**AN OPTIMALITY THEORETIC APPROACH TO SYLLABLE STRUCTURE IN GUTOB GADABA**

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9. **Introduction**

This paper is an attempt to study the syllable structure in Gutob Gadaba language under the OT framework. A syllable is a central component of generative phonological theory, which allows us to make generalizations at both segmental and higher prosodic levels (*Féry and van de Vijver, 2003)*. Syllable structure requirements govern morpho-phonological processes and repair strategies seen in languages such as epenthesis, deletion and other structural mutations. Languages of the world differ in the way the tripartite structure of the syllable (onset, nucleus and coda) is organized. Though there are strong preferences towards one the perfect syllable (CV), languages differ widely in their syllable typology. Optimality theory can help us account for the different aspects of syllabification in a language, which in turn govern word formation and other higher order processes. OT does this by creating a system of constraints and their interactions. After presenting a descriptive analysis of the Gutob language and lexicon, we will review the data within an OT framework, to arrive at these constraints and internal rankings.

1. **Gutob – Language background**

Gutob-Gadaba is an Austro-Asiatic language belonging to the South Munda family. Gutob-Gadaba, which will henceforth be referred to as Gutob for the purpose of this paper, has a namesake in the Dravidian language *Ollari-Gadaba*. Gutob is spoken by the Gadaba tribes inhabiting the regions of Koraput, Orissa especially along the villages in Lamatput corridor as well as the Malkangiri districts in Andhra. The number of speakers (SPPEL, 2001) of Gadaba was estimated at ~72,000 speakers. The use of the common name Gadaba to denote both Ollar and Gutob varieties, means that the actual numbers attributable to Gutob are much lower. Rajan (2003) notes that the number of Gutob speakers may be as low as 5000. The Gadaba tribes inhabiting the regions mentioned above, have been continually displaced by the the advent of hydroelectric projects, and the native language Gutob faces the risk of extinction, as majority of the younger Gutob speakers from the Gadaba tribes are shifting to the lingua franca, *‘Desiya’*. Oriya and Hindi are also preferred over Gutob, as media of instruction in schools.

Language contact and negative attitudes surrounding the native tongue have affected the use and development of the Gutob language, which is now classified as an endangered or “at risk” language, that is under the threat of being totally wiped out.

Fieldwork in Gutob has been carried out by many Austro-Asiatic scholars like Anderson DS (1993) and Rajan (2003), and there are also efforts being made in creating a comprehensive Gutob dictionary. More details about the sources used in this paper are available in the references section.

**Gutob – Phonemic inventory**

Tables 1.1 and 1.2 represent the phoneme inventory of the language. Diphthongs in Gutob are of the form /iV/ or /Vi/ in native words, with other rarer forms only occuring in loan words.

Nasalization of vowels is a morphophonological process that is shown several instances of nasalized vowels which are possibly results of fusion or coalescence with Nasals that are dropped. However, the status of nasalization as a contrastive behavior is not corroborated by the available data.

The alveolar voiced stop “d” is a marginal phoneme i.e it’s only found in loan words from Desiya.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Stops** | **p, b** | **t** | **ʈ, ɖ** | **k, g** | **ʔ** |
| **Nasals** | **m** | **n** |  | **ŋ** |  |
| **Trills** |  | **r** |  |  |  |
| **Laterals** |  | **l** |  |  |  |
| **Fricatives** |  | **s, z** |  |  |  |
| **Approximants** | **w** |  | **j** |  |  |

**Table 1.1**

|  |  |  |  |
| --- | --- | --- | --- |
| **High** | **i:, i** |  | **u:, u** |
| **Mid** | **e** |  | **o** |
| **Low** |  | **a** | **ɒ** |

**Table 1.2**

1. **Data presentation and descriptive analysis**

The syllable is a key phonological unit, consisting of vowel and optionally onsets and codas, across languages of the world. Syllable based generalizations help us better understand the underlying patterns in a language. This paper attemtps to look at syllabification and syllable typology from the framework of Optimality theory. To do this, I will first describe the syllable distribution in Gutob language, based on the data available. A number of researchers have done limited fieldwork in Koraput with Gutob speakers, but a lot of the data collected has been with the help of Desiya interpreters and may not be totally reliable, especially in terms of the annotations. Nevertheless, data from a few documented field trips have been archived and are available for analysis. Some of the sources used here are the Munda Lexical archive (Donnegan and Stampe 2004), Munda languages project (Zide, 1962-65), SPPEL (2003) among others.

* 1. **Possible syllable structures in underived Gutob words**

Based on the data available from the sources mentioned above, the possible types of syllables in Gutob are tabulated below with examples.

|  |  |  |
| --- | --- | --- |
| **Syllable type** | **Gutob Word** | **Gloss** |
| V | /**o**.nob/ | (“girl”) |
| CV | / **bu**. toŋ/ | (“fear”) |
| CrV | /*lo****.bra****/* | *(“*giddy*”)* |
| CrVC | /sin. ***ɖroŋ****/* | *(“*medicine*”)* |
| VC | /mu.**ir**. o/ | (“one”) |
| CVC | /lo. **boŋ**. kodi/ | (“nose ring”) |

**Table 1.3 Syllable typology in Gutob**

We can draw a descriptive generalization about syllable structure in Gutob based on the above data

1. Onsets in Gutob are not obligatory
2. Codas are not obligatory
3. Complex codas are disallowed
4. Complex onsets are allowed only in the form of C /r/ where C can be any consonant other than “ŋ”

More examples to substantiate these generalizations are available in the appendix.

* 1. **Morphophonological processes – Inflection**

In this section, some key morphophonological processes will be described along with the changes that present in Gutob when morphemes come together to form new words.

Gutob is a highly inflected language, with words combining with various infixes or affixes to reflect tense, aspect and other morphological characteristics. Though the complexity and range of inflections available in Gutob are much greater than the scope of this paper, only few processes will be highlighted here for descriptive convenience.

Consider the following data from Griffith (2008)

|  |  |  |
| --- | --- | --- |
| **Verb** | **Past** | **Gloss** |
| bil | bilgu | “to be drunk” |
| ser | sergu | “to sing” |
| goj | gojgi | “to die” |
| moɖ | moɖgu | “to get up” |
| ɖem | ɖeŋgu | “to become” |
| ɖu(k) | ɖugu | “be” |
| riŋ | r˜i˜oʔ | “to bring” |
| sun | sunoʔ | “to ask” |
| som | somoʔ | “to eat” |

**Table 1.4 Past tense marking for verb roots in Gutob**

Descriptive generalization of tense affixation

Two types of tense morphemes are visible to indicate the past. [-gu] in case of intransitive verb roots and [oʔ] in case of transitive verb roots, also known as the middle past and the active past (Griffith, 2008).

Some alternations are triggered during inflection. The middle past morpheme [-gu] seems to apply to all verb roots except when the root ends in the palatal semivowel /j/. Here the morpheme is realized as [-gi], possibly due to a process of vowel fronting, in the context of the palatal constant,

Instances of consonant assimilation can be seen also, for example the “to become” verb. When this root attaches to the -gu morpheme we see that there is some base mutation, i.e the coda nasal (m🡪 ŋ) due to the presence of the velar stop in the affix.

The verb root for “to bring” is /riŋ/. When this attaches to the past tense marker -oʔ we get

/riŋ/ + -oʔ 🡪 riŋoʔ (This is realized in the surface as rɪ̃õ, wherein the vowels are nasalized and the nasal consonant is dropped). Nasalization of vowels is also used as a repair strategy to correct instances of clusters in the coda. For example, consider the Gutob word for arrow - ɑ̃:ʈ. The nasal + stop cluster is disallowed in the coda, which results in the nasalization of the vowel followed by deletion of the nasal. This breaks the disallowed coda cluster.

With the limited annotated data available, we are able to see that consonant assimilation and vowel harmony are key repair strategies in Gutob to satisfy some underlying syllable structure requirements. In the subsequent sections, this data is analysed within the OT framework to determine the exact nature of constraints and their interactions.

* 1. **Derivations**

There are many productive derivational processes in Gutob word formation. Gutob employs reduplication and infixation to derive new words from existing verb or nominal roots. Below I present two such instances from the data (Griffith, 2008). It illustrates two main processes applying to verb roots - causative verb formation and deverbalization.

|  |  |  |
| --- | --- | --- |
| **Verb** | **Nominal** | **Gloss** |
| /baj/ | /b-un-aj/ | to decorate/embroidery |
| /gir/ | /g-in-ir/ | to fish/ fish net |
| /giraʔ / | /g-in-iraʔ / | to spin/ spindle |
| /gug/ | /g-un-ug/ | to peck/ axe |
| /peɖ/ | /p-in-eɖ/ | to blow/ flute |
| /iŋ/ | / in-iŋ/ | to hang/rope |
| /sar/ | /s-un-ar/ | to comb/comb |

**Table 1.5 Nominalization of verb roots in Gutob**

|  |  |  |
| --- | --- | --- |
| **V1** | **V2** | **Gloss** |
| /butoŋ/ | /b-ob-toŋ/ | to be afraid/to scare |
| /bulu/ | /b-ob-lu/ | be ripe/ ripen |
| /ɖuɖig/ | /ɖ-ob-ɖig/ | to sleep/ to put to sleep |
| /tunon/ | /t-ob-non/ | to stand/ to erect |
| /gir/ | /ob-gir/ | to learn/to teach |
| /som/ | /ob-som/ | to eat/to feed |

**Table 1.6 Causative verb formation from verb roots**

Note that the causative verb is derived when the morpheme “-ob” attaches as an infix or a prefix based on the syllable type. In bi syllabic words, the ob applies as an infix in place of the V in the first syllable. In mono syllabic words, it attaches as a prefix. The exact mechanism of the attachment, has to do with the restrictions on the syllable structure.

The nominal is derived from a verb root when the morpheme “un” attaches as a prefix or an infix, but we note that there is some vowel harmony when the morpheme changes to -in when it encounters a front vowel and remains -un for central and back vowels.

If we are to derive these structures in a rule-based phonology, we would have to posit different underlying structures, and devise a sequential application of rules that cause the affix to attach as a prefix in one case, and in others, it is blocked by certain conditions and attches as an infix instead. We will devise some constraints and look at how they interact in Gutob, when we conduct the OT analysis of the data. Using a constraint-based approach we’ll do away with pesky underlying structures, and allow ourselves to derive words without imposing restrictions on the input

* 1. **Loan words in Gutob**

The Gutob vocabulary is filled with many instances of borrowed words or loanwords especially from the Desiya, Oriya and even Hindi. It is tough to find instances of loan word adaptations because most of the locals are well versed in the Desiya language as well as Oriya. Anderson et al (2016) record few instances of loan word adaptations by a native female speaker Kamla Sisa who seems to modify her pronunciations of the same, possibly due to the effect of Gutob L1. Another speaker who is recorded in the same archive, does not show these modifications was able to pronounce the words as is. These examples are discussed below

|  |  |
| --- | --- |
| *mitor* | friend (“mitr” Hindi) |
| *iskul* | school (“skul” English) |
| *ozar* | thousand (“hazar” Hindi) |
| *onu* | monkey(“hanu” Desiya) |
| kõd | shoulder (“kond”, Desiya) |

* 1. **Elicitations of loan words by native speaker of Gutob**

The loan word adaptation data shows interesting insights – firstly the dispreference for onset obstruent clusters and any clusters in coda position can be seen in the words mitr 🡪 mitor and skul 🡪 iskul

The repair strategy used in both cases is that of vowel epenthesis. The words /ozar/ and /onu/ indicate the absence of the glottal fricative “h” in the inventory of the speaker.

1. **OT analysis of Data**

Section 3 presented the data in Gutob along with some descriptive outlines. The main objective of this section is to review the data presented above within the OT framework and arrive at the constraints that govern well formedness of syllables in Gutob

Optimality theory (Prince and Smolensky,1993) redefines rule based generative phonology in terms of constraints and posits that languages of the world operate under competing constraints of markedness and faithfulness. The diversity of syllable typologies across the world’s languages is explained by the unique interaction and ranking of these constraints. Markedness and faithfulness are conflicting by nature, and help limit the world’s language inventories somewhere between being maximally contrastive and being maximally unmarked (maximum articulatory and perceptual ease)

Constraints are violable and universal. The ranking of constraints varies by language and the optimal output is attained by incurring the least number of serious violations.

Some basic markedness and faithfulness constraints (Kager, 1999) are listed below

|  |  |
| --- | --- |
| Constraint | Description |
| \*CCODA | syllables must not have codas |
| ONSET | Syllables must have onsets |
| \*Vnasal | vowels must not nasal |
| \*Comp-ONS | onsets must not be complex |
| \*Voral N | Oral vowels before nasal consonants are disallowed |

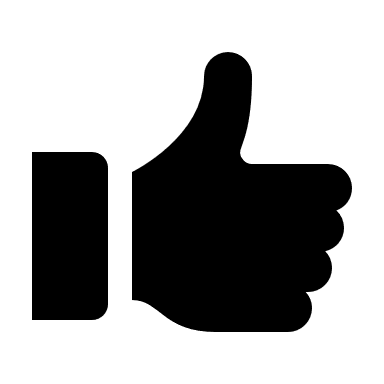
|  |  |
| --- | --- |
| Constraint | Description |
| IDENT IO | The output must match the input in terms of the features |
| DEP IO | Output segments must have counterparts in the input |
| MAX IO | The output must preserve all segments present in input |
| LINEAR IO | The output must preserve the linear order of segments |

OT analysis permits all kinds of inputs and places no restrictions on the underlying forms (Richness of base). It also allows for any number of structures and candidates to be posited (Freedom of Analysis).

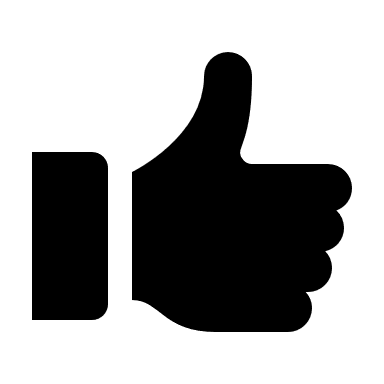
We will start with an OT tableau to explain the basic syllable structure in Gutob, that was elaborated in section 3.1

Syllable inventories are subject to structural wellformedness constraints. CV type syllables are the most well formed of syllable types. In an ideal scenario, a language will only have syllables of the CV type. In Gutob we see that syllables of type V, CV, CCV, CVC and VC are allowed. The only types of syllables that aren’t seen are ones with complex codas and complex onsets other than C/r/. Thus, we can propose some modified markedness constraints as below to account for Gutob syllables

* Onsets are simple unless C2 = /r/ **(\*ONS-Cond** - **\* [CC2  where C2 ≠r)**
* Codas are simple (**\*COMPLEXcoda -\* CC] )**

**Ex.1 Gutob word for medicine**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Input: sinɖroŋ | **ONS-Cond** | **\*COMPLEXcoda** | **Max-IO** | **DEP-IO** |
| sinɖ. roŋ |  | \*! |  |  |
| si. nɖroŋ | \*! |  |  |  |
| **sin. ɖroŋ** |  |  |  |  |
| sin.ɖo. roŋ |  |  |  | \* |
| siɖ.roŋ |  |  | \* |  |

**Ex.2 Gutob word for oil**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Input: soʔl\* | **ONS-Cond** | **\*COMPLEXcoda** | **Max-IO** | **DEP-IO** |
| soʔl |  | \*! |  |  |
| **soʔ. ol** |  |  |  | \* |
| soʔ |  |  | \* |  |

*(\*Richness of base tells us that we can introduce any kind of input structure)*

To arrive at an optimal understanding of syllable structure, we need to look at the faithfulness constraints operational in the language, and how they fare vs the markedness constraints. In underived words, we see that the main well formedness constraints are the ONS-cond and \*Complexcodacondition.

We will turn our attention to the data on inflections in table 1.4 to better understand morphophonological processes. When morphemes come together, any change that takes place is made at the cost of a faithfulness constraint because of a higher-ranking markedness constraint. Languages use repair strategies to minimize these fatal markedness violations, and usually they are – epenthesis of a segment, elision of segment or modification of a featural value.

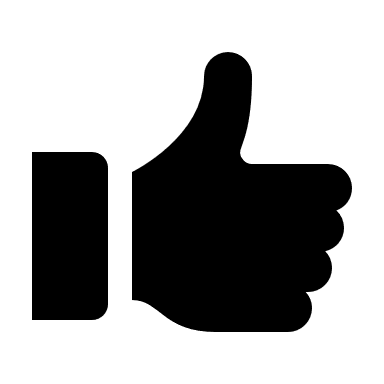
For eg. The past tense marker attaches to /ɖem/ (to become) to produce /ɖeŋgu/. How can we account for this change? Similarly, the tense marker attaches to /goj/ (to be drunk) to produce gojgi. Why does the consonant in case of former and vowel in case of the latter undergo an alternation? In OT, any kind of vowel harmony or assimilation can be explained via the markedness constraint AGREE[F]. The faithfulness constraint that conflicts with this is the IDENT-F constraint.

* Agree[F] – Adjacent segments must have the same value for feature
* IDENT-F – Input output segments must have the same value for feature [F]

When Agree[F] >> IDENT – F, we see an assimilation or harmony when two morphemes come together.

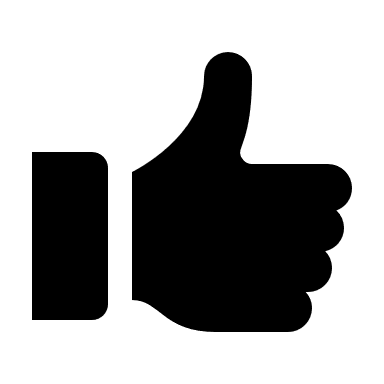
We can add to our list of constraints for Gutob to incorporate the above in the below tableau

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Input /ɖem/ + /-gu/ | ONS-Cond | \*COMPLEXcoda | Agree- Place | Max-IO | DEP-IO | IDENT Place |
| ɖemgu |  |  | \*! |  |  |  |
| ɖemugu |  |  |  |  | \* |  |
| **ɖeŋgu** |  |  |  |  |  | \* |
| ɖemu |  |  |  | \* |  |  |

****

In the example of the middle past morpheme -gu attaching to the verb root “to die” i.e /goj/, we see that the morpheme changes to -gi. This is again a repair strategy triggered by the agree feature. In this case, the palatal approximant /j/ which is characterised by a -back feature causes the vowel fronting in -gu to give -gi

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Input /goj/ + /-gu/ | ONS-Cond | \*COMPLEXcoda | Agree- Back | Max-IO | DEP-IO | IDENT Back |
| gojgu |  |  | \* |  |  |  |
| gojigu |  |  |  |  | \* |  |
| **gojgi** |  |  |  |  |  | \* |
| gojg |  | \*! |  |  |  |  |

****

Next, we turn our attention to the derivational process of causative verb formation in Gutob. This is done via process of infixation that is depicted in Table 1.5

We see that the causative morpheme is -ob and it attaches as an infix in polysyllabic words and as a prefix in monosyllabic words. This can be explained via the use of alignment constraints.

Kaager (1999) summarizes a few alignment constraints on words and morphemes that come in handy for describing affixation behaviors. The ALIGN-L constraint requires that the left edge of the Gr word coincide with the left edge of the prosodic word. The ALIGN-R constraint requires that the right edge of the Gr word coincide with the right edge of the syllable. The ALIGN-morpheme-L constraint requires that the left edge of the morpheme coincides with the left edge of all syllables.

The causative verb derivation can be explained by using a few of these alignment constraints. An ALIGN-L constraint is violated when prefixes are added to a word. From the data it is clear that the causative morpheme attaches as an infix in words, except when the word is monosyllabic. For the word /gir/, the causative verb is ob-gir. We need to account for this fact.

So, ALIGN-L is a constraint that must apply, but we need other constraints to apply that are higher ranked than ALIGN-L so we can explain why prefixes happen in case of some words and not in others. None of the words attach the -ob- morpheme as a suffix. Thus, we know that the ALIGN-R constraint ranks higher on the list. Having just these 2 constraints, does not help explain forms such as /g-ob-ir/. So, we’ll have to add one more constraint to explain the fact.

For this purpose, I propose the ALIGN AFX– L constraint, that ensures that the left edge of the affix (-ob) coincides with the left edge of a syllable.

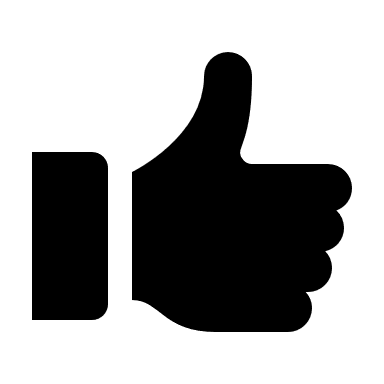
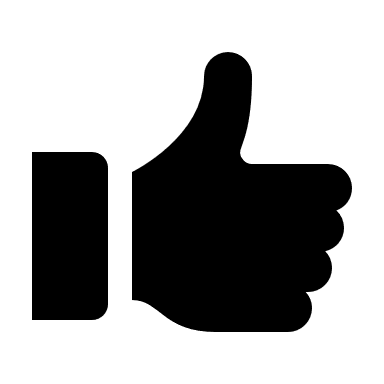
With all these alignment constraints, it is important to note that the complex coda constraint has to be highest ranked, because it helps rule out forms such as /gobr/. Thus, by using both these examples, we are able to arrive at a comprehensive generalization of constraints and their ranking.

Consider the tableaus for the verbs “to stand” /tunon/ and “to learn” /gir/ which undergo derivation (causative morpheme) to give /t-ob-non/ “to erect” and /ob-gir/ “to teach” respectively.

The constraints are ordered such that \*COMPLEXcoda >>ALIGN-R>ALIGN-AFX-L > ALIGN-L

The least # of violations of affix constraint help select the optimal candidate as shown in the tableaus below for /gir/ and the violations in the affix constraint in addition to the violation of ALIGN-L constraint help select the optimal candidate for /tunon/

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Input /tunon/ + /-ob/ | ONS-Cond | \*COMPLEXcoda | ALIGN- -R | ALIGN-AFX-L | ALIGN- L |
| ob.tu.non |  |  |  | \*\* | \* |
| tob-non |  |  |  | \*\* |  |
| to.bo.non |  |  |  | \*\*\* |  |
| tunon-ob |  |  | \*! |  |  |

(Total # constraints violated lesser for tobnon as opposed to tobonon)

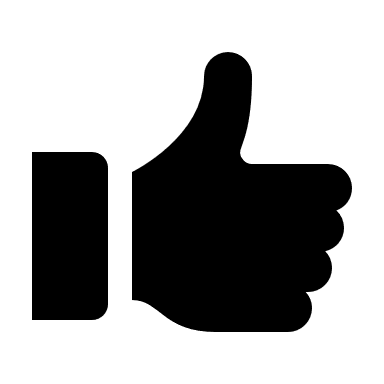
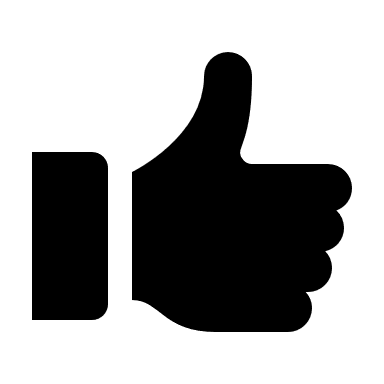
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Input /gir/ + /-ob/ | ONS-Cond | \*COMPLEXcoda | ALIGN- -R | ALIGN-AFX-L | ALIGN- L |
| ob.gir |  |  |  | \* | \* |
| gobir |  |  |  | \*\* |  |
| gobr |  | \*! |  | \* |  |
| girob |  |  | \* | \*\* |  |

(fewer serious violations in ob.gir)

Finally let us consider loan word adaptations and see if any more constraints are required to explain the changes

The loan words show repair strategies of epenthesis to satisfy the ONS-Condition defined previously - \* [ C1C2 whereC2 ≠ /r/ and the complex coda condition \*COMPLEXcoda which rank above the DEP IO constraint. Consider the tableau for “school” /skul/

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Input /skul/ | ONS-Cond | \*COMPLEXcoda | Morpheme Integrity | Max-IO | DEP-IO |
| si.kul |  |  | \* |  | \* |
| is.kul |  |  |  |  | \* |
| kul |  |  | \* | \* |  |
| skul | \*! |  |  |  |  |



|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Input /ko1n2d/ | ONS-Cond | \*COMPLEXcoda | Max-IO | DEP-IO | Linearity-IO | IDENT-manner |
| kond |  | \*! |  |  |  |  |
| kondo |  |  |  | \* |  |  |
| **kõ12d** |  |  |  |  | \* | \* |
| kod |  |  | \* |  |  |  |

We see a similar Complex Coda condition coming into play that might influence the fusion of the nasal feature into the vowel in a word like / kõd/ which shows that the Complex coda condition is highest ranked while the linearity IO condition (faithfulness is lowest ranked) even below the DEP and MAX conditions.

The fact that we see the formation of mitor vs mitro even though C/r/ clusters are allowed in onsets, shows that the ALIGN-R constraint blocks the epenthesis on the right edge.

Thus, based on the different constraints and interactions acting within the language, we can summarize that markedness constraints and alignment constraints outrank faithfulness constraints within the language.

Based on all the data considered in this analysis, we can see conclude the ranking of constraints in Gutob as follows

ONS-Cond > \*COMPLEXcoda >AGREE[F] >ALIGN-R> ALIGN-AFX-L ≈ Morpheme Integrity> ALIGN-L >> MAX-IO> DEP-IO > LINEARITY -IO ≈ IDENT[F]

1. **Conclusions**

Gutob-Gadaba is an interesting language that is at the risk of extinction due to social constraints such as displacement, language contact and language identity crises. Many of the younger speakers in these tribes are shifting completely to the lingua france “Desiya” as the mode of communication. Even schools prefer to teach “Oriya” and “Hindi” over the Gutob language to their children. Over the last few years, organizations and scholars have tried to revitalize the interest in Gutob, via special projects and campaigns.

The data collected through the fieldwork of leading scholars like Zide (1963-65), Anderson, Gregory (2003) and ongoing efforts of the Munda lexical archive to collect and annotate Gutob recordings have been immensely useful in the understanding of the phoneme inventory as well as syllable typology and operating constraints within Gutob. From the limited analyses done in this paper, it is evident that in Gutob the markedness constraints (owing to dispreference for clusters and agreement inconsistencies) rank higher than its faithfulness constraints, which is why repair strategies like assimilation, epenthesis etc are common occurences. Alignment constraints are also highly ranked, which is highlighted in the derivational processes (prefixes and infixation).

The language is still relatively understudied due to the lack of data on other processes occuring within the language. More fieldwork and reliable data recordings can help us understand the other constraints operating within the language, and thus help make more succint syllable-based generalizations.

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**8 APPENDICES**

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