The slides can be found, in compressed and uncompressed versions, here:
https://linguistics.mit.edu/user/steriade/_


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## TOC

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The puzzle
Certain $\mathrm{V}(\mathrm{C})$ word finals are avoided some contexts in the quantitative meters of Greek and Latin

Avoided word finals: under-attested or banned overall

| (a) $\check{\mathrm{V}} \# \mathrm{CV}$ | (b) $\check{\mathrm{V}} \# \mathrm{CCC}_{0} \mathrm{~V}$ | (c) $\mathrm{V} \mathrm{C} \# \mathrm{CC}_{0} \mathrm{~V}$ | V̌ short V |
| :--- | :--- | :--- | :--- |
|  |  |  |  |

Word finals that are not avoided:

$$
\begin{array}{l|l|l|}
\hline \text { (d) } \check{\mathrm{V}} \mathrm{C} \# \mathrm{~V} & \text { (e) } \check{\mathrm{V}} \mathrm{CC} \# \mathrm{C}_{0} \mathrm{~V} & \text { (f) } \overline{\mathrm{V}} \mathrm{C}_{0} \# \mathrm{C}_{0} \mathrm{~V}
\end{array} \overline{\bar{V} \text { long } \mathrm{V} \text {, or diphthong }}
$$

## 1. Introduction to intervals

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The basics (1)

- V-to-V intervals are units of rhythm.
- Proposed as substitutes for syllables
- Each interval is a nucleus ( $\mathrm{V}, \mathrm{VV}, \mathrm{Q})$ plus an entire $\mathrm{C}_{0}$ interlude, up to next nucleus, $\left|\mathrm{VC}_{0}\right| \mathrm{V}$, or up to pause, $\left|\mathrm{VC}_{0}\right| \# \#$.
- ' I' interval boundary.
- interval parsed |min|v|al|
- syllable parsed ${ }^{\text {s }}|\mathrm{I}|$ | $\mathrm{bb}|!|$
- $\mathrm{C}_{0}\left|\mathrm{VC}_{0}\right| \mathrm{VC}_{0} \mid$ instead of $. \mathrm{C}_{0} \mathrm{VC}_{0} . \mathrm{C}_{0} \mathrm{VC}_{0}$.

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The basics (2)

- Intuitive word divisions, e.g. in.ter.val, *int.erv.al, are not interval-based Claim: such divisions reflect a preference to preserve intact the CV transitions of undivided form, e.g. [Into.ival], in the corresponding isolated fragments [m],[tar],[val].
on CV transitions as main cues to C identity Fujimura et al. 1978; Ohala 1990; on their effect on intuitions of syllable division, Steriade 1999.
- Preference to preserve CV transitions is unrelated to the units of rhythm; and it's enforced independently of these units.
CV transitions/CV-units tend to be preserved even when separated from corresponding weight units: Hombert 1986 on CV swapping in Bakwiri 'backwards talk', e.g. lùùná $\rightarrow$ qààlú.)


## The basics (3)

- Arguments for intervals: Sturtevant 1922; Farnetani \& Kori 1996; McCrary 2006; Barbosa 2007; Steriade 2009, 2012, 2019; Hirsch 2010; Guilherme-Garcia 2015; Seifart \& al. 2017; Ryan 2022; others
- The Greek grammarians' statements on weight presuppose intervals: 'a short vowel is heavy by position if followed by [at least] two Cs,' not '... if followed by a C in its syllable'
Dionysius Thrax (2 $2^{\text {nd }}$ BC; Uhlig 1883: I, 1, 18,4-19.1)
- Latin grammarians: $\mathrm{VCC}_{0}$ is unit of weight, distinct from syllable Quintilianus Inst. Or. ( $2^{\text {nd }} \mathrm{AD}$ ): 9,4,85-86. Pompeius ( $5^{\mathrm{th}} \mathrm{AD}$ ), as cited in Marotta 2015:73

Intervals are like syllables, except

1. Intervals have no (need for) internal constituents

Syllables need Onset + Rime to compute weight.
2. All segments in an interval contribute to its weight (Ryan 2019, Steriade 2012). Syllables exclude Onsets.
3. An interval's boundaries are invariably placed: $\left|\mathrm{VC}_{0}\right| \mathrm{V}$ Syllables: VCCV is parsable as V.CCV, VC.CV

## Weight categories

- Weight is a continuum (Gordon 1999, Ryan 2012)

$$
\mathrm{V}>\mathrm{VC}>\mathrm{VCC}>\mathrm{VV} . . .
$$

- Weight categories like Light/Heavy $(\mathrm{L} / \mathrm{H})$ are regions in it.


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## Weight categories

- Latin stress and meter refer to a $\mathrm{L} / \mathrm{H}$ distinction.

With syllables, we must draw the line at V vs. VC rimes:

liberōo ‘I liberate'; ibertō 'freed-man-DatSg'; sufferctō ‘stuffed-DatSg'; Ibē̄̄o ‘'tberian-DatSg'

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Weight categories

- Latin stress and meter refer to a L/H distinction.
- With intervals, we must draw the line at VC vs. VCC:


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|  | Isolation | before \#V | before \#CV | before \#CCV |
| :---: | :---: | :---: | :---: | :---: |
|  | V\# | V\#V | V\#CV | V\#CCV |
| Weight of $\pi_{1}$ |  | Light | Light | Heavy |
| E.g. | arma | arma et | arma virum | arma stant |
|  | VC\# | VC\#V | VC\#CV | VC\#CCV |
| Weight of $\pi_{1}$ |  | Light | Heavy | Heavy |
| E.g. |  | ater et | ater canis | ater stat |
| ater 'black', et 'and, canis 'dog-NomSg', stat 'is standing' |  |  |  | (17) |

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| Syllables | Isolation | before \#V | before \#CV | before \#CCV |
| ---: | :--- | :--- | :--- | :--- |
|  | V\# | V\#V | V\#CV | V\#CCV |
| Weight of $\pi_{1}$ | Light | Light | Light | Heavy |
| E.g. | arma | arma. et | ar.ma. vi.rum | ar.mas.tant |
|  |  |  |  |  |

Resyllabification, weight change: ar.ma. stant $\rightarrow$ ar.mas.tant; basic Light becomes a Heavy

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| Intervals | Isolation | before \#V | before \#CV | before \#CCV |
| ---: | :--- | :--- | :--- | :--- |
|  | VC\# | VC\#V | VC\#CV | VC\#CCV |
| Weight of $\pi_{1}$ | Light | Light | Heavy | Heavy |
| E.g. at\|er | at\|er|et | at\|erc|an|is | at\|erst|at |  |

at|er + c|an|is $\rightarrow$ at|erc|an|is: isolation Light $(\mathrm{VC})$ becomes Heavy VCC at|er + st|at $\rightarrow$ at|erst|at: isolation Light $(\mathrm{VC})$ becomes Heavy VCCC

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Predictions summarized:
different weight changes with syllables vs. intervals


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## Changes of interval weight relative to isolation weight

|  | $\mathrm{L} \pi$ | $\mathrm{H} \pi$ | $\mathrm{H} \pi$ | $\mathrm{L} \pi$ |
| :---: | :---: | :---: | :---: | :---: |
| $\check{L}$ | L | L | L | $\mathrm{H} \pi$ |

2. 

Weight of the word-final interval in isolation
Weight of the word-final interval in line medial context:
the weight changes, relative to isolation, in (a-c); it doesn't change in (d-f)

Quantitative meters test these different predictions

- Some word final $\bar{V}(\mathrm{C}) \#$ sequences are avoided in some contexts.

| (a) V̆\#CV | (b) $\breve{\mathrm{V}} \# \mathrm{CCV}$ | (c) $\mathrm{V} \mathrm{C} \# \mathrm{CV}$ | (d) V̆C\#V | (e) $\mathrm{V} \mathrm{CCH} \# \mathrm{C}_{0} \mathrm{~V}$ | (f) $\overline{\mathrm{V}} \mathrm{C}_{0} \# \mathrm{C}_{0} \mathrm{~V}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| L $\pi$ | H $\pi$ | H $\pi$ | $\mathrm{L} \pi$ | H $\pi$ | H $\pi$ |

- (a), (b), (c): restricted or impossible in A.Greek and Latin poetry.
- E.g. Vergil: (b) is impossible in all positions for s-stop clusters.
(a), (c) are very rare when a foot boundary coincides with \#.
- (d), (e), (f): unrestricted for all classical poets, in all metrical contexts, all periods

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## Interval-based hypotheses about these $\check{\mathrm{V}}(\mathrm{C}) \#$ restrictions

| (a) $\breve{\mathrm{V}} \# \mathrm{C} \mid \mathrm{V}$ | (b) $\mathrm{V} \# \mathrm{CC} \mid \mathrm{V}$ | (c) $\mathrm{V} \mathrm{C} \# \mathrm{C} \mid \mathrm{V}$ | (d) $\breve{\mathrm{V}} \mathrm{C} \mid \# \mathrm{~V}$ | (e) $\mathrm{V}^{\text {CCCHC }} \mathrm{C}_{0} \mid \mathrm{V}$ (f) $\overline{\mathrm{V}} \mathrm{C}_{0} \# \mathrm{C}_{0} \mid \mathrm{V}$ |
| :---: | :---: | :---: | :---: | :---: |
| L $\pi$ | H $\pi$ | H $\pi$ | L $\pi$ | H $\pi$ |
| L | L | L | L | H |

- Restricted finals (V(C)\#): their weight can increase, L to L, L/L to H
- Unrestricted finals $\left(\breve{\mathrm{V} C C C} \mathrm{C}_{0} \#, \overline{\mathrm{~V}} \mathrm{C}_{0} \#\right)$ are already H, their weight can't increase

Interval-based hypotheses about these $\breve{\mathrm{V}}(\mathrm{C}) \#$ restrictions

| (a) $\check{\mathrm{V}} \# \mathrm{C} \mid \mathrm{V}$ | (b) $\overline{\mathrm{V}} \# \mathrm{CC} \mid \mathrm{V}$ | (c) $\mathrm{V} \mathrm{C} \# \mathrm{C} \mid \mathrm{V}$ | (d) $\check{\mathrm{V} C \mid \# V}$ | (e) $\mathrm{V}_{\mathrm{V}} \mathrm{CC} \# \mathrm{C}_{0} \mid \mathrm{V}$ | (f) $\overline{\mathrm{V}} \mathrm{C}_{0} \# \mathrm{C}_{0} \mid \mathrm{V}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{L} \pi$ | $\mathrm{H} \pi$ | $\mathrm{H} \pi$ | $\mathrm{L} \pi$ | $\mathrm{H} \pi$ |  |
| $\check{\mathrm{L}}$ | $\check{\mathrm{L}}$ | L | L | H |  |

- Restricted finals (V(C)\#): their weight can increase, L to L, L/L to H
- Unrestricted finals ( $\mathrm{VCCC}_{0} \#, \overline{\mathrm{~V}}_{0} \#$ ) are already H, their weight can't increase
- Restricted contexts (_\#C): those that can change weight of preceding intervals

Unrestricted context (_ \#|V), as in (d): those that can’t add anything to an interval, so they can't increase its weight category.

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## Syllable accounts don't draw the right distinction

| (a) $\breve{\mathrm{V}}$.\#CV | (b) $\mathrm{V} \# \mathrm{C} . \mathrm{CV}$ | (c) $\mathrm{V} \mathrm{C} . \# \mathrm{CV}$ | (d) V̆.C\#V | (e) $\mathrm{V}^{\text {CCH }} \mathrm{C}_{0} \mathrm{~V}$ | (f) $\overline{\mathrm{V}} \mathrm{C}_{0} \# \mathrm{C}_{0} \mathrm{~V}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| L $\pi$ | H $\pi$ | H $\pi$ | L $\pi$ | $\mathrm{H} \pi$ |  |
| L | L | H | H |  |  |

Sequences (a) and (c) preserve isolation $\sigma$-weight category, but are avoided. (d) changes its $\sigma$-weight category, but is preferred to (a), which preserves $\sigma$-weight

Alignment of word to $\sigma$-boundaries? It doesn't distinguish avoided from preferred: violated in (b), (d) and instances of (e-f). Satisfied in (a), (c) and other cases of (e-f).

An interval-based constraint class:
Penalize any increase in the weight of an interval relative to the weight of its counterpart in the isolation form.

| (a) $\check{\mathrm{V}} \# \mathrm{C} \mid \mathrm{V}$ | (b) $\check{\mathrm{V}} \# \mathrm{CC} \mid \mathrm{V}$ | (c) $\mathrm{V} \mathrm{C} \# \mathrm{C} \mid \mathrm{V}$ | (d) $\mathrm{V} \mathrm{C} \mid \# \mathrm{~V}$ | (e) $\mathrm{V}_{\text {CCC\# }} \mathrm{C}_{0} \mid \mathrm{V}$ | (f) $\overline{\mathrm{V}} \mathrm{C}_{0} \# \mathrm{C}_{0} \mid \mathrm{V}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| L $\pi$ | $\mathrm{H} \pi$ | $\mathrm{H} \pi$ | L $\pi$ | H $\pi$ |  |
| L̆ | L̆ | L | L | H |  |

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5. The evidence, part 1: V̌CV strings across a boundary
$\breve{\mathrm{V}} \mathrm{C} \# \mathrm{~V}$ (e.g. dīrigit et) vs. V$\# C V$ (e.g. dirige sed) HLL HLL

Changes of weight predicted by each theory

| syllables |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | in context | －${ }^{\text {V }}$ | － HCV | HCCV |
|  | v＊ | $\mathrm{vi*} \mathrm{v}$ | vicc | L $\rightarrow$ H：vicicy |
|  | ${ }_{\text {H }} \mathrm{vc}$ \＃ | $\mathrm{H} \rightarrow \mathrm{L}$ ：V．C．tiv | vc．fev | vc．fecr |
| 年 | $\mathrm{H}^{\text {vcce }}$ | vc．ify | vcc．fev | vccijecv |
|  | H V\＃ | viviv | vick | vifc．cy |
|  | vCH | v．cev | vc．fev | vc．fecr |

dī．ri．gi．t \＃et H L L

Basic H $\rightarrow$ L

Soubiran＇s Law（Soubiran 1955
－Words placed at the end of a dactyl tend to end in V̆C\＃

|  | Foot n | Foot $\mathrm{n}+1$ |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | －－し | ．．． |  |  |
| a． | ．．．V̆C\＃ | V ．．． | dīrigit et preferred， | esp．when \＃coincides |
| b． | ．．．V̆\＃ | CV．．． | dīrige sed dispreferred | with a punctuation |

In Greek，this law holds strongly for Theocritos，Callimachos；mildly for Homer In Latin，it begins to hold with Vergil，to a significant extent．

Soubiran＇s Law confirms the predictions of the interval analysis．

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Soubiran＇s Law（Soubiran 1955）
－Words placed at the end of any dactylic foot tend to end in V̌C

|  | Foot n | Foot $\mathrm{n}+1$ |  |
| :---: | :---: | :---: | :---: |
|  | －〕－ | $\ldots$ |  |
| a． | ．．．V̆C\＃ | V ．．． | Preferred，esp．at major phrasal break |
| b． | ．．．V̆\＃ | CV．．． | Dispreferred，esp．at major break |
| c． | ．． $\mathrm{V}^{\text {CCO}}{ }_{0} \#$ | CV ．．． | unmetrical H at end of dactyl |
| d． | $\ldots \overline{\mathrm{V}} \mathrm{C}_{0} \#$ | （C）V ．．． | at end of dact |

## Vergilian examples

－Common between dactyl and next foot：V̌C\＃V
1．Constitit，et lacrimans，＂Quis jam locus＂＿inquit＂Achātes＂（Aen．1．459）
$\left[\begin{array}{ll}\mathrm{H} & \mathrm{L}\end{array}\right]_{4}$
$\left[\begin{array}{lll}\mathrm{H} & \mathrm{L} & \mathrm{L}\end{array}\right]_{4}\left[\begin{array}{lll}\mathrm{H} & \mathrm{L} & \mathrm{L}\end{array}\right]_{5}[\mathrm{H} \pi]_{6}$

Less common，in same context：V̌\＃CV
2．Perge mod̛ et，quā tē dūcit via，dīrige gressum．（Aen．1，401）

$$
[\mathrm{H} \mathrm{~L} \mathrm{~L}]_{4}[\mathrm{HL} \mathrm{~L}]_{5}[\mathrm{H} \pi]_{6}
$$

1．Transl．He paused and，tearing $\psi$ ，ssid：＂Achates，what place now＂
2．Transl．Only press on and divect vour step where the route eeads youl．

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Soubiran's Law in Vergil's Aeneid
Counts from Soubiran 1955, songs IV-VI (2476 lines)

|  | Foot 4 | Foot 5 | Major phrasal break | Word boundary |
| :---: | :---: | :--- | :--- | :---: |
|  | - | $\ldots$ | 113 | 119 |
| a. | $\ldots \mathrm{V} \mathrm{C} \#$ | $\mathrm{~V} \ldots$ |  |  |
| b. | $\ldots \mathrm{V} \#$ | CV $\ldots$ | 31 | 141 |

Rate of $\mathrm{V} \mathrm{C} \# \mathrm{~V}$ at end of all dactyls
78\%
$46 \%$ in ft 4 , where Soubiran looked

Counts in Aeneid song 1 (751 lines)

|  Foot 4 Foot 5 Punctuation break |
| :--- |

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## Aeneid 1 lines with C\#,V punctuation after foot 4

## Some Aeneid 1 lines with C\#V between ft 4 and 5

| um cleaustra frem*unt; cels $\bullet$ a sedete Aeolus $\bullet$ arce | C\#V |  |
| :---: | :---: | :---: |
| impulit in latus ac ventio, velut agmine foacto, | C\#V |  |
| Intonu $\bullet$ ere pol- $\bullet$, et crebro is micat ignibus a aether, | C\#V |  |
| saevus ub $\bullet$ Aeacidoe tel $\bullet 0$ jacet Hoector_ub -ingens $^{\text {a }}$ | C\#V | Last word in foot 4 highlighted |
| terram intoer fluctous apervit; furito aestus har ©enis, | C\#V | - = foot boundary at interval boundary |
| torquet agoens circoum, et rapidous vorato aequore _vo | C\#V |  |
| Disjectoam Aene ae, totoo videto aequore_cloassem, | C\#V | <h> marks a voiceless V |
| detrud 0 unt naveis scopul $\bullet$; levato ipse.trid $\bullet$ enti; | C\#V |  |
| iamque facees et seaxa vol eant-furore arma_mino istrat; $^{\text {a }}$ | C\#V |  |
| efficitoobjectou later $\bullet$ um, quibus 0 omnis ab alto | C\#V |  |
| desupere horrentoique atroum nemus $\bullet$ imminetoumbra, | C\#V |  |
| ulla teneent, unco non ealligate ancoram*orsu, | C\#V |  |
|  | C\#V |  |
| "O sociei-neque en*im ignaroi sumuse antemal•orum | C\#V |  |
|  | C\#V |  |
| Et iam foinis ereat, cum Iouppiter* aetheresoummo | C\#V | 39 |

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|  | foot 4 end foot 4 punctuation |  |  |
| :---: | :---: | :---: | :---: |
| quale manous addount eboroi decus,0 autubifleavo | D | C\#V | comma |
| Est in seceessou long*o locus:* insulap 0 ortum | D | c\#v | colon |
| mortalois, nee voox homin $\bullet$ em sonat: $\mathrm{O}_{-}$deaccerte= | D | C\#V | colon |
| sic cunctous pelagoi cecidotit fragore, aequorapoostquam | D | C\#V | comma |
| prospecoum latee pelagoo peitit, ©Anteassoi.quem | D | C\#V | comma |
| Teucroroum, et gentoi nomoen dedito, armaque fo foxit | D | C\#V | comma |
| omnibus exhaustoos jam ceasibus, omniumege enos, | D | c\#v | comma |
| haretete interdoum gremioo fovet, 0 inscial. Doido, | D | C\#V | comma |
| Adsit toeetitioae Bacchous datore, ettbona Jounos | D | c\#v | comma |
| Quos inter medious venoit furoro. Ile.Sychoaeum | D | C\#V | period |
|  | D | c\#v | quote |
| hinc atque boinc glomere antur oreades; , illaphareetram | D | C\#V | semicolon |
| insidoat quantous misereae deuss; atmemore ille | D | c\#v | semicolon |
| Perge mod $\theta$ e, et, qua tee duc oit via, doinige grgeessum." | D | VHC | comma |
| et vereaincessou patuoit dea.॰ Ile:ubimoatrem | D | V\# | period |

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Extension: all dactyls followed by any punctuation mark

|  | $\mathrm{C} \# \mathrm{~V}$ | $\mathrm{~V} \# \mathrm{C}$ | $\mathrm{V} \# \mathrm{~V}$ | totals |
| :---: | :---: | :---: | :---: | :---: |
| ?! marks | 3 | 0 | 2 | 5 |
| semi-colon | 12 | 1 | 1 | 14 |
| colon | 6 | 1 | 0 | 7 |
| period | 1 | 1 | 0 | 2 |
| comma ft 1 | 22 | 8 | 8 | 38 |
| comma ft 4 | 14 | 1 | 0 | 15 |
| comma ft 5 | 1 | 1 | 0 | 2 |
| \% from total | $71 \%$ | $16 \%$ | $13 \%$ | (Aen. Song 1) |

V̆C\#V preferred to $\breve{\mathrm{V}} \# \mathrm{CV}$ at all post-dactyl punctuation breaks. Also: there is no context where $\breve{V} \# C V$ is preferred to $\breve{V} C \# V$

Aeneid l's lines with semicolon after a dactyl, in any foot

|  |  | cture | punctuation |  |
| :---: | :---: | :---: | :---: | :---: |
| dat latus; insequitour cumuloo praerouptus aqaune.mons. | 1 | C\#V | semicolon |  |
| Sic Venuso ; et Venereis contrea sic foilius _orsus: | 1 | c\#v | semicolon |  |
| occulits, ipse unoo graditour comitatus Achoate, | 1 | C\#V | semicolon |  |
| dispulit houc paucoi vestrois adnoevimus -oris. | 1 | c\#v | semicolon |  |
| non metus\%; officoo nec toe certoasse prioorem | 1 | C\#V | semicolon | Most feet, especially foot 1 , allow post-dactyl breaks. Soubiran's Law holds here: 12/15 with VC\#V juncture, 1 with C\#V juncture; <br> 2 with V\#V: coalescence. |
| vocibus; et vereor, quo see Iunoonia veerant | 1 | C\#V | semicolon |  |
| Iora tenoens tamen; houic cervoixque comeacque trabountur | 2 | C\#V | semicolon |  |
| ex numeroo subito; ac magnoo tellouris am.ore | 2 | c\#v | semicolon |  |
| volviture in caputo; ast illoam ter flenctus.j.bidem | 2 | C\#V | semicolon |  |
| hic currous fuit, hoocr regroum dea genentibusesse. | 2 | C\#V | semicolon |  |
| hinc atquetwoinc glomerematur oreeades, oilla.phro | 4 | c\#v | semicolon |  |
| insidoat quantos miseroex deuso; atmemore: ille | 5 | C\#V | semicolon |  |
| atria; doepend entt y ychnoi laquearibusaureis | 1 | V\#c | semicolon |  |
| hospitioy hoand tantoo cess abit cordinersecrum. | 1 | V\#V | semicolon |  |
| corda voloente dees; in primotis reg oina quieetum | 2 | v\#v | semicolon |  |
| Significance: Soubiran's Law is not about foot 4, but about any post-dactyl breaks. |  |  |  |  |

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## An interval interpretation of Soubiran's law

Weight Correspondence: Isolation-to-Metrical Line, foot-final (WeightCorr I-M, ] $\Phi$ )

If an interval is final in a phonological phrase (e.g. before punctuation) and final in a foot (e.g. at the end of a dactyl),
then its isolation weight is identical to its line-medial weight.

## Structures permitted by Weight Corr


Permitted by Weightciorr:
locus is LL in isolation
also LL before this end of colon/phrase
End of foot (\& meter, colon) End of phrase
End of interval

- Sic Venus|; et Veneris contra sic filius orsus (Aen 1,325)
$\left[\begin{array}{ll}\mathrm{H} & \mathrm{L} \\ \mathrm{L}\end{array}\right]_{1} \quad\left[\begin{array}{ll}\mathrm{H} & \mathrm{L} \\ \mathrm{L}\end{array}\right]_{2} \ldots \quad$ (transl: Thus spoke Venus, and her son replied thus)
Venus is LL in isolation
also LL before this end of foot/phrase


## Structures penalized by Weight Corr

- Perge modo et, qua te dūcit viă, d Jīrige gressum (Aen.1. 387


End of word/phrase End of interval and foot

- viă ends in $\check{L}$ in isolation, but becomes $L$ when placed before dīrige
- dīrigě ends in L in isolation, but becomes L when placed before gressum.


## Significance of Weight Corr

Preference for VC\#V vs. V\#CV is predicted by interval representations plus the general preference to preserve any properties of the basic form, including weight.

Interval weight is preserved

Lexical/text frequencies of \#C-initial and \#V-initial words vs. \#V-initial words after a word-final dactyl

- Prose text frequencies estimated from Caesar's De Bello Gallico
- Lexical frequencies estimated from Perseus.tufts.edu counts

|  | V-initial | C-initial | total | \% V-initial |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Prose text freq | 2620 | 5191 | 7811 | $\mathbf{3 4 \%}$ |
| Dictionary freq | 14,386 | 37,726 | 52,112 | $\mathbf{2 8 \%}$ |
| After 4th foot dactyl | (Soubiran's Vergil IV-VI data) | $\mathbf{7 8 \%}$ |  |  |
| After any dactyl + punctuation | (my Vergil I counts) | $\mathbf{8 2 \%}$ |  |  |

Over-represented \#V-initials after dactyls can't be attributed to the frequency of Vinitial words in Latin; in either dictionary, or non-poetic speech. Rather, Vergil is using \#V-initials to satisfy a text-to-meter constraint, Weight-Corr.

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## Predicting aspects of Weight Corr

- Why is the preference limited to end-of-dactyl positions?
- It isn't. Weight Corr applies generally, but spondees end in a Heavy $\pi$ so the junctures it prefers at end of spondees will be different.
When $\check{V}$ occurs in a spondee-final H interval, Weight Corr predicts restrictions on VC\#C|V and V\#CC|V. Confirmed (Appendix 2).

Compare interval and syllable accounts
of metrical restrictions on $\mathrm{VCC}_{0} \mathrm{~V}$ across boundaries

| (a) $\check{\mathrm{V}} \# \mathrm{CV}$ | (b) $\mathrm{V} \# \mathrm{CCV}$ | (c) $\mathrm{V} \mathrm{C} \# \mathrm{CV}$ | (d) $\check{\mathrm{V}} \mathrm{C} \# \mathrm{~V}$ | (e) $\mathrm{V} \mathrm{CC} \# \mathrm{C}_{0} \mathrm{~V}$ | (f) $\overline{\mathrm{V}} \mathrm{C}_{0} \# \mathrm{C}_{0} \mathrm{~V}$ |
| :--- | :--- | :--- | :--- | :--- | :--- |

Sequences (a-c) are restricted in the meter. (d-f) are unrestricted
Interval analysis: restricted sequences are intervals that change their weight Key to analysis: intervals includes entire C interlude, up to next V , So, VC|V

## Cross-linguistic weight patterns in $\breve{\mathrm{V}} \mathrm{C} \# \mathrm{~V}$

- $\mathrm{V} \mathrm{C} \# \mathrm{~V}$ is consistently parsed as Light $\pi$
- in all periods and styles of A. Greek/Latin meter,
- in Sanskrit (Arnold 1905)
- Berber (Dell and Elmedlaoui 2008)
- in Hungarian, Lithuanian quantitative hexameters
- no documented exception to this
- Intervals predict this: the only parse of $\breve{\mathrm{V} C}(\#) \mathrm{V}$ is $\breve{\mathrm{V} C}|\mathrm{~V},|\mathrm{VC}|=$ Light
- Syllables don't: if FAITH $\gg$ OnSET/*CODA, VC\#V parsed as VC.V But a $\mathrm{C}_{0} \mathrm{VC}$ unit is a Heavy, in a syllabic analysis.


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## Varieties of Weightcorr

1. Generalized to all foot positions: foot-medial and foot-final
2. Generalized to all phrasal positions: phrase-medial and phrase-final
3. Generalized to all types of inputs: isolation forms or underlying forms
4. Limited to extreme mismatches of weight (L $\leftrightarrow \mathrm{L}$ only)

All WeightCorr types have in common the preservation of an interval's weight category from some input type to an output form in a metrical text.
Vergil presents evidence for all 4 varieties.

Generalizations on Vergil + post Vergilian poetry: weight-by-position Hs can't get their weight from across \#

|  |  | Word 1 | Word 2 | in Latin |
| :---: | :---: | :---: | :---: | :---: |
| longum $[-\ldots]_{\phi}$ | 1. | ...V̆\# | CCV... | impossible in Vergil (Hoenigswald 1949) |
| (foot medial) | 2. | ...V̆C\# | C(C)V... | possible but restricted in Vergil |
| biceps $[\ldots-]_{\phi}$ | 3. | ...V̆\# | CCV... | impossible in Vergil (Hoenigswald 1949) |
| (foot final) | 4. | ...V̆C\# | C(C)V... | highly restricted in Vergil |

All 4 observations also correspond to Hilberg's (1879) laws on restricted weight-by-position Hs in A.Greek meter, dactylic or not.

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Factors in these laws: an interval analysis

| $\begin{aligned} & \text { longum }[-\ldots]_{\phi} \\ & \text { (foot medial) } \end{aligned}$ | Word 1 |  | Word 2 | Latin |
| :---: | :---: | :---: | :---: | :---: |
|  | 1. | . V̆\# | CCV... | impossible in Vergil (Hoenigswald 1949) |
|  | 2. | .V̆C\# | C(C) V... | possible but restricted in Vergil |
| biceps $[\ldots-]_{\phi}$ | 3. | V\# | CCV. | impossible in Vergil (Hoenigswald 1949 |
| (foot final) | 4. | ...V̆C\# | $\mathrm{C}(\mathrm{C}) \mathrm{V} \ldots$ | highly restricted in Vergil |

i. weight increase in an interval, relative to isolation form, is penalized (cf. 1-4)
ii. especially at the end of metrical constituents (cf. 2 vs .4 ); cf. WEIGHTCORR
iii. extreme weight increase $(\breve{\mathrm{L}} \rightarrow \mathrm{H})$ more strongly penalized than others $(\mathrm{L} \rightarrow \mathrm{H})$ (cf. (1,3), $\breve{V} \# \mathrm{CC}$, absolutely banned in more contexts than $\check{\mathrm{V} C \# C(C))}$

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Word classes exempt (Hilberg's 1879 'free words')

|  | Class | Why is this class exempt? |
| :--- | :--- | :--- |
| 1. | proper names, esp. place names | no substitute for the word |
| 2. | all articles, some pronominal | no isolation form, no surface |
| adverbials, all prepositions |  |  |
| conjunctions, complementizers* |  |  |$\quad$| reference term to compare the |
| :--- |
| increased weight to |

*Common examples like et terrīs, begin with class 2 'free words'.

The interval interpretation of $\mathrm{V} \mathrm{C} \# \mathrm{CV}, \mathrm{V} \# \mathrm{CCV}$ restrictions

1. WeightCorr

If an interval is foot-final, its isolation weight category is identical
to its line-medial weight category
A * mark for each such weight mismatch, Ľ $\leftrightarrow \mathrm{L}, * \mathrm{~L} \leftrightarrow \mathrm{H}, * \mathrm{~L} \leftrightarrow \mathrm{H}$.
2. X-WeightCorr

No interval differs in weight from its isolation form by more than one step on the weight scale L-L-H
A * mark for each extreme weight mismatch, $*$ Ľ $\leftrightarrow \mathrm{H}$

## Evidence in the Aeneid 1 on $\breve{\mathrm{V}} \mathrm{C}(\#) \mathrm{CV}$

- Song 1 scanned into feet \& intervals, to check avoidance of V̆C\#CV
- All lines annotated for 6 varieties of heavies-by-position (V̆CC)

|  | Foot-medial (spondee or dactyl) |  | Foot-final (spondee-final) |  |
| :--- | :--- | :--- | :--- | :--- |
| Word-final <br> V̆C\#CV | Free word | Un-free word | Free word | Un-free word |
|  | 234 | 503 | 161 | 36 |
| Word-medial <br> V̆GCV | 1673 | 723 |  |  |

Free word = lacks an isolation form, so it's freer to break WeightCorr, under the OO-WeightCorr interpretation: the word lacks an isolation form

## Interpretation

- H-by-position less common across \# (VC\#C |V) than word medial VCC|V - VC\#C|V $=30 \%$ of all foot medial VCC Hs (N=2410
- VC\#C|V = 21\% of all foot final VCC Hs (N=910)

Why? No form of Weight Corr is violated by word medial H's VCC.
While generalized Weight Corr is violated by final VC\#CV

- VC\#CV is less common in foot-final than in foot-medial position
- foot-final VC\#C $=21 \%$ of all instances of V C\#CV (N=938)

Why? Weight Corr] $]_{\text {Ft }}$ is violated, in addition to general Weight Corr

- cf. Soubiran's Law

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## Interpretation

- $\mathbf{V} \mathbf{C} \# \mathbf{C} \mid \mathbf{V}$ H's are far less common with 'unfree words' than with free words foot-finally (the most restricted metrical position) than foot-medially.

|  | Foot-medial (spondee or dactyl) |  | Foot-final (spondee-final) |  |
| :--- | :--- | :--- | :--- | :--- |
| Word-final <br> V̆C\#_CV | Free word | Un-free word | Free word | Un-free word |
|  | 234 | 503 | 161 | 36 |

Chi ${ }^{2}$ p-value $<.00001$
Why? (i) There are far more unfree words than free; the foot-medial ratio reflects the natural difference in text frequency between free/unfree words
(ii )The foot-final 161/36 ratio reflects the joint effect of WEIGHT CORR] fft + fact that free words can't violate Weight Corr relative to isolation form.

Appendix 2:
Cluster compression effects

## Cluster compression and *V̌\#CC: Latin

- Latin bans $\breve{\mathrm{V}} \# \mathrm{CCV}$ in all positions, iff $\mathrm{CC}=$ s-stop (Hoenigswald 1949)
- It allows $\breve{V} \# C C V$ in Lights (biceps of dactyls), iff CC $=$ stop-liquid
- Word-internal VCCV is always parsed $\mathrm{H} \pi$ if $\mathrm{CC}=$ s-stop and other CCs
- Word-internal V̆CCV is variably parsed $\mathrm{H} \pi \sim \mathrm{L} \pi$ if $\mathrm{CC}=$ stop liquid
- No variation for initial V$\# C C V$, if $\mathrm{CC}=$ stop-liquid, and no avoidance
- Suggestions for analysis (cf. Italian cluster duration data in McCrary 2005): (i) stop-liquid clusters can be long (CC) or compressed, dur. equivalent to one C. (ii) s-stop clusters are incompressible.
(iii) To avoid *Weight Change (*L̆ $\rightarrow \mathrm{H}$ ) violations, compressible clusters are compressed in $\check{\mathrm{V}} \# \mathrm{CGV}$. Incompressible clusters are beyond repair. The only way to satisfy * $\breve{\mathrm{L}} \rightarrow \mathrm{H}$ is to avoid $\breve{\mathrm{V}} \# \mathrm{sTV}$.


## eference

Dell, F. and M. Elmedlaoui 2008 Poetic Meter and Musical Form in Tashhhít Berber Songs, Köpper Verlag, Köln. Farnetani, Edda and S. Kori 1986 in Spech Communication, 5, 17-34
Garća-Duarte, Guilhermo 2016 in WCCFL
Gordon, Matt 2002 in Language 78, 51-80
Hartel, Wihhelm 1873 Homerische Studien, Berlin
Hayes, Bruce 1985 in Edebivat 4:pp. $193-242$.
Hayes, Bruce, Colin Wilson, Anne Shisko 2012 in Language, 691-731
filberg, Isidor 1879 Princip der Silbenuägung und die daraus entspringenden Gesetzze der Endsilben in der griechischen Poesie, Wien Hirsch, Aron 2014 in Proceedings of AMP, 2013

( Reassessing the Role of the Syllable in Italian Phonology, Routledge (UCLA diss.
O'Neill, Eugene 1942, in Yale Classical Studies, 8 pp 103-178
yan, Kevin 2011 in Pherg 28 (2011) 413-454
Ryan, Kevin 2018 Prosodic weight, OUP

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Cluster compression and $* \breve{\mathrm{~V}} \# \mathrm{CC}$ : Greek (Steriade 2009)

- Homer parses most V\#CCV sequences as $\mathrm{H} \pi$
- Whether CC = stop-sonorant, or s-stop, or others.
- He parses word-internal VCCCV nearly always as $\mathrm{H} \pi$, for all clusters
- Post-Homer: a gradual increase in the frequency of $\breve{\mathrm{V}} \# \mathrm{CCV}$ parsed $L \pi$, just for voiceless stop-sonorant CCs.
- Corresponding medial V̆CCV clusters lag behind in using the L $\pi$ parse.
- Suggestions for analysis:
(i) All clusters are generally uncompressed in Homer,
(ii) Post-Homer, a marginal option of CC-compression, for some CCs, enters Greek. It is used to provide $L \pi$ parses for $\breve{V} \# C C V$, to avoid violations of $*$ Weight Change ( ${ }^{\mathrm{L}} \rightarrow \mathrm{H}$ ).

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## Reference

Steriade, D. 1999 Alternatives to syllable-based accounts of consonantal phonotactics. Proceedings of LP 98 (1999 Steriade 2009 Light and heavy clusters: weight and total durationotal duration, talk at Clusters \& Complexity Workshop, IPS, Munich Weigh
Steriade 2019 CiV-Lenothening and the Weight of CV in Bowler et al. (eds.) Schuhschrift, UCLA, pp161-178 Siffer, Thea 1928 in Philologus, 79 , pp. 323-354
Soubiran 1966 in Pa
Sturtevant, Edgar 1922 in Transactions and Proceedings of the American Philological Association, vol. 53 , pp. 35-51
Uhli, 1883 Grammatic Guri Uhlig, 1883 Grammatici Gracei, Pars Prima Dionysii Thracis Ars Grammatica, Leipzig: Taeubne Wernicke, Friedrich 1819 The capture of Troy by Typhiodoros, Leipzig.

