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THEORETICAL IMPLICATIONS OF INITIAL GEMINATES IN CYPRIOT GREEK

ABSTRACT

Cypriot Greek (CG) constrasts singleton and geminate consonants in word-initial position: *péfti* 'Thursday'; *ppéfti* 'he falls'. While word-initial geminates are less common than their word-medial counterparts, they are found in a substantial number of unrelated languages and thus must be acknowledged in developing a theory of phonological representation. Word-initial geminates are of particular interest to phonologists since two divergent representational frameworks, moraic theory (Hayes 1989) and segmental theory, including CV or X-slot frameworks (Clements and Keyser 1983, Levin 1985), make substantially different predictions with regard to the expected behavior of initial geminate consonants. The investigation of geminates in CG allows for these implications to be tested.

After establishing that the CG segments are true geminate consonants, rather than sequences of identical segments, analyses of the facts within the different theories will be presented. As will be demonstrated, the patterning of geminates in CG is best accounted for by assuming that the segments are dominated by abstract timing units such as X- or C-slots, rather than by a unit of prosodic weight such as the mora. While there is a considerable amount of evidence suggesting that the moraic representation can supplant the timing-slot representation (e.g. McCarthy and Prince 1995), it is demonstrated here that timing slots are in fact crucial in developing a coherent, explanatory account of geminates in the word-initial environment.

1. INTRODUCTION

Cypriot Greek (CG) is unusual, not only because it is one of the few varieties of Modern Greek that maintains a consonant length contrast, but more importantly because it exhibits this contrast in word-initial position: *péfti* 'Thursday' vs. *ppéfti* 'he falls'. While word-initial geminates are more rare than their word-medial counterparts, they have been attested in a variety of languages (e.g. Luganda, Leti, Hatoma, among others), and thus can not be rejected as anomalous. The investigation of these segments is of particular importance to phonologists because two competing representational frameworks (moraic theory and segmental theory) make crucially different predictions with regard to the expected behavior of geminates and consonant clusters in word-initial position. A detailed investigation of initial geminates and clusters in CG tests the predictions of these frameworks, in a way that the analysis of the more common word-medial segments cannot.

As will be shown in section 2 of this paper, the CG geminates are single segments that behave like consonant clusters. This is an unsurprising pattern that is found in many of the world's languages. What is of particular interest is that this pattern is best accounted for via a segmental representation that has, in recent years, been widely rejected in favor of a moraic representation. Specifically, it will be demonstrated in section 3 that the CG pattern is best described under the assumption that all segments are dominated by an abstract timing unit, along the lines of Clements and Keyer's 1983 CV theory, or Levin's 1985 X-slot theory. For comparison, the moraic theory framework (Hayes 1989) is shown to be inefficient in accounting for the facts of this language. Section 3 offers concluding remarks.

2. DATA

2.1 BACKGROUND AND BASIC FACTS

Geminates are common in CG and are found throughout the language, in both native and borrowed words. These segments are found in both word-medial and word-initial position, as shown below:

(1) a. word-medial consonant length contrast

xapárin	'piece of news'	appárin	'horse'
túti	'this girl'	mútti	'nose'
plék̭i	'she knits'	purék̭k̭in	'cake'
kaká	'bad'	kakká	'feces'

b. word-initial consonant length contrast

péfti	'Thursday'	ppéfti	'he falls'
távla	'table'	ttávlin	'backgammon'
k̭iŕa	'Mrs.'	k̭k̭iŕas	'rent'
kullúrka	'rolls'	kkuláfḱa	'flattery'

The CG geminates have been described in depth by Newton (1968, 1972) and have been discussed in Hamp (1961) and Malikouti-Drachman (1987). The analysis presented in this paper is the first to examine the implications that CG holds for different modern prosodic frameworks.

2.2 GEMINATES AS SINGLE SEGMENTS

Evidence that suggests CG geminates are single segments, rather than sequences of two identical segments, comes from a variety of sources. One type of evidence comes from a palatalization process. In CG, consonants are realized as palatals before the front vowel /i/. As shown in (2a), the segment /k/ is realized as /č/ in this environment. When a consonant cluster occurs before the high front vowel, as in (2b), only the segment immediately preceding the vowel is realized as a palatal; the first segment is unchanged. As shown in (2c), the behavior of geminates is different from that of heterorganic consonant clusters. Here, the entire geminate undergoes palatalization, unlike consonant clusters in which only the second half of the cluster is affected by the process.

(2) Palatalization

a.	kakós	'bad (masc. sg.)'	kači	'bad (fem. sg.)'	
b.	péfkos	'pine tree (nom. sg.)'	pefči	'pine tree (nom. pl.)'	*pečči
c.	sákkos	'jacket (nom. sg.)'	sačči	'jacket (nom. pl.)'	*sakči

If geminates were sequences of two identical segments rather than a single monolithic segment, their behavior with regard to palatalization would be inexplicable. However, if geminates are single units, this pattern is unsurprising.

Additional evidence that suggests CG geminates are single segments comes from phonotactic restrictions in the language. Specifically, stop clusters are mostly absent from the inventory of the language. Newton 1972 shows that the only stop cluster allowed in native Cypriot words is /pk̯/, but that all examples of this cluster are historically derived from /pi/ or /py/ sequences.

(3)	pk̯anno	'I take'
	kupk̯a	'oars'
	pk̯aton	'plate'

Newton (1972) /pi/, /py/ > /pk̯/

Patterns exhibited in morpheme concatenation also indicate that stop clusters are dispreferred in CG. Specifically, when stems with final stops precede the perfective past suffix /-tin/, the stop is lenited, as demonstrated in (4). If the stem-final segment were unaltered, a stop cluster would result as indicated in the starred examples. The lenition process only occurs in this environment and thus it is assumed that it is the result of a general prohibition against clusters of this type.

(4) Stem-final consonant alternation[1]

Proposed stem	*(Newton 1972)*	*gloss*	*Perfective past passive /-tin/*	
/vlap/		'hurt'	efláftin	*efláptin
/pemp/		'send'	epéftin	*epéptin
/sfank̯/		'slaughter'	esfáxtin	*esfáktin

cf. /sfank̯/ + perfective past active suffix /sen/ → esfáksin *esfáxsin

[1] The second and third examples also illustrate the deletion of nasals in tri-consonantal clusters, a process which is independent of lenition but which will be described in more depth later in the paper.

It is crucial to note that there are no processes which lenite the initial part of a geminate consonant, demonstrating that geminates do exhibit behavior unlike clusters:

(5)	/mutti/ → [mútti]	'nose'	*muθti
	/ppara/→ [ppará]	'money'	*fpara

If geminates were taken to be sequences of identical segments, the patterns described above would be difficult to explain, since a 'cluster' of stops such as /p/ /p/ is allowed, while a cluster such as /p/ /t/ is not. However, if it is assumed that geminates are single segments, these patterns become clear. Stop clusters are avoided; geminates are unaffected by this prohibition because they are single segments and not real clusters.

2.3 GEMINATES PATTERNING AS CONSONANT CLUSTERS

While geminates behave as single segments for some processes, they also pattern like consonant clusters for others. A clear example comes from the process of final nasal deletion across word boundaries.

As demonstrated in the examples below, the final nasal consonant of the articles /tin/ and /ton/ surfaces unaffected when followed by a word that begins with a vowel or a single consonant[2] . As illustrated in (b), when the second word has an initial geminate consonant, the nasal is deleted. Similarly, when the second word begins with an onset cluster, the nasal may also be deleted, as shown in (c). However, as demonstrated by the examples in (d), the nasal is not deleted before all types of word-initial consonant clusters. Specifically, the clusters that do not trigger deletion consist of stops followed by liquids.

(6) Nasal deletion

a.	ton áпparon	'the horse'	*to áпparon
	ton tíxon	'the wall'	*to tíxon
	tin petterá	'the mother-in-law'	*ti petterá
b.	ti k̭k̭ellén	'the head'	*tin k̭k̭ellén
	to ppará	'the money'	*ton ppará
	to ttavá	'the stew'	*ton ttavá
c.	ti psačín	'the poison'	*tin psačín
	ti ksilopaúra	'the hedge'	*tin ksilopaúra
	to flokkón	'the mop'	*ton flokkón
	ti ðromolakšás	'the ditch'	*tin ðromolakšás

[2] Coda nasals undergo place assimilation, a process that is independent of the deletion process to be described here. The point remains that the nasal is not deleted.

d.	tin krémma	'the cream'	*ti krémma
	tin klátsa	'the sock'	*ti klátsa
	ton traóullo	'the billy goat'	*to traóullo
	ton prúnzo	'the bronze'	*to prúnzo
	ton platáno	'the tree'	*to platáno

2.4 SUMMARY

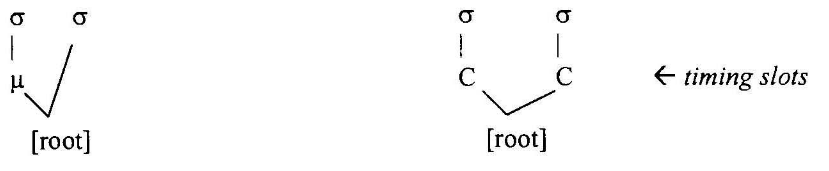
The geminates of CG exhibit dual patterning that is typical of geminates cross-linguistically. With regard to palatalization, geminates act like single segments, since they are completely palatalized in the correct environment, unlike clusters in which only the second member of the cluster is affected by the process. At the same time, geminates also pattern with some consonant clusters in that they trigger final nasal deletion across word boundaries. Accounting for these apparently conflicting facts is at the core of the analysis presented here.

3. ACCOUNTING FOR THE FACTS

The dichotomous pattern exhibited by CG geminates is accounted for in similar but not identical ways under all modern prosodic frameworks. Specifically, the dual patterning of geminates is accounted for by the assumption that these segments comprise a single root node that is multiply linked to two prosodic positions. As demonstrated below, Hayes' moraic theory (1989) posits that a geminate is a root node which is linked to a mora (an abstract unit of prosodic weight) and to a syllable node. Crucially, the mora is linked to a preceding syllable, and constitutes part of the coda. Earlier frameworks, such as those outlined in Clements and Keyser 1983 and Levin 1985, assume that a geminate is a root node linked to two abstract timing units, which in turn may be linked to syllable nodes. Unlike moraic theory, there is no restriction on where the 'parts' of the geminate can be linked.

(7) Representation of geminates

Moraic theory (Hayes 1989) Segmental theory (e.g. Clements and Keyser 1983)

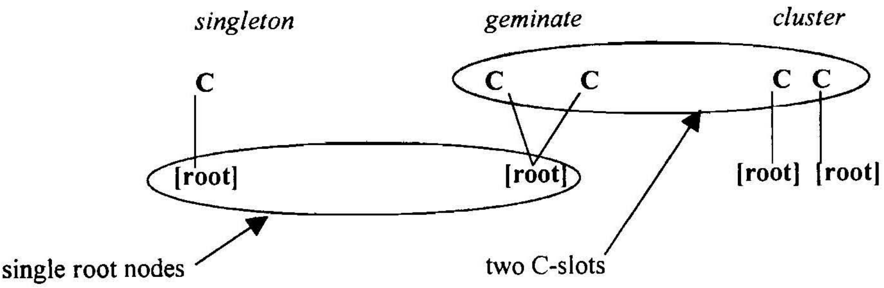


There is a substantial amount of evidence indicating that timing units such as C-slots are superfluous, and that a framework such as Hayes' moraic theory is capable of describing and predicting all prosodic processes (see McCarthy and Prince 1995 for examples and discussion). However, as will be shown, the earlier segmental approach allows for a more straightforward and explanatory account of the behavior of geminates in CG.

3.1 BACKGROUND ASSUMPTIONS

The account of CG presented below follows the assumptions of Clements and Keyser 1983, in which consonants are typically dominated by C timing slots and vowels are usually dominated by V timing slots[3]. As shown in (8), a geminate in CV theory is similar to a single consonant in that it has a single root node, and is similar to a consonant cluster in that it occupies two C-slots. It is these structural parallels which allow for a unified account of the geminates in this language.

(8) CV theory (Clements and Keyser 1983)



The formal analysis of CG will be presented within Optimality Theory, a constraint-based framework (Prince and Smolensky 1993, McCarthy and Prince 1995). In this framework, multiple potential surface forms are evaluated by a set of universal constraints that have a language-specific ranking.

3.2 PALATALIZATION AND THE CV FRAMEWORK

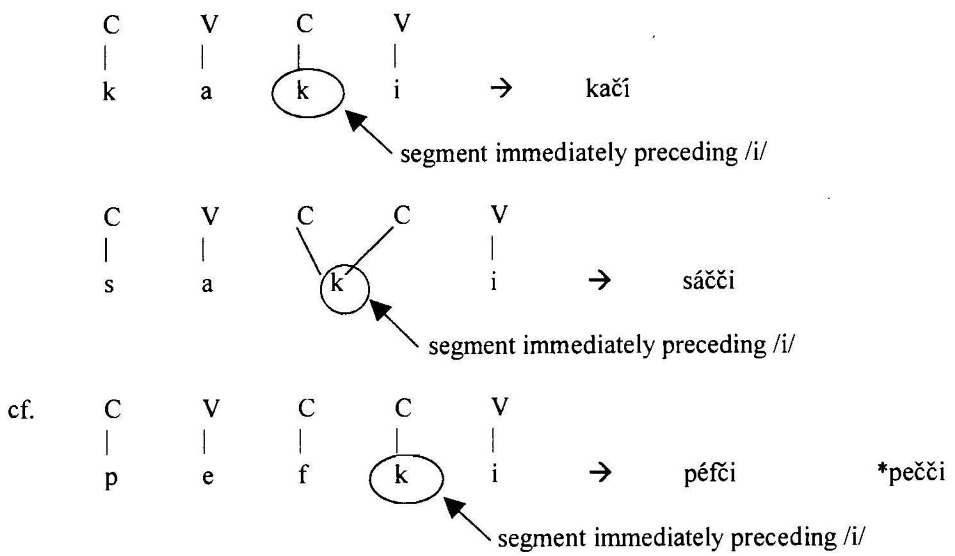
An account of the palatalization process is straightforward in the CV framework. Recall that single and geminate segments are palatalized before the vowel /i/, while only the second member of a consonant cluster is affected, as repeated below, from (2a).

(9)	kakós	'bad (masc. sg.)'	kač͡i	'bad (fem. sg.)'	
	sákkos	'jacket (nom.sg.)'	sáčči	'jacket (nom. pl.)'	
cf.	péfkos	'pine tree (nom. sg.)'	péfči	'pine tree (nom. pl.)'	*pečči

[3] While the generalizations afforded by Levin's 1985 framework, in which all segments are dominated by a generic X timing slot, are important, the CV framework is adopted for ease of exposition. Both frameworks can describe the facts equally well, under the assumptions that 'C-slot' is functionally equivalent to 'X-slot that dominates a root node with consonantal features'.

Under the assumption that geminates have a single root node and thus are single segments, the process can be described as the palatalization of the segment immediately preceding the vowel /i/, as graphically demonstrated below. Here, as throughout the paper, the root nodes are represented as phonetic symbols in prosodic representations.

(10) Palatalization:



This generalization can be expressed as below. It is assumed that this prohibition against sequences of dorsals and front vowels operates on the root node level; since geminates and singletons are both single root nodes, they are expected to pattern in the same manner.

(11) *[ki] Root node sequences of [k] and [i] are prohibited

Since no [ki] sequences are observed in CG, it is safe to assume that this constraint is undominated in this language. Additionally, since an underlying non-palatal consonant may surface as a palatal, it is also safe to assume that a constraint such as FAITH, which prohibits featural changes, is lowly ranked. This is demonstrated in the following tableau. Here, the winning candidate (a) is selected because it only violates the relatively lowly-ranked FAITH constraint. This violation is incurred because the underlying segment /k/ is realized as [č] on the surface. Candidate (b) does not incur a violation of FAITH because there have been no changes to the underlying segments. However, this form violates the more highly ranked constraint against sequences of [k] and [i]. Thus, it is rejected.

(12) Palatalization *input: /kak-/ 'bad (root)' + /-i/ 'fem. sg. adj. suffix'* → [kačí]

/kak + i/	*[ki]	FAITH
☞ a. kači		*
b. kaki	*!	

A form with a geminate consonant is evaluated in exactly the same manner as a singleton, as shown below. Recall that since a geminate consists of a single root node, it is entirely affected by the palatalization process. Since the root node cannot be split, there is no candidate in which the candidate is 'half' palatalized, such as *sakči.

(13) *input: /sakk-/ 'jacket (root)' + /-i/ (nom. pl. suffix)* → sáčči

/sakk+ i/	*[ki]	FAITH
☞ a. sačči		*
b. sakki	*!	

Forms with consonant clusters are also correctly predicted by the constraints that have been proposed. As demonstrated below, candidate (a), in which only the segment immediately preceding /i/ is palatalized, is chosen. Candidate (b) violates the constraint against sequences of [ki]. Candidate (c), in which both of the segments of the cluster have been palatalized, is compared unfavorably to the winning candidate. This is because in (d), two underlying segments have been changed in the surface form, while in (a), only one segment of the cluster has been affected.

(14) *input: /pefk-/ 'pine tree (root)' + /-i/ (nom. pl. suffix)* → péf̌či

/pefk + i/	*[ki]	FAITH
☞ a. pef̌či		*
b. pefki	*!	
c. pečči		*!*

In summary, the behavior of geminates with regard to palatalization in CG are accounted for in a straightforward manner: only the segment immediately preceding the vowel /i/ is affected. Since geminates comprise a single root node and thus are single segments, they behave as such for this process, and not as consonant clusters.

3.3 NASAL DELETION IN THE CV FRAMEWORK

The behavior of geminate consonants with regard to nasal deletion is also explicable within the CV framework of representation. Recall that geminates and some consonant clusters trigger deletion of a preceding word-final nasal. Following the analysis presented in Malikouti-Drachman (1987), it is assumed that nasal deletion occurs because of restrictions on syllable structure in CG. Specifically, complex onsets are dispreferred in this language, unless the onset consists of a stop followed by a liquid. Furthermore, while coda consonants are allowed, coda clusters are entirely prohibited. The interaction of these two restrictions leads to deletion of the final nasal, as demonstrated below.

The prohibition against coda clusters is observed language-wide. There are no words that end in more than one consonant, and in the event of a sequence three consonants, such as across the word boundary of *ton prunzo* 'the bronze', the segments are always syllabified by speakers as a single coda and a complex onset: [ton.prun.zo], not *[tonp.run.zo]. The formal expression of this prohibition is shown below:

(15) $*CC]_\sigma$ Consonant clusters in syllable codas are prohibited

Unlike the prohibition against coda clusters, the restriction on complex syllable onsets is not categorical, since it appears that some, but not all, clusters are allowed in onsets. Drawing on the facts of nasal deletion, it can be seen that stop + liquid clusters do not trigger deletion, while all other clusters do. As demonstrated below, the deletion-triggering onsets are syllabified as single coda + onset sequences, rather than as complex onsets.

(16)	Deletion:	tin + psačin	[tip.sa.čin]	'the poison'	*[tin.psa.čin]
		ton + flokkon	[tof.lok.kon]	'the mop'	*[ton.flok.kon]
	No Deletion	tin + kremma	[tin.krem.ma]	'the cream'	
		tin + klatsa	[tin.klat.sa]	'the sock'	

The clusters that trigger deletion are thus not allowable as syllable onsets[4]. To define this class of clusters, the concept of relative sonority is drawn on. It appears that the crucial factor that determines whether an onset triggers deletion or not is the sonority of the segments involved: stop + liquid sequences do not trigger deletion, while all others do. Presented below is a modified sonority scale, based on concepts presented in Zec (1995) and references therein. Each segment class is assigned a numerical sonority value indicating their relative sonority value: stops have a value of 1, as they are less sonorous than liquids.

[4] Except in absolute phrase initial position. In this environment, I follow Malikouti-Drachman in assuming that the first segment of an absolute initial cluster is extrametrical and thus not subject to the restrictions on onsets.

(17) Relative sonority scale (following Zec 1995 *inter alia*)

less sonorous	⟵		⟶	*more sonorous*
Sonority value:	1	2	3	
	stops	fricatives	liquids	

In terms of sonority values, the onsets that trigger deletion can be defined simply. The onset clusters that do not trigger deletion all have a sonority value ratio of 1:3 (stops and liquids). The clusters that trigger deletion have a smaller ratio:

(18) Sonority ratio for onset clusters:

Do not trigger deletion	*ratio*	Trigger deletion	*ratio*
kr	1:3	ks	1:2
kl	1:3	ps	1:2
tr	1:3	fl	2:3
pl	1:3	ðr	2:3

Under the assumption that geminates are comprised of two C slots, the fact that they pattern like some consonant clusters in triggering deletion is entirely expected: the two Cs have the same sonority value (since they are linked to the same root node), as illustrated below. Naturally, the two C slots have a sonority ratio value of less than 1:3 and so are expected to trigger deletion.

(19) Sonority ratio for geminates:

C_i C_j sonority value of C_i= 1; sonority value of C_j = 1

\ /

[p:] ratio: 1:1

A constraint that captures the generalization about relative sonority values and onset restrictions is found in (20). Essentially, this constraint prohibits complex syllable onsets that do not have the desired 1:3 sonority ratio. Since deletion occurs, it is assumed that this onset constraint dominates MAX, a prohibition against segment deletion.

(20) $*_\sigma[C_iC_j$ Onset sequences in which the sonority ratio of C_iC_j is less than 1:3 are prohibited

MAX No deletion

As demonstrated in the following tableaux, the combination of these constraints leads to final nasal deletion before all complex onsets except those consisting of a stop + liquid combination.

In tableau (i), a form with a stop + liquid onset cluster is evaluated. The winning candidate does not incur any violations. Candidate (b) violates the constraint against coda clusters, since the nasal and the /k/ are syllabified as the syllable coda. Candidate (c), in which the nasal has been unnecessarily deleted, incurs a violation of MAX.

In tableau (ii), a word with a deletion-triggering onset is evaluated. The winning candidate (a) incurs a violation of the MAX constraint, since the nasal has been deleted. However, this is a necessary violation, since the other candidates incur violations of more highly ranked constraints. In (b), the /ps/ cluster is syllabified as an onset, violating the sonority ratio constraint, while candidate (c) violates the coda cluster constraint.

Tableau (iii) evaluates a form with an initial geminate. The winning candidate incurs a violation of MAX, since the nasal is deleted. As in the previous tableau, the other options incur violations of more highly ranked constraints.

(21) i. no deletion

/tin + klatsa/	$*_{\sigma}[C_iC_j$	$*CC]_{\sigma}$	MAX
a. ☞ tin.klat.sa			
b. tink.lat.sa		*!	
c. tik.lat.sa			*!

ii. deletion before cluster

/tin + psačin/	$*_{\sigma}[C_iC_j$	$*CC]_{\sigma}$	MAX
☞ a. tip.sa.čin			*
b. tin.psa.čin	*!		
c. tinp.sa.čin		*!	

iii. deletion before geminate

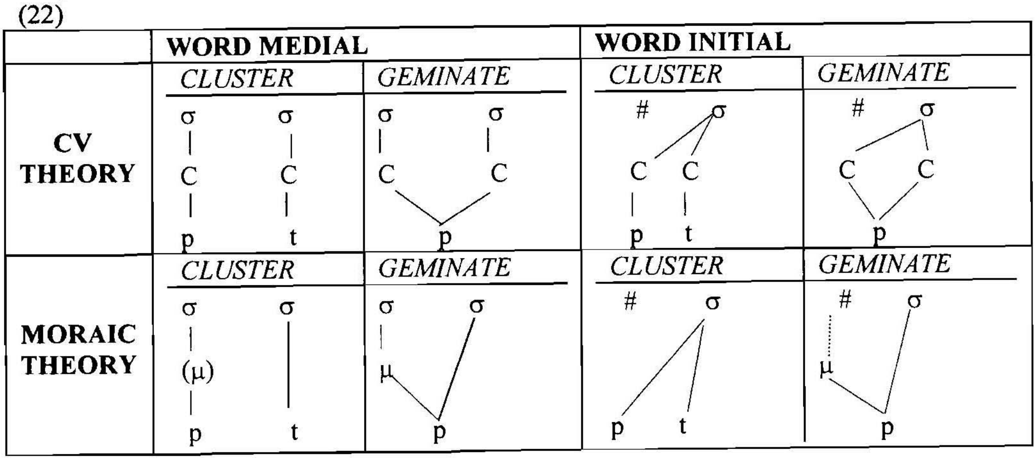
/ton + ppara/	$*_{\sigma}[C_iC_j$	$*CC]_{\sigma}$	MAX
☞ a. top.para			*
b. ton.ppara	*!		
c. tonp.para		*!	

In conclusion, the preceding analysis demonstrates that in the CV framework, the facts of nasal deletion can be described in a unified manner. While it is a group of constraints that conspire to result in deletion, both geminates and certain consonant clusters pattern alike for the same reason: they each consist of two C slots. As will be demonstrated later, this parallel structure is crucial in developing a unified account.

3.4 ACCOUNTING FOR CG IN MORAIC THEORY

Moraic theory (1989) cannot account for CG in as elegant a manner because under this framework, geminates and consonant clusters may be represented in different manners. As demonstrated in the first row of the table below, in CV theory geminates and clusters have the same representation regardless of their environment in the word. In each case, both the geminate and the cluster comprise a sequence of two C-slots.

(22)



The representations under moraic theory are not as consistent. Recall that geminates are assumed to be inherently moraic, and so bear a mora in all environments. Other consonants may be assigned a mora, but only in syllable codas As shown in the moraic representation of a medial cluster, (μ) indicates a mora that has been assigned to a coda consonant. Thus, word-medial geminates and consonant clusters may have a similar representation, in that both contribute prosodic weight to the preceding syllable. It is in word-initial position that the representation of geminates and clusters crucially differs under moraic theory. While the geminate bears a mora, the cluster cannot since there is no process which would result in the assigning of a mora to an initial segment.

The two theories are similar in that both assume that geminates are single root nodes. Thus, the account of palatalization is identical in both CV theory as well as moraic theory. Essentially, the root node immediately preceding the triggering vowel is subject to palatalization. However, the lack of parallel structure between initial geminates and clusters in moraic theory means that there is no way to account for a process such as nasal deletion in a unified manner.

For example, it is possible to assume that the sonority/onset constraint described earlier motivates deletion before consonant clusters (with minor revisions, so that the constraint targets root nodes with certain sonority features, not C-slots). Just as in the CV analysis, when this constraint dominates the prohibition against deletion, final nasal deletion before clusters is predicted, as demonstrated in the sample tableau.

(23) Deletion before consonant clusters in moraic theory:

$*_\sigma[[rt]_i[rt]_j$ Onsets that begin with two root nodes, in which the sonority ratio of the root nodes is less than 1:3, are prohibited.

/tin + psačin/	$*_\sigma[[rt]_i[rt]_j$	MAX
☞ a. ti psačin		*
c. tin psačin	*!	

Naturally, the same constraint will not predict deletion before geminates, since geminates comprise a single root node. In fact, there is no constraint that can predict deletion before both geminates and clusters, since they have fundamentally different structures in moraic theory. Thus, it is necessary to posit an independent constraint to account for geminate-triggered deletion.

As has already been established, coda clusters are prohibited, and thus syllabifying the geminate as part of a coda is unacceptable: *tonp.para. It is assumed that the cross-linguistic prohibition against moraic onsets prohibits syllabification of the geminate in the onset of the syllable: *ton.ppara. Thus, it is posited that deletion occurs to allow for accommodation of the mora. The constraint that drives this deletion is:

(24) *Moraic onset Moraic onsets are prohibited

The appropriate ranking of this constraint, along with the syllabification and deletion constraints, accounts for deletion before initial geminate consonants, as shown in the following tableau. Here the form that exhibits deletion wins because the initial part of the geminate (the part with the mora) is in the syllable coda. In (b), the entire geminate is in the onset, violating the constraint against moraic onsets.

(25)

/ton + ppara/	*Moraic onset	MAX
a. ☞ top.para		*
b. ton.ppara	*!	

Thus, it is possible to account for the pattern of nasal deletion while maintaining the assumptions of moraic theory. However, two different principles must be posited to account for the process. In the case of deletion before geminates, the triggering environment is defined in prosodic terms: nasals are deleted before moraic consonants. In the other case of deletion, the triggering environment is defined in melodic terms: nasals are deleted before sequences that have a certain relative sonority.

In addition to the fact that there are two independent processes driving deletion, it is important to note that in order to derive the correct effect, both the constraint against moraic onsets and the constraint against complex onsets with low sonority ratios must be undominated: $*_{\sigma}[[rt]_i[rt]_j$ and *Moraic onset dominate all else. It is only with this particular ranking that geminates and clusters pattern alike. Since constraints may have different rankings in different languages, the following ranking is possible:

(26) $*_{\sigma}[[rt]_i[rt]_j$ >> MAX >> *Moraic onset

This ranking predicts a language in which onset clusters trigger deletion, while onset geminates do not. Since geminates and clusters are observed to pattern alike cross-linguistically, this prediction appears to be incorrect and thus presents a serious problem for the moraic theory framework.

4. CONCLUSION

As was demonstrated, there is a fundamental difference in how CV theory and moraic theory account for final nasal deletion. In the segmental approach, deletion occurs before two C slots that have a certain sonority contour. Both geminates and clusters fit this description, and so are predicted to pattern alike. In the moraic framework, it is necessary to posit two independent constraints that lead to nasal deletion, because consonant clusters and geminates have different prosodic representations in this theory. Thus it is concluded that the CV framework provides a superior account of CG.

It is important to note that the discrepancy between these two theories is revealed only by investigating the behavior of clusters and geminates in word-initial position, because it is only in this environment that the frameworks diverge with regard to the representation of geminates and clusters (as was demonstrated in the chart comparing the representations of the two frameworks). Therefore, it is apparent the investigation of a language such as Cypriot Greek is crucial to our understanding of phonological structure.

It is also important to note that while it is possible to posit constraints that account for final nasal deletion within a moraic framework, these constraints are independent of each other, and so it is only via stipulation that the constraints work together to result in deletion before both geminates and clusters. As was shown, a simple re-ranking of the constraints results in an unattested situation in which geminates and clusters do not pattern alike. Within the CV framework however, there is a single constraint that targets CC sequences, thus affecting both geminates and clusters. Thus, there is no ranking that would result in an unattested situation: in every case, the geminates will behave as clusters do. Since geminates and clusters pattern alike cross-linguistically, this appears to be a favorable aspect of this framework.

Although a segmental framework is demonstrated to be superior in predicting the behavior of word-initial geminates and clusters in CG, it is not suggested that moraic theory be rejected altogether. The insights afforded by this theory, specifically with regard to weight-based prosodic processes are fundamental to our understanding of phonology. Furthermore, the ability of moraic theory to predict prosodic processes (such as compensatory lengthening) cannot be duplicated by a segmental framework, as discussed in Hayes (1989). Conversely however, the results of the analysis of CG imply that timing units such as C-slots also play a crucial role in phonological processes that cannot be duplicated by moraic structure, a finding also supported by languages such as Leti (Hume, Muller and van Engelenhoven 1997). Since neither framework can subsume the other, it is suggested that the basic components of both play a fundamental role in phonological representation.

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