



# Post-Lexical Vowel Deletion in Obolo

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## Abstract

Cross-linguistically, there is a tendency for juxtaposed segments in a connected speech to undergo some phonological modifications, which sometimes result in the re-syllabification of segments, for a preferred CV structure, or even a complex structure. One phonological process that conditions re-syllabification is vowel deletion, which is determined by the constraints responsible for regulating the syllable structure of a language. This paper examines the conditioning environments for vowel deletion in the Obolo language, the direction of vowel deletion, and morpheme boundary vowel combinations that do rebuff deletion. Data for the study were elicited from eight informants in the Amadaka speech community of Eastern Obolo Local Government Area of Akwa Ibom State, who were selected through the stratified sampling method. Findings show that in Obolo, vowels occur before stops and nasals in the CV.CV syllables outside a morpheme are generally deleted, while the stop in the affected syllable is always exposed to weakening. This happens after an initial CVC.V syllable is re-syllabified to CV.CV. These cases are regulated by \*VstopV, NOCODA, and \*CV.CV. The high vowels also determine the deletion of their non-high counterparts, implying that they cannot co-occur at morpheme boundary. When preceded by a stop consonant, the high back vowel /u/, together with any other vowel at morpheme boundary also repel deletion, while MAX-+V<sub>2hi</sub> regulates the deletion of V1 when two high vowels occur at morpheme boundary. Naturally, \*CV.CV fails to apply during height-induced V-deletion, thereby necessitating the non-application ranking schema, MCONS >> IO-faith >> MCON, in the analysis. The constraints defined and used in this study show the phonotactics and language-specific ranking schema for Obolo language regarding deletion, for a preferred syllable structure.

**Keywords:** re-syllabification, vowel deletion, morpheme boundary, constraints, non-application.

## 1. Introduction

Both pitch and segmental phonemes in human languages do undergo some phonological changes since during inter-connected speech, sounds are not disjointedly articulated one after the other but strung together to form words. Between the two splits of human speech sounds known in the world's languages, vowels are the articulatorily unobstructed since they are produced without any audible obstruction of air as it passes from the lungs to the oral/nasal speech organs. A vowel, from its singular property of no-obstruction, could be termed a resonator continuant oral/nasal sound. It is a fact that vowels, just like consonants, do undergo some phonological processes due to their occurrence or juxtaposition with other vowels or even consonant sounds (Schane, 1973). One of such processes is vowel deletion – a syllable structure process. Udoh (1996) quotes Crystal (1991) as seeing deletion to be the omission of sound segments in certain environments in connected speech. The expression, 'connected speech', suggests that vowel deletion takes place in inter-word situations (that is, not within a word). There are, however, cases of intra-word vowel deletion in a language like Ibibio (Urua, 1990; 2000). The present work looks at cases of vowel deletion at the post-lexical level in the Obolo language, using Optimality Theory (OT) as the framework.

The Obolo people generally are people from Andoni Local Government Area in Rivers State (which is now known as the Obolo West) and Eastern Obolo Local Government Area in Akwa Ibom State. The Obolo people are part of the Ijaw tribe. They are related to the Anaañ and Ibibio people of Akwa Ibom State and the Efik people of Cross River State in Nigeria. They are considered as a distinct ethnic linguistic group by others. The Andoni people are also called the Obolo people and they speak Obolo as their only native language.

According to Faraclas (1982), Obolo is a language spoken by about two hundred thousand (200,000) people living in the east corner of the Niger Delta region in Nigeria facing the Atlantic Ocean. Obolo refers to the language, the people, and their homeland. Obolo language is closely related to Akwa Ibom and Cross River State languages better known as Lower Cross languages. Many Obolo speakers speak Igbo and Ibibio as their second languages while the younger generation speaks Pidgin English and/or Nigerian Standard English in addition to the Obolo language. Obolo language is classified along with the Cross River groups of the Benue-Congo language (Faraclas, 1982, 1984). It belongs to the Western part of the Lower Cross languages based on the classification by Blench and Dendo (2004), and Connell (1994).

## 2. Theoretical Issues

This work revolves around the Optimality Theory (OT) - a theory that successfully juxtaposes the complexity and idiosyncrasy of each language's phonology and morphology with the clarity and abundance of solid typological generalizations using ranking permutations. Optimality Theory is neither rule-based nor transformational. Rather, it is

comparative as it compares candidates by applying a hierarchy of violable constraints to assess their forms and relationships (McCarthy, 2008). Following Prince and Smolensky (1993), these said constraints are universal. Universal Grammar consists of a constraint component **CON** that contains the entire repertoire of constraints that are present in the grammars of all languages. In that case, constraints are not language-specific statements of phonotactic truths but universal statements of languages' grammars with several formulations. Therefore, these violable constraints are universal, while individual grammars are constructed by imposing a ranking on the Universal set of constraints.

OT proposes that Universal Grammar contains a set of violable constraints which spell out some universal properties of language. These violable constraints, which are always in conflict, are of two types – faithfulness and markedness constraints. Markedness constraints require output forms to meet some structural well-formedness criterion while faithfulness constraints require that outputs preserve the properties of their basic (lexical) forms i.e. prohibits differences between the output and input (Archangeli, 1997; Kager, 1999a; McCarthy, 2008). Since every linguistic output form has to be optimal, it follows that it incurs the least serious violations of a set of conflicting constraints.

The application of constraints in OT for linguistic analysis suggests, according to Prince and Smolensky (2001), and McCarthy (2008), that OT holds more explanatory force than the rule-based analysis. OT sees the ability to explain the phonological scenario during a given analysis as the missing link between rules and constraints.

### 3. Vowel Deletion in Obolo

#### 3.1 Intra-Word Vowel Deletion

In Obolo language, intra-word vowel deletion results from a truncated syllable within a word, due to fast or connected speech. There are two possible reasons for this: it is either that the language does not permit a vowel before a tap [ɾ] or does not allow a CV.CV syllable structure.

##### 1. Intra-Word Vowel Deletion in Obolo

S/N	Before Deletion	After Deletion	Gloss
A	e.kì.rì.kà v.CV.CV.CV	[é.krì.kà] v.CrV.CV	Harmattan
B	m̄.bá.ká.rá.kád N.CV.CV.CV.CVC	[m̄.bá.krá.kád] N.CV.CrV.CVC	A type of fish
C	í.ká.rí.kád v.CV.CV.CVC	[í.krí.kád] v.CrV.CVC	Spherical object
D	é.lé.kí.rí.ɲe v.CV.CV.CV.CV	[é.lé.krí.ɲé] v.CV.CrV.C	Clock
E	bì.rì.bì.rì CV.CV.CV.CV	[brì.brì] CrV.CrV	Trickster
F	gwá.rá.lék	[g <sup>w</sup> rá.lék]	Fast

	CCV. CV. CVC	CrV.CVC	
G	bú.rú.bú.rú CV.CV.CV.CV	[brú.brú] CrV.CrV	Very early in the morning. (ideophonic expression)
H	ɔ.mɔ.rɔ.kɔ V.CV.CV.CV	ó.mró.kó V.CrV.CV	Sugar cane

The demonstration concerning intra-word vowel deletion is for an appreciation of the post-lexical cases that are examined later. Overall, the CrV syllable replaces the CV.CV syllable structure; implying that the CV.CV syllable may be marked in Obolo.

### 3.2 Pre-Morpheme Boundary Vowel Deletion in Obolo

Obolo has cases of post-lexical vowel deletion (before morpheme boundary) where the structure ought to have been CV.CV, but is constrained to become a CrV syllable. The syllabification is done in the underlying form (in ‘before vowel deletion’ column) while the actual (surface) syllabification is represented in ‘after vowel deletion’ column. This scenario suggests that the CrV syllable is a well-formed, unmarked, and (maybe) inevitable structure in Obolo, especially when there is a CV.CV structure. It also suggests that the CV.CV syllable structure is marked and dispreferred in the Obolo language. Therefore, a constraint to regulate this phonological scenario in Obolo is:

1. **\*CV.CV**  
CV.CV syllable is marked
2. Pre-Morpheme Boundary Vowel Deletion in Obolo

S/N	Before Vowel Deletion	After Vowel Deletion	Gloss
A	i.bot + é.bót → /i.bo.té.bót/ Head + goat V.CV.CV.CVC	[i.bré.bót] V.CrV.CVC	Head of a goat
B	ú.fít + é.lék → /ú.fí.té.lék/ dark + body V.CV.CV.CVC	[ú.fré.lék] V.CrV.CVC	Dark in complexion
C	é.zít + ò.gú.bǎñ → /é.zì.tò.gú.bǎŋ/ heart + king V.CV.CV.CV.CVC	[é.zrò.gú.bǎŋ] V.CrV.CV.CVC	Heart of a king
D	ú.zád + é.lék → /ú.zá.dé.lék/ Pain + body V.CV.CV.CVC	[ú.zré.lèk] V.CrV.CVC	Body pains
E	téd + ú.bək → /té.dú.bək/ Hold + hand CV.CV.CVC	[trú.bək] CrV.CVC	Hold with hands
F	ʃít + ó.tú → /ʃí.tó.tú/ close + mouth CV.CV.CV	ʃró.tú CrV.CV	Shut-up
G	dút + ú.zé → /du.tú.zé/ Drag along CV.CV.CV	[drú.zé] CrV.CV	Drag along

H	tét + ì.ríñ → /te.tì.ríj/ catch fish CV.CV.CVC	[tɾì.ríj] CrV.CVC	Catch fish
I	í.bát + é.lék → /í.ba.tê.lék/ dirty body V.CV.CV.CVC	[í.brê.lék] V.CrV.CVC	Dirty body
J	mèn + átáák → /mè.ná.táák/ swallow + saliva CV.CV.CVVC	[mrá.táák] CrV.CVVC	Swallow saliva
K	é.bón + ótú → /é.bó.nó.tú/ joint + mouth V.CV.CV.CV	[é.bró.tú] V.CrV.CV	Jaw bone
L	bén + à.nám → /bé.nà.nám/ Carry + meat CV.CV.CVC	[bré.nám] CrV.CVC	Carry meat
M	i.mèn + ó.tú → /i.mè.nó.tú/ Big + mouth V.CV.CV.CV	[í.mró.tú] V.CrV.CV	Big mouth
N	é.gú.rú.wú + í.sí → /é.gú.rú.wú + í.sí/ sweat + face V.CV.CV.CV + V.CV	[é.g <sup>w</sup> ú.rú.wú.sí] V.CrV.CV.CV	Facial sweat

The data in example 2 show a re-syllabification of the underlying words when they come together. This re-syllabification follows the maximal onset principle which states that intervocalic consonants are maximally assigned to the onsets of syllables in conformity with universal and language-specific conditions. Here, unless doing so would violate universal or language-specific constraints, consonants should be assigned to the syllable onsets rather than the syllable coda. For example a sequence like i.bot + é.bót (head + goat) is not syllabified as \*i.bot.é.bót (V.CVC.V.CVC) but i.bo.té.bót (V.CV.CV.CVC), following this principle. This principle is regulated by the constraint:

### 3. NOCODA Codas are marked

The re-syllabification brings the stop consonants in (a-i) to an intervocalic environment, which would naturally get it weakened (or spirantised). This would have made /i.bo.té.bót/ to become /i.bo.ré.bót/, but it is rather realised as [i.bré.bót]. A consonant sound undergoes weakening when, due to some phonological conditioning, it is realised as a sound in the lower rung of the strength hierarchy. As put by Katamba (1989), the consonant strength scale has the stops on the highest rung while the approximants are found on the lowest rung. This is shown thus:

### 4. Consonant strength hierarchy (Goldsmith, 1990)

Stops >> Affricates >> Fricatives >> Nasals >> Liquids >> Glides

The most prevalent cases of weakening are from stops to fricatives or continuants. The triggering environment is an intervocalic one, which is regulated by a constraint which shows a preference for weaker segments in intervocalic environments, especially at morpheme boundary position.

5. **\*Vstop+V**  
Morpheme boundary intervocalic stops are marked

A serial illustration of maximal onset-induced re-syllabification, consonant weakening and vowel deletion-induced re-syllabification in i.bot + é.bót would be:

6. a. /i.bot.é.bót/ → b. /i.bo.té.bót/ → c. /i.bo.ré.bót/ → d. [i.bré.bót]

Since Optimality Theory is not a theory of serialisation, it does not recognise units (b) and (c) in (6), but only (a) and (d), which are the input and output. From the composition of the output [i.bré.bót], there is no correspondence relation with the input. This is analysed through interaction with faithfulness constraints like:

**MAX-IO (S)**

Don't delete any segment in the input from the output

**DEP-IO (S)**

Don't insert any segment in the output

**IDENT-IO (S)**

Segments in the input and output must be identical in feature values

Using the markedness and faithfulness constraints, Tableau 1 has the analysis (the ranking schema is indicated for each tableau to show how re-syllabification applies after V-deletion).

**Tableau 1: MCONS >> IO-faith**

	/i.bo.té.bót/	NOCODA	*Vstop+V	*CV.CV	MAX-IO (S)	DEP-IO (S)	IDENT-IO (S)
a.	i.bot.é.bót v.CVC.V.CVC	**!W	*W			L	L
b.	i.bo.té.bót v.CV.CV.CVC	*	*!W	*W		L	L
c.	i.bo.ré.bót v.CV.CV.CVC	*		*!W		L	* (r)
d.	i.bré.bót v.CrV.CVC	*			*W(o)	L	* (r)
e.	i.bor.é.bót v.CVC.V.CVC	**!W				L	* (r)
f.?	i.bo.oo.ré.bót v.CVV.CV.CVC	*				* (o)	* (r)

Candidate (f) is not an acceptable form in Obolo, so even when it seems to win, it has a question mark placed against the hand-winning pointer (?<sup>h</sup>). Its winning status seems to be a result of a poor ranking of faithfulness constraints. In a construction like this, insertion and deletion are both violations; but segment deletion is a graver violation than insertion, hence the need to rank the former lower than the latter. Therefore, if the F-CONS are re-ranked to make the anti-insertion constraint rank higher than the anti-deletion constraint, the optimal candidate would win in the competition. This bears out in tableau 2.

**Tableau 2: MCONS >> IO-faith**

	<b>/i.bo.té.bót/</b>	<b>NoCODA</b>	<b>*Vstop+V</b>	<b>*CV.CV</b>	<b>DEP-IO (S)</b>	<b>MAX-IO (S)</b>	<b>IDENT-IO (S)</b>
a.	i.bot.é.bót V.CVC.V.CVC	**!W	*W			L	L
b.	i.bo.té.bót V.CV.CV.CVC	*	*!W	*W		L	L
c.	i.bo.ré.bót V.CV.CV.CVC	*		*!W		L	* (r)
d.	<sup>h</sup> i.bré.bót V.CrV.CVC	*				* (o)	* (r)
e.	i.bor.é.bót V.CVC.V.CVC	**!W				L	* (r)
f.	i.booo.ré.bót V.CVV.CV.CVC	*			*W (o)	L	* (r)

It is worthy to note once again that the \*CV.CV constraint is inevitable in the phonology of Obolo, because, other MCONS notwithstanding, its exclusion would spell doom for the optimal and acceptable candidate. The analysis in Tableau 3 shows this.

**Tableau 3: MCONS >> IO-faith**

	<b>/i.bo.té.bót/</b>	<b>NoCODA</b>	<b>*Vstop+V</b>	<b>DEP-IO (S)</b>	<b>MAX-IO (S)</b>	<b>IDENT-IO (S)</b>
a.	i.bot.é.bót V.CVC.V.CVC	**!W	*W			L
b.	i.bo.té.bót V.CV.CV.CVC	*	*!W			L
c.	? <sup>h</sup> i.bo.ré.bót V.CV.CV.CVC	*				* (r)
d.	i.bré.bót V.CrV.CVC	*			*W (o)	* (r)
e.	i.bor.é.bót V.CVC.V.CVC	**!W				* (r)



f.	i.boó.ré.bót V.CVV.CV.CVC	*		<b>*W (o)</b>		<b>* (r)</b>
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Candidate (c) is not an acceptable form in Obolo. It wins because of non-inclusion of the mattering constraint \*CV.CV in the analysis. Even when a candidate (d) did not incur a violation as to MAX-IO(S), there would have been a tie between candidates (c) and (d). Therefore, as far as vowel deletion at the post lexical (even lexical) level is concerned, \*CV.CV has to be used for analysis because it calls for syllable re-organization.

Data (j) – (m) in example (2) show that coda nasals are re-syllabified to have a CrV syllable just like (a) – (i). In this case, however, the nasal feature changing to tap is not as a result of stop weakening, but from the fact that Obolo does not permit a CV.CV syllable and at the same time replaces this unwanted syllable structure with the CrV syllable. This could be shown using:

7. mèn + átáák → /mè.ná.táák/ CV.CV.CVVC → [mrá.táák] CrV.CVVC.

We use the same constraints for analysis of stop consonants.

**Tableau 4: MCONS >> IO-faith**

/mè.ná.táák/ CV.CV.CVVC	NOCODA	*CV.CV	DEP- IO (S)	IDENT- IO (S)	MAX- IO (S)
a. mèn.á.táák CVC.V.CVVC	<b>**!W</b>				<b>L</b>
b. mè.ná.táák CV.CV.CVVC	*	<b>*!W</b>			<b>L</b>
c. mè.náa.táák CV.CVV.CVVC	*		<b>*!W (a)</b>		<b>L</b>
d. mrá.táák CrV.CVVC	*			<b>*!W (r)</b>	<b>* (e)</b>
e. ?  mná.táák CCV.CVVC	*				<b>* (e)</b>

Candidate (e) is not supposed to win this competition because it is not acceptable. This is because the right constraint has not been introduced in the analysis. It is one thing to have a CV.CV syllable reorganised but another to have a CrV syllable from it, not CCV.

Therefore, a constraint which specifies the existence of the CrV syllable is necessary, since this is an inevitable part of the Obolo phonology. Therefore, we have:

8. **CrV**  
Have a CrV syllable

Let us see how this works in the next analysis.

**Tableau 5: MCONS >> IO-faith**

/mè.ná.táák/ CV.CV.CVVC	NOCOD A	*CV.CV	CrV	DEP- IO (S)	IDENT- IO (S)	MAX- IO (S)
a. mèn.á.táák CVC.V.CVVC	**!W		*W		L	L
b. mè.ná.táák CV.CV.CVVC	*	*!W	*W		L	L
c. mè.náa.táák CV.CVV.CVVC	*		*!W	*W (a)	L	L
d. mrá.táák CrV.CVVC	*				*(r)	*(e)
e. mná.táák CCV.CVVC	*		*!W		L	*(e)

The analysis in Tableau 5 shows that the MCONS and FCONS, as well as their proper ranking, are very important for the survival of optimal candidates.

### 3.3 Height-induced Vowel Deletion in Obolo

In this section, we look at cases of vowel deletion that are quite different from the ones already discussed. Instead of deleting a vowel from a sequence of sounds on account of preference for a CrV over and above a CV.CV syllable, vowels could be deleted because of some height-related issues. This is discussed in the following sections.

#### 3.3.1 Non-High Vowel Deletion

Obolo has a case of vowel hiatus which is resolved by deleting a non-high vowel in the sequence. That is, in contexts of morpho-syntactic concatenations, when the ending vowel of the first word faces the first vowel of the second word in a morpheme boundary, the high one survives in that boundary while the non-high gets elided. The following data bear this out.

9. Non-high vowel deletion (at morpheme boundary)

- |      |  |   |                       |                |
|------|--|---|-----------------------|----------------|
| i.   | /édí + édí/<br>V.CV + V.CV<br>plural marker pig    | → | [édídí]<br>V.CV.CV    | ‘pigs’         |
| ii.  | /édí + ókòk/<br>V.CV V.CVC<br>plural marker lizard | → | [édíkòk]<br>V.CV.CVC  | ‘lizards’      |
| iii. | /mé + ìzòn/<br>CV V.CVC<br>on floor                | → | [mìzòn]<br>CV.CVC     | ‘on the floor’ |
| iv.  | /ìkpá + ùkòt/<br>V.CV V.CVC<br>leather leg         | → | [ìkpùkòt]<br>V.CV.CVC | ‘shoe’         |
| v.   | /ògù + áfiá/<br>V.CV V.CVV<br>person herbal        | → | [ògùfiá]<br>V.CV.CVV  | ‘herbalist’    |

The case of morpheme boundary vowel deletion in Obolo, constrained by vowel height in 9 (i-v) is also attested in other Lower Cross languages. For instance, earlier studies by Essien (1990), Urua (2000), *et cetera*, show this case in the Ibibio language; while Cook (1985) accounts for it in Efik. This is an indication that vowel deletion of this nature is a cross-linguistic phonological phenomenon.

From the foregoing, it is safe to posit that, much as a high and non-high vowel may not stay together at morpheme boundary in a morpho-syntactic construction, it is phonologically ill-formed to delete a high vowel at morpheme boundary in Obolo. It, therefore, becomes pertinent to give the desired pep and explicitness to this phonological scenario by invoking the following constraints:

**Constraints:**

- a. \*V<sub>[-hi]</sub>+V<sub>[+hi]</sub>: No non-high and high vowels at morpheme boundary (Udoh, 2016).
- b. MAX-+V[hi]: Do not delete high vowel at morpheme boundary.
- c. MAX – IO: Do not delete input from the output.

The utilization of these constraints is justified in the analysis that follows.

**Tableau 6: MCONS >> IO-faith**

/mé+ìzòn/	*V <sub>[-hi]</sub> +V <sub>[+hi]</sub>	MAX-+V[hi]	MAX-IO
a. $\text{mizòn}$			* (e)
b. mézòn		*!W	* (i)
c. méìzòn	*!W		L
d. mzòn		*!W	**W (e, i)

It is pertinent to point out that the constraint MAX-+V[hi] is very vital in constructions like this; else, the optimal candidate would have been held to a bracket by a candidate like (b). It goes to reiterate the fact that the Obolo phonology does not permit the deletion of a high vowel at morpheme boundary. Therefore, in addition to the structural requirement that, a high and non-high vowel should not face each other at morpheme boundary position, this faithfulness constraint is a given in Obolo. From the table above, candidate A is the winner of the contest on the tableau because it does not violate the highest-ranked constraints, which makes it the most optimal candidate, describing the forms spoken by the Obolo people.

From the table, a descriptive statement such as “Obolo does not permit high vowels occurring with low vowels at morpheme boundary position” can be made with a high degree of certainty following the language’s constraints as displayed in the tableau above. This is more so because, the exclusion of the markedness constraint, \*V<sub>[-hi]</sub>+V<sub>[+hi]</sub> from the analysis would have been disadvantageous to the winners of the wellformed candidate A. Therefore, the faithfulness and markedness constraints work together to ensure accurate explanations for wellformed outputs in linguistic constructions.

Another fact deserves mention and elucidation at this point. It could be recalled that \*CV.CV as a constraint was needed in the analysis of vowel deletion before the morpheme boundary (cf. section 3.2). In that morpho-phonological make-up, the first V (always preceding a morpheme boundary) in an underlying CV.CV syllable is deleted, to realize a CrV syllable. Therefore, re-syllabification as a process applies in that case. However, a situation has shown up in Obolo constructions where the CV.CV syllable subsists. In 9, *édí* + *édí* (plural marker + pig) becomes *édídí* ‘pigs’ after the deletion of the non-high /e/ at morpheme boundary (this is also observed in examples 10 a-e). Therefore, CV.V.CV rewrites as CV.CV. Nonetheless, this does not mean that the constraint \*CV.CV is incongruous in Obolo. It is mainly apt in constructions where vowel deletion does not involve height, but just resyllabification of a CV.CV syllable to CrV due to certain phonological conditions. By the same token, it implies that \*CV.CV only applies in inputs with CV.CV to derive a different output (CrV).

Conversely, when a CV.CV syllable becomes the output of a CV.V.CV syllable through V-deletion, it means that \*CV.CV (resyllabification to CrV) fails to apply in the

language. Following McCarthy and Prince (1995), who describe non-application as a situation where a phonological process fails to apply in a given environment, Udoh and Udoh (forthcoming) modified a schema for non-application, thus: MCONS >> IO-faith >> MCON. This non-application of \*CV.CV in Obolo only holds sway in constructions with height-conditioned vowel deletion. We now compare the normal application ranking schema with that of non-application, to justify the existence of CV.CV outputs and a selective application of \*CV.CV in Obolo.

**Tableau 7: MCONS >> IO-faith**

/édí + édí /	*V[hi]+V[hi]	*CV.CV	IDENT-IO	MAX-+V[hi]	MAX-IO
a. é.dí.dí		*!W	L		*W (e)
b. é.dé.dí		*!W	L	*W	*W (i)
c. é.dí.é.dí	*!W		L		
d. ? é.díí.dí			* (i)		
e. ? é.déé.dí			* (e)		

With the normal application ranking schema (MCONS >> IO-faith), candidate A, which is the well-formed construction, fails to surface as the winner. Candidates D and E have done well in the competition, but the problem is that there is a tie between both of them. They are ill-formed in Obolo and none of them can stand out in the competition. The only way out is to look at the fact that \*CV.CV does not apply in height-induced post-V-deletion output forms. This then calls for the ranking schema for non-application of processes. To show this non-application, the \*CV.CV constraint that failed to apply is taken from the MCONS section and downtrodden to rank after all IO-faith constraints; hence the schema MCONS >> IO-faith >> MCON. The next analysis bears this out.

**Tableau 8: MCONS >> IO-faith >> MCON**

/édí + édí /	*V[hi]+V[hi]:	IDENT-IO	MAX-+V[hi]	MAX-IO	*CV.CV
a. é.dí.dí				* (e)	*
b. é.dé.dí			*!W	* (i)	*
c. é.dí.é.dí	*!W			L	L
d. é.díí.dí		*!W (i)		L	L
e. é.déé.dí		*!W (e)		L	L

The well-formed construction, *é.dí.dí* comes out as the winner because the constraints with their ranking have no problem. This ranking may be used to analyse any height-related vowel deletion and subsequent re-syllabification in Obolo. The next section examines a height-related vowel deletion which sees the second vowel in a morpheme boundary consistently resisting deletion.

### 3.3.2 High Vowel Deletion Based on Preceding High Vowel

In a situation where none of the vowels in a hiatus is higher than the other, Obolo, which, like some other languages, does not accept hiatus, gets this phonological situation resolved by deleting the first (V1) of the two juxtaposed high vowels at morpheme boundary. This is illustrated in the following data:

#### 10. High V1 deletion in Obolo

- |    |                         |   |              |               |
|----|-------------------------|---|--------------|---------------|
| a. | /úwú + ilé/             | → | [úwílé]      | ‘big house’   |
| b. | /édí + úsèm/            | → | [édúsèm]     | ‘languages’   |
| c. | /úwú + ízí/             | → | [úwízí]      | ‘our house’   |
| d. | /òwú + íré + aja + néé/ | → | [òwíréjanéé] | ‘you are new’ |
| e. | /émém + úwú + ikpà/     | → | [émémúwikpà] | ‘at school’   |

V1 deletion may not just be a fall out of two high vowels in a boundary sequence but may also involve non-high vowels. In his 1997 work, Casali (1997) observes the latter case in Etsako (a Niger-Congo language), where a word-final vowel is often elided before a following word-initial vowel, irrespective of the height. In trying to offer explanations to this scenario, Casali (1997) proposed that the universal set of constraints accountable for this includes a position-sensitive constraint which favours the preservation of segments in certain morphological or prosodic positions. In correspondence with the word-initial position, he posited the constraint, MAXWI that demands the preservation of word-initial segments. In addition to this faithfulness constraint, it is pertinent to be particular about the ill-formedness of two high vowels facing each other at morpheme boundary in Obolo morpho-syntactic constructions. The following constraints regulate this phonological scenario:

#### Constraints:

- a. MAXWI: Every word-initial segment in the input must have a corresponding segment in the output
- b. \*V[hi]+V[hi]: No two high vowel occurring together at morpheme boundary.
- c. IDENT-IO: Let input and output segments be identical
- d. MAX-IO: Do not delete input from the output.

**Tableau 9: MCONS >> IO-faith**

/édí+úsèm/	*V[hi]+V[hi]:	MAXWI	IDENT-IO	MAX-IO
a. éédúsèm				* (i)
b. édíúsèm	*!W			L
c. édíúsèm		*!W		* (u)
d. édíásèm		*!W	*W (a)	

The analysis in Tableau 9 shows how prominent \*V[hi]+V[hi] is, in this kind of hiatus situation. The wellformed candidate A would not have come out good if this MCON were not included in the analysis. The FCON, MAXWI is equally very important in this kind of morpho-syntactic constructions in Obolo language, as its exclusion would have resulted in a stalemate between the optimal candidate A and ill-formed candidate C. Therefore, the constraints and ranking in tableau 9 are suitable for hiatus situations with two high vowels and may prove so cross-linguistically.

#### 4. Conclusion

The phonological scenario in Obolo vowel deletion is unique when compared with three of its Lower Cross counterparts - Efik, Ibibio and Anaañ. In these three languages, vowel deletion is mainly determined by height, where high vowels consistently rebuff deletion in the face of a non-high vowel, especially at morpheme boundary position (cf. Cook, 1985; Urua, 1990, 2007; Udoh, 2004; Udoh, 2016). In that case, they share in common, \*V<sub>[-hi]</sub>+V<sub>[+hi]</sub> and MAX-+V[hi] during an analysis of vowel deletion. However, these languages do not attest to the situation whereby a CrV is derived from a CV.CV syllable at morpheme boundary after the deletion of the first V and weakening of the second C to a tap. This is the thesis of this paper: Obolo is interestingly constrained to change a CV.CV syllable to a CCV (CrV) given that the second C is a stop (oral or nasal). This phonological change applies normally, only in constructions with pre-morpheme boundary vowel deletion; but fails to apply in those with height-induced vowel deletion.

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