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THE PSYCHOLOGICAL AND SOCIOLOGICAL REALITY
OF FINNISH VOWEL HARMONY

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0. *Introduction.* A detailed description of the vowel harmony (henceforth VH) of a given language may have valuable implications for the treatment of VH generally and for testing various assumptions in phonological theory. My purpose in this paper is to explore some little-known details of Finnish VH and to consider their theoretical implications. I will assume some familiarity with both recent approaches to generative phonology and with Finnish VH. Briefly stated, the Finnish harmonic series are back *a, o, u*, front *ä [æ], ö [ø], y [y]*, and neutral *i, e*, with suffix vowels agreeing with the quality of the last non-neutral vowel of the stem. (For discussion of Finnish VH, see Skousen 1971; Kiparsky 1973; and Campbell 1976.) I will first present arguments for the psychological reality of Finnish VH; then various real but unnatural or phonetically unmotivated complications in Finnish VH (henceforth FVH) will be considered. Finally, the theoretical implications of these facets of FVH will be considered.

1. *The psychological reality of FVH.* The psychological reality of FVH is supported by a variety of kinds

1.1. VH is productive in eliminating some violations in more common recent loan words. Thus *olympialaiset* "Olympic games" very often becomes *olump(p)ialaiset*, sometimes *ölympiäläiset*.

1.2. VH applies to adjust the vowels of recent changes (added rules) in many of the dialects. For example, the results of *e*-labialization in many eastern dialects is further adjusted by VH (e.g. *tulloo* "comes" < *tulou* < *tulov* < *tulovi* < *tulvi* < **tuleβi*; *kävellöö* "walks" < *kävelöy* < *kävelöv* < *kävelövi* < *kävelvi* < **käveleβi* (Kettunen 1930:69; Turunen 1959:247; Rapola 1965:255, 1969:64; Ruoppila 1974:42, 69, etc.) The epenthetic transition vowel which becomes fully syllabic in some dialects also undergoes adjustment by VH (e.g. *jalaka* < *jalka* "foot"; *nälökä* < *nälkä* "hunger"; *juuma* < *juuma* "cruel"; *kyymä* < *kylmä* "cold"; (for details see Kettunen 1930:165, 171, 132, 108, 129, etc.; Rapola 1969:56, 64, 66, 117, 140; Ruoppila 1974:59-62; and Harms 1976).

1.3. VH applies across word boundaries, especially in fast speech, e.g. *ma tulen* "I come" (< *mä*); *sa tulet* "you come" (< *sä*); *vaihka hal lupas* (< *hän*) "though he promised" (Rapola 1965:250, 1966:398; Penttilä 1963:17).

1.4. Perhaps the strongest evidence for the psychological reality of FVH comes from secret languages or word games, analogous to Pig Latin in English, where speakers consciously apply the VH rule to accommodate the rules of the language games. I will consider three such games here.

1.4.1. The first is rather simple; one merely places *-tä-* after the first syllable whenever possible, but *-ta-* when a back vowel of the first syllable (*a, o, u,*) makes *-tä-* impossible. For example, *kevät* "spring" is *ketävät*; *minä* "I" is *mitänä*; *kädessä* "in hand" is *kätädessä*, but

kala "fish" is *k* the "underlying fact that back *v* only neutral vowel harmony. For example *mertätä*, *vertä* "Similarly, *dösa* "physics class" Finally, other *l* *jonglööri* "juggler" correctly adjust harmony, they mu

1.4.2. In and vowel of each changed. Part of changes often co with humorous (vowels of a word must agree with are:

Saksalais becomes *hi*
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kuusi; *kävellöö* "walks"

kyi < **kävelebi*

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the epenthetic trans-

formation in some dialects

jalka < *jalka*

vi < *julma* "cruel";

(Kettunen 1930:165,

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varieties, especially

(*< mä*); *sa tulst*

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There is also evidence

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For example, one merely places

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becomes *-tä-* (e.g. *kuusi*

becomes *kütävät*;

kuusi becomes *kütädessä*, but

kala "fish" is *katala*. That *-tä-* (rather than *-ta-*) is the "underlying form" of the substitution is shown by the fact that back vowels after an inserted *-tä-* (following only neutral vowels) are changed to accommodate front harmony. For example, *merta* "sea (partitive sg)" becomes *mertätä*, *verta* "blood (partitive sg)" is *vertätä*.¹ Similarly, *dösa* "bus" (a Swedish loan word) and *fysa* "physics class" are *dötäsä* and *fytässä* respectively. Finally, other loans with mixed vowels take *-tä-*, as in *jonglööri* "juggler", *jongtälööri*. Because speakers correctly adjust vowels after *-tä-* to agree with it in harmony, they must know the vowel harmony rule.²

1.4.2. In the second word game, the first consonants and vowel of each succeeding pair of words are interchanged. Part of the amusement of this game is that changes often coincide with existing words of the language with humorous (and often obscene) results. The remaining vowels of a word following the interchanged first vowel must agree with the new first vowel in VH. Some examples are:

Saksalaisia hätyytettiin "the Germans were attacked" becomes *häksäläisiä satuutettiin*
Ruotsalaisia hätyytettiin "the Swedes were attacked" becomes *hätsäläisiä ruotuutettiin*
tykkään urheilusta "I like sports" becomes *ukkaan tyrheilystä*
otsansa hiessä "in the sweat of his brow" becomes *hitsuansa oessa*
tule sisään "come in" becomes *sile tusaan*
pitää kalasta "likes fish" becomes *kataa pilasta*
 etc.

Speakers must know VH in order to adjust the vowels correctly as they generate new forms in this secret langu-

age, and since they always generate the forms correctly, they know the VH rule.

1.4.3. The third case is *kontti kieli* (or *kontin kieli*), "knapsack language", which has simple rules, but is rather difficult to play. The relevant details are the replacement of the first consonant(s) and vowel of a word by *ko* (of *kontti*), and placement of the replaced material before *ntti* (of *kontti*). Thus *vesi* "water" in *kontti kieli* is *kosi ventti*, *susi* "wolf" is *kosi suntti*. In this game, VH adjusts the remaining vowels of the root and those of any suffixes to agree with *ko*. Some examples are:

<i>Helsingissäkö</i>	<i>kolsingissako hentti</i> "in Helsinki?"
<i>nälänsänsäkö</i>	<i>kolassansako näntti</i> "in his hunger?"
<i>pyrstö</i>	<i>korsto pyntti</i> "tail (of bird or fish)"
<i>hänkö</i>	<i>konko häntti</i> "him?"
<i>tekijöillä</i>	<i>kokijoilla tentti</i> "on the workers"
<i>kylpylöissä</i>	<i>kopuloissa kyntti</i> "in the baths"
<i>näkö</i>	<i>koko näntti</i> "appearance"
<i>nähtyt</i>	<i>kohnut näntti</i> "seen"
<i>pysähtyköön</i>	<i>kosähtukoon pyntti</i> "let him stop"

If FVH were not a psychologically real rule, speakers would not be able to adjust the vowels to agree accurately with the back vowel when *ko* is substituted. Since speakers

speak *kontti kieli* the VH rule.³ (F *kieli*, see Campbell together, we may real.

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speak *kontti kieli* without VH mistakes, they must know the VH rule.³ (For a more detailed description of *kontti kieli*, see Campbell, 1976.) Taking all this evidence together, we may conclude that FVH is psychologically real.

2. *Sociological reality of FVH.* Though FVH is psychologically real, there are many complications that make its formal description far from straightforward. Some of these complications involve sociolinguistic or "external" factors (see below). These complications are considered in this section.

2.1. *Loan words.* It is well-known that FVH has exceptions in recent loan words, especially in the learned vocabulary. Some of my favorites are:

<i>akronyymi</i>	acronym
<i>byrokraatti</i>	bureaucrat
<i>dynamiitti</i>	dynamite
<i>dyykata</i>	to dive (from Swedish <i>dyka</i>)
<i>etymologia</i>	etymology
<i>faryngaalinen</i>	pharyngeal
<i>flygata</i>	to fly (from Swedish <i>flyga</i>)
<i>följetongi</i>	serial (from French <i>feuille-</i> <i>ton</i>)
<i>hieroglyfi</i>	hieroglyph
<i>homonyymi</i>	homonym
<i>hyperkorrektius</i>	hypercorrection
<i>jonglööri</i>	juggler (from French <i>jongleur</i>)
<i>kompleksisymboli</i>	complex symbol
<i>lynkata</i>	to lynch (from English)
<i>lyssa</i>	lyseum
<i>manööveri</i>	manouever (from French <i>ma-</i> <i>noeuvre</i>)
<i>miljonääri</i>	millionaire
<i>polysyllabinen</i>	polysyllabic
<i>polyyppi</i>	polyp

<i>pseudonyymi</i>	pseudonym
<i>röökaaja</i>	smoker (from Swedish <i>röka</i>)
<i>sköpata</i>	to buy (from Swedish <i>köpa</i>)
<i>sutenööri</i>	pimp (from French <i>souteneur</i>)
<i>syntaksi</i>	syntax
<i>tsökata</i>	to cook (from Swedish <i>kök</i>)
<i>uvertyyri</i>	overture (from French <i>ouverture</i>)
<i>vampyyri</i>	vampire
<i>vulgääri</i>	vulgar

2.2. *Neutral y*. Though in native lexical items *y* always belongs to the front harmonic series (with *ä* and *ö*), in specialized loans *y* is considered a neutral vowel (like *i* and *e*). Actual practice, however, varies for the sociolinguistic reasons discussed below. Thus, *analyysi-stä* "from analysis" is better (more frequent) than *analyysi-stä*; *marttyyrejät* "martyrs (partitive pl.)" is better than *marttyyrejä*, and *marttyyrius* "martyrdom" is much better than *marttyyriys*. (See Ikola 1971:147, 273; Saarimaa 1971:15-16.) Some other examples of neutral *y*, which allows both back and front harmony are:

<i>brodiyyri</i>	embroidery
<i>daktyyli</i>	dactyl
<i>katalyytti</i>	catalyte
<i>klorofylli</i>	chlorophyl
<i>miniatyyri</i>	miniature
<i>manikyyri</i>	manicure
<i>molekyyli</i>	molecule
<i>parfyymi</i>	perfume
<i>polyyppi</i>	polyp
<i>pseudonyymi</i>	pseudonym
<i>satyyri</i>	satyr
<i>uvertyyri</i>	overture
<i>vampyyri</i>	vampire
<i>volyymi</i>	volume (book)

2.3. *Prestitge*. FVH is further complicated by a sociolinguistic phenomenon. While both back and front harmony are possible in most cases with neutral *y*, back

harmony is consi while front harm *hieroglyfia* and seem totally acc because it "sour word such as thi factor in FVH af one might expect last harmonic vc o, or u. Thus, *amatööriä* "amate sounding, though ly acceptable. the like are imp FVH will have to if it is to be a

2.4. *Non-n pounds, suffixes compound (e.g. s avo+kätis-tä* "op words which were the host languag nevertheless are with the last po *barometri-stä* "f were *baro+metri*, ing in VH with t -*metri*. This re the formal descr forms Finnish sp tions of the com or guesses about are (Ikola 1971:

harmony is considered more prestigious, more learned, while front harmony is more colloquial. Thus while both *hieroglyfia* and *hieroglyfiä* ("hieroglyph (partitive sg))" seem totally acceptable, *hieroglyfia* would be preferred because it "sounds better", more prestigious for a learned word such as this. Furthermore, this sociolinguistic factor in FVH affects not only cases with neutral *y* (as one might expect), but also forms violating VH where the last harmonic vowel is *ö* as well, though not if it is *ä*, *o*, or *u*. Thus, *sutenööriä* "pimp (partitive sg)" and *amatööriä* "amateur (partitive sg)" are both prestigious sounding, though *sutenööriä* and *amatööriä* are both perfectly acceptable. However, **hydrosfääriä*, **följätangiä*, and the like are impossible. Thus the formal description of FVH will have to include sociolinguistic factors as well, if it is to be accurate.

2.4. *Non-native compounds*. In native Finnish compounds, suffixes agree in VH with the last portion of the compound (e.g. *silmä+puol-tä* "one-eyed (partitive sg)" *avo+kätis-tä* "open-handed (partitive sg)"). However, some words which were morphologically complex or compound in the host language and borrowed as single unsegmented forms nevertheless are treated as compounds by FVH, VH agreeing with the last portion of the compound. For example, *barometri-stä* "from the barometer" is treated as though it were *baro+metri*, with front vowels in the suffixes agreeing in VH with the neutral *e* and *i* of the final portion, *-metri*. This represents a considerable complication for the formal description of FVH, since for many of these forms Finnish speakers have no basis for segmenting portions of the compounds (other than possible knowledge of or guesses about the donor language). Some other examples are (Ikola 1971:147, 273-351) the following, F for front

Swedish *röka*)
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harmony, B for both front and back VH alternatives:

<i>voltametri</i> (F)	voltameter
<i>termometri</i> (F)	thermometer
<i>skitsofreeninen</i> (F)	schizophrenic
<i>polyteismi</i> (B)	polytheism
<i>polyteekki</i> (B)	polytechnic school
<i>heterogeeninen</i> (B)	heterogeneous
<i>heliosentrinen</i> (F)	heliocentric
<i>heksametri</i> (F)	hexameter
<i>geosentrinen</i> (F)	geocentric
<i>galvanometri</i> (F)	galvanometer
<i>fennofiili</i> (F)	fennophile
<i>endogeeninen</i> (B)	endogenous
<i>biogeneettinen</i> (B)	biogenetic
<i>pluskvamperfekti</i> (F)	'a verb tense'
<i>introvertti</i> (F)	introvert

2.4.1. Another VH complication, certainly related to the list above, involves the placement of secondary stress (which usually falls on the third syllable) and its effect on VH. In both standard and colloquial Finnish there are examples of recent loan words, which should take back-vowel suffixes by normal VH predictions, but which nevertheless may receive front-vowel endings because in the syllable with secondary stress and those following it there is *i-* or *e-*vocalism. In spite of the usual usage, forms such as *adjektiivejä* "adjectives (partitive pl)", *partikkeleistä* "particles (relative pl)" exist. Furthermore, examples are found in native Finnish words in Old Literary Finnish and in modern dialects (e.g. Luopioinen dialect *keskuhittistä* (relative pl)). (For details, see Rapola (1965:251).

Thus when an otherwise back-vowel word contains only neutral vowels in the syllable with secondary stress and beyond, there may be variation in the application of VH. An important question is just how this complication interacts with the interpretation of many foreign words as compounds.

2.5. *Vou*

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2.5. *Vowel Harmony variation in native words.*

Another complication is that there is variation in the application of VH in a few native words:

- hiljempää/hiljempää* "quieter" (from *hilja* "quiet")
illemmällä/illemmällä, illempänä/illempana "later in the evening" (from *ilta* "evening")
liiemmäältä/liiemmalta "excessively" (from *liika* "excess")
seista/seistä "to stand"
 etc.
 (Penttilä 1963:17)

2.6. *Unassimilated loans.* Frequently very recent and unassimilated loans may take either front or back harmony in suffixes, irrespective of the actual vowels pronounced in the stems, e.g. (Ikola 1971):

- baby* [beibi] (from baby)
business [biznäs] (from business)
camping [kämping] (from camping)
come back [kam bäk] (from come back)
copyright [kopirait] (from copyright)
dandy [dändi] (from dandy)
design [disain] (from design)
jury [juri] (from jury)
lady [leidi] (from lady)

2.7. *Neologisms.* Finally, neologisms (usually slang) may violate VH: (See also Campbell 1967, Anttila 1975.)

- | | |
|-----------------------|---|
| <i>lyssa</i> | lyseum |
| <i>fyssa</i> | physics class |
| <i>Lönska, Lönska</i> | Lönnrotinkatu (an important street in Helsinki) |
| <i>fönari</i> | widow |

3. *Historical complications.* There are other complications in FVH that stem from developments in the history of VH. The historical accounts are rather straightforward, but the relics of historical changes seriously complicate the formal synchronic statement of VH.

3.1. Though the origin of VH in Finno-Ugric (henceforth FU) and its character in Balto-Finnic have been quite controversial, the bulk of current opinion (at least in Finland) seems to follow Erkki Itkonen's view (1948, 1966, etc.). Some major treatments of FU VH are: Collinder, B. 1940-2, 1960:149-93; Hakulinen, L. 1968:39; Itkonen, E. 1948, 1966:61-7; Rapola, M. 1965:248; Steinitz, W. 1944. In Itkonen's opinion, Proto-Finno-Ugric had *i, e, ä, ü, u, o, a, ii, ee, uu, oo* in initial syllables and *e, ä, a* in non-initial syllables. He argues that FU VH was not based on a progressive assimilation where the quality of the vowel of the first syllable determined whether front vowels or back vowels occurred in later syllables (which is an early view still followed by some). Such a view would not easily accommodate the Finnish peculiarity of the neutral *i* and *e* which allow following front vowels or back vowels equally well. Itkonen assumes, rather, that the origin of FU VH is to be found in how the individual members of the FU vowel system combined in roots. The first syllable allowed all vowels to occur; the second allowed only pairless *e* and the pair *a-ä* (which were not etymologically combinatory variants of each other any more than front and back pairs of the first syllable were). As Itkonen 1966:65 put it

...then it is natural that the back vowels of the first syllable combined with the *a* of the second syllable, the front vowels with *ä*, while pairless [first-syllable] *i* could combine with both *a* and *ä*; ... with second-syllable pairless *e* all first-syllable vowels were capable of combining. (my loose translation [LC])

To restate this in a more contemporary jargon, Itkonen seems to opt for a view of PFU VH stemming from morpheme structure conditions, opposing the view of its origin as some assimilatory change determined by the vocalism of the first syllable.

The different important ways the issue of *i* followed by *n* (henceforth PF) had *n* vowels) in combination with front vowels. orthographic *õ*) is assumed that *g* > *e* later in opinion (Itkonen neutral *i* and *e* in Estonian, *Vo* the greater current different terms languages innovation tendency to red Livonian development to be transparent opaque aspect *t* then Estonian, developing *g* *wh* Thus in this case perhaps just parallel to the development of the language see: Collinder 1948, 1966:61-7 75; Rapola 1965 1959:253.

3.2. The "perfect" because perhaps even *le*

The difference may not be profound, but it relates in important ways to another issue of considerable interest, the issue of $\underset{\sim}{j}$ and $\underset{\sim}{g}$ in Balto-Finnic studies. One opinion followed by many is that originally Proto-Finnic (henceforth PF) had no neutral vowels, but had $\underset{\sim}{j}$ and $\underset{\sim}{g}$ (central vowels) in combination with back vowels and i and e with front vowels. This would be reflected by the $\underset{\sim}{g}$ (Estonian orthographic $\underset{\sim}{g}$) in Estonian, Vote, and Livonian, where it is assumed that $\underset{\sim}{j} > i$ already in the proto language, and $\underset{\sim}{g} > e$ later in the other Finnic languages. The other opinion (Itkonen's) is that the proto language had only neutral i and e and that $\underset{\sim}{g}$ is thus a secondary innovation in Estonian, Vote, and Livonian. This view seems to have the greater current following. To restate the issue in different terms, one might ask, are Finnish and other Finnic languages innovative, eliminating $*\underset{\sim}{j}$ and $*\underset{\sim}{g}$ because of the tendency to reduce markedness, or did Estonian, Vote, and Livonian develop $\underset{\sim}{g}$ in response to the tendency for rules to be transparent (presumably neutral vowels contribute an opaque aspect to VH)? If Itkonen is right, as I believe, then Estonian, Vote, and Livonian were innovative in developing $\underset{\sim}{g}$ which made the VH rule more transparent. Thus in this case, the tendency toward transparency (or perhaps just pattern symmetry) seems to have contributed to the development of a more highly marked segment in some of the languages. (For discussion of the $\underset{\sim}{j}$ and $\underset{\sim}{g}$ issue, see: Collinder 1960:149-93; Hakulinen 1968:31; Itkonen 1948, 1966:61-7; Kettunen 1962:130, 151, 152; Posti 1966:75; Rapola 1965:247; Ruoppila 1974:1-2, 57-58; and Turunen 1959:253.

3.2. *The origin of $\underset{\sim}{ö}$ and VH wrinkles.* If VH was not "perfect" because it allowed neutral i and e , then it was perhaps even less perfect in other ways. Rapola (1965:247)

believed that to perhaps as late as Late PF times, VH had the exception that a front vowel of the first syllable could be followed in the second or later syllables by *o* and perhaps *u* as well). The *ö* is the youngest of Finnic vowels and did not occur beyond the first syllable (see for details Collinder 1960:149; Hakulinen 1968:38, 40; Rapola 1965:248-9, 253-5; Turunen 1959:253, etc.) Modern Finnish no longer has *o* in words with first syllable *ä*, *ö*, *y*, since *o* changed to *ö* in these cases. This history accounts for "exceptions" to VH in which front-vowel roots occur with some back-vowel derivational suffixes when the first syllable has neutral *e* or *i*. Some examples are: (cf. Ruoppila 1974:61-2; Turunen 1959:254; etc.)

<i>pisto</i>	"sting"	<i>pistä-</i>	"to sting"
<i>kiitos</i>	"thanks"	<i>kiittä-</i>	"to thank"
<i>liitto</i>	"alliance"	<i>liittä-</i>	"to join"
<i>hiikto</i>	"skiing"	<i>hihtä-</i>	"to ski"
<i>elo</i>	"life"	<i>elä-</i>	"to live"
<i>pelko</i>	"fear"	<i>pelkää-</i>	"to fear" (<i>pelätä</i>)
<i>teko</i>	"deed"	<i>take-</i>	"to do" (<i>tehdä</i>)
<i>meno</i>	"expense, going"	<i>mene-</i>	"to go" (<i>mennä</i>)
<i>tieto</i>	"knowledge"	<i>tietä-</i>	"to know"
<i>kesto</i>	"duration"	<i>kestä-</i>	"to last"
<i>silmikko</i>	"bud"	<i>silmä</i>	"eye"
<i>silmu</i>	"bud"	<i>silmä</i>	"eye"
<i>silmutka</i>	"loop, mesh"	<i>silmä</i>	"eye"
<i>peru</i>	"legacy"	<i>perä-</i>	"back, rear"
<i>perukka</i>	"remotest corner"	<i>perä-</i>	"back, rear"
<i>elukka</i>	"beast, animal"	<i>elä-</i>	"to live"
<i>mieluummin</i>	"preferably"	<i>miele-</i>	"mind"
<i>pienuus</i>	"smallness"	<i>piene-</i>	"small"
<i>pienokkainen</i>	"baby, little one"	<i>piene-</i>	"small"
<i>pituus</i>	"length"	<i>pitkä</i>	"long"

nelikko
viisikko
nimikko
esikainen
heinikko
lepikko
 (also *lepi*)
itku
pesu
pelmoinen
siloinen
veto

Old Litera

neutral *i* and *e*
sydämikko "spite"
 VH exceptions in
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kesakko "fr
kesanto "fa

PF times, VH had first syllable syllables by *o* longest of Finnish syllable (see n 1968:38, 40; 53, etc.) Modern first syllable *ä, ö,* This history front-vowel roots suffixes when the examples are:

<i>nelikko</i>	"firkin"	<i>neljä</i>	"four"
<i>viisikko</i>	"gang of five"	<i>viits-</i>	"five"
<i>nimikko</i>	"namesake"	<i>nime-</i>	"name"
<i>esikoinen</i>	"first born"	<i>ete-</i>	"forward, first"
<i>heinikko</i>	"grass, meadow"	<i>heinä-</i>	"grass"
<i>lepikko</i> (also <i>lepiikkö</i>)	"alder grove"	<i>leppä-</i>	"alder"
<i>itku</i>	"crying"	<i>itke-</i>	"to cry" (<i>itkeä</i>)
<i>pesu</i>	"washing"	<i>pesse-</i>	"to wash" (<i>pestä</i>)
<i>pehmainen</i>	"soft"	<i>pehmeä</i>	"soft"
<i>siloinen</i>	"smooth"	<i>sileä</i>	"smooth"
<i>veto</i>	"pull"	<i>vetä-</i>	"to pull"

Old Literary Finnish had even more *o* suffixes after neutral *i* and *e* than now, with a few real exceptions (e.g. *sydämikko* "spiteful person"). For attempts to treat these VH exceptions in generative phonology, see Harms 1966; Kiparsky 1973; and others.

A second group causes much greater problems for VH than just the back-vowel endings where front-vowel endings are expected after neutral vowels. In some forms having derivational endings with *o* in the third syllable, after neutral *i* or *e* of the first syllable, an original *ä* of the second syllable has changed to *a*, while the *o* of derivational endings has held its ground, not becoming *ö* as predicted by VH. These exceptions were more common in Old Literary Finnish than today (Rapola 1965:248-50).

Some modern examples are:

<i>emä</i>	"female"	<i>emä-</i>	"womb, mother"
<i>erä</i>	"hermit"	<i>erä-</i>	"wilderness, separate"
<i>venä</i>	"Russian woman"	<i>venä-</i>	"Russian"
<i>elä</i>	"livelihood"	<i>elä-</i>	"to live"
<i>kesä</i>	"freckle"	<i>kesä-</i>	"summer"
<i>kesä</i>	"fallow"	<i>kesä</i>	"summer"

"to sting"
 "to thank"
 "to join"
 "to ski"
 "to live"
 "to fear" (*pelätä*)
 "to do" (*tehdä*)
 "to go" (*mennä*)
 "to know"
 "to last"
 "eye"
 "eye"
 "eye"
 "back, rear"
 "back, rear"
 "to live"
 "mind"
 "small"
 "small"
 "long"

The late origin of *ö*, then, explains historically the occurrence of *o* in many derivational affixes after neutral vowels, though *ö* is expected. It also accounts for the exceptional cases where *ä* changed to *a* when preceded by neutral vowels and followed by a syllable with an *o* of a derivational suffix. However, this historical account makes it no less difficult to make a formal statement of VH in a synchronic grammar of Finnish. Presumably forms such as *elanto*, *emakko*, *venakko*, etc. are clearly derived from front-vowel roots, and VH should account in some way for these back-vowel forms (see below for a possible explanation).

4. *Theoretical implications.* The details of FVH considered above under the headings of psychological reality, sociological reality, and historical complications have implications for phonological theory generally. In this section, I will try to indicate some of these implications.

4.1. *Rule classifications.* There seems to be something of a convergence of opinion in recent approaches to GP that kinds of rules (or phonological processes) must be distinguished, classified along such varying parameters as productive/non-productive (Skousen 1972, 1975; Karlsson 1974), allophonic/morphophonemic (Karlsson 1974), exceptionless/exceptional (Vennemann 1974, Hooper 1975, 1976, etc.), automatic/non-automatic (Kiparsky 1973), opaque/transparent (Kiparsky 1973; others), natural processes (innate)/acquired rules (Stampe 1969, 1973), natural (phonetically motivated, exceptionless, from a finite universal set)/morphophonemic (with non-phonetic information in the formal statement) (Vennemann 1974, Hooper 1975); etc. These rule classifications seem to be motivated by desires to constrain phonological descriptions

so that they may actually be less than the formal criteria approaches for (to assure the learner the goal for which the rules were devised (Campbell 1976.)

Finnish VH as discussed above is less, not automatically completely phonetic (at least in many cases that it has survived). In fact, "real" phonology (presented above) is the psychological

This suggests that to establish sharp criteria are called for. Ability and psychological reality would suggest exceptionless, "promoted" to morphophonemic exceptions, grammatical rule may have phonetic morphophonemic and postulate such as our theories, but along which speakers opposed to, say morphological perceived relations

so that they may truly reflect something that might actually be learned by children acquiring language. All the formal criteria so far proposed in the various recent approaches for distinguishing kinds of rules fail to assure the learnability or psychological reality of rules, the goal for which presumably at least some of the distinctions were devised. (For a more extended discussion, see Campbell 1976.)

Finnish VH has an inordinate number of complications, as discussed above. It is clear that FVH is not exceptionless, not automatic, not transparent, not allophonic, not completely phonetically determined; it is an acquired rule (at least in many aspects); it is not fully productive (in that it has surface violations which have not been eliminated). In fact, it meets almost no one's criteria for a "real" phonological rule. Nevertheless, the evidence (presented above in section 1) is indisputably in favor of the psychological reality of the FVH rule.

This suggests that it is perhaps misguided to try to establish sharp dichotomies for classes of rules if the criteria are calculated to lead automatically to the learnability and psychological reality of rules. Mere reflection would suggest as much, since phonetically motivated, exceptionless, allophonic, natural rules may be gradually "promoted" to morphophonemic rules, gradually acquiring exceptions, grammatical functions, etc. In fact, the same rule may have phonetic consequences in some paradigms, but morphophonemic effect in others. The real trick is not to postulate such classificatory criteria for the welfare of our theories, but actually to investigate the parameters along which speakers may choose real phonological rules as opposed to, say, surface patterns of analogy based on morphological paradigms or piecemeal learning with no perceived relationship among forms linguists might relate.

4.2. *External factors and the sociological reality of rules.* If the sharp dichotomies in classes of rules have failed, it has not been because those theoreticians' hearts were in the wrong spot, but rather perhaps because they had too simplistic a view of what motivates rules to be as they are. The assumed "phonetic" or "natural" motivation for rules seems to stem from what I call "internal" factors. "Natural" or "phonetically motivated" appears to mean that rules so classified match expectations from what we know of constraints on human speech production and perception which lead rules to be the way they are. What seems to be forgotten in these neat and discrete catalogues is the agency of man to intervene deliberately, consciously modifying internally motivated rules by culturally determined or "external" factors. External factors are largely outside the structure of language, outside the grammar per se (e.g. language contact, social evaluation, linguistic play, etc.). (For clarification of the "external" and "internal" factors, see Campbell 1976; Ohala 1974a, 1974b.) Perhaps it is in the nature of the many kinds of rules for both internal and external factors jointly to determine their ultimate description. FVH is an excellent example of how a phonetically motivated, natural rule, can be modified by external factors, by the factors determining its social prestige, by the neutrality of *y* for certain loan words, by the treatment of certain foreign forms as compounds, by the learned loan words and neologisms, etc., as discussed in section 2.

The point I hope to make is that both internal and external aspects of phonological rules must be recognized and taken into account in their formal description. Current practitioners of GP seem not to be aware that external factors are extremely important in determining the nature of many "natural rules", and so are unprepared

to account for this is an impc example will be $t + s / _ i$ is 1 (see Paunonen 1 not apply to:

<i>piti</i>	ɸ
<i>veti</i>	v
<i>kuti</i>	k
<i>kynti</i>	k

The rule is blc pernicious homc past tenses abc

<i>pi<i>s</i>i</i>	"
<i>ve<i>s</i>i</i>	"
<i>ku<i>s</i>i</i>	"
<i>ky<i>n</i>s<i>i</i></i>	"

This is an avoidance of hc phonological ru case) raise the interact with i rules. What do as opacity, prc One thing that cannot by theor rule by interna exhibit externa aspects. There now have, we ca constraints dec phonetic, or in one of trying t

to account for those factors in their theories. Since this is an important point, perhaps an additional, non-VH example will be helpful. The well-known Finnish rule: $t + s / _ i$ is largely optional for past-tense verb forms (see Paunonen 1973 for full details). However, it does not apply to:

<i>piti</i>	past of <i>pitä-</i>	"to hold" (* <i>pisi</i>)
<i>veti</i>	<i>vetä-</i>	"to pull" (* <i>vesi</i>)
<i>kuti</i>	<i>kute-</i>	"to spawn" (* <i>kusi</i>)
<i>kynti</i>	<i>kyntä-</i>	"to plow" (* <i>kynsi</i>)

The rule is blocked in these verbs but not others to avoid pernicious homophony. Compare the expected but blocked past tenses above with the following:

<i>pisi</i>	"urinated" (obscene)
<i>vesi</i>	"water"
<i>kusi</i>	"urinated" (obscene)
<i>kynsi</i>	"fingernail, scratched (<i>kynsiä</i> , "to scratch")"

This is another case where external factors (the avoidance of homophony) determine aspects of a particular phonological rule. Such examples (together with the FVH case) raise the question of just how external factors interact with internal factors in determining phonological rules. What do such external factors mean for such notions as opacity, productivity, for theories of exceptions, etc.? One thing that is clear from the FVH case is that we cannot by theoretical decree deny the naturalness given a rule by internal factors just because the rule may also exhibit external factors that determine some of its aspects. Therefore, without much more information than we now have, we cannot on the basis of currently proposed constraints declare rules a priori to be unnatural, non-phonetic, or in any other sense unreal. Our task becomes one of trying to determine by investigation rather than

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4.3. *External complications in language universals.*

In the last section it was suggested that perhaps the natural aspects of rules are determined by internal factors, factors stemming from the limitations and potentials of human speech production and perception, while the less natural aspects often stem from external factors, factors outside of language structure but imposed on the language more or less consciously or deliberately for sociocultural reasons. It was suggested that a recognition of the roles of these multiple factors would eventually lead to greater explanatory power concerning the nature of phonological rules. In this section I wish to consider a corollary to this, that the investigation of linguistic universals will also be enhanced by an understanding of the different effects of internal and external factors in language development. Language change is governed in the same way; internal factors give natural and phonetically motivated sound changes. Phonological universals hold true so long as the only determining factors are internal ones. It appears, however, that many universals can be violated when external factors participate.

This is best understood through some examples. It is normally held to be a universal that languages which have *q* (uvulars or post-velars) by implication also must have *k* (velars). This seems always to hold true except in several languages of different genetic families in an area of the Northwest Coast. Languages from the northern part of Vancouver Island to the mouth of the Columbia River, due to areal influence, share a diffused sound shift *k* > *č*, so that (for a period of time) they had *q* and *č* but no *k* (until new *k*'s were introduced in later loans) (Sapir 1926,

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Kinkade and Powell 1976, Kinkade 1973, etc.). Areal pressure and borrowing generally are counted among external factors. We might safely predict that the shift of k to \check{k} in a language with q could not take place due to internal factors alone. That is, we might predict that changes induced by internal factors do not violate universals, though external factors are not so restricted and may in fact lead to the violation of some universals. It is important to recognize the difference between changes induced by internal factors and those induced by external factors. Otherwise we might be tempted to reject the potential universal upon discovery of an externally induced counter-example.

A second example is the change of Proto-Algonquian $*a$ to a nasalized vowel in Eastern Algonquian due to contact with Iroquoian (Goddard 1965, 1971, Sherzer 1972). This would seem to violate the universal that nasalized vowels may only originate in the context of nasal consonants (Ferguson 1963), but its external origin (rather than internal motivation) prevents it from being a true counter-example.⁵

The final phonological example also comes from an area of the Northwest Coast. Languages of several families lack primary nasals. For example, in the Nootkan family, Nitinat and Makah have changed Proto-Nootkan nasals to voiced stops. Not only is this a rare and usually, unnatural change, it violates an otherwise near universal that languages don't lack primary nasals, and languages especially don't lack primary nasals while containing voiced stops. Nevertheless, Nitinat and Makah belong to that linguistic area of the Northwest Coast which lacks primary nasals, and have lost them due to areal pressure (Haas 1969a, 1969b). If this were an internal development,

it would violate universals, but once we recognize its external motivation, we need not be so ready to give up the universal.⁶

Since many phonological universals appear to have explanations determined by internal factors, perhaps a productive strategy for research on universals might be to investigate the perceptual and articulatory potentials and limitations of man which sharply limit the range of candidates for universals, and to couple this research with the traditional cross-linguistic approach to universals. Then perhaps the internal reasons for a feature's universality (or near-universality) need not be abandoned just because some speech community for whatever reasons chooses to modify the expected through external intervention.

NOTES

- ¹ Both *merta* (part: *veri* "blood") are front-vowel suff: Since these are *er-tV*, it is some where the *r* has less, it is seen
- ² I wish to thank !
- ³ I thank Sigward : information on k
- ⁴ Ikola (1971:147) the front- or ha. *barometri-stä*. truly are compou as compounds are *adverbeinea* ["as *apokryfisia* (or thesis)".] (my
- ⁵ Actually, recent in glottal envir nasal consonant These considerat (though Iroquoia for the nasaliza weakened form th potential univer J. Ohala 1974, e
- ⁶ External factors syntactic univer convincing examp It is sometimes unmarked form of imperatives to k language should forms. If one v example would po languages of the periphrastic for

NOTES

- ¹ Both *merta* (partitive sg of *meri* "sea") and *verta* (partitive sg of *veri* "blood") are Standard Finnish exceptions to the usual VH of front-vowel suffixes with roots which have only neutral vowels. Since these are the only two forms in the language which have *er-tV*, it is sometimes suggested that there is a subregularity where the *r* has a back affect that prevents front VH. Nevertheless, it is seen that the VH is adjusted in the word game.
- ² I wish to thank Martti Nyman for telling me about this word game.
- ³ I thank Sigward Linnio and his family, and Martti Nyman for information on *kontti kieli*.
- ⁴ Ikola (1971:147) says, "In compounds the last portion determines the front- or back-vowel vocalism of suffixes, for example *barometri-estä*. Nevertheless, words which in the donor language truly are compounds but which the Finnish user does not understand as compounds are treated as unconnected, for example, *adverbeinea* ["as adverbs"], *analyysia* (or *analyysiä*) ["analysis"], *apokryfisia* (or *apokryfisiä*) ["apocryphal"], *hypoteesia* ["hypothesis"]." (my loose translation [LC].)
- ⁵ Actually, recent work shows that nasalization of vowels may develop in glottal environments and spontaneously on low vowels without the nasal consonant required in the early formulation of the universal. These considerations weaken this example from Eastern Algonquian (though Iroquoian contact still seems the most plausible account for the nasalization of the vowel). Nevertheless, even in its weakened form this example illustrates the interplay between potential universals and internal vs. external factors. (See J. Ohala 1974, etc.)
- ⁶ External factors may also prove important in considerations of syntactic universals. Though I have not yet seriously sought convincing examples, the following may illustrate the potential. It is sometimes proposed that the simple imperative must be the unmarked form of verbs, that it is normal (unmarked) for imperatives to be the shortest of the verb forms and that every language should have a direct way of indicating imperative verb forms. If one were to suppose this, the Boas' (1966:44) areal example would pose problems: "we find that in the most diverse languages of the North Pacific coast, commands are given in the periphrastic form, *It would be good if you did so and so*; and

in many cases this periphrastic form has been substituted entirely for the ordinary imperative." Similarly, James Tai (1976) argues for the possibility that without external influence a language will not develop from SVO word order to SOV. Regardless of how we ultimately look at these two cases, they do illustrate that external factors may be involved in some syntactic universals.

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