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GEMINATES AND SYLLABLE STRUCTURE

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Background

- Central questions:
  - What is the phonological representation of true geminates (G)?
  - What phonological patterns do Gs exhibit?
- Two main approaches to underlying / input representations

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Background

- **1. Syllabic weight analysis** (Hyman 1985, McCarthy and Prince 1986, Hayes 1989, etc.): Gs are inherently heavy (moraic), with a single node on the length tier (C,V, or X), and double prosodic association

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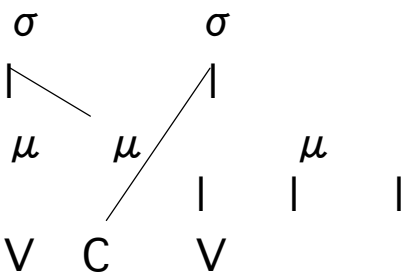
Background

Underlying

Intervocalic



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Background

- **2. Segmental length analysis** (Selkirk 1990): Gs are inherently long (bipositional) and light (non-moraic)

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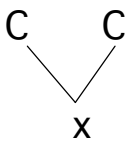
Background

Underlying



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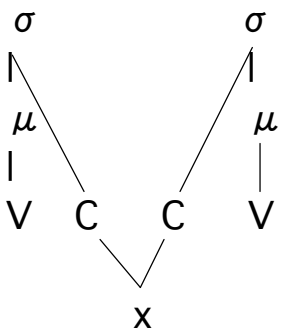

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Outline

- The syllabic weight analysis, the predominant view, makes two crucial representational claims:
  - Gs are always mora-bearing (heavy)
  - Gs are specified with a single unit on the length tier (short)
- We will bring together evidence that both claims are false

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Outline

- We will argue that within derivationally-oriented theories underlying G structure contains double units on the length tier and no inherent prosodic properties
- We allow for the first C component of Gs to become heavy, in case coda Cs (less frequently, onset Cs) in general are heavy in a particular language

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Outline

- We claim that within the output-oriented OT approach, the defining property of Gs in outputs is bipositional representation on the timing tier
- Due to variable ranking of relevant constraints, Gs may be moraic (heavy) in some languages, non-moraic (light) in others

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Line of Argumentation

- Argument 1: Gs can be light in coda position
- Argument 2: Gs can be light in onset position
- Argument 3: Gs have bipositional, double linked structures
- Argument 4: Nondistinctness of heavy Gs and heavy singleton Cs
- Argument 5: Gs pattern with C clusters (CC)

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Argument 1: Light G in coda position

- If Gs have inherent weight, then syllables closed by the first half of a geminate should count as heavy, or bimoraic, since the vocalic nucleus and the coda G each contribute to syllable weight
- However, this does not always appear to be the case, as claimed for a variety of languages
- We will take up two cases here

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Argument 1; Case 1

Selkup (West Siberian) Stress (Halle and Clements 1983)

- Stress falls on the rightmost heavy syllable, or else on the initial syllable
- Stress rightmost heavy syllable:

  [qumo:ql_l__:] 'your two friends'

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Argument 1; Case 1

- Medial CVC syllables are light:
  - [_m_rna] 'eats'
  - initial syllable is stressed
- Medial CVG syllables are light:
  - [_:c_kkak] 'I am working'
  - initial syllable is stressed

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Argument 1; Case 1

- Ever since the original data on Selkup were presented by Halle and Clements in 1983 the status of CVG syllables have remained controversial (Tranel 1991; Curtis 2003; Davis 2003)
- The problem is that the data contain only one exemplar with a medial CVG syllable: [_:c_kkak]

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Argument 1; Case 1

- CVG is preceded by VV; the initial VV syllable attracts stress over the medial CVG syllable
- Possible hypothesis: CVG syllables are heavy (G = moraic), and stress targets (rightmost) VV heavy syllables preferentially over CVG heavy syllables (Davis 2002)

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Argument 1; Case 1

- Words of the shape CVCVGV(C), i.e. those containing a CVG medial syllable flanked by short vowels, provide the critical empirical testing ground for the weight of CVG syllables
- The weight analysis of G predicts that stress will fall on CVG, the only heavy syllable in the word

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Argument 1; Case 1

- The length analysis of G predicts default stress on the initial light syllable, in the absence of any heavy syllable in the word
- We will now bring additional data into the discussion that bear crucially on the theoretical issue at hand

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Argument 1; Case 1

- The missing link is provided by the Taz dialect of Selkup (Helimski 1998; p.c.)
- Stress rightmost heavy syllable:
  - [_ss_:_qo] 'to happen (already)'
  - [_e:l_:q_n] 'in the day'
- Medial CVC syllables are light:
  - [q_p_r_mp_t_l] 'which became fat'
  - initial syllable is stressed

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Argument 1; Case 1

- Medial CVG syllables are light:
  _ [p___tta] 'he cuts down (a tree)' (_*tta*)
  _ [_s_kka] '(it) happens (occasionally)' (_*kka*)
  _initial syllable is stressed

- We conclude that Gs are unmistakably light in Selkup

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Argument 1; Case 2

Ngalakgan (Northern Australian) Stress (Baker 2008)

- In trisyllabic roots stress falls on medial heavy syllables, otherwise on initial syllables

- Heavy CVC medial syllables:

  [lu___rwa] 'vine sp.'
  [mo___cp_r] 'mud cod'
  [bur__ci] 'water python'

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Argument 1; Case 2

- Light CV medial syllables:
  _[m__na_a] 'European'
  _[w_lama] 'face'
  _[w_iya] 'multiparous woman'

- Light CVG medial syllables:
  _[j_batta] 'freshwater tortoise sp.'
  _[g_makk_n] 'properly'
  _[m___pp_] 'shovelhead catfish'

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Argument 1; Case 2

- Summary: If Gs are inherently heavy, then CVG medial syllables should attract stress. But in fact, they don't.

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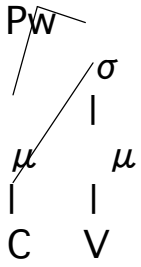
Argument 2: Light G in Onset Position

- Languages such as Trukese (Austronesian) have heavy Gs in onset position (Davis 1999)
- Strong version of weight analysis of onset Gs (Hayes 1989; Davis 1999): invariant representation, where a single C node is attached to an extrametrical mora, as well as the syllable node



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Argument 2

- Non-moraic initial Gs falsify this approach
- Two such cases will be highlighted

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Argument 2, Case 1

Leti (Austronesian) initial G (Hume, et al. 1997)

1. Distribution of Gs
   - Words may begin with G
   - Words are minimally bimoraic
   - If initial Gs are heavy, then GV words would satisfy word minimality
   - But no such words are countenanced

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Argument 2, Case 1

2.Stress

- Word initial heavy syllables are stressed, as well as penultimate syllables:

  _[m_:n^{w}or^{y}_ri] 'crow'

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Argument 2, Case 1

- Word initial CVC syllables are light:
  _[matr_na] 'master of the house'
- Word initial GVC syllables are light:
  _[ppun_rta] 'nest' s egg'

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Argument 2, Case 2

- **Thurgovian Swiss initial G** (Muller 2001; Kraehenmann 2003)
- Bimoraic word minimality, weight-by-position, word final extrametricality (Kraehenmann 2003)

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Argument 2, Case 2

Root	*Base*		*Pl.*	*Sg.*
CVC	/has/	'share'	has-e	ha:s

- In singular, final /s/ is extrametrical
- Violation of bimoraic minimal word
- Repair by V lengthening

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Argument 2, Case 2

Root	*Base*		*Pl.*	*Sg.*
CVCC	/walt/	'forest'	walt-e	walt

- /t/ is extrametrical
- /l/ is mora bearing via weight-by-position
- Word is bimoraic
- V lengthening is obviated

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Argument 2, Case 2

Root	Base	Pl.	Sg.	
CVG	/f_tt/	'fat'	f_tt-e	f_tt

- Final G is moraic
- Word is bimoraic
- No repair via V lengthening
- Note: if G were represented with a single C node, as the weight analysis would have it, it would be extrametrical, as other final Cs are. Hence, V lengthening would be expected.

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Argument 2, Case 2

Root	Base	Pl.	Sg.
GVC tta:k	/ttak/	'day'	ttak-e

- /k/ is extrametrical
- V lengthening is induced by minimal word violation
- Explained on the view that initial G is non-moraic

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Argument 3: Bipositional / Linked Structure of G

Ngalakgan trisyllabic stress revisited

- Stress medial heavy syllables, otherwise initial syllables
- Medial CVN / CVG syllables pattern together vs. other CVC syllables

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Argument 3

- Medial syllables closed by C which is heterorganic with a following C are heavy:
  _ [lu___rwa] ‘vine sp.’

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Argument 3

- Medial syllables closed by N (always homorganic with a following C) are light:
  - _ [___l__g_] ‘eucalyptus sp.’
  - _ [j_ganda] ‘female plains kangaroo’
  - _ [___r___c] ‘emu’
- Medial syllables closed by G are light:
  - _ [j_batta] ‘freshwater tortoise sp.’

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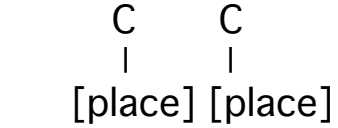
Argument 3

- The affinity between Gs and homorganic NC clusters follows on the double, but not single slot analysis of Gs:
- Heterorganic CC (heavy)



- G (light) Homorganic NC (light)

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Argument 3

- Conclusion: G have bipositional, linked structures

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Argument 4: Heavy G vs. Heavy C

- On the weight analysis of G, distinguishing between a G and a moraic singleton C within the same language is problematic, since both have the same structure (Curtis 2003)

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Argument 4

- This is the case e.g. in Hungarian
- Monosyllabic content words must have either a long vowel or a short vowel followed by at least one C (2 exceptions)
- Bimoraic minimal word constraint and weight-by-position (Cs_ri 1990; Sipt_r and T_rkenczy 2000)

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Argument 4

- Problem: CVC vs. CVG minimal pairs, where both C and G must be mora bearing (due to word minima) are not distinct: both have a single mora bearing C slot
- E.g.: *sok* 'many' vs. *sokk* 'shock'; *lap* 'page' vs. *lapp* 'Lapp'; *tol* 'push' vs. *toll* 'pen' (Vago 1992)

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Argument 4

- In contrast, the length analysis of Gs has a moraic C slot for a singleton coda, and a moraic C for the first of the two C slots of a G coda

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Argument 5: Gs Pattern with CC

- Gs and CC clusters may pattern together with respect to segmental processes
- Bipositional representation on the timing tier is the common bond
- Three cases will be considered

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Argument 5, Case 1

- Leti, as analyzed by Hume et al. (1997), provides a battery of support for the bipositional nature of geminates
- Underlying G and CC occur only word initially:

ppuna 'nest' *pninu* 'fool'

mmanan 'food' *mninivu* 'soft'

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Argument 5, Case 1

- Word final metathesis:
  - applies before CC: /kunis/ 'key' + /vnutan/ 'iron' --> [kunsivnutan] 'iron key'
  - applies before G: /ukar/ 'finger' + /ppalu/ 'bachelor' --> [ukrappalu] 'index finger'
  - blocked before single C: /m ɛ sar/ 'teacher' + /lavan/ 'big' --> [m ɛ sarlavan] 'professor'

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Argument 5, Case 1

- Word final vowel deletion:
  - applies before single C: /sam ɛ la/ 'mouse' + /nura/ 'coconut tree' --> [sam ɛ lnura] 'tricolored squirrel'
  - blocked before G: /sam ɛ la/ 'mouse' + /tt ɛ nan/ 'spine' --> [sam ɛ latt ɛ nan] 'mouse's spine'
  - blocked before CC: /sam ɛ la/ 'mouse' + /tpunan/ 'throat' --> [sam ɛ latpunan] 'mouse's throat'

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Argument 5, Case 1

- Secondary articulation:
  - realized on initial single C: /kkani/ 'late' + /tani/ 'soil' --> [kkantʸani] 'earthenware plate'
  - blocked on initial G: /sivi/ 'chicken' + /tt ɛ i/ 'female' --> [sivitt ɛ i] 'hen'
  - blocked on initial CC: /ai/ 'wood' + /vlakar/ 'crossed' --> [aivlakar] 'cross'

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Argument 5, Case 2

- **Cypriot Greek Nasal Deletion**
- The definite articles *ton* (masc.) and *tin* (fem.) lose the final nasal consonant if the next word begins either with a consonant cluster or geminate, motivated by a *CCC constraint (Muller 2001)

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Argument 5, Case 2

- Final nasal stays before V or C:

  _ ton _pparon ‘the horse’
  _ ton t_xon ‘the wall’

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Argument 5, Case 2

- Final nasal deletes before CC:
  - _ ti psa__n ‘the poison’
  - _ to fl_kkon ‘the mop’

- Final nasal deletes before G:
  - _ to ppar_n ‘the money’
  - _ to ttav_n ‘the stew’

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Argument 5, Case 3

Hungarian Epenthesis (variable)

- A low vowel ([_] or [ɛ]) is inserted between verbal stems ending in CC and C-initial suffixes (Vago 1992)

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Argument 5, Case 3

- No epenthesis after C- or V- final stems:

	'3sg'	*'2sg'*	*'Infin.'*
'receive'	[k_p]	[k_p-s]	[k_p-ni]
'grow'	[n_:]	[n_:-s]	[n_:-ni]

- Epenthesis after CC- final stems:

	'3sg'	*'2sg'*	*'Infin.'*

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Argument 5, Case 3

- Motivation: * CC] $_{VB\ ST}$ C
- The two theories of G representation make different predictions with respect to epenthesis after verbal stems ending in a G
- If Gs have a single C node on the timing tier, they are not expected to trigger epenthesis
- If Gs have CC nodes, they are expected to behave like consonant clusters and induce epenthesis

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Argument 5, Case 3

- In point of fact, it is the claim of the segmental length theory that is substantiated: epenthesis obtains after G- final stems

'Infin.'	*'3sg'*	*'2sg'*
'hear'	[h_ll]	[h_ll-_s]
[h_ll-_ni]		

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Conclusion

- We have presented arguments against the syllabic weight analysis of Gs based on both weight sensitive and quantity sensitive processes

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Conclusion

Regarding the prosodic domain:

- We have shown that Gs can be light in both onset and coda positions
- The strong version of the weight analysis of Gs is thus invalidated
- A weaker version is proposed by Davis (2002) for initial Gs: the weight analysis for moraic Gs (Trukese), the length analysis for non-moraic Gs
- We view this approach as an unnecessary relaxation of phonological theory

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Conclusion

- Our approach posits that Gs have an invariant, universal representation: doubly linked CC slots
- Gs may become moraic on a language particular basis by the same mechanisms (rules or constraints) that govern non-G consonants
- Thus, Gs receive no special treatment

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Conclusion

- Gs are free to occur in all positions and to exhibit varying behavior with respect to syllable weight: either one or both components (C slots) are found syllable initially as well as syllable finally, in both weight-bearing and weightless flavors

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Conclusion

Regarding quantity sensitive processes:

- all descriptions of single C Gs known to us are reanalyzable into CC representations (for one such case involving Sinhala, see Ringen and Vago 2003)
- We are not aware of any argument that some G structure must contain a single C node and not a double node
- Some facts are not compatible with the single C node hypothesis, as we have shown here

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Conclusion

- We conclude therefore that the full range of evidence supports the strong position that geminates are uniformly long

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