

Epenthesis as a Hiatus Breaker: The Case of Esahie Phonology

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Abstract

This study investigates hiatus resolution in Esahie (Sehwi), a Central Comoe language, with particular focus on glide epenthesis and feature-driven conditioning. The analysis is based on primary phonological data collected from 10 native speakers through structured elicitation tasks involving approximately 100 lexical items and phrasal constructions designed to create vowel hiatus environments. Data were audio-recorded, transcribed using the International Phonetic Alphabet (IPA), and systematically coded according to vowel height, backness, and Advanced Tongue Root (ATR) features. The reliability of the data was checked using speaker validation and iterative elicitation and feedback session procedures. The study adopts a qualitative descriptive approach within the frameworks of Generative Phonology and Feature Geometry to examine how these features condition the selection of epenthetic glides [j] and [w]. The findings show that high-front vowels strongly favor palatal glide insertion regardless of position, providing evidence for both progressive V1 and regressive V2 spreading. This challenges the traditional assumption of V1 dominance in hiatus resolution. Additionally, [-ATR] high-back vowels consistently trigger labio-velar [w], even in environments where front vowels are present. These results support a feature hierarchy model in which palatal and ATR features determine glide selection, demonstrating that hiatus resolution in Esahie is a systematic, feature-driven process rather than a purely positional one.

Keywords: Esahie (Sehwi), hiatus, epenthesis, feature geometry, glide insertion, ATR harmony

Introduction

The occurrence of adjacent vowels across syllable or word boundaries poses a well-documented challenge in phonological systems. Many languages avoid such configurations due to constraints on syllable structure, particularly the preference for consonant-initial syllables. As a result, languages employ a range of repair strategies, including elision, coalescence, and epenthesis, to resolve hiatus and maintain phonotactic well-formedness.

Within Niger-Congo languages, hiatus resolution often reflects deeper interactions between phonological features and syllable structure constraints. In many cases, epenthesis is preferred because it preserves the segmental identity of adjacent vowels while satisfying the requirement for syllable onsets.

Previous studies, particularly those of Casali (1996, 2011), have proposed that hiatus resolution is largely governed by the first vowel (V₁), suggesting a directional asymmetry in which V₁ determines the outcome of the repair strategy. While

this assumption has been influential in phonological theory, it has not been sufficiently tested across a wide range of languages, especially within the Central Comoe subgroup.

Esahie (Sehwi) provides an important case for examining these assumptions. Preliminary observations suggest that glide epenthesis in Esahie is not strictly determined by V_1 but rather by the interaction of phonological features of the vowel. This study therefore investigates hiatus resolution in Esahie with the aim of determining the role of feature interaction in glide selection and the extent to which V_2 may override V_1 in conditioning epenthesis. The study addresses the following research questions:

1. What phonological features condition glide epenthesis in Esahie?
2. To what extent is hiatus resolution governed by V_1 dominance versus V_2 influence?

Literature Review

In the study of phonology, the sequence of two vowels across a syllable boundary is frequently treated as a marked or illicit configuration. Many languages across the globe avoid vowel clusters that lack an intervening consonant (Casali, 1996/1997). While some languages, such as Greek (Devine & Stephens, 1994) or certain dialects of English, may permit hiatus in specific morphological contexts, others—including many Niger-Congo languages—enforce strict bans. Languages like Esahie (Sehwi), Ewe, Nzema, and Twi utilize various phonological strategies to ensure that the preferred CV (Consonant-Vowel) syllable structure is maintained.

The structural challenge presented by hiatus mostly arises in two distinct phonological environments. First, within words, it occurs at the junction of a vowel-final prefix and a vowel-initial root, or between a root and a suffix. Second, across word boundaries, it occurs during rapid speech where the final vowel of one word precedes the initial vowel of the next. In both cases, the language must reconcile the underlying representation (UR) with phonetic and phonotactic requirements to produce a well-formed surface representation (SR).

To resolve vowel hiatus, languages apply one of the three strategies: elision, coalescence, or epenthesis. Elision involves the deletion of one vowel, often resulting in loss of phonological information (Owusu-Ansah, 2020, Casali, 2011, Mvundura, 2015, Agyemfra & Amoh, 2025, and others). Coalescence merges two vowels into a single segment that combines features from both inputs (Youngberg, 2013, Tebay 2018: 7, Ngunga, 2000, and others). Epenthesis also works by inserting an intervening segment, thereby preserving both vowels while satisfying structure requirements.

Within Optimality Theory, these strategies reflect different rankings of faithfulness and markedness constraints. For instance, while epenthesis violates DEP-IO (which penalizes insertion), it satisfies ONSET and preserves input segments, thereby maintaining phonological contrast (McCarthy & Prince, 1995). As a result, epenthesis is often considered a relatively “faithful” strategy compared to deletion or coalescence. However, the choice among these strategies varies across languages, indicating that hiatus resolution is shaped by language-specific constraint interactions.

Typological Variations in Epenthetic Segments

Although epenthesis is a common repair strategy, the selection of the epenthetic segment is not arbitrary. As noted by Casali (1996), the inserted consonant is mostly determined by language-specific phonological patterns or by feature spreading from adjacent vowels in hiatus. In some languages, the epenthetic segment is relatively “neutral.” For example (as in example (1)), Malay employs a glottal stop [ʔ] to resolve hiatus, a segment that lacks strong place features and therefore minimizes interference with surrounding vowels.

(1) Malay

UR	SR	Gloss
a. /di + ubah/	[diʔubah]	'to change (passive)
b. /di + ikat/	[diʔikat]	'to tie (passive)'
c. /dʒuru + atʃara/	[dʒuruʔatʃarə]	'master of ceremony'
d. /sə + indah/	[səʔindah]	'to be as beautiful as
e. /sə + elok/	[səʔeloʔ]	'to be as pretty as'
f. /kə + ibu + an/	[kəʔibuwan]	'motherhood'
g. /kə + əmas + an/	[kəʔəmāssan]	'golden'

This dataset illustrates glottal stop insertion irrespective of the vowels in sequence. This occurs at morpheme boundaries, preventing vowel hiatus, suggesting that every syllable must have an onset. This process is consistent across different affixation types:

- i. Passive formation (e.g., di- prefix in (a-b))
- ii. Comparative constructions (e.g., sə- ‘as... as’ in (d-e))
- iii. Derivational morphology (e.g., kə- prefix in (f-g))

It is well established in the SR that a morphological process of prefixation that creates hiatus cannot be heterosyllabified as [V.V] because this will create an onsetless syllable (Ahmand, 2005). This is best accounted for by a C-epenthesis because the data suggest that the language does not tolerate onsetless syllables across morpheme boundaries. Unlike languages such as Ndebele and Axininca Campa, the hiatus is separated by a glottal stop as seen in (1). Theoretically, ONSET is compelled to violate DEP-IO, hence ONSET is ranked higher over DEP-IO.

Table 1

A Glottal Stop Epenthesis

/di + ubah/	*COMPLEX	MAX-IO	ONSET	DEP -IO
a. di.u.bah			*!	
b. du.bah		*!		
c. dju.bah	*!			
d. di diʔubah				*

The process is syllabifying hiatus in OT involves the interaction of wellformedness constraints. But potentially, there should be the possibility of ensuring that ONSET is satisfied. The first candidate remained the same and the violation is fatal. Satisfying ONSET by the process of deletion led to a fatal violation as well. The third candidate appears acceptable because hiatus is resolved but the insertion of the glide created a complex cluster. The first three candidates cannot be the optimal candidates because they violated a highly ranked constraint. The last candidate was adjourned the optimal despite violating DEP-IO constraints. This makes sense because DEP-IO is lower- ranked as against the rest of the constraints.

In other languages like isi-Ndebele and Axininca Campa, the epenthetic consonant reflects more specific phonological properties. For instance, in Ndebele, the bilabial consonant [b] may be inserted in certain morphological contexts (Sabao, 2015), while in Axininca Campa, a coronal consonant [t] is frequently used, often associated with its status as an unmarked consonant (Payne, 1981).

Beginning with isi-Ndebele, the epenthesized segment contrast with Malay but yields the same result. As Sabao (2015) explains, the presence of [b] as the epenthetic segment is triggered by the presence of the mid back vowel /o/ juxtaposed with the low central vowel /a/. This is limited to prepositional prefixes as the examples showcase. There is an interplay of morphology which determines which phonological process to be employed. As Sabao (2015) continued, when the sequence occurs in singular forms, the two sequential vowels are merged (coalesced) as can be seen in example (2). In this example, the high back rounded vowel /u/ coalesces with the preceding /a/ to form [o] in the surface form. But when it happens to be in a plural form, a segment is rather epenthesized as it is realized in example (3). A consonant /b/ is inserted to break the vowel hiatus, prioritizing the language's preference to have onsets.

(2) Coalescence form

UR	SR	Gloss
a. /la-umama/ →	[lomama]	'with a mother'
b. /la-umangoye/ →	[lomangoye]	'with a cat'

(3) Epenthesis form

UR	SR	Gloss
a. /la-o-mama/ →	[labomama]	'with mothers'
b. /la-o-mangoye/ →	[labomangoye]	'with cats'

We can account for the application of epenthesis just like Malay. The tableau shows how vowels are preserved to avoid violating ONSET. The following constraints are necessary for the application of Optimality Theory.

a. ONSET: Penalizes onsetless syllables (i.e., syllables starting with a vowel).

b. PARSE[F]: Ensures that all features in the input are preserved (no deletion of segments).

c. PARSE[F]-1seg: Ensures that features associated with at least one segment are parsed (a more specific version of PARSE[F]).

d. IDENT-IO: Penalizes changes between input and output (i.e., preserves underlying features)

e. DEP-IO: Penalizes epenthesis (insertion of new elements that is not present in the input).

f. UNIFORMITY: Penalizes coalescence (merging of two distinct elements into one).

The table (2) shows how epenthesis is preferred over deletion. Since the sequence [o.ma.ma] in (a) starts with a vowel, it violated the ONSET constraint, which is disallowed. Candidate (c) loses because of the PARSE [F] constraint. The transformation led to the deletion of the segment /a/, which is penalized. Candidate (d) is eliminated due to the coalescing process. This is a potential optimal candidate when one wants to account for singular form. But, in the case, as presented by Sabao (2015), the underlined representation is in plural, hence, priority is given to epenthesis over coalescence. This is why candidate (b) wins despite violating DEP-IO.

Table 2

A Bilabial Stop [b] Epenthesis

la-o-ma.ma	ONSET	PARSE [F]	PARSE [F]-1seg	IDENT -IO	DEP -IO	UNIFORMITY
a. /la-o.ma.ma/	*!					
b. la /la-bo-ma.ma/				*	*	**
c. /lo.ma.ma/		*!		*	*	**
d. /la.ma.ma/		*!	*(!)	*	*	**

Continuing with Axininca Campa, [t] which is often cited in phonological literature as the "unmarked" coronal consonant is inserted (Payne, 1981). Let us see the example (4) below.

(4) Axininca Campa (Payne, 1981 cited in Casali 2011).

UR	SR	Gloss
a. /i-N-koma-i/ >	[ɪŋkomati]	‘he will paddle’
b. /i-N-koma-aa-i/ >	[ɪŋkomataati]	‘he will paddle again’

Despite the application of the same phonological process, the selection of the epenthetic segments differs. The glottal stop [ʔ] employed serves as a neutral segment that avoids introducing additional place features. isi-Ndebele shows a preference for a consonant with a labial feature, aligning with the language’s morphological pattern. Hence, [b] reflected as the preferential consonant. The coronal [t] demonstrated in Axininca Campa shows the tendency for coronals to be unmarked and therefore favored in epenthesis. Alignment constraints are recommended for this analysis. These constraints require that the prosodic constituents and the morphological edges coincide (McCarthy & Prince, 1995). The general alignment constraint’s structure is;

ALIGN-L (Stem, Word):

The left edge of a stem must align with the left edge of the word.
Ensures that prefixes attach directly to the beginning of the root.

ALIGN-R (Suffix, Word):

The right edge of a suffix must align with the right edge of the word.
Prevents material from intervening between the suffix and the stem.

ALIGN-L (Foot, Prosodic Word):

The left edge of a metrical foot must align with the left edge of a prosodic word.
Influences stress placement and foot structure.

ALIGN-L (Vowel, Syllable):

The left edge of a vowel must align with the left edge of a syllable.
Can help explain vowel epenthesis strategies in hiatus resolution.

In the case of Axininca Campa, ALIGN-R (stem, σ) is the considered constraint in addition to DEP-IO. This constraint ensures that the rightmost segment in every stem must be the final one in the same syllable. This is what compelled consonant epenthesis in (4) and tableau (3).

Table 3

A Coronal [t] Epenthesis

/i-N-koma-i/	ALIGN-R (stem, σ)	DEP
a. in .ko.ma ti		*
b. in.ko.ma i	*!	

Synthesizing these languages, although they differ in constraint ranking and selection, they all enforce that every syllable must have an onset and therefore avoid vowel hiatus. Also, the choice of the epenthetic consonant varies reflecting language-specific preferences.

Feature Geometry and Feature Spreading in Epenthesis

The relationship between vowels and epenthetic segments can be understood within the framework of Feature Geometry (Clements, 1983/1985). This framework represents phonological segments as hierarchical bundles of features. Epenthesis, in this context, is seen as the result of feature spreading. Features from adjacent vowels extend into an empty consonantal position, leading to the insertion of an epenthetic segment. Glide insertion serves as a clear example of this process. The palatal glide [j] exhibits similarities with high-front vowels, while the labio-velar glide [w] reflects features of high-back vowels, the rounding feature. Consequently, glide epenthesis in most cases mirrors the articulatory properties of neighboring vowels. Feature spreading, while providing a compelling explanation for epenthesis, raises significant questions about the process's directionality. Specifically, it is unclear

whether feature spreading is consistently driven by the first vowel, the second vowel, or by a more intricate interaction of feature salience.

V₁ Dominance and Competing Perspectives

A widely claim in the literature on hiatus resolution is that the first vowel plays a dominant role in determining the outcome of phonological repair. Casali (1996, 2011) argues that feature spreading is mostly progressive, with V₁ influencing the form of the epenthetic segment. This V₁-dominance model has been widely applied in analyses of most languages and has shaped much of the theoretical understanding of hiatus resolution. For instance, in Faroese (Lockwood (1955), the possibility of epenthesis is contingent upon the presence of a high and non-high vowel in concatenation.

(5) Faroese glide epenthesis

VV	Example		Stem alternations
a. /i:a/	/mi:-aɪ/	[mi:jaɪ] 'middle-PL.FEM'	
b. /i:i/	/si:-ɪ/	[si:ji] 'lower-PST.PART'	
c. /i:ʊ/	/si:-ʊɪ/	[si:joɪ] 'custom-NOM'	[si:lɛsʊɪ] 'immoral'
d. /u:a/	/t ^h u:-a/	[t ^h u:wa] 'to say tú (thou)	
e. /u:ɪ/	/pu:-ɪ/	[pu:wɪ] 'live-1SG.PST'	[pʊiɪt] 'live.2SG'

Esahie will suggest in the research that the second vowel may exert significant influence, particularly when it carries phonologically salient features. For example, high-front vowels are often associated with strong palatal properties, which may override competing features from V₁. Similarly, vowel harmony systems demonstrate that feature spreading can operate across segments in ways that are not strictly left-to-right. Despite these observations, the extent to which V₂ can override V₁ remains underexplored, particularly in Esahie. As a result, the assumption of V₁ dominance may oversimplify the complexity of feature interaction in hiatus resolution. This study addresses these gaps by examining hiatus resolution in Esahie, with particular focus on feature hierarchy and the potential for V₂ dominance.

Method-Research Design

This study employs a qualitative, descriptive research design. The primary goal is to provide a comprehensive mapping of the phonological rules that govern hiatus resolution in Esahie, using the frameworks of Generative Phonology and Feature Geometry.

Respondents and Data Source

Data were collected through fieldwork with native speakers of Esahie in the Western North Region of Ghana. The study involved 10 participants, who were bilingual in Esahie and English, aged 25 to 65. This demographic range helped ensure that the data captured both traditional lexemes and ongoing linguistic change.

Instruments and Procedures

Data collection involved several stages:

1. Word List Elicitation: A list of 100 potential hiatus-inducing environments was created, including noun prefixes, verb infinitives, and common phrasal combinations.
2. Recording: Participants were asked to pronounce words in isolation (to observe word-internal hiatus) and in short sentences (to observe phrasal hiatus).
3. Transcription: All recordings were transcribed using the International Phonetic Alphabet (IPA).

Data reliability

To ensure the reliability and validity of the data, two validation procedures were implemented throughout the data collection and analysis process. First of all, two additional native speakers of Esahie were consulted to cross-check. This helped to identify community wide patterns and idiolectal patterns. Secondly, preliminary analyses were presented informally to speakers, who were asked to judge acceptability and suggest corrections. This helped to refine interpretations and functioned as a form of community-based validation.

Data Analysis

Data were analyzed by comparing the Underlying Representation (UR) of the morphemes with their Surface Representation (SR). We specifically looked for:

Symmetry: Cases where the glide quality matched V₁.

Asymmetry: Cases where the glide quality was determined by V₂ or by other features such as ATR.

Theoretical Mapping: Using Feature Geometry to draw spreading diagrams that account for the transition from a V-V sequence to a V-C-V sequence.

Results**Feature-Driven Nature of Glide Epenthesis**

The research results reveal that glide epenthesis in Esahie is not random but systematically influenced by vowel features. The high frequency of palatal glide [j] insertion, occurring in 74.4% of 39 cases, in environments involving high-front vowels, indicates that frontness and height are primary determinants of glide selection. This finding aligns with a feature-based account of epenthesis, consistent with Feature Geometry (Clements, 1983/1985), which posits that phonological processes are driven by the spreading of specific articulatory features.

Contrary to the view of epenthesis as a purely structural repair mechanism, the data suggest that it serves as a feature-preserving strategy. This aligns with the predictions of faithfulness constraints in Optimality Theory (McCarthy & Prince, 1995), where the inserted glide reflects the most prominent features of adjacent vowels

The Dominance of Front-High Vowels (V₁ Spreading)

A central finding of this study is that the high-front vowels /i/ and [ɪ] act as powerful triggers for epenthesis. When these vowels occupy the V₁ position, they consistently result in the insertion of a palatal glide [j]. This is a clear instance of progressive spreading, where the features of the first vowel spread forward to fill the empty onset slot of the second syllable.

Table 4*Progressive Palatal Spreading (V₁ Dominance)*

Spelling	UR	SR	Gloss
kuanie	/kuanie/	[kijanijɛ]	farmer
awie	/awie/	[æwije]	orphan
akaatia	/akaatia/	[akæ:tija]	baboon
afia	/afia/	[æfija]	middle
mviaseɛ	/mviaseɛ/	[mvijasijɛ]	begin
sia	/sia/	[sija]	in-law
kanea	/kanea/	[kænija]	lamp
akyideɛ	/akyideɛ/	[atɛɛdijɛ]	gift
ahwea	/ahwea/	[æɥija]	mongoose
atee	/atee/	[atijɛ]	spoon

The Challenge of V₂ Influence (Regressive Spreading)

High-front vowels in the second position consistently trigger [j] insertion, even when the first vowel is a back vowel as can be seen in Table (5). This finding directly challenges Casali's (1996, 2011) claims that a predominantly V₁-driven model of hiatus resolution is the most accurate. The Esahie data suggest that feature salience can override positional asymmetry, with high-front vowels exerting dominant influence regardless of their position in the vowel sequence.

This does not entirely invalidate V₁ dominance but rather refines it. Positional effects are secondary to feature strength. In this sense, hiatus resolution in Esahie is better understood as a competition between features, rather than a strictly directional process.

Table 5*Regressive Palatal Spreading (V₂ Dominance)*

Spelling	UR	SR	Gloss
ɛboe	/ɛboe/	[ɛbojɪ]	shell
ɛwɛɛn	/ɛwɛɛn/	[ɛwɛjɪn]	boundary
ɛfɔɛn	/ɛfɔɛn/	[ɛfɔjɪn]	thin
ɛlɔɛn	/ɛlɔɛn/	[ɛlɔjɪn]	crowd
ɛwɔɛn	/ɛwɔɛn/	[ɛwɔjɪn]	boundary
nsusui	/nsusui/	[nsusujɪ]	suggestion
asoɛ	/asoɛ/	[asɔjɛ]	ear
mbain yɛɛ	/mbain yɛɛ/	[mbajɪn jɛɛ]	senile person
esurein	/esurein/	[esurejɪn]	fear (v)

Labio-Velar /w/ and the ATR Constraint

The distribution of labio-velar glide [w] in Table (6) provides further support for a feature hierarchy model. The results show that high-back vowels account for a significant proportion of [w] insertions 25.6%. This is where a front-high vowel is absent.

Table 6*Labio-velar /w/ Insertion and Back Vowel Patterns*

Spelling	UR	SR	Gloss
brasua	/brasua/	[bræsuwa]	woman
bua	/bua/	[buwa]	pot
mmaboa	/mmaboa/	[mabowa]	shoe
mboano	/mboano/	[mbowanɔ]	beach
asau	/asau/	[asawu]	hunting net
huwɛ	/huwɛ/	[huwɛ]	husband
ɛsue	/ɛsue/	[ɛsuwɛ]	cry, weep
ahoɔyaa	/ahoɔyaa/	[ahɔwɔja:]	jealous
anwoɔ nzue	/anwoɔ nzue/	[aɲwɔwɔ ŋzuwe]	semen
ayuo	/ayuo/	[æjuwo]	sorghum

The data from Table (6) also confirm that the low vowel /a/ functions as a neutral element in hiatus resolution. Across all observed contexts, /a/ does not independently determine the quality of the epenthetic glide. Instead, glide selection is consistently governed by the non-low vowel in the sequence. This asymmetry reflects the phonological underspecification of /a/. Unlike high vowels, which carry clear [front] or [back] features, /a/ lacks the feature specifications necessary to condition glide formation. As a result, it serves as a passive participant in the process. This finding aligns with broader phonological observations that low vowels often play a limited role in feature-driven processes, despite their high sonority.

Mid-Front Vowels

While high vowels are the primary triggers for epenthesis, mid-front vowels /e/ and /ɛ/ also participate in glide selection.

Table 7*Glide Selection with Mid-Front*

Category	Spelling	SR	Gloss
/ɛ/	asefoɛ	[asɪfojɛ]	descendant
	ɛwɔfoɛ	[ɛwɔfojɛ]	guest, visitor
	kɔmvoɛ	[kɔmvoɛ]	fetish priest
	awɛrɛhyɛmɛ	[awɛrɛɛmuwɛ]	hope
	ndɛamɛ	[ndɪjamuwɛ]	shout, cry out
/e/	awue	[æwuje]	kill, murder
	hue	[huje]	chest
	sona ebue	[sona buje]	side (of body)
	ewue	[ewuje]	death
	awisea	[æwiseja]	orphan

The study brings to light the V₁-dominance models and reinforces Feature Geometry's role in modeling epenthesis. It highlights the importance of integrating ATR into analyses of segmental processes, particularly in languages with vowel harmony.

Discussions

Interpretation of V₁ Dominance Patterns

The results show that glide epenthesis in Esahie is conditioned by vowel features rather than applied randomly. Palatal glide [j] accounts for most cases, particularly in environments involving high-front vowels. In contrast, labio-velar [w] occurs in fewer cases and is primarily associated with high-back vowels.

A key issue in the literature is whether hiatus resolution is governed by the first vowel. Casali (1996, 2011) proposes that V₁ mostly determines the outcome through progressive spreading. The Esahie data partially support this claim, as [j] insertions are triggered by high-front vowels in V₁ position.

The data in Table (4) reveal that when V₁ is a front-high vowel, the epenthetic segment consistently shares the palatal feature. In the word *sia* [sija], the [palatal] node of the vowel /i/ spreads to the onset of the following syllable. This process is motivated by ease of articulation; moving from a high-front position to a low-central position (/a/) requires greater articulatory unless a transitional glide is provided. The glide [j] serves as this bridge, maintaining the articulatory trajectory.

Furthermore, in *kuanie* [kujanije], two instances of hiatus resolution are observed. The second hiatus /i-ε/ is resolved by the expected [j]. However, the first resolution /u-a/ → [ija] is more complex. While one might expect [kuwanije] due to the high-back V₁, the language opts for a palatal glide. This suggests that in certain environments, the presence of a front vowel elsewhere in the word may exert a "harmony effect" or that the language has a default preference for [j] in specific morphological categories. In this example provided, two sequential phonological derivations precede hiatus resolution, each contributing to the conditioning environment that licenses the subsequent application of glide epenthesis.

Step 1: Consonant labialization due to vowel roundness

i. Labialization

Spelling

kuanie

SR

[k^wuanije]

This step involves the labialization of /k/, triggered by the influence of the following rounded vowel /u/. This yields the surface form [k^wuanije]. The labialization results from regressive coarticulatory assimilation, in which the articulatory feature [+round] from the back vowel /u/ spreads to the adjacent consonant, producing the sequence [k^w]. This process is consistent with patterns in Akan, as described by Dolphyne (2006), in which CVV sequences (CUa) undergo similar coarticulatory adjustments.

The replacement of /u/ by /i/ occurs under the influence of the adjacent low vowel /a/, creating a phonetic transition between the inserted high vowel and the following low vowel. While the high front vowel /i/ is produced with a constricted glottis and without lip-rounding, it simultaneously exhibits a palatal secondary

articulation, yielding the surface form [k^{wj}ianijɛ], as observed in the subsequent derivational step.

Step 2

ii. Palatalization

Spelling

kuanie

SR

[k^wianijɛ] turns to [k^{wj}ianijɛ] (vowel and articulatory change)

However, the output in step 2 is ill-formed, as it assigns two secondary articulators to the same segment. Instead, the two secondary articulators-[w] from the original labialized consonant and [j] from the high front vowel-merge, yielding the secondary articulator [ɥ], as illustrated in step 3. (Dolphyne, 2006, p. 28) The surface form then becomes [k^ɥianijɛ].

Step 3

iii. Labial-palatalization

Spelling

kuanie

SR

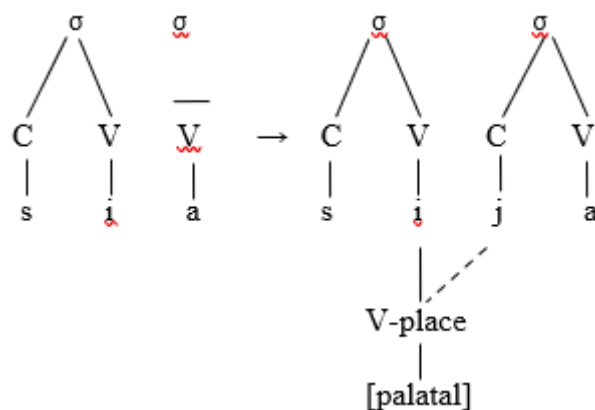
[k^ɥianijɛ]

It is important to emphasize that, although the hiatus is initially triggered by the sequence /u+a/, the intervening vowel alternation (/u/ → /i/) reconfigures the sequence as /i+a/. Consequently, the glide required for hiatus resolution is not [w], which would be appropriate for /u/, but rather [j], reflecting the phonological properties of /i/.

Additionally, as indicated, high-front vowels can propagate features beyond their syllable to the preceding syllable, as evidenced by the West Greenlandic inserted glide, which mirrors the quality of the vowels. Nonetheless, this may constitute an exception in the language, as proposed by Ortmann (1998), or potentially reflect a dialectal variation. For this study, such happening will be deferred to future research endeavors.

Figure 1

Feature Geometry for Progressive V-place Spreading



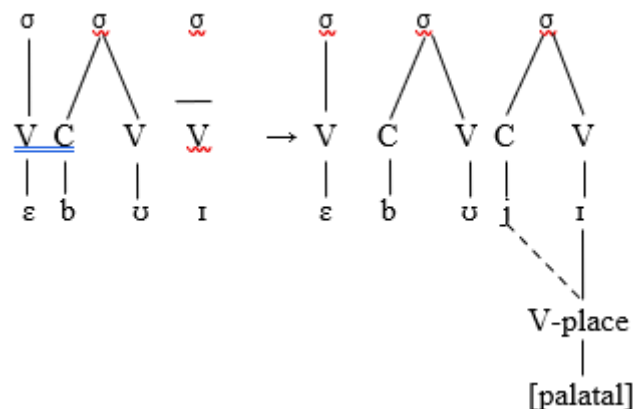
Interpretation of V₂ Dominance and Regressive Spreading

However, the results also show that a substantial proportion of [j] insertions are conditioned by V₂. In forms such as /εboe/ → [εbojɪ], the presence of a high-front vowel in V₂ leads to palatal glide insertion despite a back vowel in V₁. A strict V₁-dominance model would predict [εbowɪ]. However, the surface form is [εbojɪ]. This pattern demonstrates that V₂ can override V₁, particularly when it carries highly salient features such as [+high, +front]. Therefore, while V₁ dominance is attested, it does not fully account for the data. Instead, the findings suggest that feature strength, rather than linear position, determines the direction of spreading.

From a Feature Geometry perspective, this implies that the [palatal] feature of the V₂ is more salient than the [labial] or [round] feature of the V₁. The language system determines that the best transition into a front-high vowel is a palatal glide. This supports the argument that hiatus resolution is not merely a local rule but is part of a larger hierarchy of feature prominence.

Figure 2

Feature Geometry for Regressive V-place Spreading



From Figure (2), it is evident that the front-high vowel spreads backward, resulting in the insertion of the consonant [j], despite the coexistence of a high-back vowel. This illustrates the dominance exerted by front-high vowels over back vowels in determining epenthetic segments. Contrastingly, supposing one were to deviate from the norm and insert a labial glide due to the presence of a back vowel, as illustrated in Table (8), what would happen?

Table 8

Supposedly Progressive Spreading (ill-formed)

Spelling	SR	Gloss
a. εboe	[εbowɪ]	shell
b. εfoen	[εfowɪn]	thin
c. asoe	[asojɛ]	ear
d. nsusui	[nsusuwi]	suggestion

Table (8) example highlights the consequences of not considering the feature content of neighboring sounds while in the formation of certain words. It may look good as the sounds are well patterned, observing the CV syllable structure and one can pronounce with ease. By virtue of this, it can be assumed that the hiatus is resolved. Accepting this could generate an ill-form structure and could potentially lead to semantic ambiguity. Following the line of analysis in example (6) and (7), it can be stated that the insertion of a segment is not a random occurrence but rather depends on the feature content of the adjacent sound and its dominance. This is paramount in selecting the epenthetic segment.

Interpretation of Mid-Vowel and Low Vowel Patterns

The mid-front vowels /e/ and /ɛ/ are sufficient triggers for [j] insertion in Table (7).

However, a notable divergence occurs in words like *awerɛhyɛmuɛ*. Here, the sequence is /u-ɛ/. Despite /ɛ/ being a front vowel, the language inserts [w]. This brings us to the critical intersection of vowel quality and ATR harmony.

The low vowel /a/ consistently fails to trigger any specific glide. In sequences like /i-a/ or /u-a/, the glide is consistently determined by the non-low vowel. This is because /a/ lacks the specific height and backness features that correspond to the two glides available in the Esahie inventory. In phonological terms, /a/ is "underspecified" for the features required to trigger epenthesis.

Interpretation of Labio-Velar /w/ and ATR Effects

Further evidence for a feature-based account comes from the distribution of [w]. The data from Table (6) show that high-back vowels consistently trigger labio-velar glide insertion. It highlights the role of the Advanced Tongue Root (ATR) feature. The high-back vowels are split into [+ATR] /u/ and [-ATR] [ʊ]. The findings suggest that [-ATR] vowels are particularly strong triggers for the labio-velar glide [w].

Even when a [-ATR] back vowel interacts with a mid-front vowel (as in *ahoɔyaa*), the language favors [w] over [j]. This suggests a "Feature Salience Hierarchy" in Esahie:

1. [+palatal] is the strongest trigger (High-front).
2. [-ATR, +back] is the second strongest trigger.
3. [+ATR, +back] is the weakest of the high triggers.

This hierarchy explains why *ɛboe* (with a high-front V₂) gets [j], but *ahoɔyaa* (with a mid-front V₂) gets [w]. The [-ATR] specification of the back vowel provides a level of articulatory resistance that prevents the palatal features of a mid-vowel from spreading regressively.

$\emptyset \rightarrow w/ \quad V \text{ — } V \quad (\text{insert a labio-velar glide when the first vowel is back-high})$

-low
+high

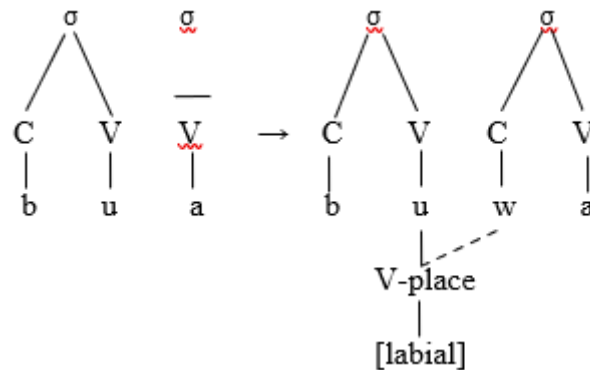
Figure 3*Feature Geometry for Progressive V-place Spreading*

Figure 3 illustrates the feature-geometric representation of progressive spreading for labio-velar glide insertion. Unlike the palatal spreading depicted in Figure 1, this diagram demonstrates how the labial feature of the high back vowels (particularly [u]) spread to the empty onset position, resulting in epenthesis. The representation shows that the node dominates in this configuration, with the tier linking the velar place of articulation. This dual articulation-labial and velar-distinguishes from the simpler palatal. The figure also captures the dependency relationship between the feature and the node, explaining why lip rounding is preserved in the epenthetic segment. Notably, the ATR feature is represented at the root node level, accounting for its system-wide influence in blocking palatal spreading even when front vowels are present in V₂ position. This geometric analysis supports the claim that back vowels constitute a distinct phonological class with enhanced triggering potential for insertion in Esahie hiatus resolution.

Mid-Front Vowels and the Neutrality of the Low Vowel /a/

The mid-front vowels /e/ and /ɛ/ demonstrate consistent triggering patterns for palatal glide [j] insertion, though with marginally reduced potency compared to their high-vowel counterparts /i/ and [ɪ]. This gradient effect reflects the articulatory proximity between mid and high vowels: both share the [+front] specification, but mid vowels lack the [+high] specification that most efficiently drives palatal epenthesis. In sequences such as /e-a/ and /ɛ-a/, the glide [j] emerges as the predictable epenthetic segment, preserving frontness trajectory while accommodating the syllable structure requirement. The data in Table (7) illustrate this pattern robustly across morphological contexts, from verbal roots *awue* [æwuje] 'kill, murder' to nominal compounds *awisea* [æwiseja] 'orphan'.

However, a critical divergence emerges in environments where mid-front vowels co-occur with [-ATR] back vowels. In *awerehyemue* [awireɛɛmuwɛ] 'hope', the underlying sequence /u-ɛ/ surfaces with [w] rather than the expected [j], despite /ɛ/ being a front vowel. This anomaly is not random but systematic: the [-ATR] specification of the back vowel [u] creates an articulatory "shield" that resists regressive palatal spreading. The reduced height of mid vowels-relative to high front vowels-renders its [palatal] feature insufficiently strong to override the combined [+round, -ATR] features of the back vowel.

The results consistently show that the low vowel /a/ does not influence glide selection. Across all examined environments-whether in V₁ position, *akaatia* [akæ:tija] 'baboon', V₂ position *sia* [sija] 'in-law', or both *kuanie* [k^hijaniɛ] 'farmer'-/a/ consistently fails to impose any glide quality. This inertness stems from /a/'s phonological underspecification: as a low vowel, it lacks the [±high] feature that correlates with; as a central vowel, it lacks the [back] and [front] specifications that determines labial versus palatal orientation. Phonetically, /a/ occupies the vowel space's neutral zone, offering no directional momentum for feature spreading.

The consequences of the neutrality of /a/ are twofold. First, in /a-V/ sequences, glide selection is entirely determined by the non-low vowel: /a-i/ yields [j] *afia* [æfija] 'middle', while /a-u/ yields [w] *bua* [buwa] 'pot', with /a/ contributing no independent effect. Secondly, in V-/a/ sequences, the same asymmetry holds-the following /a/ imposes no requirements, allowing V₁ features to spread unimpeded. This creates a systematic asymmetry of influence: high and mid vowels are "active" triggers, while /a/ is a "passive" participant, merely hosting the resolution determined by its vocalic neighbours.

This pattern aligns with broader phonological principles of sonority-driven epenthesis. In Esahie, the extreme vocalic positions-high-front and high-back-represent maximal sonority contrasts, making them optimal anchors for feature spreading. The low vowel /a/, despite being maximally sonorous in traditional sonority hierarchies, is paradoxically minimized in the epenthetic system because its articulatory openness provides no specific features associated with glide formation. Thus, hiatus resolution in Esahie prioritizes articulatory precision over raw sonority, favouring vowels whose feature bundles can be most efficiently mapped onto the consonantal space occupied by glides.

Cross-linguistically, this behaviour positions Esahie within a typology where low vowels are typically inert in vowel-to-consonant assimilation processes. The neutrality of /a/ serves a functional role: it reduces phonological ambiguity by ensuring that glide selection consistently reflects a contrastive vocalic feature, thereby maintaining the integrity of morphological contrasts that might otherwise be obscured by epenthetic variation.

Conclusion

This study set out to investigate hiatus resolution in Esahie with a focus on glide epenthesis and the role of phonological features in conditioning segmental outcomes. The findings demonstrate that hiatus resolution in Esahie is not a uniform or purely positional process, but rather a feature-driven system in which vowel quality plays a decisive role in determining glide selection.

The quantitative patterns show that palatal glide [j] is the dominant epenthetic outcome, while labio-velar glide [w] is strongly conditioned by high-back vowels. Importantly, the data also reveal that vowel position alone cannot fully account for glide selection. Although elements of V₁ influence are present, a substantial proportion of the data shows clear V₂ conditioning effects. This finding challenges the traditional assumption of V₁ dominance (Casali, 1996, 2011) and supports a more nuanced view in which feature salience can override linear position.

The study further demonstrates that hiatus resolution in Esahie is best captured through a feature hierarchy model, where certain vowel features systematically outrank others in determining epenthetic outcomes. This model accounts for both progressive and regressive spreading patterns observed in the data and provides a unified explanation for variation in glide insertion.

From a theoretical perspective, the findings reinforce the explanatory value of Feature Geometry (Clements, 1983/1985) in modeling segmental processes as feature spreading phenomena. They also extend existing Optimality Theory accounts by showing that constraint interactions must be sensitive not only to positional asymmetries but also to feature strength. In this regard, Esahie contributes important empirical evidence to ongoing debates on the nature of hiatus resolution and feature dominance in phonological theory.

Methodologically, the study underscores the importance of combining systematic elicitation with feature-based coding and quantitative analysis in phonological fieldwork. Such an approach allows for clearer identification of distributional patterns and reduces the risk of overgeneralized or impressionistic interpretations.

In conclusion, hiatus resolution in Esahie emerges as a structured and hierarchical process governed by feature interaction rather than linear vowel ordering alone. Future research could extend this analysis through acoustic phonetic studies and cross-dialectal comparison within the Kwa language family to further refine the proposed model of feature hierarchy in glide epenthesis.

Recommendation

There are several interrelated avenues along which future work on Epenthesis as a Hiatus Breaker in Esahie Phonology can fruitfully extend. This leads to one potential avenue of investigation: vowel hiatus may be resolved via an interaction between epenthesis and elision, a relationship which is perhaps best captured within the rule-ordering framework (Kiparsky, 1973)-we might call this feeding or alternately bleeding by epenthesis skating over elision in some environments. More generally, a theoretical re-consideration of the so-called glide formation phenomenon could serve as a test case for the hypothesis that the phenomenon is better understood in terms of sequences of epenthesis followed by elision and thus contribute to more general claims about phonological theory. In addition to Esahie, a cross-Kwa comparison such as with Akan and Ewe would offer useful typological insights into the contributions of closely related languages in addressing hiatus resolution. Future work could explore the prosodic conditioning of epenthesis; particularly how morphological boundaries and phonological domains may affect vowel insertion. Moreover, experiments and acoustic studies based on tools as PRAAT might provide insights into the perceptual and phonetic properties of epenthetic vowels to distinguish whether these processes are motivated by perceptual salience or grammatical obstructions. Finally, adding the tonal dimension of Esahie to hiatus analysis would surface a relatively unexplored area by showing how tone works in tandem with vowel insertion and deletion to generate well-formed phonological tunes. Collectively, these directions would greatly enhance our understanding of hiatus resolution in Esahie-and the thick theory more broadly.

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APPENDIX A

Spelling	SR	Gloss
abɛmua	abɛmuwa	‘a boy’
aburasia	æburasija	‘sixty (60)’
abusuanie	æbus ^u ija-nije	‘relative’
adoe	adoji	‘monkey’
adwufua	ædzufuwa	‘word’
ahurusie	æhurusije	‘to rejoice’
akatusa	akætusa [akæt ^u ija]	‘pay’
akɔniaba	akɔnijaba	‘to swing’
akyidee	ætɛidije	‘forbid’
amrokua	amrokuja [amrok ^u ija]	‘mouse, squirrel’
asoɛ	asuwɛ	‘ear’
awɛen	awɛjin	‘horn’
awisea	æwisija	‘nephew’
ayisia	ajisija	‘orphan’
bayie	bæjije	‘witchcraft’
bia nzue	bija ŋzuwe	‘to swim’
boa	bowa	‘to assemble, pack’
bodua	boduja [bod ^u ija]	‘amulet, charm’
boin	bujin	‘nose’
bokyea	buteija	‘cooking stone’
bosea	bosija	‘to lend, borrow’
brasua	bræsua [bræs ^u ija]	‘woman’
brensua	brensua [brens ^u ija]	‘male, man’
bu animtia	buwanimtija	‘disdain, despise’
bua	buwa	‘a pot’
bubuanie	bubuwanije	‘cripple’
bue	buwe	‘nest’
buebua	buwebuja [buweb ^u ija]	‘to cover (v)’
buluo	buluwo	‘yam’
dua	duja [d ^u ija]	‘plant, tree, tail’
dwodwo ahone	dzɔdzɔwahonɪ	‘calm (oneself)’
ebiale	ebijale	‘to wash’
esurein	esrejin	‘fear’
ewiase	ewijasɪ	‘world’
eyein	ejejin	‘firewood’
ɛboe	ɛboji	‘shell (groundnuts (v))’
ɛsoen	ɛsojin	‘elephant’
ɛsue	ɛsuwɛ	‘to cry’
ɛwɔfoe	ɛwɔfowɛ	‘guest, visitor’
foa	fowa	‘to chase’
gua nza	guwanza	‘to pour libation’
gyedie	dzɛdije	‘believe’
hia	hija	‘need’
hoa	howa	‘story’
hua	huja [h ^u ija]	‘smell’

hue	huwe	‘chest’
huɛ	huwɛ	‘husband’
hwie	ɛɸije	‘to pour’
hwie gua	ɛɸije guwa	‘to pour’
kotoa nyamaa	kotowa pama:	‘umbilical cord’
kuanie	k ^ɸ ija-niɛ	‘farmer’
kunanie	kunanije	‘widow’
kyiremvua	tɛiremvuwa [tɛiremv ^ɸ ija]	‘egg’
mboanoa	mbowanowa	‘beach’
moa	mowa	‘to fold, squeeze’
mviaseɛ	mvijasije	‘to start, begin’
ndeamue	ndijamuwe	‘shout, cry out’
nimdeɛ	nimdije	‘knowledge’
nɔboakoma	nɔbɔwakoma	‘maggot’
nsusui	nsusuji	‘suggestion’
nwu amanee	nwuwamanije	‘suffer’
nyɔkowa	ɲɔkowa	‘grinding stone’
nzoa pɛle	ɲzowa pɛle	‘insult’
nzoen	ɲzojin	‘ashes’
nzu ehoin	ɲzuwehoin	‘(be) thirsty’
nzua	ɲzowa	‘to insult’
nzue	ɲzuwe	‘water, dam’
obuo	obuwo	‘to obey’
pɛ yia	pɛ jija	‘to surround’
pia	pija	‘push’
prakasua	prakasuja [prakas ^ɸ ija]	‘harmattan’
sia	sija	‘in-law’
soa	sowa	‘to swell’
sɔ nea	sɔ nija	‘to try’
sua	suja [s ^ɸ ija]	‘to learn’
suesua	suwesuja [suwes ^ɸ ija]	‘imitate’
tu ate	tuwatee	‘to travel’
tua	tuja [ts ^ɸ ija]	‘to close, shut’
tui	tuji	‘gun’