**Ternarity in Finnish Word Stress**

## 1. Introduction

(1) The stress rule (first approximation, Carlson 1978, Elenbaas and Kager 1999):
- (a) Primary stress falls on the initial syllable.
- (b) Secondary stress falls on every other syllable after that
- (c) except that a light syllable is skipped if the syllable after that is heavy
- (d) unless the heavy syllable is final in which case skipping is optional.

(2)

| | | |
|---|---|---|
| (a) | ká.las.tè.let | 'you are fishing' |
| (b) | ká.las.tè.le.mì.nen | 'fishing' |
| (c) | íl.moit.tàu.tu.mì.nen | 'registering' |
| (d) | ú.jos.tè.le.màt.to.mùu.des.tàn.sa | 'from his lack of shyness' |

(3)

| | | |
|---|---|---|
| (a) | ká.las.te.lèm.me | 'we are fishing' |
| (b) | íl.moit.tàu.tu.mi.sès.ta | 'from registering' |
| (c) | vói.mis.te.lùt.te.le.màs.ta | 'from causing to do gymnastics' |
| (d) | rá.vin.tò.lat ~ rá.vin.to.làt | 'restaurants' |

(4) Problem 1: The skipping clause leaks both ways.

| | | |
|---|---|---|
| (a) | fí.lo.sò.fìs.sa | 'philosopher-INE' |
| (b) | á.te.ri.à.na | 'meal-ESS' |

(5) Problem 2: Skipping shows variation, with gradient judgments.

| | | | |
|---|---|---|---|
| (a) | ál.ler.gi.às.sa | ?ál.ler.gì.as.sa | 'allergy-INE' |
| (b) | pró.fes.so.rìs.sa | pró.fes.sò.ris.sa | 'professor-INE' |
| (c) | ?fí.lo.so.fìs.sa | fí.lo.sò.fìs.sa | 'philosopher-INE' |

## 2. A segmental diagnostic

(6) Stop Deletion (first approximation): A singleton stop is deleted between short unstressed vowels (Keyser and Kiparsky 1984, Kiparsky 2003: 132).

(7) Example: The partitive /-tA/ freely combines with noun stems of any length:

| | | | |
|---|---|---|---|
| (a) | /maa-i-ta/ | mái.ta | 'country-PL-PAR' |
| (b) | /talo-i-ta/ | tá.lo.ja | 'house-PL-PAR' |
| (c) | /professori-i-ta/ | pró.fes.sò.re.ja ~ pró.fes.so.rèi.ta | 'professor-PL-PAR' |

(8) Stop Deletion is variable in (7c) because of optional skipping in (5b).

(9) Stop Deletion (second approximation): No extrametrical singleton stops.

| | | | |
|---|---|---|---|
| (a) | /maa-i-ta/ | (mái.ta) | 'country-PL-PAR' |
| (b) | /talo-i-ta/ | (tá.lo)ja | 'house-PL-PAR' |
| (c) | /professori-i-ta/ | (pró.fes)(sò.re)ja ~ (pró.fes.so)(rèi.ta) | 'professor-PL-PAR' |

(10) Stop Deletion also applies in verbs, as in the first infinitive:

| | | | |
|---|---|---|---|
| (a) | /juo-taC/ | (júo.da) | 'drink-INF' |
| (b) | /puno-taC/ | (pú.no)a | 'weave-INF' |
| (c) | /vakioi-taC/ | (vá.ki)(òi.da) | 'keep.constant-INF' |
| (d) | /formalisoi-taC/ | (fór.ma.li)(sòi.da) | 'formalize-INF' |

(11) In the past participle, the singleton stop geminates in the same environment:

| | | | |
|---|---|---|---|
| (a) | /juo-tu/ | (júo.tu) | 'drink-PAST.PCP' |
| (b) | /puno-tu/ | (pú.not)tu | 'weave-PAST.PCP' |
| (c) | /vakioi-tu/ | (vá.ki)(òi.tu) | 'keep.constant-PAST.PCP' |
| (d) | /formalisoi-tu/ | (fór.ma.li)(sòi.tu) | 'formalize-PAST.PCP' |

(12) What explains the variation and preferences in skipping?

(a) Vowel Sonority: /a, ä, o, ö/ are preferably stressed /i, e, u, y/ are preferably not, e.g., (*ál.ler.gi*)(*òi.ta*) is better than (*ál.ler*)(*gì.o*)*ja* 'allergy-PL-PAR'

(b) Prominence Clash: Stress avoids falling next to a heavy syllable, e.g., (*pró.fes.so*)(*rèi.ta*) is better than (*pró.fes*)(*sò.re*)*ja* 'professor-PL-PAR'

## 3. Corpus method

(13) (a) Extract V-final noun stems from a dictionary (Tuomi 1972, about 23,000 stems), and annotate for number of syllables, syllable weights, and vowel qualities.

(b) Generate all hypothetically possible partitive plural forms. After exclusions (e.g., all forms with *ä* and *ö*) 29,526 forms remain.

(c) Find matching forms on Finnish web sites and count the sites (April 12, 2005). I used QueryGoogle (for precedents, see Zuraw 2000, Hayes and Londe 2006).

(d) Result: 7,632 forms scored actual hits, about 9 million hits in all.

## 4. Categorical patterns

### 4.1 The constraints

(14) Feet are minimally disyllabic and maximally trisyllabic.

| | | | | |
|---|---|---|---|---|
| (15) | (a) | TROCHEE | Feet are left-headed. | (undominated) |
| | (b) | PARSE-STEM | Stems are exhaustively footed. | (undominated) |
| | (c) | *UNARY | No monosyllabic feet. | (undominated) |
| | (d) | MAXφ | No deletion within a foot. | (undominated) |
| | (e) | MAX | No deletion. | |
| | (f) | *T | No stops (**p, *t, *k*). | |

(16) The blocking of Stop Deletion: the monosyllabic stem /maa/ 'country'

| /maa-i-ta/ | TROCHEE | PARSE-STEM | *UNARY | MAXφ | MAX | *T |
|---|---|---|---|---|---|---|
| a. ☞ (mái.ta) | | | | | | 1 |
| b. (máa.ja) | | | | 1! | 1 | |
| c. (mái)ta | | | 1! | | | 1 |
| d. mai.ta | | 1! | | | | 1 |
| e. (mai.tá) | 1! | | | | | 1 |

(17) Weight-to-Stress Principle (WSP): Heavy syllables are stressed (undominated). (Prince 1990, Kiparsky 2003, Karvonen 2005)

(18) Effect 1: Invariant Stop Deletion in disyllabic stems. Example: /talo/ 'house'

| /talo-i-ta/ | WSP | MAX | *T |
|---|---|---|---|
| a. ☞ (tá.lo)ja | | 1 | |
| b. (tá.loi)ta | 1! | | 1 |
| c. (tá.loi.ta) | 1! | | 1 |

(19) Effect 2: Ternary stress in longer stems. Example: /adrenaliini/ 'adrenalin'

| /adrenaliini-i-ta/ | WSP | MAX | *T |
|---|---|---|---|
| a. ☞ (ád.re.na)(lìi.ne)ja | | 1 | |
| b. (ád.re)(nà.lii.ne)ja | 1! | 1 | |
| c. (ád.re)(nà.lii)(nèi.ta) | 1! | | 1 |
| d. (ád.re.na)(lìi.nei.ta) | 1! | | 1 |
| e. (ád.re.na)(lìi.nei)ta | 1! | | 1 |
| f. (ád.re)(nà.lii.nei)ta | 2! | | 1 |

(20) A minor complication: CVV attracts stress from CVC (Karvonen 2005: 81-94):
(a) (kóor.di)(nàa.tis.to)ja 'coordinate grid-PL-PAR'
(b) (hó.ri.son)(tàa.le)ja 'horizontal-PL-PAR'

(21) WSP/VV: Heavy syllables with a long vowel are stressed. (undominated). Karvonen 2005: 90)

(22) Illustrating WSP/VV

| /koordinaatisto-i-ta/ | WSP/VV | WSP | MAX | *T |
|---|---|---|---|---|
| a. ☞ (kóor.di)(nàa.tis)(tòi.ta) | | 1 | | 1 |
| b. ☞ (kóor.di)(nàa.tis.to)ja | | 1 | 1 | |
| c. (kóor.di.naa)(tìs.to)ja | 1! | 1 | 1 | |
| /horisontaali-i-ta/ | WSP/VV | WSP | MAX | *T |
| a. (hó.ri)(sòn.taa)(lèi.ta) | 1! | 1 | | 1 |
| b. (hó.ri)(sòn.taa.le)ja | 1! | 1 | 1 | |
| c. ☞ (hó.ri.son)(tàa.le)ja | | 1 | 1 | |

(23) Interim summary:
(a) No variation in Stop Deletion in monosyllabic and disyllabic stems because the foot structure is invariant.
(b) No variation in Stop Deletion in certain longer stems with heavy syllables because the foot structure is invariant.

(24) By hypothesis, all stem syllables except the first are metrically relevant. L = light, H = heavy, I = light [+high], A = light [+low] (ignoring the two types of heavies for now).

| | | | |
|---|---|---|---|
| (a) | 3-syllable stems | X.{L,H}.{I,A} | 4 types |
| (b) | 4-syllable stems | X.{L,H}.{I,A,H}.{I,A} | 12 types |
| (c) | 5-syllable stems | X.{L,H}.{I,A,H}.{I,A,H}.{I,A} | 36 types |

**4.2 Testing the predictions**

(25) Only candidates that satisfy TROCHEE, PARSE-STEM, *UNARY, and MAXφ are included.

(26) Three-syllable stems. All stems are predicted to be variable (4/4).

| HI | /poliisi-i-ta/ ‘police’ | WSP/VV | WSP |
|---|---|---|---|
| | a. ☞ (pó.lii)(sèi.ta) | 1 | 1 |
| | b. ☞ (pó.lii.se)ja | 1 | 1 |
| | c. (pó.lii.sei)ta | 2 | 2 |
| LI | /kameli-i-ta/ ‘camel’ | WSP/VV | WSP |
| | a. ☞ (ká.me)(lèi.ta) | | |
| | b. ☞ (ká.me.le)ja | | |
| | c. (ká.me.lei)ta | 1 | 1 |
| HA | /korjaamo-i-ta/ ‘repair shop’ | WSP/VV | WSP |
| | a. ☞ (kór.jaa)(mòi.ta) | 1 | 1 |
| | b. ☞ (kór.jaa.mo)ja | 1 | 1 |
| | c. (kór.jaa.moi)ta | 2 | 2 |
| LA | /kamera-i-ta/ ‘camera’ | WSP/VV | WSP |
| | a. ☞ (ká.me)(ròi.ta) | | |
| | b. ☞ (ká.me.ro)ja | | |
| | c. (ká.me.roi)ta | 1 | 1 |

(27) The dactylic variant, e.g. *(pó.lii.se)ja*, conflicts with generalization (1) which predicts the trochaic variant, e.g. (*pó.lii*)(*sè.ja*). This is because light syllable secondary stresses come in at the word level and thus do not bleed Stop Deletion (Kiparsky 2003: 125).

(28) Four syllable stems. No variation in stems with a heavy third syllable (4/12).

| HHA | /edustusto-i-ta/ ‘representation’ | WSP/VV | WSP |
|---|---|---|---|
| | a. (é.dus)(tùs.toi)ta | 1 | 2 |
| | b. (é.dus.tus)(tòi.ta) | | 2 |
| | c. (é.dus)(tùs.toi.ta) | 1 | 2 |
| | d. ☞ (é.dus)(tùs.to)ja | | 1 |
| HHI | /termostaatti-i-ta/ ‘thermostat’ | WSP/VV | WSP |
| | a. (tér.mos)(tàa.tei)ta | 1 | 2 |
| | b. (tér.mos.taa)(tèi.ta) | 1 | 2 |
| | c. (tér.mos)(tàa.tei.ta) | 1 | 2 |
| | d. ☞ (tér.mos)(tàat.te)ja | | 1 |
| LHA | /affrikaatta-i-ta/ ‘affricate’ | WSP/VV | WSP |
| | a. (áf.fri)(kàa.toi)ta | 1 | 1 |
| | b. (áf.fri.kaa)(tòi.ta) | 1 | 1 |
| | c. (áf.fri)(kàa.toi.ta) | 1 | 1 |
| | d. ☞ (áf.fri)(kàat.to)ja | | |
| LHI | /margariini-i-ta/ ‘margarine’ | WSP/VV | WSP |
| | a. (már.ga)(rìi.nei)ta | 1 | 1 |
| | b. (már.ga.rii)(nèi.ta) | 1 | 1 |
| | c. (már.ga)(rìi.nei.ta) | 1 | 1 |
| | d. ☞ (már.ga)(rìi.ne)ja | | |

(29) Four-syllable stems: predictions and observations

| | TYPE | PREDICTION | DELETION% | GHITS |
|---|---|---|---|---|
| (a) | HHA | (é.dus)(tùs.to)ja | 100.0 | 92,308 |
| (b) | HHI | (tér.mos)(tàat.te)ja | 100.0 | 80,063 |
| (c) | LHA | (áff.ri)(kàat.to)ja | 99.7 | 13,039 |
| (d) | LHI | (már.ga)(rìi.ne)ja | 100.0 | 392,942 |

(30) Five-syllable stems: No variation if the third syllable is lighter than the fourth (12/36).

| L.I.H.I | /auktoriteetti/ 'authority' | WSP/VV | WSP |
|---|---|---|---|
| | a. (áuk.to)(rì.tee)(tèi.ta) | 1 | 1 |
| | b. (áuk.to.ri)(tèe.tei.ta) | 1 | 1 |
| | c. (áuk.to.ri)(tèe.tei)ta | 1 | 1 |
| | d. (áuk.to)(rì.tee.tei)ta | 2 | 2 |
| | e. ☞ (áuk.to.ri)(tèet.te)ja | | |
| | f. (áuk.to)(rì.teet.te)ja | 1 | 1 |
| L.VC.VV.I | /horisontaali/ 'horizontal' | WSP/VV | WSP |
| | a. (hó.ri)(sòn.taa)(lèi.ta) | 1 | 1 |
| | b. (hó.ri.son)(tàa.lei.ta) | 1 | 2 |
| | c. (hó.ri.son)(tàa.lei)ta | 1 | 2 |
| | d. (hó.ri)(sòn.taa.lei)ta | 2 | 2 |
| | e. ☞ (hó.ri.son)(tàa.le)ja | | 1 |
| | f. (hó.ri)(sòn.taa.le)ja | 1 | 1 |

(31) Five-syllable stems: predictions and observations

| | TYPE | PREDICTION | DEL% | GHITS | |
|---|---|---|---|---|---|
| (a) | LIHI | (áuk.to.ri)(tèet.te)ja | 100.0 | 103,312 | 'authority-PL-PAR' |
| (b) | LIHA | (hý.po.te)(nùu.so)ja | 100.0 | 65 | 'hypotenuse-PL-PAR' |
| (c) | LAHI | (ád.re.na)(lìi.ne)ja | 100.0 | 9,225 | 'adrenalin-PL-PAR' |
| (d) | LAHA | (má.te.ma)(tìik.ko)ja | 92.2 | 167 | 'mathematics-PL-PAR' |
| (e) | HIHI | (ré.pub.li)(kàa.ne)ja | 100.0 | 1,884 | 'republican-PL-PAR' |
| (f) | HIHA | (é.van.ke)(lìs.to)ja | 100.0 | 290 | 'evangelist-PL-PAR' |
| (g) | HAHI | (kón.ser.va)(tìi.ve)ja | 100.0 | 969 | 'conservative-PL-PAR' |
| (h) | HAHA | (é.dus.ta)(jìs.to)ja | 100.0 | 14 | 'representation-PL-PAR' |
| (i) | LHHI | (hó.ri.son)(tàa.le)ja | 93.5 | 1,040 | 'horizontal-PL-PAR' |
| (j) | LHHA | (dí.a.lek)(tìik.ko)ja | 100.0 | 2 | 'dialectic-PL-PAR' |
| (k) | HHHI | (ós.kil.los)(kòop.pe)ja | 100.0 | 117 | 'oscilloscope-PL-PAR' |
| (l) | HHHA | -- | -- | -- | -- |

(32) Some counterexamples (top of the frequency list)

| | TYPE | GHITS | GLOSS |
|---|---|---|---|
| arkkitehtuureita | LHHI | 65 | 'architecture-PL-PAR' |
| semifinaaleita | LIHI | 14 | 'semifinal-PL-PAR' |
| automatiikoita | LAHA | 11 | 'automaticity-PL-PAR' |
| materiaaleita | LIHI | 4 | 'material-PL-PAR' |
| automobiileita | LAHI | 3 | 'automobile-PL-PAR' |

(33) Of the 328 predicted invariant initial dactyls, 38 seem to allow an initial trochee:

| | INITIAL DACTYL | | INITIAL TROCHEE | |
|---|---|---|---|---|
| (a) | (án.ti.bi)(òot.te)ja | 'antibiotic' | (án.ti)(sè.miit.te)ja | 'antisemite' |
| (b) | (má.ni.e)(rìs.me)ja | 'mannerism' | (má.ni)(kỳ.ris.te)ja | 'manicurist' |
| (c) | (mó.no.te)(ìs.te)ja | 'monotheist' | (mó.no)(fỳ.siit.te)ja | 'monophysite' |
| (d) | (má.te.ri)(àa.le)ja | 'material' | (sé.mi)(fì.naa.le)ja | 'semifinal' |

(34) Many of these are quasi-compounds, e.g. *arkki=tehtuuri* (cf. Ringen and Heinämäki 1999: 313, Kiparsky 2003, Karvonen 2005).

(35) Summary:
- (a) The metrical analysis seems essentially correct.
- (b) Many of the problem stems are plausibly reanalyzable as quasi-compounds.

## 5. Quantitative patterns

### 5.1 The extent of variation

(36) The internet data instantiate 6,150 stems 1,475 of which are variable.

| STEM | CATEGORICAL | | VARIABLE | | TOTAL |
|---|---|---|---|---|---|
| 3 syllables | 2,095 | (66.4%) | 1,058 | (33.6%) | 3,153 |
| 4 syllables | 1,808 | (83.6%) | 355 | (16.4%) | 2,163 |
| 5 syllables | 772 | (92.6%) | 62 | (7.4%) | 834 |

### 5.2 Vowel sonority and prominence clash

(37)
- (a) /a, ä, o, ö/ are preferably stressed, /i, e, u, y/ preferably unstressed.
- (b) Secondary stress avoids falling next to a heavy syllable.

(38) Vowel sonority and prominence clash at work

| | TYPE | BINARY | TERNARY | DEL% | GHITS | |
|---|---|---|---|---|---|---|
| (a) | LAI | (fí.lo)(sò.fe)ja | (fí.lo.so)(fèi.ta) | 90.7% | 23,595 | 'philosopher' |
| (b) | HAI | (pró.fes)(sò.re)ja | (pró.fes.so)(rèi.ta) | 84.9% | 34,612 | 'professor' |
| (c) | LIA | (gál.le)(rì.o)ja | (gál.le.ri)(òi.ta) | 1.0% | 91,598 | 'gallery' |
| (d) | HIA | (ál.ler)(gì.o)ja | (ál.ler.gi)(òi.ta) | 0.3% | 190,416 | 'allergy' |

### 5.3 Variation in three-syllable stems

(39) The predicted variants:
- (a) trochee + trochee, no Stop Deletion: (*pó.lii*)(*sèi.ta*)
- (b) dactyl, no Stop Deletion: (*pó.lii.se*)*ja*

(40)

| | TYPE | PREDICTIONS | DEL% | GHITS | |
|---|---|---|---|---|---|
| (a) | HI | (pó.lii)(sèi.ta) ~ (pó.lii.se)ja | 98.1% | 1,803,692 | 'police' |
| (b) | HA | (kór.jaa)(mòi.ta) ~ (kór.jaa.mo)ja | 96.1% | 2,203,235 | 'repair shop' |
| (c) | LI | (ká.me)(lèi.ta) ~ (ká.me.le)ja | 36.7% | 1,180,225 | 'camel' |
| (d) | LA | (ká.me)(ròi.ta) ~ (ká.me.ro)ja | 2.2% | 2,030,424 | 'camera' |

(41) The dominated constraints, all unranked (A = /a, ä, o, ö/, I = /e, i, u, y/)

| | | | |
|---|---|---|---|
| (a) | FTBIN | Feet are disyllabic. | |
| (b) | PEAKPROM | No unstressed light syllables. | |
| (c) | *ALIGN-L | All feet left. | |
| (d) | *(Í.A) | No trochees with sonority reversal. | (= *REV) |
| (e) | *(Í.I), *(Á.A) | No trochees with a flat sonority profile. | (= *FLAT) |
| (f) | *H.X | No stress next to a heavy syllable. | |

(42) Constraint violations for three-syllable stems. No rankings are intended.

| | | *X.H | *REV | *FLAT | FTBIN | ALIGN-L | PEAKPR |
|---|---|---|---|---|---|---|---|
| HI | a. ☞ (pó.lii)(sèi.ta) | 2 | 1 | 1 | | 2 | 1 |
| | b. ☞ (pó.lii.se)ja | 1 | | | 1 | | 1 |
| LI | a. ☞ (ká.me)(lèi.ta) | | 1 | 1 | | 2 | 1 |
| | b. ☞ (ká.me.le)ja | | | | 1 | | 1 |
| HA | a. ☞ (kór.jaa)(mòi.ta) | 2 | | 1 | | 2 | |
| | b. ☞ (kór.jaa.mo)ja | 1 | | | 1 | | |
| LA | a. ☞ (ká.me)(ròi.ta) | | | 1 | | 2 | 1 |
| | b. ☞ (ká.me.ro)ja | | | | 1 | | 1 |

(43) T-order for trisyllabic stems (precision = 1, recall = 0.417). The graph was computed from (42) using Djalali and Jeffers 2015, also Anttila and Andrus 2006.


**5.4 Variation in four-syllable stems**

(44) The predicted variants:

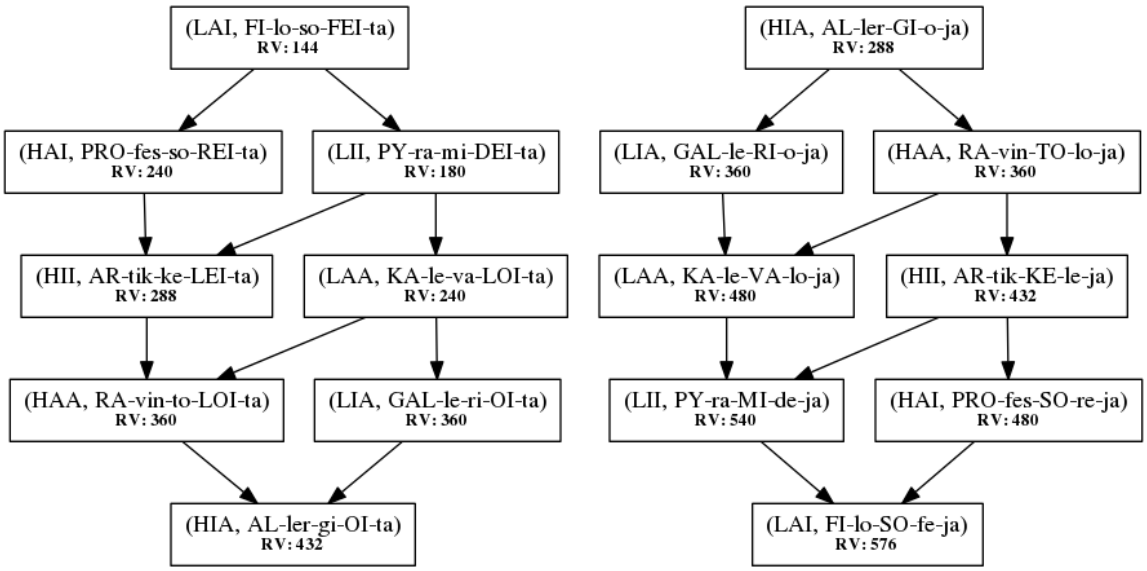
(a) trochee + trochee, Stop Deletion: (*pró.fes*)(*sò.re*)*ja*

(b) dactyl + trochee, no Stop Deletion: (*pró.fes.so*)(*rèi.ta*)

(45)

| TYPE | PREDICTIONS | DEL% | GHITS | |
|---|---|---|---|---|
| LAA | (ká.le)(và.lo)ja ~ (ká.le.va)(lòi.ta) | 96.7% | 30 | 'Kalevala' |
| LAI | (fí.lo)(sò.fe)ja ~ (fi.lo.so)(fèi.ta) | 90.7% | 23,595 | 'philosopher' |
| HAI | (pró.fes)(sò.re)ja ~ (pró.fes.so)(rèi.ta) | 84.9% | 34,612 | 'professor' |
| LII | (pý.ra)(mì.de)ja ~ (py.ra.mi)(dèi.ta) | 72.2% | 4,175 | 'pyramid' |
| HII | (ár.tik)(kè.le)ja ~ (ár.tik.ke)(lèi.ta) | 67.6% | 630,594 | 'article' |
| HAA | (rá.vin)(tò.lo)ja ~ (rá.vin.to)(lòi.ta) | 6.5% | 24,479 | 'restaurant' |
| LIA | (gál.le)(rì.o)ja ~ (gál.le.ri)(òi.ta) | 1.0% | 91,598 | 'gallery' |
| HIA | (ál.ler)(gì.o)ja ~ (ál.ler.gi)(òi.ta) | 0.3% | 190,416 | 'allergy' |

(46) T-order for four-syllable stems (only variable cases, precision = 0.942, recall = 0.608)




(47) Errors are often due to misclassification:
- (a) Orthography: *eldorado* [eldora:do], *obligato* [obliga:to], *autostrada* [autostra:da]
- (b) Quasi-compounds: *uni=sono, tele=foto*

**5.5 Variation in five-syllable stems**

(48) Only 28/36 types found in the dictionary (temporarily ignoring CIC vs. CAC vs. CVV).

(49) The first predicted type of variation (14 stem types) yields two distinct outputs:
- (a) trochee + dactyl, Stop Deletion: (*ák.va*)(*rèl.lis.te*)*ja*
- (b) trochee + trochee + trochee, no Stop Deletion: (*ák.va*)(*rèl.lis*)(*tèi.ta*)

(50)

| TYPE | PREDICTIONS | DEL% | GHITS | |
|---|---|---|---|---|
| LHHA | (kóor.di)(nàa.tis.to)ja ~ (kóor.di)(nàa.tis)(tòi.ta) | 100 | 205 | ‘coord. grid’ |
| LHHI | (pró.pa)(gàn.dis.te)ja ~ (pró.pa)(gàn.dis)(tèi.ta) | 100 | 79 | ‘propagandist’ |
| LHHI | (ák.va)(rèl.lis.te)ja ~ (ák.va)(rèl.lis)(tèi.ta) | 100 | 9 | ‘aquarellist’ |
| LIII | (sým.po)(sì.u.me)ja ~ (sým.po)(sì.u)(mèi.ta) | 98.6 | 296 | ‘symposium’ |
| LAII | (pó.ly)(à.mi.de)ja ~ (pó.ly)(à.mi)(dèi.ta) | 95.7 | 69 | ‘polyamid’ |
| HHII | (líi.rum)(làa.ru.me)ja ~ (líi.rum)(làa.ru)(mèi.ta) | 18.6 | 43 | ‘nonsense’ |
| LHII | (ín.ku)(nàa.be.le)ja ~ (ín.ku)(nàa.be)(lèi.ta) | 9.5 | 2,139 | ‘incunable’ |
| HHAI | (kóm.men)(tàat.to.re)ja ~ (kóm.men)(tàat.to)(rèi.ta) | 1.2 | 1,525 | ‘commentator’ |
| LHAI | (ó.pe)(ràat.to.re)ja ~ (ó.pe)(ràat.to)(rèi.ta) | 0.8 | 20,316 | ‘operator’ |
| HHIA | (kón.sul)(tàa.ti.o)ja ~ (kón.sul)(tàa.ti)(òi.ta) | 0.5 | 10,126 | ‘consultation’ |
| LIIA | (kóm.mu)(nì.ke.o)ja ~ (kóm.mu)(nì.ke)(òi.ta) | 0.3 | 3,474 | ‘communiqué’ |
| LHIA | (ó.pe)(ràa.ti.o)ja ~ (ó.pe)(ràa.ti)(òi.ta) | 0.0 | 42,237 | ‘operation’ |
| LAIA | (ál.le)(gò.ri.o)ja ~ (ál.le)(gò.ri)(òi.ta) | 0.0 | 63,717 | ‘allegory’ |

(51) The second predicted type of variation (7 stem types) yields three distinct outputs:
- (a) dactyl + trochee, Stop Deletion: (*á.vant.gar*)(*dìs.te*)*ja*,
- (b) trochee + dactyl with Stop Deletion, e.g. (*á.vant*)(*gàr.dis.te*)*ja*,
- (c) trochee + trochee + trochee, no Stop Deletion, e.g. (*á.vant*)(*gàr.dis*)(*tèi.ta*)

(52)

| TYPE | PREDICTIONS | DEL% | GHITS | |
|---|---|---|---|---|
| HAAI | (kón.kvis.ta)(dò.re)ja ~ (kón.kvis)(tà.do.re)ja ~ (kón.kvis)(tà.do)(rèi.ta) | 100 | 23 | ‘conquistador’ |
| HIII | (kóm.pen.di)(ù.me)ja ~ (kóm.pen)(dì.u.me)ja ~ (kóm.pen)(dì.u)(mèi.ta) | 100 | 6 | ‘compendium’ |
| HHHI | (á.vant.gar)(dìs.te)ja ~ (á.vant)(gàr.dis.te)ja ~ (á.vant)(gàr.dis)(tèi.ta) | 100 | 36 | ‘avantgardist’ |
| HIAI | (kó.les.te)(rò.le)ja ~ (kó.les)(tè.ro.le)ja ~ (kó.les)(tè.ro)(lèi.ta) | 90.0 | 50 | ‘cholesterol’ |
| LIAI | (jé.re.mi)(à.de)ja ~ (jé.re)(mì.a.de)ja ~ (jé.re)(mì.a)(dèi.ta) | 74.2 | 66 | ‘jeremiad’ |
| HIIA | (ó.pis.ke)(lì.jo)ja ~ (ó.pis)(kè.li.jo)ja ~ (ó.pis)(kè.li)(jòi.ta) | 0.0 | 221,456 | ‘student’ |
| HAIA | (rés.pon.so)(rì.o)ja ~ (rés.pon)(sò.ri.o)ja ~ (rés.pon)(sò.ri)(òi.ta) | 0.0 | 21 | ‘responsory’ |
| LAAI | (ánt.ro.po)(lò.ge)ja ~ (ánt.ro)(pò.lo.ge)ja ~ (ánt.ro)(pò.lo)(gèi.ta) | 99.6 | 1,990 | ‘anthropologist’ |

(53) The theory predicts that *akvarellisteja* must have the foot structure (*ák.va*)(*rèl.lis.te*)*ja*, but *avantgardisteja* may be (*á.vant*)(*gàr.dis.te*)*ja* or (*á.vant.gar*)(*dìs.te*)*ja*. Which is it? We don’t know since the data are written, not spoken.

(54) T-order for five-syllable stems (only variable cases, precision = 0.864, recall = 0.625). [The graph won’t fit on this page.]

**6. Summary**

(55) Finnish word stress is almost entirely rhythmical.

(56) Two phonological tendencies that emerge quantitatively in variable data:
- (a) Vowel sonority: low vowels attract stress, high vowels repel stress. Analysis: feet are sonority-sensitive. The best trochee is left-prominent (Á.I), which is better than flat trochees (Í.I) and (Á.A), which are better than sonority reversals (Í.A).
- (b) Prominence clash: Secondary stress avoids falling next to a heavy syllable.

(57) A small residue of lexical effects remains: /-lógi/ ‘-logist’, (*tés.tos*)(*tè.ro.ne*)*ja* ‘testosterone-PL-PAR’ vs. (*kó.les.te*)(*rò.le*)*ja* ‘cholesterol-PL-PAR’.

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