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An Optimality Analysis of Hiatus Resolution Strategies in Olusuba

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Abstract

Vowel hiatus is a prohibited configuration of vowels in many languages of the world. This study is established to examine strategies used to resolve vowel hiatus in Olusuba, a Bantu language spoken in parts of Kenya, Tanzania and Uganda, within the framework of Optimality Theory (OT). The work describes two vowel processes used as hiatus resolution strategies in Olusuba. Well-formedness of data obtained in this study are analysed using OT. The theory explains how constraints interact to optimise the output in this language. Using descriptive analytic research design and following the available data obtained from native speakers of Olusuba, this paper provides two vowel processes used as strategies in resolving a sequence of dissimilar vowels in the language under study.

Keywords: Hiatus, Olusuba, optimality, resolution, strategies.

Introduction

Hiatus is a phonological phenomenon in which case two dissimilar vowels occur in a sequence without an insertion of any consonantal sound to break it. This phenomenon as observed by Mudzingwa and Kadenge (2011) and Ondondo (2013), is a prohibited configuration in many languages of the world as it is usually difficult to articulate syllables with adjacent dissimilar vowels (Nandelenga, 2014; Ondondo, 2013 & Tanner (2006). Therefore, vowel hiatus resolution strategies are always brought into play to repair such marked sequences. As observed by Mudzingwa and Kadenge (2011), there are cross-linguistic variations on when and how vowel hiatus is resolved. One of the most common hiatus repair strategy is glide formation which is observable in Olusuba. There are five phonemic vowels in Olusuba. The vowels are /a/, /e/, /i/, /o/ and /u/. These vowels can occur in sequences in Olusuba if and only if they are similar. A sequence of dissimilar vowels is disallowed in Olusuba as it causes vowel hiatus that makes articulation difficult. This calls for glide formation or vowel assimilation to repair the configuration as discussed in the following sections. Dissimilar vowel sequences in Olusuba can occur at two major boundaries: morphological boundaries and syntactic boundaries. This study is limited to dissimilar vowel sequences that occur within roots and those that occur at morphological boundaries.

Methodology

The study was conducted in Mfangano Island where most native speakers of Olusuba are settled (Gordon, 2005; Mhando, 2008; Ogone, 2010 & Rottland & Okombo, 1992). The target population for this research was native speakers of Olusuba. The study used snowball sampling technique to identify subjects from the target population. From the accessible population, the researcher purposively sampled 3 informants who were used in generating and verifying data. Data in this study was collected through elicitation, audio recording using the Swadesh list, an elicitation frame and audio recorder. It is during elicitation and play-back of the audio-recorded data that the researcher took note of phonological changes that are morphology based.

Result and Discussion of Findings

Glide Formation

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Glide formation is a process whereby a high vowel changes its phonological qualities of a vowel hence its assumption of consonancy in order to break up a hiatus complex (Kadenge, 2010).This process takes place in Olusuba both tautomorphemically and heteromorphemically. [2]

Heteromorphemically, when the high front vowel /i/ is followed by any of the four vowels /a, e, o, u/, the high front vowel /i/ glides to the approximant /y/ hence a repair of the vowel hiatus. This kind of gliding happens with noun class prefixes and noun roots as shown in (1), as well as with inflectional prefixes and verb roots as seen in (2).

1. a)SR: *e-ky-aagi*
   UR: *e-ki-agi*
   AUG-7-burn
   'burn'

   b) SR: *e-ry-uuwa*
   UR: *e-ri-uwa*
   AUG-5a-sun
   'sun'
2. a) SR: *ry-eet-a*
   UR: *ri-et-a*
   5S-call-IND
   'it calls'

   b) SR: *ky-oonek-a*
   UR: *ki-onek-a*
   7S-preserve-IND
   'it preserves'

Glide formation also happens heteromorphemically when the high back vowel /u/ is followed by any of the four vowels /a, e, i, o/. When this happens, the high back vowel /u/ glides to /w/ thus breaking the vowel hiatus. The gliding of the high back vowel /u/, just like the high front vowel /i/, occurs at morphological boundaries with noun class prefixes and noun roots as seen in (3), as well as with inflectional prefixes and verb roots as example (4) illustrates.

3. a) SR: *o-mw-aana*
   UR: *o-mu-ana*
   AUG-1-child
   'child'

   c) SR: *o-mw-iiko*
   UR: *o-mu-iko*
   AUG-3-cooking stick
   'cooking stick'
4. a) SR: *gw-eet-a*
   UR: *gu-et-a*
   3S-call-IND
   'they call'

   b) SR: *tw-oowok-a*
   UR: *tu-owok-a*
   1Spl-burst-IND
   'we burst'

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[2] In the process of gliding of a high vowel in Olusuba, the following vowel is lengthened to compensate for mora lost when a high vowel glides hence a long vowel in the Surface Representation (SR) which misses in the Underlying Representation (UR).

Glide formation in Olusuba is also seen to occur tautomorphemically. However, there are no underlying forms for the tautomorphemic sequences. Given that there are pieces of evidence for this phenomenon in Olusuba with heteromorphemic sequences as discussed above, tautomorphemic sequences are also given similar treatment in this language. Consider the data in examples (5) and (6).

5. a) *o-mu-zyaala*
AUG-1-uncle
'uncle'

b) *zyuuk-a*!
raise-2Ssg
'Raise!'

6. a) *swaawuk-a*!
cane-2Ssg
'Cane!'

b) *o-wu-lwiire*
AUG-14-disease
'disease'

OT Analysis of Glide Formation

Glide formation, as discussed in section 3.1, is meant to repair sequences of dissimilar vowels. For this to be achieved in Olusuba, as in other Bantu languages, a constraint that works against vowel hiatus is invoked (Ondondo, 2013). This constraint is given in (a).

a) *HIATUS: Two adjacent vowels cannot be linked to two sets of features (Pulleyblank, 2003 & Tanner, 2006). This constraint is inviolable in Olusuba as this language does not permit a sequence of dissimilar vowels. Whenever this sequence occurs a resolution strategy is employed to repair the sequence. For this to be achieved, this constraint must be undominated.

Any glide formation in Olusuba result into incorrespondence between the output and the input as a glide which is not in the input surfaces in the output. In the analysis of this process, a faithfulness constraint that works against incorrespondence between the output and the input is invoked. Following violability of this constraint by an optimal candidate, it is ranked relatively low in Olusuba's hierarchy. The constraint is stated in (b).

b) IDENT-IO: Every element in the input has a correspondence in the output (McCarthy & Prince, 1995) When gliding takes place in Olusuba, moraic affiliation of the input is always maintained in the output by the lengthening of the following vowel. For the maintenance of the moraic affiliation in the output, a faithfulness constraint that ensures preservation of a mora is brought into play. This constraint is as explained in (c).

c) IDENT-μ: Mora in the output must have the same moraic affiliation as their correspondents in the input (Prince & Smolensky, 2004 & Tanner, 2006).

To attain optimality in the selection of candidates, the constraints above are ranked as shown below:
*HIATUS >> IDENT-μ >> IDENT-IO

The tableau below shows how these constraints interact when the high front vowel /i/ glides to the approximant /y/.

kiagu ~ kyaagu	*HIATUS	IDENT-μ	IDENT-IO
☞a) kyaagu			*
b) kyagu		*!	*
c) kiagu	*!		

The surfacing of candidate (c) in the same form as the input causes it to violate the highest ranked constraint *HIATUS as it displays vowel hiatus prohibited by the constraint. This violation causes its disqualification. Candidate (b) on the other hand, is disqualified on the ground that it violates the constraint IDENT-μ which works for maintenance of mora count of the input in the output. Having satisfied the two highly ranked constraints, candidate (a) is selected as the best candidate.

The constraints above interact in the same way in selecting the best candidate when the high back vowel /u/ glides to the approximant /w/ as shown in the tableau below.

omuana ~ omwaana	*HIATUS	IDENT-µ	IDENT-IO
☞a) omwaana			*
b) omwana		*!	*
c) omuana	*!		

Candidate (c) display a sequence of dissimilar vowels thus violating the highest ranked constraint *HIATUS that prohibits vowel hiatus. This violation causes its disqualification. Candidate (b) is disqualified following the fact that it does not compensate for the mora lost when the high back vowel /u/ glides to /w/ thus violating the constraint IDENT-µ. This constraint works for maintenance of mora count of the input in the output. Despite its violation of the lowest ranked constraint IDENT-IO, candidate (a) is still picked as the best candidate following its satisfaction of the two highly ranked constraints which the other candidates violate.

Vowel Assimilation

Vowel assimilation is a process through which a neighbouring vowel segment is made similar or more similar to another vowel by duplicating a phonetic feature (Dirven, 2004). This process happens in Olusuba when a sequence of dissimilar vowels occurs at a morpheme boundary. In this case, a vowel is made similar to another vowel as shown in the data in examples (7) and (8).

7. SR: *e-ewok-a*
UR: *e-owok-a*
9S-spill-IND
'it spills'
8. SR: *a-mi-iso*
UR: *a-ma-iso*
AUG-6-eye
'eyes'

Two types of assimilation take place in Olusuba: regressive assimilation and progressive assimilation. Regressive assimilation occurs when the vowel that undergoes a change (target vowel) precedes the vowel that trigger the change as seen in (9).

9. SR: *a-mi-ino*
UR: *a-ma-ino*
AUG-6-tooth
'teeth'

Progressive assimilation on the other hand, occurs when the target vowel comes after the trigger vowel as shown in example (10).

10. SR: *e-egal-a*
UR: *e-agal-a*
9S-want-IND
'it wants'

Assimilation occurs at two morphological boundaries in Olusuba: affix-root boundary and affix-affix boundary. The following sub-sections are discussions of assimilation at the two morphological boundaries.

3.3.1 Assimilation at Affix-Root Boundary

Assimilation at affix-root boundary occurs when adjacent vowels at a boundary of an affix and a root are made to be similar through duplication of phonetic features of the adjacent vowels.

In Olusuba, assimilation at affix-root boundary happens with noun class prefixes and noun roots, as well as with inflectional prefixes and verb roots both regressively and progressively. Regressive assimilation at affix-root boundary occurs in an environment where the first vowel is the low vowel /a/ and the following vowel is any of the four vowels /e, i, o, u/. This happens with noun class prefixes and vowel initial noun roots as illustrated in (11), as well as with inflectional prefixes and vowel initial verb roots as seen in the data in example (12).

11. a) SR: *a-me-eru*
UR: *a-ma-eru*

AUG-6-white
'the/a white'

b) SR: *a-mo-owa*
UR: *a-ma-owa*
AUG-6-mushroom
'mushroom'

12. a) SR: *tu-ne-et-a*
UR: *tu-na-et-a*
1Spl-NERF-call-IND
'we will call (very soon)'

b) SR: *tu-ku-uz-a*
UR: *tu-ka-uz-a*
1Spl-REMP-will-IND
'we would (long ago)'

It is uncommon in Olusuba for noun roots to begin in the high back vowel /u/.

Assimilation at affix-root boundary can also occur progressively in Olusuba. Progressive assimilation at affix-root boundary in Olusuba, unlike the aforementioned regressive assimilation, occurs only with inflectional prefixes and vowel initial verb roots. The process of progressive assimilation in this language is evidenced in two environments: first, the process occurs when the preceding vowel is the mid front vowel /e/ and the following vowel is any of the four vowels /a, i, o, u/. In this case, the mid front vowel triggers a change of the following vowel to the mid front vowel /e/ hence a sequence of similar vowels. Consider the data in example (13).

13. a) SR: *e-ewok-a*
UR: *e-owok-a*
9S-spill-IND
'it spills'

b) SR: *e-ez-a*
UR: *e-uz-a*
9S-will-IND
'it will'

Second, progressive assimilation occurs when the preceding vowel is the mid back vowel /o/ and the following vowel is any of the four vowels /a, e, i, u/ as shown in (14).

14. a) SR: *o-ot-a*
UR: *o-et-a*
1Ssg-call-IND
'you call'

b) SR: *o-ow-a*
UR: *o-iw-a*
1Ssg-steal-IND
'you steal'

3.3.2 Assimilation at Affix-Affix Boundary

Assimilation in Olusuba can also occur at affix-affix boundary. Assimilation at affix-affix boundary in Olusuba, just as assimilation at affix-root boundary, occurs both regressively and progressively particularly between inflectional prefixes. Regressive assimilation at an affix-affix boundary happens when the preceding vowel is the low vowel /a/ and the following vowel is any of the two vowels /e/ or /o/. In this case, the low vowel /a/ regressively assimilates to the following vowel as the data in example (15) show.

15. a) SR: *nge-e-som-a*
UR: *nga-e-som-a*

NEG-9S-read-IND
'it does not read'

b) SR: *ko-o-kub-a*
UR: *ka-o-kub-a*
12S-beat-1Osg-IND
'it beats you'

This process does not involve the high vowels /i/ and /u/ since no prefixes in Olusuba take the form of the high vowels.

Similarly, progressive assimilation occurs at affix-affix boundary. This happens when the first vowel is the mid front vowel /e/ and the following vowel is /a/ or /o/. Consider the data in (16).

16. a) SR: *e-e-sees-a*
UR: *e-a-sees-a*
9S-NERP-winnow-IND
'it winnowed (recently)'

b) SR: *e-e-kam-a*
UR: *e-o-kam-a*
9S-1Osg-milk-IND
'it milks you'

Progressive assimilation at affix-affix boundary also occurs when the preceding vowel is the mid back vowel /o/ and the following vowel is either the low vowel /a/ or the mid front vowel /e/. Consider the data in example (17).

17. a) SR: *o-o-gon-a*
UR: *o-a-gon-a*
1Ssg-NERP-sleep-IND
'you slept'

b) SR: *o-o-vun-a*
UR: *o-e-vun-a*
1Ssg-9O-break-IND
'you break it'

OT Analysis of Vowel Assimilation in Olusuba

Vowel assimilation, as glide formation, is a phonological process whose main strategy is to repair sequences of dissimilar vowel thus resolving vowel hiatus. The markedness constraint *HIATUS is the solution to vowel hiatus in Olusuba. This makes the constraint inviolable in Olusuba hence its ranking as undominated in the hierarchy. Direction of assimilation is important in the description of assimilation in Olusuba as either regressive or progressive. Therefore, assimilation of vowels in any feature is either regressive, targeting an adjacent vowel on the left hand side of the trigger vowel or progressive, targeting an adjacent vowel on the right hand side of the trigger vowel. To take care of directionality of assimilation in Olusuba, the markedness constraints formulated by Sasa (2006) are invoked. These constraints are postulated as shown in (a) and (b).

a) SPREAD[F]-L: If a vowel feature [F] is associated with a vowel on the right, the same feature is associated with an adjacent vowel to the left.
b) SPREAD[F]-R: If a vowel feature [F] is associated with a vowel on the left, the same feature is associated with an adjacent vowel to the right.

Satisfaction and violation of the constraints (a) and (b) above are determined by the kind of assimilation under analysis. Therefore, the ranking of the constraints in (a) and (b) above depends on whether assimilation is progressive or regressive.

Within the framework of Optimality Theory, assimilation can also be treated as a process that requires a segment within a phonological or morphological domain to agree in some features and any feature disagreement or disharmony within the domain is attributed to the restrictions set by markedness constraint (Cole & Kisserberth, 1995 & Padgett, 1995).

Constraints driving assimilation across an oral segment are satisfied at the cost of violating a faithfulness constraint that works in favour of correspondence between the input and the output (Padgett, 1995). The faithfulness constraint adopted in this analysis is stated in (c).

c) IDENT[F]: The vowel segments in the output must have the same specification as their input correspondents in features (Beckman, 1998 & Sasa, 2001).

The faithfulness constraint in (c) above has to be ranked relatively low to allow assimilation to take place in Olusuba thus repairing vowel hiatus.

The assimilation process in Olusuba does not interfere with mora count even though the process causes incorrespondence between the input and the output. Just as glide formation discussed in section 3.1, vowel assimilation in Olusuba also takes care of mora count. To preserve the mora count, the faithfulness constraint IDENT-μ is invoked during this process. In analysis of regressive assimilation in Olusuba, the following constraint hierarchy is adduced.

*HIATUS >> IDENT-μ >> SPREAD[F]-L >> SPREAD[F]-R >> IDENT[F]

The following tableau demonstrates how the constraints above interact in generating the best candidate in regressive assimilation at Affix-Root boundary in Olusuba.

amaino ~ amiino	*HIATUS	IDENT-μ	SPREAD[F]-L	SPREAD[F]-R	IDENT[F]
☞a) amiino				*	*
b) amaano			*!		*
c) amino		*!	*	*	*
d) amano		*!	*	*	*
e) amaino	*!		*	*	

Candidate (e) displays vowel hiatus, a feature prohibited by the undominated constraint *HIATUS hence its disqualification. Incorrespondence in the mora affiliation of candidates (c) and (d) and that of the input causes these candidates to violate the highly ranked constraint IDENT-μ. This leads to their disqualification. Candidate (b) on the other hand, is ruled out for violating the third ranked constraint SPREAD[F]-L as it displays a progressive assimilation instead of a regressive one. Candidate (a) is optimized because it satisfies all the highly ranked constraints that the other candidates do not.

The same constraints interact in selection of the best candidate when regressive assimilation occurs at affix-affix boundary as shown in the tableau below.

ngaofuga ~ ngoofuga	*HIATUS	IDENT-μ	SPREAD[F]-L	SPREAD[F]-R	IDENT[F]
☞a) ngoofuga				*	*
b) ngaafuga			*!		*
c) ngofuga		*!	*	*	*
d) ngafuga		*!	*	*	*
e) ngaofuga	*!		*	*	

Candidate (e) is disqualified for violating the undominated constraint *HIATUS. The deletion of vowels in the candidates (c) and (d) causes them to violate the second highly ranked constraint IDENT- μ hence their disqualification. Even though it satisfies the first two highly ranked constraints, candidate (b) is still disqualified following its violation of the markedness constraint SPREAD[F]-L that militates against progressive assimilation. Candidate (a) satisfies all the constraints that the other candidates do not satisfy hence its selection as the optimal candidate.

As previously discussed, the types of assimilation in Olusuba are determined only by the direction of assimilation. Therefore, the same constraints used in the analysis of regressive assimilation are used in the analysis of progressive assimilation even though in this case it is the constraint SPREAD[F]-L that is violated hence its ranking below the constraint SPREAD[F]-R . This results into the ranking shown below.

*HIATUS >> IDENT-μ >> SPREAD[F]-R >> SPREAD[F]-L >> IDENT[F]

The following tableau shows how these constraints interact in working out the best candidate in a progressive assimilation at affix-root boundary.

eagaana ~ eegaana	*HIATUS	IDENT-μ	SPREAD[F]-R	SPREAD[F]-L	IDENT[F]
☞a) eegaana				*	*
b) aagaana			*!		*
c) agaana		*!	*	*	*
d) egaana		*!	*	*	*
e) eagaana	*!		*	*	

As shown in the tableau above, candidate (e) is ruled out for violating the highest ranked constraint *HIATUS. Candidates (c) and (d) show incorrespondence in the mora counts with that of the input. This causes the candidates to violate the highly ranked constraint IDENT-μ leading to their disqualification. Candidate (b) displays a regressive assimilation instead of a progressive one thus violating the constraint SPREAD[F]-R leading to its disqualification. Despite its violation of the lowest ranked constraints, candidate (a) is still selected as the optimal candidate on the ground that it satisfies all the other constraints violated by the other candidates.

The tableau below shows the interaction of the constraints above in the selection of an optimal candidate when progressive assimilation takes place at affix-affix boundary.

oagona ~ oogona	*HIATUS	IDENT-μ	SPREAD[F]-R	SPREAD[F]-L	IDENT[F]
☞a) oogona				*	*
b) aagona			*!		*
c) ogona		*!	*	*	*
d) agona		*!	*	*	*
e) oagona	*!		*	*	

Candidate (e) is characterised by vowel hiatus that causes it to violate the highest ranked constraint *HIATUS that prohibits a sequence of dissimilar vowels. Candidates (c) and (d) violate a highly ranked constraint IDENT-μ hence their disqualification. Candidate (b) on the other hand, violates the third ranked constraint SPREAD[F]-R that works against regressive assimilation exhibited by the candidate. Candidate (a) satisfies all the highly ranked constraint hence its selection as the optimal candidate.

Vowel Assimilation with the Class Prefixes *wi-* and *wu-*

There are some instances in Olusuba where gliding does not take place as expected. This happens when the class prefix *wi-* or *wu-* is affixed to a verb root beginning in any other vowels except a high vowel /i/ or /u/. The high vowels instead assimilate to the following vowels to block formation of a consonant cluster /wy/ or /ww/ which are difficult to articulate. In a case where the class prefix *wi-* is affixed to a verb root beginning in the low vowel /a/, instead of the high front vowel /i/ changing to the glide /y/ , it regressively assimilates to the low vowel /a/ hence a vowel sequence of /aa/ at a morphological boundary as shown in (18).

18. SR: *wa-agal-a*
UR: *wi-agal-a*
8S-want-IND
'they want'

When the prefix *wi-* is followed by the mid front vowel /e/ in a verb root, the high front vowel /i/ in the prefix changes to mid front vowel /e/ leading to a vowel sequence of /ee/ at a morphological boundary as the data in (19) shows.

19. SR: *we-erem-a*
UR: *wi-erem-a*
8S-swim-IND
'they swim'

This assimilation also happens when this prefix is followed by the mid back vowel /o/ in a verb root. In this case, the high front vowel /i/ in the prefix assimilates to the following vowel /o/ in the verb root resulting into a vowel sequence of /oo/ at a morphological boundary as seen in example (20).

20. SR: *wo-owok-a*
UR: *wi-owok-a*
8S-spill-IND
'they spill'

When the high front vowel /i/ in the prefix is followed by the high back vowel /u/ in a verb root, the high front vowel changes to the high back vowel /u/ hence a vowel sequence /uu/ at a morphological boundary. Consider the data in (21).

21. SR: *wu-uz-a*
UR: *wi-uz-a*
8S-will-IND
'they will'

When the class prefix *wu-*, just as with the class prefix *wi-*, is followed by any of the four vowels /a/ /e/ /i/ or /o/ in a verb root, the high back vowel /u/, instead of gliding to /w/, it assimilates to the following vowel in a number of environments. First, when the class prefix *wu-* is followed by the low vowel /a/, the low vowel /a/ triggers the change of the high back vowel /u/ in the class prefix to the low vowel /a/ hence a vowel sequence /aa/ as shown in (22).

22. a) SR: *wa-avul-a*
UR: *wu-avul-a*
14S-scroll-IND
'it scrolls'

Second, when the class prefix is followed by the mid front vowel /e/ in a verb root, the high back vowel /u/ in the prefix assimilates to the mid front vowel /e/ resulting into a vowel sequence of /ee/. See the data in (23).

23. SR: *we-ezer-a*
UR: *wu-ezer-a*
14S-rest-IND
'it rests'

Third, when the class prefix *wu-* is followed by the high front vowel /i/ in a verb root, the high back vowel /u/ in the class prefix changes to the high front vowel /i/ hence a vowel sequence of /ii/ as illustrated by the data in (24).

24. SR: *wi-igerer-a*
UR: *wu-igerer-a*
14S-learn-IND
'it learns'

Fourth, the high back vowel changes to /o/ whenever it is followed by the mid back vowel /o/ in a verb root. This results into a sequence of similar vowels /oo/. Consider the data in (25).

25. SR: *wo-olol-a*
UR: *wu-olol-a*
14S-weed-ID
'it weeds'

OT Analysis of Vowel Assimilation with Class Prefixes wi- and wu-

When the high front vowel /i/ in the class prefix *wi-* is followed by any of the four vowels /a, e, i, u/, the high front vowel /i/ in the class prefix *wi-* does not glide to /y/ as expected but the vowel hiatus is resolved by regressive assimilation of the high front vowel to the following vowel in a verb root. This is based on the fact that gliding of the high front vowel /i/ to /y/ results into two adjacent glides assimilated in manner of articulation. To solve this, a markedness constraint OCP, which according to Myers, (1997) and Fukuzawa (1999) prohibits adjacent identical segments in terms of stricture, is invoked.

The feature banned by this constraint in such a situation in Olusuba is [+glide] hence its inviolability in the hierarchy. This constraint is formulated in this analysis as shown in (a).

a) OCP[+Glide]: Adjacent assimilated segments with the stricture feature [+Glide] are prohibited.

As a hiatus resolution strategy in Olusuba, changes that occur in high vowels in the class prefixes *wi-* and *wu-*, when followed by any other vowels except the high vowel /i/ or /u/, is to ensure that the undominated constraint *HIATUS is satisfied by an optimal candidate. This places the markedness constraint *HIATUS above all the relevant constraints in Olusuba's hierarchy. The satisfaction of these markedness constraints results into violation of the faithfulness constraint IDENT-IO which works for correspondence in the output and the input. The need for satisfaction of the markedness constraints above through changes in form in the surface realisation of the input ranks the faithfulness constraint IDENT-IO below the markedness constraints.

Just as in other kinds of assimilations discussed in section 3.3, assimilation of the high vowels in the two class prefixes is restricted, that is, the spread of features of the trigger vowel to the target vowel is from left to right. This calls for the constraint SPREAD[F]-L which ensures the spread of vowel feature from left to right. Assimilation process in the two environments where the high vowels in the class prefixes *wi-* and *wu-* are followed by [-high] vowels do not interfere with mora count hence the satisfaction of the faithfulness constraint IDENT-μ by an optimal candidate. Adduced in this analysis is the rank given below.

*HIATUS >> OCP[+Glide] >> IDENT-μ >> SPREAD[F]-L >> IDENT-IO

The tableau below shows how the constraints above interact in the selection of the best candidate when the high front vowel /i/ in the class prefix *wi-* is followed by the mid front vowel /e/ in a verb root.

wietana ~ weetana	*HIATUS	OCP[+Glide]	IDENT- μ	SPREAD[F]-L	IDENT-IO
☞a) weetana					*
b) wiitana				*!	*
c) wetana			*!		*
d) witana			*!		*
e) wyeetana		*!			*
f) wietana	*!			*	

Candidate (f) is disqualified as it violates the highest ranked constraint *HIATUS by exhibiting a sequence of dissimilar vowels, a characteristic militated against by the constraint. Candidate (e) is ruled out for violating the constraint OCP[+Glide] by allowing a consonant cluster of the same stricture. Candidate (c) and (d) violate the constraint IDENT-μ as these candidates do not show the same mora count as does the input. Candidate (b) on the other hand, is disqualified following its exhibition of progressive assimilation prohibited by the constraint SPREAD[F]-L. Even though it violates the lowly ranked constraint IDENT-IO, candidate (a) is still picked as the best for satisfying all the constraints violated by the other candidates.

The same constraint ranking above are also be used to analyse assimilation that occurs when the high back vowel in the class prefix *wu-* is followed by any of the four vowels /a, e, i, o/. This analysis is demonstrated in the tableau below.

wuavula ~ waavula	*HIATUS	OCP[+Glide]	IDENT- μ	SPREAD[F]-L	IDENT-IO
☞a) waavula					*
b) wuuvula				*!	*
c) wavula			*!		*
d) wuvula			*!		*
e) wwaavula		*!			*
f) wuavula	*!			*	

As shown in the tableau above, the inviolable constraint *HIATUS assigns fatal violation sign to candidate (f) resulting into its disqualification. Candidate (e) allows a consonant cluster of the same stricture this causes it to violate the constraint OCP[+Glide] hence its disqualification. Candidates (c) and (d) are ruled out for violating the highly ranked constraint IDENT-μ as they do not account for mora count in the input. Candidate (b) is ruled out on the ground that it violates the constraint SPREAD[F]-L which ensure regressive assimilation instead of progressive assimilation exhibited by this candidate. Candidate (a) satisfies all the highly ranked constraints that the other candidates violate hence its optimality.

Conclusion

This paper has discussed the two vowel processes that are used in Olusuba to resolve sequences of dissimilar vowels disallowed in Olusuba at SR. The resolution is meant to ease articulation of Olusuba of words. Well-formedness of vowel configurations in Olusuba was found to be constraint based in which case optimality of a candidate that undergoes repairs through either glide formation or vowel assimilation is determined by ranking of the universal constraints that interact in selection of candidates.

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