowel variation as organized rather than chaotic. The maintenance of vowel categories with controlled internal variation demonstrates that speakers of Kui maintain contrast while permitting surface differences. This tolerance of surface differences does not reduce phonological structure, but rather exemplifies how categories remain stable due to shared social norms of production and recognition.

The support for the variationist perspective comes from the fact that the perceptual results of this study demonstrate that Kui speakers rely upon the phonological relations among vowels to identify them rather than upon the precise acoustic qualities of the vowels. The results of this study show that speakers of Kui are able to recognize the lexical items regardless of whether the vowel quality or duration varies, provided that the relative contrasts within the vowel system remain constant. Thus, high and low vowels are easily recognized across regions due to the robust perceptual anchors of high and low vowels. However, the degree of recognition is influenced by domain and authority. In ritual contexts, vowel realization is less tolerant of variation, and speakers will actively check for correctness. However, in everyday speech, more tolerance of variation is acceptable, and speakers are willing to accept the variation without a loss of meaning. This pattern indicates that the perception of Kui is not solely based on auditory information, but is socially regulated. Phonological relations determine how speakers of Kui interpret variation, thus enabling speakers to adjust for regional differences while maintaining shared meanings. The results of this study support the notion that phonological variation in Kui reflects a controlled adjustment of perceptual weight of cues, and not a reduction in the strength of the vowel categories, consistent with the variationist views of stable systems in contact conditions (Labov, 2001; Thomason & Kaufman, 1988).

The Kui findings are problematic for simple contact-induced change theories that predict early restructuring of vowel systems as a result of prolonged bilingualism. Exposure to Odia has affected the frequency and distribution of some mid-vowels, especially /o/ in Phulbani, but has not resulted in the creation or loss of any vowel categories. This finding suggests that contact may affect internal phonetic space (i.e., how often and in what positions a vowel is found) before affecting the categorical inventory itself. The distinction is important and indicates that

phonological systems can respond to external pressure by expanding or contracting the internal ranges of vowels rather than by creating new categories.

The restricted but stable distribution of neutral vowels is also informative. The fact that neutral vowels are lexically anchored and perceptually regulated, and that they continue to exist across regions in spite of their limited distribution, suggests that phonological marginality (being a neutral vowel) does not lead to structural instability.

The comprehension findings support the variationist perspective that the stability of categories is dependent upon relational contrast rather than uniform acoustic representation. Kui speakers are able to perceive regional variations in quality or duration of vowels as long as the oppositions within the system are maintained. Therefore, the Kui findings provide evidence for a model of phonological resilience that is based on shared social expectations rather than phonetic targets.

10. VOWEL CATEGORIES

Across Baliguda, G. Udayagiri, and Phulbani, the vowel system reported here contains a clearly defined set of phonemic categories that persist across regional varieties. High vowels /i/ and /u/, as well as low-central /a/ and its counterpart /aː/, are repeated across lexical domains and word positions without evidence of merging or re-classification. They represent a stable phonological foundation of Kui and a source of mutual intelligibility across regions.

Mid and rounded vowels occupy a more limited but still systematic place in the inventory. The mid-front vowel /e/ and the mid-back rounded vowels /o/ and /ɔ/ occur less frequently and exhibit positional constraints; nonetheless, their occurrence is rule-governed rather than random. The occurrence of /o/ versus /ɔ/ in Phulbani represents variation within an established category space, and does not result in loss of contrast. There is no evidence that any region exhibits loss or creation of vowel categories. Rather, all of the observed differences occur within a shared categorical space and demonstrate that Kui retains a unified vowel system despite regional phonetic variation.

10.1 Internal Structure of Vowel Categories

Although vowel categories are stable, their internal structure permits limited variation that is conditioned by factors such as speech rate, lexical domain, and regional experience. The core vowels /i/, /u/, and /a/ show a high degree of clustering around their prototypical realizations, with limited tolerance for deviation. These vowels possess high functional loads and are resistant to qualitative change, even in environments characterized by heavy contact. Similarly, the long vowel /aː/ maintains lexical distinction and does not undergo duration-based phonetic lengthening, thereby supporting its phonological status across regions.

The peripheral categories exhibit a wider range of internal variation. For example, /e/ tolerates minor changes in quality in rapid speech, particularly in Phulbani, without jeopardizing category recognition. Similarly, /o/ is located at the end of a continuum with /ɔ/ and represents a stable category in the interior regions, whereas /o/ gains prominence in contact-rich environments. Neutral vowels represent a structurally distinct position. Their centralized realizations and limited lexical distributions suggest that neutral vowels function as phonemic categories whose usage is culturally regulated rather than as reduced versions of other vowels.

The layered internal structure of Kui vowel categories permits the accommodation of variation without destabilizing categorial boundaries.

10.2 Influence of Phonological Relations on Speech Perception

The perceptual results of this study indicate that speakers of Kui depend upon the phonologically determined relationships among vowels rather than on fine-grained acoustic differences to identify vowels. Speakers of Kui recognize lexical items regardless of the variation in vowel quality or duration as long as the relative contrasts within the system are maintained. Thus, high and low vowels are identified with minimal hesitation across regions, indicating strong perceptual anchorage. Perceptual difficulty arises from mid-vowel variation, particularly the /o/-/ɔ/ alternation, but speakers interpret these variations within an anticipated relational space that is influenced by regional exposure.

Perception is influenced by domain and authority. Ritual contexts exhibit reduced tolerance for vowel variation, and speakers actively assess correctness. Everyday speech, on the other hand, permits greater flexibility without loss of meaning. This pattern indicates that perception in Kui is not simply based on auditory information but is socially regulated. Phonological relationships provide the basis for how speakers of Kui interpret variation, permitting speakers to accommodate regional differences while maintaining shared meanings. The results of this study support the idea that phonological variation in Kui is the result of controlled adjustment of the weights assigned to cues for perception, and not a weakening of vowel categories, consistent with variationist perspectives of stable systems in contact conditions (Labov, 2001; Thomason & Kaufman, 1988).

11. IMPLICATIONS FOR PHONOLOGICAL THEORY AND CONTACT

The Kui findings contradict simple theories of contact-induced change that predict the early restructuring of vowel systems as a result of prolonged bilingualism. Exposure to Odia has had an effect on the frequency and distribution of some mid-vowels, especially /o/ in Phulbani, but has not led to the creation or loss of any vowel categories. This finding implies that contact may initially affect the internal phonetic space (how often and where a vowel is found) prior to affecting the categorical inventory itself. The distinction is significant since it demonstrates that phonological systems may be able to expand or contract their internal vowel ranges rather than create new categories to accommodate external pressures.

The limited but stable distribution of neutral vowels also offers insight. The fact that neutral vowels are lexically anchored and perceptually regulated, and continue to exist in multiple regions despite their limited distribution, demonstrates that phonological marginality (neutral vowel) does not imply structural instability.

The comprehension findings offer additional support for the variationist perspective that the stability of categories is contingent upon relational contrast rather than uniform acoustic representations. Speakers of Kui can perceive regional variation in the quality or duration of vowels as long as the oppositions within the system are maintained. Thus, the Kui findings provide evidence for a model of phonological resilience that is founded on shared social expectations rather than phonetic targets.

12. CONCLUSION

The results of this analysis show that phonological variation in Kui occurs within an established vowel system found across the areas sampled in Kandhamal district. The categories identified in the vowel system via field work continue to serve the same contrastive functions regardless of whether their surface realisations vary across different regions and contexts. As such, high, low, mid, and neutral vowels remain discrete phonemes and there is no indication of category overlap or reorganization. These findings provide a phonological foundation for interregional intelligibility of Kui speakers based on observed regional variation in pronunciation. However, at the same time, this research has demonstrated that each vowel category in Kui exhibits non-uniform internal structure. All categories allow a relatively narrow range of surface realizations which are constrained by lexical domain, speech rate and local usage practices. Prototype forms arise due to both frequency of use and shared speaker expectation, while marginal variants will remain mutually intelligible as long as they maintain relational contrasts relative to other members of the system. Length and centralization appear to represent organized properties of the vowel system that are regulated by lexical identity and culturally determined rules, rather than being available as free variables.

The data collected from Kui illustrate that the phonological stability of vowel categories in small multilingual communities need not be defined by surface-phonetic homogeneity. The vowel categories in the regions surveyed remain intact even when their internal realization undergoes change as a result of contact with neighboring languages. This illustrates that structural resilience may occur through the controlled internal differentiation of a system rather than through its resistance to all types of change. The vowel system does absorb external pressures without sacrificing contrast.

This research also enhances our understanding of how contact-induced change proceeds. The Kui data indicate that the model of sustained bilingualism leading directly to reorganization of the core phonemic system of a language is not supported by these data. Rather, change appears to be selective, and sensitive to domain-specific factors. For example, the frequency of occurrence of mid-vowels undergoes frequency-based adjustments in response to contact conditions; rounded vowels exhibit fluctuations in contact-prone environments; however, the overall categorical framework remains intact. Such patterns suggest that contact may initially cause a redistribution of phonetic detail and functional loads prior to altering inventory structure, and may in certain instances never exceed that level of change.

The findings of this research emphasize the role of social regulation in preserving phonological coherence. Speakers perceive variation as regional and thus treat it as regional (i.e., not categorical), but speakers recognize regional variation as part of the normal functioning of a phonological system. In this respect, the Kui case supports a view of phonological systems as socially constructed structures whose robustness is dependent upon shared expectations of what constitutes “normal” practice embedded in daily routines of communication.

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