Emergent strength strata in Cherokee hiatus resolution*

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1. Introduction

In Cherokee (Southern Iroquoian; North Carolina, Oklahoma), when morpheme concatenation places two vowels in adjacent positions, hiatus is always repaired. However, the form of that hiatus resolution is not fixed; instead, there are several attested hiatus resolution strategies, listed in (1). For an underlying /V_1 V_2/ sequence, we can see preservation of one of the vowels while the other is deleted, or we can see glide insertion between the two vowels (Montgomery-Anderson 2008, Uchihara 2013).

(1) Attested hiatus resolution strategies in Cherokee

a. Preservation of V_1 and deletion of V_2: /V_1 V_2/ → [V_1]
b. Preservation of V_2 and deletion of V_1: /V_1 V_2/ → [V_2]
c. Glide Insertion: /V_1 V_2/ → [V_1 j V_2]

We focus on the key observations that (i) which of these repair strategies occurs is determined by the identity of the morphemes that each vowel belongs to, and that (ii) glide insertion is only triggered by specific combinations of morphemes. In both (2a) and (2b), the concatenation of two verbal prefixes creates an underlying /i-a/ sequence. However, in (2a) only the [i] of the first prefix surfaces, while in (2b) only the [a] of the second prefix surfaces. This is a case of *phonological idiosyncrasy*, as the speaker must memorize the fact that the /i/ of the Set A first person subject with animate object prefix /t͡siː-/ surfaces, but the /i/ of the Set B third person plural marker /uːniː/ does not.

(2) Identity of morphemes determines repair strategy

a. /t͡siː- ali-/ → [t͡siːli...] (V_1 surfaces)
1A.AN MDL

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b. /uːniː- atuːliha/ → [uːnatuː...] (V_2 surfaces)
3B.PL want:PRC

The pattern shows an additional degree of complexity, in that glide insertion only occurs when certain pairs of morphemes are concatenated. The data in (3) illustrate. Again, we see two underlying /i-a/ sequences; in both examples the /i/ is part of the Set A first person subject with animate object prefix. However, the vowel sequence surfaces differently based on what that prefix is attaching to. In (3a), the [i] surfaces while the [a] deletes. However, in (3b), both vowels surface with the glide [j] inserted between them. As discussed later in the paper, glide insertion only occurs if each of the individual morphemes compels deletion of another vowel in a separate context.

(3) Only some combinations of morphemes trigger glide insertion

a. /t͡siː- ali-/ → [t͡siː-li...] (V_1 surfaces)
1A.AN MDL

b. /t͡siː- ataʔjiha/ → [t͡siːjataʔjiha] (glide insertion)
1A.AN deny:PRC

This data illustrates that not only does a speaker of Cherokee need to memorize which hiatus repair a given morpheme can undergo, but also what occurs across different combinations of morphemes. This renders Cherokee hiatus resolution highly idiosyncratic, and not uniformly predicted by factors previously proposed to condition hiatus repair, such as linear order, root-affix asymmetry, or vowel quality (Hopkins 1987, Casali 1997, 2011, Baron 2023). In this paper, we examine all of the combinations of verbal roots and prefixes reported by Montgomery-Anderson (2008) and find that there are multiple degrees of vowels' propensity to surface, conceptualized here as vowel *strength*. These strengths appear to be transitive, such that no vowel is found to be weak in one morpheme combination and strong in another.

In light of this finding, we propose an analysis of the Cherokee vowel hiatus pattern in Gradient Harmonic Grammar (Smolensky and Goldrick 2016, Rosen 2016, Zimmermann 2018a, Hsu 2019, 2022), a constraint-based grammar in which input elements are specified for degrees of activity (i.e. presence) between zero and one. We show that the key properties of the Cherokee hiatus resolution pattern can be successfully modeled, using the basic idea that vowels associated with each morpheme may be specified with different levels of activity in their input representations. Vowels with greater strength are represented with a higher level of input activity than vowels of lesser strength.

We also show that Cherokee hiatus resolution makes a particularly compelling case for Gradient Harmonic Grammar because it exhibits a combination of properties that are easily modeled in this framework, but are challenging for other models of phonological idiosyncrasy. In brief, it is a process involving the deletion of whole segments, as opposed to featural changes (Hsu and Smith 2023). It also exhibits multiple levels of idiosyncrasy, rather than being a phonological process that either does or does not apply (Zimmermann 2019, Guekguezian and Jesney 2021, Revithiadou and Markopoulos 2021, Hsu and Smith

2023). And finally, it includes a process (glide formation) that is conditioned by specific combinations of lexical items, rather than the locus of idiosyncrasy being just the trigger or just the undergoer of a process (Rosen 2016, 2018, 2019).

The paper is organized as follows. In section 2, we present an overview of Cherokee verbal morphophonology and the empirical motivation for representing vowels with different degrees of strength. In section 3, we introduce the workings of Gradient Harmonic Grammar, and in section 4 we present our analysis of Cherokee hiatus resolution within the framework. Section 5 considers some theoretical implications of our analysis, and section 6 concludes.

2. Cherokee verbal morphophonology

2.1 Cherokee verbal template

In this paper, we focus on patterns of hiatus resolution among vowels in three types of verbal morphemes: verb roots, pronominal prefixes, and voice prefixes. All verb roots in Cherokee obligatorily occur with one pronominal prefix that expresses person and number properties of at least one thematic argument of the verb. There are six pronominal prefix paradigms containing a total of fifty-five prefixes. Which one appears on a given verb depends on a combination of factors, including its number of thematic arguments; their relative prominence; and the person, animacy, and number values of each argument. Pronominal prefixes most frequently attach directly to the verb root, but there are two voice prefixes (reflexive and middle voice) that occur in between pronominal prefixes and verb roots.

There are a number of other optional prefixes that may appear in Cherokee verbs that are not discussed here. Prepronominal prefixes occur before pronominal prefixes and express a range of properties primarily related to mood, aspect, and spatial directionality. Incorporated nouns may also occur as prefixes; when they do, they occur directly preceding the verb root and following any other prefixes. Because we have access to few glossed examples of these types of prefixes, we will not discuss them further.

The full Cherokee verbal template, following Montgomery-Anderson (2008), is provided in (4). The different paradigms of pronominal prefixes are listed below its position in the template, along with the number of prefixes within each paradigm.

(4) Cherokee verbal template

Prepronominal (optional)	Pronominal	Voice (optional)	Incorp. Noun (optional)	Verb Root
	Set A (11)	Middle		
	Set A anim. obj. (8)	Reflexive		
	Set B (10)			
	Comb. nonlocal (6)			
	Comb. nonsg. subj. (10)			
	Obj. focus (10)			

2.2 Hiatus resolution in Cherokee

Because many Cherokee prefixes begin and/or end in a vowel, when pronominal and voice prefixes and verb roots are concatenated, often a potential VV sequence is created. In Cherokee, this hiatus between vowels is always repaired in surface forms. However, different combinations of morphemes exhibit different types of hiatus resolution: glide insertion, deletion of the first vowel, or deletion of the second vowel.

When pronominal prefixes attach directly to vowel-initial roots, we see that some combinations preserve both vowels and insert a glide between them, as in (5a). However, other combinations of pronominal prefix and verb root see deletion of the pronominal prefix vowel, as in (5b).

(5) Pronominal prefixes attached directly to verb roots

a. /t͡siː- ataʔjiha/ → [t͡siːjatajiha]
1A.AN deny:PRC

b. hi- atitʰask/ → [hatitʰask]
2A drink:INC

When pronominal prefixes occur adjacent to either of the voice prefixes, again there is nonuniformity in which vowel surfaces. In some cases, such as (6a), the vowel of the pronominal prefix surfaces while the vowel of the voice prefix is deleted. In others, as in (6b), the vowel of the middle voice prefix surfaces while the vowel of the pronominal prefix is deleted. Glide insertion does not occur in this context.

(6) Adjacent pronominal and voice prefixes

a. /t͡siː- ali-/ → [t͡siːli]
1A.AN- MDL-

b. /iːt͡siː- ali-/ → [it͡sali]
2A.PL- MDL-

It is important to note that prefix vowels that are preserved via glide insertion when they precede vowel-initial verb roots are the ones that are preserved when adjacent to vowels of voice prefixes. Compare (6a) and (5a). Similarly, vowels of pronominal prefixes that are deleted when adjacent to vowel-initial verb roots are also deleted when they precede a voice prefix.

Finally, we see that the vowels of verb roots uniformly surface when preceded by an otherwise vowel-final voice prefix, while the final vowel of the voice prefix is deleted, as in (7).

(7) Voice prefixes attached to verb roots

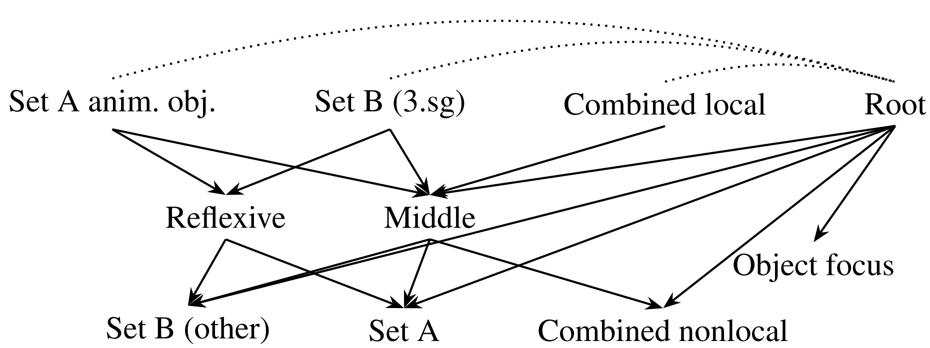
a. /ataː- oluhwat^{h}iːha/ → [aːtoluhwat^{h}iːha]
MDL- develop:PRC

b. /ataː- eːjoːhʌsk/ → [ateːjoːhʌsk]
MDL- teach:INC/AGT

Using data from Montgomery-Anderson (2008), we identified all combinations of pronominal prefixes, voice prefixes, and verb roots in which hiatus resolution occurred. Our findings are laid out in 8. An arrow between two sets of morphemes indicates what we can conceive of as ‘domination’ between vowels, where the vowel of the higher element surfaces, and the vowel of the lower element (at the end of the arrow) is deleted. A dashed line between two sets of morphemes indicates that one vowel is not being deleted in favor of preserving the other. Instead, boundary-adjacent vowels in both morphemes surface, with a glide inserted between them.

These patterns suggest that hiatus resolution occurs in an orderly, principled way. There are no loops or inconsistencies among these patterns, such that one morpheme or paradigm seems to be strong in some cases and weak in others. Rather, all domination relations are transitive. Morphemes from the same paradigms also tend to pattern together in terms of their propensity to delete or trigger deletion. However, there is one exception: among the Set B pronominal prefixes, the third person singular marker has a greater propensity to surface than vowels in the rest of the Set B prefixes.

(8) Observed hiatus resolution patterns among verbal prefix and root combinations



Based on the observed patterns in which morphemes’ vowels undergo glide insertion versus deletion when adjacent to one another, we identify three strength strata among vowels in Cherokee roots and prefixes, which we refer to as Strong, Medium, and Weak. These designations of morphemes into strata are illustrated in (9).

(9) Emergent strength strata among verbal prefixes and roots

Strong	Set A anim. obj.	Set B (3.sg)	Comb. local	Root
Medium	Reflexive		Middle	
Weak	Set B (other)	Set A	Comb. nonsing. subj.	Obj. focus

In the Strong stratum are vowels that occur in the Set A animate object prefixes, the third person singular prefix of Set B, the combined local set of prefixes, and verb roots. In these morphemes, vowels always surface. If vowels from any of these morphemes surface adjacent to one another, glide insertion will occur to repair hiatus. In the Medium stratum are vowels that occur in the reflexive and middle voice prefixes. These vowels delete when adjacent to a vowel from a Strong prefix, but are preserved when adjacent to a vowel from a Weak prefix. In the Weak stratum are those vowels that never surface in hiatus conditions. These include vowels in Set B prefixes (other than the third person singular), Set A prefixes, and combined nonsingular subject prefixes. While our data indicates that object focus prefixes are not Strong, we cannot determine whether they should be designated as either Medium or Weak; for now, we classify them as Weak.

2.3 The (un)predictability of hiatus resolution

It is noteworthy that the strength designations that we have identified are idiosyncratic, ultimately arbitrary properties of individual morphemes, which do not neatly align with any general predictors of which vowel is deleted in hiatus repair. This includes directionality, morphological structure, vowel quality, and vowel quantity (cf. Casali 1997, among others). We address each of these predictors in turn.

First, Casali (1997, 2011) notes that languages that resolve hiatus by elision generally elide the first vowel in a VV sequence, and attributes this to a greater preference to preserve morpheme-initial segments than non-initial segments. This corresponds to some extent with the hierarchy of strength that we have identified; verb roots (always Strong) occur to the right of voice prefixes (Medium), and Weak prefixes precede both of these elements. Nonetheless, this does not fully predict the pattern in Cherokee. Some pronominal prefixes are Strong, and compel deletion of Medium-strength prefixes that follow them. As the data we have provided has shown, Cherokee verbs exhibit deletion of both the preceding and following vowel in a VV sequence.

Second, it has been observed that vowels belonging to stems and/or content morphemes can be systematically favored over vowels belonging to affixes and/or functional morphemes (Casali 1997, 2011). Again, this characterizes only part of the Cherokee pattern. While vowels of verb roots are uniformly preserved, some prefix vowels show a similar degree of strength. The root/affix asymmetry also does not explain the variable patterning observed in sequences of prefixes. Furthermore, some pronominal prefixes show greater strength than voice prefixes, suggesting that proximity to the verb root also cannot be a uniform predictor of strength.

Whether a vowel undergoes deletion is in part predicted by some morphological properties. Specifically, most non-root items in the Strong class are prefixes that simultaneously express person and number features of two verbal arguments (the set A animate object and combined local prefixes), while prefixes that express features of one argument are typically in the Weak class. However, the tendency is not without exception. For example, the third person singular set B prefix /u-/ patterns as Strong, while other set B prefixes are weak, as is the third person singular Set A prefix /a-/ or /ka-/. Similarly, the combined nonsingular subject prefixes pattern as Weak, despite expressing features of more than one argument.

Finally, vowel quality and quantity do not predict whether a vowel will be preserved or deleted in a given case of hiatus, as observed in some other cases of hiatus resolution (Hopkins 1987, Baron 2023). Most of the vowels in the Cherokee inventory are attested as either being preserved or deleted in hiatus conditions. However, it should be noted that not all vowels are attested as occurring in each class of prefix. In addition, some vowels in Cherokee are generally rare, such as /e/. Nonetheless, we have found no clear evidence that any particular type of vowel quality or vowel quantity uniformly deletes or triggers deletion of another vowel.

A successful analysis of Cherokee hiatus resolution, then, must account for the idiosyncratic patterning of vowels in different morphemes and their complex interaction. Such an analysis is provided by Gradient Harmonic Grammar, which we introduce in the next section.

3. Gradient Harmonic Grammar

As in 'categorical' Harmonic Grammar (Legendre et al. 1990, Smolensky and Legendre 2006), optimization in Gradient Harmonic Grammar is driven by the interaction of violable, numerically weighted constraints. The defining property of Gradient Harmonic Grammar (Smolensky and Goldrick 2016) involves the nature of linguistic representations. Specifically, all structures are represented with a potentially non-integer level of activity (in other words, its degree of presence or representational strength) between 0 and 1. This places it in contrast with the traditional assumption of other phonological frameworks that all structures are categorically present or absent.

The consequence of gradient activity for the computation of optimality is that each faithfulness constraint assigns a penalty that is proportional to the activity of the structure that incurs a violation of that constraint. Crucially, two input representations may contain structures that differ only in input activity value specifications and therefore incur different penalties from the faithfulness constraints that they violate. We assume that output representations contain only fully active structures, meaning that markedness constraints are not sensitive to input activity values (see Zimmermann 2018a, 2018b, 2019 et seq. for uses of output gradience).

We provide a basic illustration of harmony calculation in Gradient Harmonic Grammar with a toy example in (10). Both tableaux contain inputs with the same segments /pak/, differing only in the input activity of the final consonant. The MAX penalty incurred by deleting the final consonant in each candidate (a) is the constraint weight times the amount of deleted activity ($4 \times -0.75 = -3$ in the top tableau, $4 \times -0.25 = -1$ in the bottom tableau). The DEP penalty incurred by realizing the final consonant is the constraint weight times the amount of activity that must be added to its input activity level to produce a fully active segment in the output ($2 \times (1 - 0.75) = 0.5$ in the top tableau, $2 \times (1 - 0.25) = 1.5$ in the bottom tableau). Note that the constraint weights establish a specific *threshold input activity value* that determines whether a segment that must be syllabified as a coda will surface. Any final consonant with input activity above 0.5 surfaces in the output, while any final consonant with activity below 0.5 is optimally deleted.

(10) Effects of input activity on violations of MAX, DEP

Input: $/p_1\ a_1\ k_{0.75}/$		*NOCODA $w = 1$	MAX $w = 4$	DEP $w = 2$	H
☞ a.	[pak]	−1		−0.25 (1 − k)	−1.5
b.	[pa]		−0.75 (k)		−3
Input: $/p_1\ a_1\ k_{0.25}/$					
a.	[pak]	−1		−0.75 (1 − k)	−2.5
☞ b.	[pa]		−0.25 (k)		−1

The key consequence of gradient activity for linguistic analysis is that two input representations that contain identical structures, and differ uniquely in the activity associated with those structures, may correspond with different optimal outputs, given a single set of constraints and constraint weights. Previous analyses conducted in this framework have shown that key properties of idiosyncratic phonological patterns can be analyzed as the result of contrasts in the input activity levels of otherwise identical representations (see Hsu 2022 for a recent overview). This includes properties that define the observed pattern of hiatus resolution in Cherokee: the existence of multiple, implicational degrees of idiosyncrasy (Hsu 2019, Zimmermann 2019, Guekguezian and Jesney 2021, Hsu and Smith 2023) and conditioning by combinations of lexical items rather than unique sets of triggers or targets (Smolensky and Goldrick 2016, Rosen 2016, 2018, 2019).

4. Analysis: strength strata in Cherokee

The essence of our Gradient Harmonic Grammar analysis is that stronger segments (those more resistant to deletion) are represented with higher levels of input activity than weaker ones. The Cherokee hiatus resolution pattern arises from interaction among faithfulness constraints MAX and DEP and the markedness constraint *VV.

(11) *VV
Assign a violation for any pair of adjacent vowel root nodes.

(12) MAX
Assign a violation A for any root node whose input activity A is absent in the output.

(13) DEP
Assign a violation A for any root node whose output activity A is absent in the input.

Segments with higher input activity incur relatively high MAX penalties when deleted, and relatively low DEP violations for surfacing. We assume that the glide that occurs between two strong vowels is fully epenthetic (not present in the input representation); therefore, the insertion of a glide always incurs one full violation of DEP.

Our sets of constraints and candidates determine a threshold activity value above which vowels pattern as Strong and always surface. Preservation of both vowels with glide insertion between them occurs if both vowels are above the input activity threshold provided in (14). With activity levels above this threshold, deletion of either vowel is more costly than inserting a glide between them.a

(14) Input activity threshold for Strong vowels

$$\text{Activity threshold} = \frac{2 \times w(\text{DEP})}{w(\text{DEP}) + w(\text{MAX})}$$

We illustrate the workings of our analysis with one set of constraint weights and activity values that meets these criteria. Given a constraint weight $w = 3$ for DEP and $w = 4$ for MAX, any vowel with input activity above $6/7 = 0.86$ will pattern as Strong.

Each of the following tableaux compares four output candidate types: (a) faithful surfacing of input V_1 and V_2 in hiatus, unattested in Cherokee; (b) insertion of a glide between surfacing V_1 and V_2, observed when both vowels are Strong; (c) deletion of V_2, which occurs when the second vowel is not Strong, and weaker than V_1; (d) deletion of V_1, which occurs when the first vowel is not Strong, and weaker than V_2.

The tableau in (15) illustrates an input-output mapping in which both input vowels surpass the activity threshold defined in (14). The winning candidate (b), which exhibits glide insertion, incurs a single violation of DEP. It incurs a lower penalty than the candidate with hiatus (a), which violates *VV, as well as candidates (c) and (d), which delete either of the two vowels and violate MAX.

(15) Glide insertion occurs between two strong vowels

Input:	/$i_{1.0}$ $a_{1.0}$/	*VV $w = 5$	MAX $w = 4$	DEP $w = 3$	H
a.	[i a]	−1			−5
☞ b.	[i j a]			−1 (j)	−3
c.	[i]		−1 (a)		−4
d.	[a]		−1 (i)		−4

A different outcome occurs if either of the input vowels falls below the strength threshold in (14). In the tableau in (16), V_2 is specified for a lower input activity value of 0.67 in the input. Consequently, the MAX violation incurred by deleting this vowel is proportionally reduced, as seen in candidate (c). However, surfacing of the vowel incurs a DEP penalty proportional to the amount of activity that must be added to produce a fully present vowel in the output ($1 - 0.67 = 0.33$). As a result, the penalty of deleting the weaker vowel is lower than the penalties incurred by either glide insertion, as in candidate (b), or deleting the first vowel, as in candidate (d).

(16) Strong vowel surfaces; medium vowel deletes

Input: /$i_{1.0}$ $a_{0.67}$/	*VV $w = 5$	MAX $w = 4$	DEP $w = 3$	H
a. [i a]	−1		−0.33 (1 – a)	−5.99
b. [i j a]			−1 (j) + −0.33 (1 – a)	−3.99
☞ c. [i]		−0.67 (a)		−2.68
d. [a]		−1 (i)	−0.33 (1 – a)	−4.99

Finally, the tableau in (17) illustrates that as long as one vowel falls below the threshold of strength, the vowel with lower activity will delete while the other surfaces. This occurs regardless of the precise activity value of either V_1 or V_2, so it is not necessary to determine a threshold for input activity that distinguishes Medium from Weak vowels. In this tableau's input, V_1 has a lower input activity than V_2, and so deletion of V_1 occurs in optimal output (d).

(17) Medium vowel surfaces; weak vowel deletes

Input: /$i_{0.33}$ $a_{0.67}$/	*VV $w = 5$	MAX $w = 4$	DEP $w = 3$	H
a. [i a]	−1		−0.67 (1 – i) + −0.33 (1 – a)	−8
b. [i j a]			−1 (j) + −0.67 (1 – i) + −0.33 (1 – a)	−6
c. [i]		−0.67 (a)	−0.67 (1 – i)	−7.37
☞ d. [a]		−0.33(i)	−0.33 (1 – a)	−2.31

By allowing input segments to be specified for gradient activity, Gradient Harmonic Grammar allows us to successfully generate the idiosyncratic hiatus resolution pattern exemplified in Cherokee. Furthermore, we are able to do so using a small set of widely accepted constraints.

5. Theoretical Implications

Previous works have shown that Gradient Harmonic Grammar is apt for generating idiosyncratic phonological patterns that are characterized by (a) the deletion versus preservation of whole segments (Smolensky and Goldrick 2016, Hsu 2019), (b) multiple levels of idiosyncratic patterning (Guekguezian and Jesney 2021, Revithiadou and Markopoulos 2021, Hsu and Smith 2023), and (c) conditioning by specific combinations of lexical items (Smolensky and Goldrick 2016, Rosen 2016, 2018). Here, we discuss the strengths of Gradient Harmonic Grammar in analyzing these patterns, as exemplified in Cherokee, and the difficulties that such patterns pose for alternative theoretical approaches to phonological idiosyncrasy.

The use of gradient activity contrasts in some ways resembles a proposed use of featural underspecification, according to which subsegmental features may be present or absent on particular input forms, making some items idiosyncratically inaccessible to feature-filling phonological rules (Kiparsky 1993, Inkelas 1994). However, this approach cannot generate idiosyncrasy in vowel deletion versus non-deletion, because the process cannot be analyzed in terms of feature-filling (Inkelas 2015). The problem does not arise in Gradient Harmonic Grammar, in which all elements of input representations may be represented with gradient activity, including segmental root nodes.

Another approach to analyzing phonological idiosyncrasy relies on the use of indexation between input structures and constraints. One aspect of the Cherokee pattern, the fact that glide insertion only occurs between two strong vowels, is problematic in particular for approaches that employ morpheme-indexed constraints (Pater 2000) and cophonologies (Orgun 1996). Consider a possible analysis using indexed constraints, in which the grammar contains three instances of MAX, corresponding with each stratum of strength, with the ranking MAX(STRONG) $\gg$ MAX(MEDIUM) $\gg$ MAX(WEAK). This can generate the attested patterns in which vowel deletes, when vowels of different strengths are adjacent in the input. However, this requires DEP to outrank all indexed MAX constraints when vowels of different strength are present, as glide insertion does not occur in these contexts. This then incorrectly predicts that glide insertion does not occur even when both input vowels are strong, as in (18).

(18) Hiatus resolution with indexed constraints

Input:	$/\mathrm{i}_S\text{-}\mathrm{a}_M/$	*VV	DEP	MAX(S)	MAX(M)	MAX(W)
a.	[ia]	*!				
b.	[ija]		*!			
☞ c.	[i]				*	
d.	[a]			*!		

Input:	$/\mathrm{i}_S\text{-}\mathrm{a}_S/$	*VV	DEP	MAX(S)	MAX(M)	MAX(W)
a.	[ia]	*!				
☹ b.	[ija]		*!			
☞ c.	[i]			*		
☞ d.	[a]			*		

In essence, the fact that glide insertion occurs only in the presence of two strong vowels requires a constraint-based grammar in which the identity of each vowel can adjust the penalty of a faithfulness constraint violation. This arises straightforwardly in Gradient Harmonic Grammar from the assumption that all vowel root nodes may be represented with different degrees of activity, which proportionally influence penalties of MAX and DEP. We note that the same type of pattern can also be generated by other approaches to idiosyncrasy in traditional Harmonic Grammar in which individual lexical items may scale or adjust constraint penalties (Coetzee and Pater 2011, Coetzee and Kawahara 2013, Sande 2019, Sande et al. 2020). Crucially, each of these approaches requires a grammar in which optimization is determined by weighted, rather than ranked constraints. See Hsu (2022), Hsu and Smith (2023) for discussion of other differences in the predictions made by these analyses.

6. Conclusion

We have argued in this paper that Gradient Harmonic Grammar provides a successful model of phonological idiosyncrasy in hiatus resolution in Cherokee. The propensity of a vowel to surface when adjacent in the input to another vowel, which we characterize as strength, corresponds with the amount of activity of the vowel's root node, specified in its input representation. In addition, we propose a set of weighting conditions in which glide insertion between two surfacing vowels occurs only when both vowels surpass a relatively high threshold of input activity, a pattern that is difficult to analyze in approaches to idiosyncrasy using ranked constraints. In conjunction with Hsu and Smith (2023), our analysis shows that Gradient Harmonic Grammar is well-suited for modeling a range of idiosyncratic patterns that are attested in patterns of vowel hiatus resolution.

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