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Identical Tones and the OCP in Èwùlù: An Optimality Account

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***Abstract*—The Obligatory Contour Principle (OCP) potentially acts as a constraint on adjacent identical tones. This is why, in tone languages, underlying /HHL/ and /LLH/ may surface as [HL] and [LH] respectively. Èwùlù (Igboid: West-Benue Congo, Nigeria), a relatively unknown small dialect, exhibits such OCP-motivated adjustments on adjacent identical tone structures. Adopting the Optimality Theory, this study accounts for the tonal modifications in order to complement the earlier findings in the literature that advance our understanding of how the OCP shops for adjacent identical tones in representations but may fail to do so due to attested structural exceptions in its tonology. Therefore, the study examines tonal patterns such as, juncture tone deletion, consecutive high and low tones, tonal affix, downstep and final high tone displacement. The findings showed that the OCP can be dominated by some higher-ranked constraints in the Èwùlù tonal grammar, like is the case in some languages,. This study draws some theoretical implication. The Èwùlù tonal system provides further evidence that suggests the OCP is not universal; it is violable just like other constraints active in Universal Grammar.**

***Index Terms*—Èwùlù, OCP, Optimality Theory, tonal patterns, tones**

I. Introdution

Tone languages characteristically avoid identical tones adjacent to each other, such as the sequences, high-high-low (HHL) and low-low-high (LLH) (see Leben, 1973; Goldsmith, 1976, 1990; Myers, 1997; Akinlabi & Liberman, 2000; Yip, 2002; Akpabio et al., 2021). Extensive works, particularly the ones on African tone systems, have shown that the languages typically modify the aforementioned tonal sequences phonetically by simplifying them as HL and LH respectively. Research findings, specifically those from Leben, and later Goldsmith (1976), establish that the constraint which deletes one of the identical tones is the Obligatory Contour Principle (OCP). Goldsmith states the principle thus: *Adjacent identical elements are prohibited*.

A lesser known, small Nigerian dialect named Èwùlù (Igboid: West Benue-Congo), with approximately fifteen thousand native speakers (Ezimechine 2014; Utulu 2015), exhibits some tonal changes similar to the OCP-induced tonal modifications documented in the literature. For instance, in the current Èwùlù data, tonal reductions/simplifications occur, where tautomorphemic and heteromorphemic input tonal sequence /HH/ and /LL/ are characteristically modified phonetically as [H] and [L], respectively. In this regard, we suspect that the simplification of the adjacent identical tones, in which one of two sequences of identical tones deletes from the representation may be triggered by the OCP. Until now, studies that explored such input duplicate tone structures with the aim to ascertain the motivation for their simplification, particularly from a constraint-based perspective in Èwùlù is nonexistent. Therefore, the objective of this present study is to explore a body of data from Èwùlù, which makes a theoretical contribution to our understanding of how the OCP as a constraint may, (i) prohibit identical tone structures in tonal languages, and (ii) become weakened to a point that it is unable to resolve similarity of tone structures due to some structural exceptions, thereby becoming dominated by some higher-ranked constraints.

To achieve the objective, this paper examines six tonal patterns in the Èwùlù tonal grammar we assume are implicated in the perceived 'antics' of the OCP effects on duplication of tonal structures. The tonal patterns are: Juncture Tone Deletion, Consecutive High Tones, Consecutive Low Tones, Tonal Affix, Downstep, and Final High Tone Displacement. To account for the tonal phenomena, we adopt the Optimality Theory (OT) proposed by Prince and Smolensky (1993) for analysis. Our adoption of the theory is hinged on its adequacy in accounting for OCP-induced tonal identity, and its capacity to generate some fundamental higher-ranked constraints to resolve some peculiar tonal identity problems the OCP fails to resolve. We examine both the existing and a new body of data that highlight such cases in the dialect.

This work is organised as follows: Section 2 reviews a few phonological literature that touch on the effects of the tonal OCP in three African languages, namely, Shona-Bantu, Igbo and Yoruba. Section 3 gives an overview of the Èwùlù tone system, its number of level tones, contour tones and distributions of the levels. Section 4 discusses the methodology, the source of the current data, and then states how the data are purposively categorised for the analysis. In Section 5, the paper briefly highlights the fundamentals of the Optimality Theory by listing the relevant faithfulness and markedness constraints required to capture the six Èwùlù tonal patterns.

Section 6 provides descriptive and theoretical analyses of the data adopting the framework of the OT. Finally, the article highlights the theoretical implication of the findings of this study in the light of researchers' earlier assumption of the OCP as a universal constraint, but is proven in the current data it is more a tendency than a principle.

II. The Functional Effects of the OCP in the African Tonal Grammars: An Overview

There are pieces of evidence from natural language data validate the function of the OCP as a constraint that adjusts adjacent identical tone structures to avoid its violations. The proofs come from some African and Asian tone systems. Specifically, the pieces of evidences come from the tone systems of three African languages, namely Shona-Bantu (McCarthy, 1986; Myers, 1997), central Igbo (Yip, 2002), and Yoruba (Akinlabi & Liberman, 2000; Yip, 2002).

Bantu (Shona)

Relating to the OCP effect on tone, Yip (2002) shows that the disyllabic word *bángá* 'knife' in Shona-Bantu is underlying specified with doubly-linked H tone. However, in the sentence, *í-banga* 'it is a knife', Yip, following Myers (1997), explains that the doubly linked H is deleted. She suggests that the H tone deletion in the sentence is due to the H specified on the copula prefix, **i**, 'is', and that the elision of the doubly-linked H tone is triggered by the OCP to avoid its violation.

Igbo (Central Variety)

ln Igbo, Yip (2002) shows that the underlying L tone of the root, zà 'sweep', in the construction *zà-chà-fụ̀-ɣì*, 'sweep-be clean-go out-NEG' is lost on the surface, where ***zà**-chà-fụ̀-ɣì* becomes ***za**-chà-fụ̀-ɣì*. Yip claims that the loss of the abstract L tone is due to the influence of two OT constraints, OCP and NONINITIAL, ranked in that order, thus, suggesting that the OCP is active in Igbo.

Yoruba

Yoruba, a three-tone system, it is reported, exhibits structural changes made on some specific tonal domain (i.e., in the context where polarity applies) to avoid OCP violations. In the language, Yip (2002), citing examples from Akinlabi and Liberman (2000), draws the following polarity examples: *ó pa mí* 'he/she/it killed me' versus *ó kọ́ mi* 'he/she/it taught me'. Yip shows that the Yoruba object clitic, *mi* can be specified with a H tone or M tone (or sometimes a L tone), giving rise to, *mí* and mi respectively. She explains that the tone quality specified for the Yoruba object clitic, H or M, is determined by the tone of the preceding verb, in this case *pa* and *kọ́*. Accordingly, *pa* takes a M tone if the object clitic is high-toned, whereas *kọ́* takes a H tone if the object clitic is mid-toned. Consequently, due to the need to satisfy the OCP, the object clitic alternates between H and M. Also, the sensitivity of the language to the OCP effect accounts for the forms, *ó kọ̀ yín* 'he/she/it divorced you-all' vs. *ó pa yín* 'he/she/it killed you-all', where the object clitic *yín* takes a H tone, since the preceding verbal tones are distinct tones, a L tone and a M tone respectively.

The examples illustrated above strongly justify the activeness of the OCP as a condition on identical tones in tone languages. In this study, we will show that the OCP is active too in Èwùlù. However, we will provide some counterexamples that suggest the OCP can be inactive due to some structure-specific patterns allowing some other competing constraints to dominate the OCP. The evidence of the activeness and inactiveness of the OCP in dealing with similarity of tonal structures, as this study will reveal, will crucially further expose its strengths and weaknesses, as previously shown in the literature (see particularly McCarthy, 1986; Myers, 1997; Odden, 1986, 1995). On exploring these two extremes is the main thrust of this work.

III. The Èwùlù Tone System: An Overview

Èwùlù is a registered tone language with two level tones, the H tone and the L tone. In addition to these two levels is downstep, represented with the exclamation mark (!) (Utulu, 2015). Of the three levels, only the first two levels are overtly mapped on syllables composed of any of the nine phonemic vowels: /i/, /ɪ/, /e/, /ɛ/, /a/, /ɔ/, /o/, /ʊ/, /u/, which function as syllable nucleus/peak in the dialect. In addition to the vowels, five phonetic homorganic syllabic nasals [m], [ɱ], [n], [ɲ] and [ŋ] are specified for some tone, making them tone bearing units (TBUs) (Utulu, 2020a, 2020b). Essentially, the H and L levels may merge to derive surface falling (ˆ) and rising (ˇ) contour tones. In the next sub-sections, we will give an overview of the distributions of the three tonal phenomena and the contour tones.

A. Level Tones

This subsection discusses the level tones attested in Èwùlù and their distributions at the word level. It also gives a brief description of how the rising and falling tones are derived phonetically from the H and L tones.

(a). The High Tone

Like in other tone languages, the Èwùlù H tone carries the higher F0 load relative to the downstepped H tone and L tone (Utulu, 2015; 2020a). Distributionally, the H tone can be found in the initial, medial and final positions in the word. The examples in (1) illustrate this fact.

(1) High tone distribution

	Initial position			Medial position			Final position	
a.	/ɔfò/	‘prophecy’	b.	/ɔkwókwò/	‘fowl’	c.	/òfú/	‘one’
	/ójù/	‘slave’		/ògúdè/	‘a name’		/èʃǒ/	‘flesh’
	/áβì/	‘scorpion’		/ɔʧĩʧá/	‘riping’		/àkú/	‘door’

Sequences of H tones

d.	/ɔβóβó/	‘bone’
	/ńɓílíɓá/	‘bell’
	/ńkíríká/	‘rickety’

In addition, we observe that some of these words have their H pitch distributed repeatedly on two or several syllables without intervening contrasting levels, a pattern that we will tackle in the analysis section.

(b). The Low Tone

Though with a relatively lower F0, distributionally, the L tone like the H tone can be found in the initial, medial and final positions. Similarly, the L tone can be distributed consecutively on several syllables with no intervening contrasting levels, as (2) depicts:

(2) Low tone distribution

	Initial position			Medial position			Final position	
a.	/ìsé/	‘five’	b.	/ńdùrì/	‘dove’	c.	/óbì/	‘heart’
	/ùdʒú/	‘abundance’		/ɔ́kòlò/	‘okro’		/ɔ́dʒì/	‘Iroko tree’
	/àzó/	‘back’		/ákítí/	‘cheek’		/ógè/	‘time’

Sequences of L tones

d.		
	/ǹdìdì/	‘patience’
	/òbòdò/	‘town’
	/ǹbòlò/	‘pebble’

A common behaviour of the H and L tones is that they may show two-way or three-way contrast in the otherwise homophones, such as *èkwá* ‘egg’, *ékwà* ‘cloth’, *ékwá* ‘cry’ (Utulu, 2015). More relevance to this study, however, is the implication of (1d) and (2d) to the subject of the OCP to be considered in Section VI.

(c). The Downstep

Languages lacking the mid tone typically compensate for the gap by utilising a covert (floating) L tone referred to as (Non-automatic) Downstep (Clements & Ford, 1979; Pulleyblank, 1986; Clark, 1990; Liberman et al., 1993, among others). It may occur lexically or grammatically, giving rise to the labels: ‘lexical downstep’ and ‘grammatical downstep’, respectively. The context of operation of downstep is between two abstract consecutive Hs, in which the final H is the target. The downstepped final H characteristically lowers in pitch as a result of a progressive assimilatory effect of the intervening floating L tone. Like the central Igbo (and many other two-tone languages), the Èwùlù downstep is found between two consecutive right-edge grammatical Hs, with the format [… + H!H] (Utulu, 2015, 2020a).

However, the application of the Èwùlù lexical (word-based) downstep is restricted. As in (3), it is found exclusively in three-/poly-syllable words and never in two-syllable words. This, therefore, differentiates the variety markedly from the central variety, where word-based downstep typically targets bisyllabic words (e.g., *é!gó*, ‘money’ *ág!ó*, ‘lion’, *ɔ́n!ó* ‘mouth’). In Èwùlù, the respective Igbo words are rather realised with sequences of two Hs, as in, **é***gó, ágó, ɔ́nó* (Utulu, 2020c). Examples of lexical downstep in Èwùlù are shown in (3). Note – (n/a) is Not applicable.

(3) Èwùlù Lexical downstep

	Initial position	Medial position	Final position Applicable	
a.	n/a	n/a	[éɗɛ̃!ké]	‘blood’
b.	”	”	[ńkí!tá]	‘dog’
c.	”	”	[áβó!kó]	‘shoe’
d.	”	”	[átó!ló]	‘sheep’
e.	”	”	[ą́ní!ké]	‘axe’
f.	”	”	[áwé!lé]	‘favour/luck’

In (3), it will be observed that the final high-toned syllables are downstepped. As we mentioned in the foregoing, the downstep process is traceable to an unspecified L tone. However, contrary to the pattern in (3), we observe that some specific trisyllabic items like the ones in (1d) do not attract downstep, for no obvious phonetic/phonological reason. Therefore, the examples in (1d) and (3a-f) seem to raise questions regarding the power of the OCP in regulating structures with consecutive identical tones. We will address the problem theoretically in the analysis Section.

In (3), it will be observed that two consecutive Hs in Èwùlù constructions may be subjected to grammatical downstep. At the grammatical level, as remarked earlier, the downstep typically targets the right edge of the phrase/clause. The postlexical tonal pattern is illustrated in (4) as follows:

(4) Grammatical downstep

	Basic form	Derived form
a.	/éɓé/	[ísí é!ɓé]
	'hawk'	'head hawk'
		'hawk's head'
b.	/ɔ́lɔ́/	[ónɔ̀ ɔ́!lɔ́]
	'work'	'house work'
		'work place'
c.	/ɔ́ʃĩ/	[ɔ́ɲé ɔ́!ʃĩ]
	'thief'	'the one thief'
		'a thief'

It is worth mentioning at this point that, in Èwùlù, lexical downstep does not contrast with H and L tones as may be found in some Igbo varieties. For example, in Onitsha-Igbo (see Williamson, 1986; Emenanjo, 1978) downstep may trigger lexical semantic contrast between words that are otherwise homophonous. This variety of the Igbo language does so by simply modulating the F0s of the three levels.

B. Contour Tones

Phonologists (e.g., Akinlabi & Liberman, 2000; Ezenwafor, 2014) agree that the motivation of contour tones is the phonetic combination of two levels, H and L tones, particularly in registered tone systems. The formation of contours often results from the effects of the operation of some segmental rules which delete or desyllabify segments that bear either of the level tones. Once the segmental rules apply, the two levels would tend to segmentalise, thus becoming either a rising tone or falling tone, as demonstrated below.

(a). The Falling Tone

Èwùlù has two domains in which the falling tone can be realised: (i) the word level, and (ii) the postlexical level. The two grammatical domains are illustrated in (5a & b) respectively:

(5) The Èwùlù falling tone

a. Word-based falling tone

i.	/ìsíì/	→	[ìsî]	'six'
ii.	/ɛ̀sáà/	→	[ɛ̀sâ]	'seven'
iii.	/sáà/	→	[sâ]	'stop it!'

b. Postlexical falling tone

i.	/ká/	+	/ɛ̀ʃʊ́/	→	[kɛ̂ʃʊ̀]
	'surpass'		'body'		'be strong'
ii.	/sí/	+	/ìtè/	→	[sîtè]
	'cook'		'pot'		'cook food'
iii.	/rí/	+	/ɔ̀ɓà/	→	[rjɔ̂ɓà]
	'eat'		'cock'		'eat cock'
iv.	/ɓú/	+	/ɔ̀ɓà/	→	[ɓwɔ̂ɓà]
	'slaughter'		'cock'		'slaughter cock'

Given the formation of the falling contour, it is clear that contours in Èwùlù are sequences of level tones realised phonetically on a single TBU. As (5a) and (5b) indicate, observe that the underlying heterosyllabic H.L sequence automatically turns to surface H-L contour tone. The falling tone [ˆ] is realised in the Èwùlù tonal grammar under the influence of two independent operating rules mentioned in the foregoing. First, it is realised under the influence of the V^1-deletion rule, as in (a, i-iii) and (b, i-ii). Second, the falling tone is realised under the influence of the desyllabification rule, where /í/ and /ú/, as in (b, iii & iv) become [j] and [w] respectively. This latter rule is referred to as Glide Formation (Casali, 1995, 2011; Utulu, 2006, 2020b). In all cases, (whether vowel syncope, or glide formation is the rule operative in the grammar of the dialect) the stranded H tone naturally segmentalises with the following L tone to generate a surface falling tone.

(b). The Rising Tone

Like the falling tone, the rising tone is phonetic. Its context is also at the lexical and postlexical levels. In the formation of the rising tone, the juncture L and H tones normally merge to derive the contour. This tonal pattern may occur in the affirmative verbs in (6a, i-iii), or in constructions, as the forms in (6bi-iv) show:

(6) The Èwùlù rising tone

a. Word-based rising tone

i.	/sìí/	→	[sǐ]	'measure'
ii.	/gùú/	→	[gǔ]	'swim'
iii.	/lòó/	→	[lǒ]	'ruminate'

b. Postlexical rising

i.	/tà/	+	/ázɔ̀	→	[tǎzɔ̀]
	‘chewed’		‘fish’		‘chewed fish’
ii.	/tè/	+	/ófé/	→	[tɔ̃fé]
	‘cooked’		‘soup’		‘cooked soup’
iii.	/ìtè/	+	ɔ́ʧá	→	[ìtɔ̃ʧá]
	‘pot’		‘fire’		‘hot pot’
iv.	/ànì/	+	/ɔ́má/	→	[ànjɔ̃mā́]
	‘land’		‘beautiful’		‘beautiful land’

Because Èwùlù is a V^1 dominant dialect (Utulu, 2020a, 2020b), deletion of the first of two juncture vowel sequences is the norm. For this reason, we should expect that the first of the two boundary vowels in (6) would delete (and sometimes would desyllabify under the motivation of the glide formation rule that converts V^1-bound /i, ɪ/ and /u, ʊ/ to [j] and [w] respectively and hence trigger contour tone formation. This, however, is usually not the case particularly if the consecutive tones affected by the segmental rules are identical. The observed exception is also of theoretical interest in this study.

IV. Methodology

The Èwùlù data for this study were drawn from two sources. The first body of the data was culled from Utulu (2015), Utulu (2020a), Utulu (2020b) and Utulu (2020c). The second set of data was gathered from two Èwùlù fluent, native speakers, a male and a female. The two sets of data were categorised into two: (i) word-based data, and (ii) phrasal-based data. We purposively gathered the two sets of data based on two different tonal patterns. The first set data consisted of samples with tone structures exhibiting adjacent ‘distinct’ tones. The second set incorporated samples with tone structures exhibiting adjacent ‘identical’ tones. We adopted this method of data stratification to highlight the morphophonological and syntactic environments under which the OCP effects may or may not apply in the Èwùlù tonal grammar. The environments where we expect the OCP effects to be active in the latter category of data thus informed our examination of the following tonal patterns: Boundary High Tone Deletion, Consecutive Lexical High and Low Tones, Tonal Affix, Downstep and final High Tone Displacement. In the OT analysis of the tonal processes, we assessed the strengths and weaknesses of the OCP in terms of its ability to compete with other conflicting constraints in the phonology.

V. Theoretical Framework - Optimality Theory

We adopt the framework of the standard Optimality Theory (OT) proposed by Prince and Smolensky (1993) for the analysis of the Èwùlù tone data. Our choice of the OT lends itself to the fact that the OCP, a principle which is central to the present study, is a constraint on outputs, given its ‘repair’ effects on input-output forms that otherwise violate it. With its basic two-way constraint formats, Faithfulness Constraint and Markedness Constraint, we assume the OT is an adequate model to account for the OCP-induced tonal phenomena, such as deletion and/or spread observed in the current data. The adequacy of the OT in handling phonological phenomena has been acknowledged by Yip (2002), who avers that, “The aspect of this theory that makes it so appealing to many phonologists is the universal nature of the constraints, which directly encode well-established cross-linguistic preference for particular classes of sounds and types of structures” (p. 79).

In this work therefore, we shall employ both the faithfulness constraints and markedness constraints to account for the six OCP-related tonal patterns mentioned in the preceding section. The faithfulness constraints adopted for the analysis are: IDENT-T, MAX-T, NOFUSION and *DISASSOCIATE, while the markedness constraints assumed for the same purpose are: OCP, SPECIFY-T, NOLONGT and *FLOAT (see McCarthy & Prince, 1993, 1995; Kager, 1999; Yip, 2002). The interpretation of the constraints is outlined in (7) as follows:

(7) Optimality Theory Constraints

Faithfulness Constraints

i. IDENT-T - Every input tone and output tone are the same.

ii. MAX-T - Every input tone has an output correspondent (No deletion of tone).

iii. NOFUSION - Separate underlying tones must stay separate.

iv. *DISASSOCIATE – No removal of association lines.

Markedness Constraints

i. OCP – Adjacent identical tones are prohibited.

ii. SPECIFY-T – A TBU must be associated with a tone.

iii. NOLONGT – A tone may be associated with at most one tone.

iv. *FLOAT – A tone must be associated with a TBU.

v. NOCONTOUR – A TBU may be associated with at most one tone.

It should be noted that the relevance of these constraints is strictly based on the typology of the tonal patterns examined below (Note, for the reader and student with no basic knowledge in OT, please consult Kager,1999; Yip, 2002).

VI. Tonal Analysis: A Descriptive and Theoretical Account

In this section, we undertake both the descriptive and theoretical analyses of the six tonal patterns/processes already outlined in Section 4 in the subsections below.

A. The Behaviour of Boundary Tones

One intriguing aspect of the tonal patterns of some tone systems, particularly the Nigerian two-tone systems, is the 'stability' of tones despite the loss of their TBUs (or, as the case may be, the 'deletion' of tones for similar reason). Studies have shown that, in the course of deletion of a specified TBU, the H tone typically survives the TBU-deletion rule at the expense of the L tone. This kind of grammatical tone behaviour operative in the context where HL or LH sequence occurs, is common with the Edoid group of languages. The Urhobo language (Aziza, 2007) and possibly Emai, with attested exceptions (Egbokhare, 1990), are good examples.

However, at the other extreme are two-/three-tone languages that would rather preserve the H or the L regardless of the loss of its TBU (compare the case in (5) and (6), where the L like its H counterpart does not succumb to deletion but is rather preserved). Thus, in some Nigerian languages (Etsako and Yoruba inclusive), both the H and L tones would rather become stable and subsequently lead to contour tone formation, as the case in (5) and (6). Like Èwùlù, the Central Igbo is one well-known language that showcases tone stability (see Clark, 1978; Williamson, 1986; Goldsmith, 1990; Obianika, 2006; Utulu, 2018a, 2018b, 2019).

The stability of tone has long been observed by phonologists, prompting the suggestion that tone is an 'autonomous' prosodic property lacking segmental support. Indeed, it was this idea about tone and its 'independent' characteristics that advanced a non-linear phonological theory in the mid 70s, christened 'Autosegmental Phonology' (Goldsmith, 1976). The interesting stability of tone implicitly discussed in (5) and (6) is illustrated with additional structures in (8) as follows:

(8) Tone stability

a.	/bì#á/	→	[bǰa]		
	'come, affirmative'		'flog'		
b	/ò-gú-ù/	→	[ògû]		
	'digging'		'digging'		
c.	/ànì/	+	/ɔ́kà/	→	[ànjɔ̌kà]
	'land'		'maize'		'maize land'
d.	/àfè/	+	/ɔʧǎ/	→	[àfɔ̌ʧǎ]
	'cloth		'white'		'white cloth'
e.	/òfú/	+	/ànì/	→	[òfwânì]
	'one'		'land'		'one land'
f.	/àdá/	+	/àfɔ/	→	[àdâfɔ]
	'first female child'		'a week day'		'a name for first born female child'

In (8), it will be noticed that there occur the segmentalisation (conflation) of all the stranded L tones with the following H tones in (8a, c, d) and the conflation of all stranded H tones with the following L tones in (8b, e, f). As the patterns show, all the stranded tones specified on V^1 merge with the following tones sequel to the gliding or deletion of their respective TBUs.

Contrary to the tonal pattern in (8), there is a possibility for the same juncture tones to 'defy' the 'stability effect', as the examples in (9) show, even when the two segmental rules mentioned in the foregoing are operative in the grammar. This non-stability (i.e., deletion) effect happens if consectuve juncture tones, as in (9) are 'identical'. The converse relations existing between (8) and (9) form the thrust of this subsection, which have implication for the functional effect of the tonal OCP. The non-stability effect on boundary tones is presented below:

(9) Èwùlù boundary H tone deletion

a.	/fí#á/		→	[bjá]	
	'come, affirmative'			'flog'	
b.	/rí#ɔ́		→	[rjɔ́]	
	'beg'			'beg'	
c.	/nú#é/		→	[nwé]	
	'swallow'			'swallow'	
d.	/nóá/		→	[nwá]	
	'came back'			'came back'	
e.	/óʧɔ́/	+	/úkwú/	→	[óʧúkwú]
	'chair'		'big'		'big seat'
f.	/éɲá/	+	/úkwú/	→	[éɲǔ́kwú]
	'eye'		'big'		'greed'
g.	/ónú/	+	/ɔ́má/	→	[ónwɔ́mǎ]

	‘neck’		‘beautiful’		‘nice voice’
h.	/ɛ́ŋá/	+	/úkwú/	→	[ɛ́ŋ́kwú]
	‘eye’		‘big’		‘greed’
i.	/ɔ́lɔ́/	+	/úkwú/	→	[ɔ́lúkwú]
	‘work’		‘big’		‘big project/task’
j.	/ǒŋné/	+	/ɔ́má/	→	[ǒŋɔ̃mã́]
	‘the one of’		‘beautiful’		‘beautiful one/person’

As (9) indicates, observe that, in all cases, the input juncture V^1 H tones are deleted, where /H#H/, /H+H/ sequences turn to a singleton [H]. Here, the first of the two boundary H tones is not preserved but lost, informing the tonal process we refer to in this works as *boundary/juncture tonal deletion*.

Following from the interesting tonal simplification process in (9), we assume that the ‘loss’ of the tone specified for the V^1 slot is triggered by the OCP effect. This is so because the OCP disallows adjacent identical tones thus, validating the statement in the introductory Section, *‘adjacent identical elements are prohibited’*. However, we suggest that the curious paradox in (8), in which the juncture tones are preserved rather than deleted is informed by the occurrence of ‘distinct’ boundary tone sequences which satisfy the OCP. Thus, it makes sense here to argue that the strict observance of the tonal OCP in Èwùlù is hinged on ‘tonal adjacency’ and ‘tonal dissimilarity/similarity’ issues.

Below, we use the insight from the OT in tableaus (10A & 10B) to validate our assumption above, as we adopt the form in (9e), /oʧo ukwu/ ‘big seat’ for analysis, as follows:

(10A)	/oʧo ukwu/ H H H H	OCP	MAX-T	SPECIFY-T	NOLONGT
a.	[oʧo ukwu] H H H H	*!			
b.	➡ [oʧ-ukwu] H		*		*

In the tableau in (10A), the candidate (b), a reflection of the output forms in (9), is the optimal candidate. This is so because it satisfies the higher-ranked constraints OCP which disallows adjacent identical tones. However, the candidate (a), which though incurs less violations of the existing constraints, loses out to candidate (b) for fatally violate OCP. Despite the fact that the winning candidate exhibits ‘tonal spreading’ which violates MAX-T, it satisfies the OCP which disallows any candidates (like candidate (a)) which display adjacency of identical tones.

However, with the case in (8), in which ‘tone stability’ is preferred to ‘tone deletion’, MAX-T would dominate the OCP. An OT analysis of this view is undertaken in (10B) taken the exemplar form, /ànì ɔ́kà/ ‘maize land’ in (8c), as follows:

(10B)	/anɪ ɔka/ H H L L	MAX-T	NOCONTOUR	SPECIFY-T	OCP
a.	[anj ɔka] H H L	*!			
b.	➡ [anj ɔka] H H L L		*		

In (10B), the optimal output is candidate (b), which dominates candidate (a). This is because the optimal candidate satisfies the faithfulness constraint, MAX-T which requires that no tone(s) should be effaced from representations. The ranking of faithfulness constraint over markedness constraints, i.e., MAX-T >> NOCONTOUR, SPECIFY-T, OCP, explains why the tonal deletion rule in (9) is intuitively inconceivable in (8), as far as the Èwùlù tonal grammar is concerned.

B. Consecutive Lexical Hight Tones

In the data available to us, some bisyllabic and trisyllabic words (11) have their TBUs take the same tonal quality, i.e., duplicated H tones specified on consecutive syllables throughout the utterance. The fact that the sequences do not alternate between Hs and Ls, as the examples in (3) and (4) naturally demonstrate caught our interested. The examples of consecutive high-tone syllables are shown below:

(11) Word-based consecutive H tones in Èwùlù

a.	/íké/	→	[íké]	‘strength’
b.	/ójú/	→	[ójú]	‘twenty’
c.	/ɔdʒí/	→	[ɔ́dʒí]	‘cola-nut’

d.	/ójí/	→	[ójí]	‘cold’
e.	/ɛ́mó/	→	[ɛ́mɔ́]	‘laughter’
f.	/ɔβóβó/	→	[ɔβóβó]	‘bone’
g.	/ɛ́ʃǔʃǔ/	→	[ɛ́ʃǔʃǔ]	‘ant/snake’
h.	/áβóβɔ́/	→	[áβóβɔ́]	‘leather’
i.	/ɛ́kwókwɔ́/	→	[ɛ́kwókwɔ́]	‘paper’
j	/ɛ́βóβá/	→	[ɛ́βóβá]	‘a rash’

In (11), it will be observed that all the output forms retain the input H tone sequences, with no evidence of deletion, as was the case in (9). In principle, the occurrence of consecutive Hs, constrained strictly within the word in this case, violates the OCP. We recall that the OCP’s primary function is to disallow adjacent identical tones from occurring in a representation, and since the OCP appears to be inactive in the outputs in (11), we assume the OCP constraint must be dominated by some faithfulness constraints. We take the forms in (11a) and (11f) to validate our claim in the tableau in (12a) and (14d) respectively, as follows:

(12)	/ike/ H H	IDENT-T	NOFUSION	SPECIFY-T	OCP	*DISASSOC	NOLONGT
a.	➡ [ike] H H				*		
b.	[ike] H	*!		*		*	
c.	[ike] H	*!	*				*

In the OT analysis in (12), candidate (a) which is an exact reflection of the input forms in (11, a-e) is the optimal of the three. In fact, its satisfaction of the higher-ranked constraint IDENT-T which candidates (b) and (c) fatally violate makes it the winner.

Nevertheless, on perceptual ground, if we assume the candidate (c) could potentially become the optimal candidate, capable of overriding the candidate (a), the OCP and SPECIFY-T must therefore dominate IDENT-T, NOFUSION, *DISASSOCIATE, and NOLONGT. Our assumption is based on the tenets of the Autosegmental Theory. The theory recognises that sequences of identical tones ‘must’ be represented as ‘spread’ of a single tone (i.e., H spread) to sanction the OCP, following the theoretical assumptions of Leben (1973), Goldsmith (1976), and Yip (2002). An OT account of the proposed effect of spread on the forms in (11a-e) would be that demonstrated in (13), as follows:

(13)	/ike/ H H	OCP	SPECIFY- T	IDENT-T	NOFUSION	*DISASSOC	NOLONGT
a.	[ike] H H	*!					
b.	[ike] H		*!	*		*	
c.	➡ [ike] H			*	*		*

As (13) depicts, our re-ranking of the constraints, OCP>>SPECIFY-T, IDENT-T, *DISASSOC makes the hitherto violable OCP constraint in tableau (12) become undominated in tableau (13).

Besides, we may account for the syllabically complex outputs in (11f-j) by adopting the constraints ranking in (12). Here we take the architype form in (11f), /ɔβóβó/ ‘bone’ for analysis in (14), as follows:

(14)	/ɔβʊβʊ/ H H H	IDENT-T	NOFUSION	SPECIFY-T	OCP	*DISASSOC	NOLONGT
a.	➡ [ɔβʊβʊ] H H H				*		
b.	[ɔβʊβʊ] H	*!		*		*	
c.	[ɔβʊβʊ] H H	*!		*	*	*	
d.	[ɔβʊβʊ] H	*!	*				*

As (14) demonstrates, despite the fact that candidate (a), the perceptual correlate of candidate (d), violates the OCP, it yet won the competition. This is because it satisfies the more fundamental faithfulness constraint, IDENT-T.

However, the autosegmental 'spread' proposed in (13) allows us to rank markedness over faithfulness, that is, the ranking of OCP>>SPECIFT-T over IDENT-T>>NOFUSION, such that candidate (a), the winner in (14a) will now be dominated by the candidate (14d) and thus potentially becomes the winner, as in (15). The constraints re-ordering militating against IDENT-T>>NOFUSION (candidate (a)) in favour of the OCP (candidate(c)) is captured in (15) as follows:

(15)	/ɔβʊβʊ/ H H H	OCP	SPECIFY- T	IDENT-T	NOFUSION	*DISASSOC	NOLONGT
a.	[ɔβʊβʊ] H H H	*!					
b.	[ɔβʊβʊ] H		*!	*		*	
c.	[ɔβʊβʊ] H H	*!	*	*		*	
d.	➡ [ɔβʊβʊ] H			*	*		*

In (15), we will observe that candidate (d) as opposed to candidate (a) satisfies the higher-ranked constraint OCP, which the latter candidate fatally violated in (14a). Though candidate (15b) satisfies OCP, it is ruled out for violating the next higher-ranked constraints, SPECIFY-T and IDENT-T.

C. Phrasal Boundary Low Tones and Tonal Affix

In (9), we showed that one of two consecutive phrasal boundary H tones in Èwùlù normally undergoes deletion, because the sequences violate the OCP. In the case of two consecutive phrasal boundary L tones, as in (16), we expect that the same V^1-deletion process would apply to resolve OCP violation. Surprisingly, this is not the case as no deletion applied. Rather, a floating H tone (also known as tonal affix, or tonal morpheme in the literature) is called up in the phonology to dislodge the first of the two L tones on the surface. Consider (16) as follows:

(16) Tonal affix (floating H tone) in Èwùlu

					Float H tone		
a.	/èβà/ 'bag'	+	/ògò/ 'farm	→	/èβà ˊ ògò/	→	[èβôgò] 'farm bag'
b.	/àɓà/ 'jaw'	+	/èŋwè/ 'monkey'	→	/àɓà ˊ èŋwè/	→	[àɓêŋwɛ̃] 'monkey's jaw'
c.	/ànì/ 'land'	+	/èwùlù/ 'Èwùlù'	→	/ànì ˊ èwùlù/	→	[ànjêwùlù] 'Èwùlù land'
d.	/ǹgàdʒì/ 'spoon'	+	/òbí/ 'king'	→	/ǹgàdʒì ˊ òbí/	→	[ŋ̀gàdʒjô!bí] 'king's spoon'
e.	/ǹkù/ 'feather'	+	/ɔgàzù/ 'guinea fowl'	→	/ǹkù ˊ ɔgàzù/	→	[ǹkwɔ̂gàzù] 'guinea fowl's feather'
f.	/ɛ́bɔ̀/ 'song'	+	/ìβè/ 'mockery'	→	/ɛ́bɔ̀ ˊ ìβè/	→	[ɛ́bwîβè] 'mocking song'

This type of tonal behaviour in (16) is prevalent in several two-tone languages of Nigeria (cf. Etsako: Edoid; Elimelech, 1976; Igbo: Hyman, 1975; Williamson, 1986; Anaang: Lower Niger Congo: Akpabio et al., 2021). Given the attested tonal affix in Èwùlù, we assume in this study it is employed to block (i.e., split) sequences of adjacent boundary Ls, without which the OCP would be violated. If this is necessarily true, the OCP must be ranked higher than *FLOAT, SPECIFY-T, MAX-T and IDENT-T, as the tableau in (17) depicts. We take the form in (16a) for generalisation.

(17)	/ɛβa ogo/ L L L L	OCP	*FLOAT	SPECIFY-T	MAX-T	IDENT-T
a.	[ɛβa ogo] L L L L	*!				
b.	[ɛβ- ogo] L H L L		*!	*		*
c.	➡ [ɛβ- ogo] L H L L					*

The ‘splitting’ or the ‘intervening’ H floating effect, as candidate (b) displays in (17), allows it to be ‘faithful’ to the OCP. However, candidate (b) concedes defeat to its OCP-faithful counterpart, the candidate (c), with respect to the next higher-ranked constraint, *FLOAT, which requires that a tone must be associated with a TBU. Of course, candidate (a) with consecutive Hs is the least harmonic of the three, having violated the higher-ranked constraint, OCP.

D. Consecutive Lexical Low Tones

Like consecutive H tones in (11, a-j), Èwùlù has lexical items with consecutive Ls. Such words contain between two and three syllables marked with consecutive L tones. This category of words is presented in (18):

(18) Word-based consecutive H tones in Èwùlù

a.	/ìsì/	→	[ìsì]	‘blindness’
b.	/òpì/	→	[òpì]	‘local flute’
c.	/ùdù/	→	[ùdù]	‘a type of musical instrument’
d.	/ɔ̀gɔ̀/	→	[ɔ̀gɔ̀]	‘favour’
e.	/òβò/	→	[òβò]	‘round worm’
f.	/ɔ̀gɛ̀dɛ̀/	→	[ɔ̀gɛ̀dɛ̀]	‘plantain’
g.	/àkùkù/	→	[àkùkù]	‘wind/breeze’
h.	/àʧ̀ìʧ̀à/	→	[àʧ̀ìʧ̀à]	‘bread’
i.	/ògìrì/	→	[ògìrì]	‘locust bean’
j	/òʃ̀ìmìrì/	→	[òʃ̀ìm̀ìrì]	‘sea’
k.	/àβàkùtù/	→	[àβàkùtù]	‘ideophone suggesting obesity’

In principle, from the perspective of the OCP effects, the tonal sequences (18) violate the OCP which disallows consecutive identical tones. An OT account of these OCP-violating sequences would look like the one already posited in (12), where faithfulness constraints outrank the OCP. We take the form in (19a) /isì/ ‘blindness’, for analysis, as follows:

(19)	/isi/ LL	IDENT-T	NOFUSION	SPECIFY-T	OCP	*DISASSOC	NOLONGT
a.	➡ [isi] LL				*		
b.	[isi] L	*!		*		*	
c.	[isi] L	*!	*				*

In (19), IDENT-T which requires that the input tone structure be preserved in the output in conjunction with NOFUSION which requires that the underlying tone stays separate in the output licenses candidate (a), a perceptually similar candidate with candidate (c), as the winner. Candidate (c) loses out on the ground that it fatally violates the two higher-ranked faithfulness constraints that militate against spread.

However, bearing in mind the effect of SPECIFY-T influencing the treatment of Hs in (14), the ranking of the multisyllable morphemes in (18, f-k) would assume the same hierarchy. We take the example, /ɔ̀gɛ̀dɛ̀/ ‘plantain’ in (18, f) as a case study in (20):

(20)	/ɔgɛdɛ/ L L L	IDENT-T	NOFUSION	SPECIFY-T	OCP	*DISASSOC	NOLONGT
a.	➡ [ɔgɛdɛ] L L L				*		
b.	[ɔgɛdɛ] L	*!		*		*	
c.	[ɔgɛdɛ] L L	*!		*	*	*	
d.	[ɔgɛdɛ] L	*!	*				*

Based on the current assumption that the OCP is potentially active in the Èwùlù tonal grammar, and given the functional effect of the constraint, SPECIFY-T, which sanctions tonal spread, we may therefore assume that the avoidance of repetition of the same tonal melodies via spread should be most preferred. On account of this, the OCP along with SPECIFY-T would have to dominate IDENT-T, as we demonstrated in (13) and (15). We exemplify the reordering of the ranking with the bisyllabic /ìsì/ 'blindness' in (21):

(21)	/isi/ LL	OCP	SPECIFY- T	IDENT-T	NOFUSION	*DISASSOC	NOLONGT
a.	[isi] LL	*!					
b.	[isi] L		*!	*		*	
c.	➡ [isi] L			*	*		*

As can be seen, the candidate (c), which was the previously dominated in (19a) now becomes the winning candidate in (21), having satisfied the higher-ranked constraints, OCP and SPECIFY-T.

The same analytical procedure in (20), as in the case of (15d), will account for the optimality of candidate (d), the previous loser (20), in (22) as follows:

(22)	/ɔgɛdɛ/ L L L	OCP	SPECIFY- T	IDENT-T	NOFUSION	*DISASSOC	NOLONGT
a.	[ɔgɛdɛ] L L L	*!					
b.	[ɔgɛdɛ] L		*!	*		*	
c.	[ɔgɛdɛ] L L	*!	*	*		*	
d.	➡ [ɔgɛdɛ] L			*	*		*

We now turn to show how the OCP may influence 'lexical downstep', 'grammatical downstep' and 'final H tone displacement' in the following last two subsections.

E. Downstepped High Tone

(a). Lexical Downstepped High Tone

Recall that, in (3), we showed that downstep is attested in Èwùlù. The following items in (23) exhibit downstep operative in the word we earlier referred to as Lexical Downstep.

(23) Èwùlù lexical downstep

a. /òβúlú/ → [òβú!lú] 'under(neath)'
b. /òkútɛ́/ → [òkút!ɛ́] 'stone'
c. /òʧĩʧǎ/ → [òʧĩ!ʧǎ] 'cockroach'

d. /àɓálá/ → [àɓá!lá] ‘thunder’
e. /ǹʃíkɔ́/ → [ǹʃí!kɔ́] ‘crab’
f. /àɓɔ́ɓáá/ → [àɓɔ́ɓá!á] ‘millipede’
g. /ífélé/ → [ífé!lé] ‘shame’

It will be observed that, in all the cases, lexical downstep (23) driven by a covert L tone shops for final H tone. Consequently, we propose that the operation of the covert (floating) L tone between the two consecutive Hs is motivated by the OCP. Our argument here is hinged on the fact that, since OCP may be undominated other constraints such as NOLONGT, SPECIFY-T, the OCP will naturally rank higher than these two constraints The ranking is demonstrated in (24) adopting the form (22a) /ɔ̀ɸú!lú/ ‘under(neath)’ for analysis:

(24)	/oɸulu/ L H H	OCP	NOLONGT	SPECIFY-T	IDENT-T
a.	[oɸulu] L H		*!		
b.	[oɸu!lu] L H L H			*	*
c.	[oɸulu] L H H	*!			

In (24), candidate (b) is the most harmonic of the three candidates. The grammar’s preference for candidate (b) over candidate (a) and candidate (c) is the optimal candidate’s satisfaction of NOLONGT, and (b)’s violation of IDENT-T which ought to match it (the optimal candidate) with the abstract form.

(b). Grammatical Downstepped High Tone

It will be recalled that Èwùlù does not operate lexical downstep on bisyllabic words. However, at the grammatical level, two-syllable word with two consecutive H tones may attract downstep on the surface. This is on the condition that the disyllabic word is found at the right position of the phonological phrase. The examples in (25) illustrate this pattern:

(25) Èwùlù grammatical downstep

					Grammatical downstep
a.	/ɛ́ŋá/	+	/ɔ́ŋwá/	→	[ɛ́ŋɔ́!ŋwǎ]
	‘eye’		‘sun’		‘face of the sun’
b.	/ókwú/	+	/ɔ́nó/	→	[ókwɔ́!nǒ]
	‘speech’		‘mouth’		‘utterance’
c.	/ézí/	+	/ókwú/	→	[ézjó!kwú]
	‘real’		‘speech’		‘truth’
d.	/áfɛ́/	+	/ɔ́nó/	→	[áfɔ́!nǒ]
	‘cloth’		‘mouth’		‘moustache’
e.	/ɔ́ʃú/	+	/égó/	→	[ɔ́ʃwé!gó]
	‘twenty’		‘money’		‘twenty (in currency)’
f.	/èʃʊ́/	+	/ɔ́kwɔ́/	→	[èʃwɔ́!kwɔ́]
	‘body’		‘hot’		‘fever’

As (25) indicates, all the high-toned items in the second column are subject to grammatical downstep (grammatical floating L tone) in the output (third column). Since the same implementation of downstep at the lexical level takes place at the grammatical level, we assume the OCP is at work here as well. The intrusion of the phonetic downstep between two Hs is motivated to block sequences of two consecutive Hs which violate the OCP. An OT analysis will capture the patterns in (26), taking the abstract form, /ɛ́ŋá ɔ́ŋwɔ́/ ‘face of the sun’ in (25a), as follows:

(26)	/ɛŋa ɔŋwa/ H H H H	OCP	NOLONGT	*FLOAT	SPECIFY-T	IDENT-T
a.	[ɛŋa ɔŋwã] H		*!			*
b.	[ɛŋa ɔŋwã] H H H H	*!				
c.	[ɛŋa ɔ!ŋwã] H L H			*		*

In tableau (26), the ranking OCP>>NOLONGT, *FLOAT SPECIFY-T, IDENT-T makes the candidate (c) the most harmonic of the three candidates, fulfilling the condition that adjacent identical tones are prohibited. This faithfulness to the OCP is predicted by its observance of both the OCP and NOLONGT constraints. Though candidate (a) observes the OCP, it is relegated in the winning hierarchy due to spreading, which fatally violates NOLONGT. The least harmonic candidate (b), that which is faithful to the input structure and sanctioned by IDENT-T, is ruled out completely. This is because it fatally violates the higher-ranked, OCP.

F. Final High Tone Displacement

In our consideration of consecutive H tones, we have observed so far three possible tonal processes that may be deployed in the Èwùlù tonal grammar to resolve OCP violations. They are deletion, downstepping and spreading, the later process being possible due to the impact of SPECIFY-T. However, in relating to the forms in (25), some of our data in (27) show a rather bewildering pattern. In (27), we find that the final H tone preceded by another H tone, rather than downstep, is completely displaced by a L tone. The motivation for the Èwùlù preference of L tone to downstepped H tone in this context, as Utulu (2020a) opines, is not clear. The pattern is illustrated below, as follows:

(27) Èwùlù final high tone displacement

Final high tone displacement

a.	/ílé/	+	/éwú/	→	[íléwù]
	‘tongue’		‘goat’		‘goat’s tongue’
b.	/égó/	+	/ńnú/	→	[égóńnǔ]
	‘money’		‘salt’		‘salt money’
c.	/ímí/	+	/ánó/	→	[ímjánǒ]
	‘nose’		‘meat’		‘animal’s nostril’
d.	/ɔ̀ŋá	+	/ísí/	→	[ɔ̀ŋ́ísì]
	‘sore’		‘head’		‘head sore’
e.	/ífé/	+	/ónú/	→	[ífónǔ]
	‘something’		‘neck’		‘necklace’
f.	/óŋé/	+	/ísí/	→	[óŋ́ísì]
	‘the one of’		‘head’		‘leader’

As (27) shows, across the board, the underlying final H tone alternates to a L tone. In central Igbo, and many other varieties of Igbo, downstep is typically the preferred process in this context. We might argue that the puzzling pattern (27) is a ‘supplementary’ tonal strategy Èwùlù deploys to avoid OCP violations. In (28), we demonstrate with the abstract form in (27a) /ílé éwú/ ‘goat’s tongue’ to show how this unique pattern plays out in a constraint-based, OT model:

(28)	/ile ewu/ HH H H	OCP	IDENT-T	SPECIFY-T	MAX-T	NOLONGT
a.	[ile ewu] H L		*		*	*
b.	[ile ewu] HH H H	*!				
c.	[il ewu] H H H	*!	*		*	

The prevailing ‘stiff’ competition between candidate (a) and candidate (b) in (28), i.e., between markedness and faithfulness, seems to be ‘resolved’ by the hierarchical ranking of OCP over IDENT-T. The candidate (b) violation of the higher-ranked constraint makes it a loser, thereby paving a way for the candidate (a) to become the most harmonic candidate. The candidate (c) is however ruled out, having violated the first two higher-ranked constraints. The inconceivable phonetic form *[ílé éwú] (including the rest of the forms in (27)) would be a loser too on account of its violation of *FLOAT, which candidate (a) does not violate.

VII. Conclusion

In this study, we have made an attempt through a theoretical description of a body of tonal data to complement the facts that have been established in existing tonological studies on the subject of the OCP, a constraint initially thought to act as an absolute condition on adjacent identical tones (e.g., McCarthy, 1986; Myers, 1997). We have done so by adopting the data (both the existing and fresh data) from a relatively unknown, small dialect referred to as Èwùlù (Igboid, West Benue-Congo: Nigeria). Using the Optimality-Theoretic model, we described some peculiar tonal patterns in the dialect. Also, we described some general tonal structures in the dialect that recur in Nigerian tone

systems, particularly the two-tone systems that advance our understanding of how the OCP functions as a universal filter on tonal duplication problems but may be violable due to some conflicting higher-ranked constraints that potentially dominate it. Given the attested tonal processes, in which, of the 14 tokens of OCP effects theoretically analysed in this study, 9 (64%) of them showed the OCP dominance over other conflicting constraints. The rest 5 (36%) cases exemplified the dominance of some relevant fundamental conflicting constraints over the OCP. The results of this study thus, crucially evoke Odden's (1995) assertion that, "The strongest possible version of the OCP…is that there may be a dispreference for adjacent identical tones; languages are free to express this dispreference by constraining lexical representations, by adding rules of tone fusion, or tone deletion, or by putting conditions on tone spreading rules. Ultimately, languages retain the option of doing nothing about OCP violations" (p. 464).

One vital revelation of this study, therefore, is its validation of the fact that the OCP is not inviolable. Its violability, as evidenced in the present data, reveals it is a soft, gradient constraint, just like other constraints active in Universal Grammar (Goldsmith, 1976, 1995; Odden, 1986, 1995, 2013; Frisch et al., 2004; Oostendorp, 2005; Akpabio et al., 2021, among others). In essence, the inviolability or violability of the OCP is subject to structure-specific tonal patterns, as much as it is to language-specific tonal structures.

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