

## I. INTRODUCTION

Finnish is a Uralic language, technically termed Finnic, whose closest relatives are Ingrian, Veps and Karelian. My speaker, though born in Houston, had Finnish as her first language and grew up speaking Finnish to her relatives and other care-givers both in the States and in Finland. She continues to use Finnish on a regular basis as she speaks the language at home and during her summers in Finland. She considers herself to be a native speaker of the Jyväskylä<sup>1</sup> dialect, though her slight American accent is perceived by Finns as a Swede-Finnish one. Any deviations in her pronunciation from those that might be expected will be noted below.

## II. CONSONANTS

### *a. Overview*

Relatively speaking, Finnish<sup>2</sup> has very few consonants. There are three contrasts each within the stops, nasals and fricatives, and only one each of the trill, central approximant and lateral approximant. All of these except /ŋ/ can appear word-initially. For this speaker, /ŋ/ is evoked by the orthographic “ng.” However, in other dialects this is pronounced /nk/ or /ŋk/, and according to Eliot,<sup>3</sup> in certain regions the orthography has been changed to “nk” to reflect this phonetic fact. The speaker also has /b/, /d/, /g/, and /f/ in her dialect, each varying in the degree to which they are similar to their Finnish counterparts. As seen in the contrasting simple consonants segment of the recordings, the voicing in her /b/ is minimal, while that in her /d/ is extreme, sounding (and according to the speaker, feeling) quite forced. The last two phonemes are somewhere in the middle, sounding much like the American versions.

(Refer to Tables 1 for a full listing of consonants. Refer to Table 2 for contrasting native and foreign consonants.)

### *b. Simple Consonants*

All Finnish stops are unaspirated plosives. The tongue tip in /t/ is positioned along both the teeth and the alveolar ridge, and much like the French, can be described as **apico-laminal**. The sound /r/ is a trill even in its simple form, and cannot be classified as either a tap or a flap, as might be the case with the “r” in the Spanish “caro” (vs. “carro”). The labiodental voiced fricative /v/ is produced with very little turbulence, occasionally approaching an approximant. While for the most part /s/ is an alveolar fricative, when it precedes a high vowel the speaker tends to retract the tongue so it approaches a post-alveolar articulation.<sup>4</sup> Eliot describes /h/ as “a stronger aspirate than in English, and is almost like the Russian *x* or the German *ch*.”<sup>5</sup> However, I have not found this to be true with the speaker; while this sound may be more regularly audible

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<sup>1</sup> Jyväskylä is a large university town in central Finland, and is the purported home of the “purest” Finnish.

<sup>2</sup> By this I mean the sound system native to Finnish. I will indicate specifically if I mean the broader range of articulations produced by the well educated population.

<sup>3</sup> Eliot, C. N. E. *A Finnish Grammar*. Oxford: Clarendon Press, 1890. p. 1. His description of the potential pronunciations is somewhat opaque, but this is how I understood it.

<sup>4</sup> This is not necessarily a native pronunciation, but it could be, as consonants are generally affected to some extent by the vowel they precede.

<sup>5</sup> Eliot, p. 2.

than in English, it is certainly not created with a constriction at the palate or velum. Finally, the lateral approximant /l/ has a constriction at the alveolar ridge, but when preceding a back vowel, especially the higher ones, the speaker tends to make it velarized.<sup>6</sup>

(Refer to Table 3 for word-initial contrasts.)

### *c. Geminate Consonants*

One way that Finnish does create more contrast within the set of consonants is by doubling them. The only ones that do not allow for a morphemic contrast are /ŋ/ (and /f/ for those who have it in their dialect), which are always long (compared to other nasals and fricatives) and /h/, /j/, and the foreign sounds, which are never doubled. Geminate consonants, including /ŋ/ and /f/, can only occur word-medially (though the speaker does pronounce /f/ as a simple consonant at the beginning of a foreign word, such as “forelli”). In each case, the geminate consonant has the same quality as the simple counterpart, but has a longer duration.

(Refer to Table 4 for word-medial contrasts.)

## III. VOWELS

### *a. Overview*

As opposed to the number of consonants, the number of contrasting vowels in Finnish is large: a total of 32 contrasts exist, including geminates and diphthongs. Each of these contrasts arises from a set of 8 simple vowels which are either lengthened to create geminates, or paired in specific ways with another simple vowel to create diphthongs.

(Refer to Figure 1 for a vowel formant chart for simple vowels, and Figure 2 for a chart for diphthongs.)

### *b. Simple Vowels*

With respect to the continuous vowel space description, Finnish vowels occur at three heights and three points along the front-back parameter, and can also differ in rounding. My choice in calling /e/ and /ø/ Mid-high rather than Central, and /æ/ Central rather than Front is motivated by their locations within the F2-F2 vs F1 Vowel Formant Chart as they relate to one another rather than to the Cardinal Vowels. (See Figure 1) Compared to a similar chart of American English vowels found in Borden, et al.,<sup>7</sup> the speaker's vowels tend to have a higher F1 value, as is especially seen in the /æ/ which is noticeably lower than the /a/. In addition, her /u/ and /o/ seem to have F2-F1 values comparable to her /a/, unlike in the American English examples, where these values are higher. The rounded counterparts of the unrounded front vowels have consistently lower F1 and F2-F1 values, as can be expected, since rounding lowers all formants. The vowel formant chart for the speaker's simple vowels is a ready counterexample to Lindblom's Dispersion Theory, which claims that languages tend to optimize the distance between vowels in order to allow for the greatest contrast between them. Rather than spacing her vowels evenly, the speaker makes a grouping of four vowels in the top left corner of the chart, leaving the other four to fill in the rest of the space.

### *c. Geminate Vowels*

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<sup>6</sup> Again, not necessarily a native Finnish trait, but being a native speaker of Russian, this is something I've found in my own speech!

<sup>7</sup> Borden, G. J., Harris, K. S., Raphael, L. J. Speech Science Primer: Physiology, Acoustics, and Perception of Speech New York: Lippincott Williams & Wilkins, 1994. p. 112.

Just as in the Geminata Consonants, Geminata Vowels are formed by lengthening the duration of each of the simple vowels while maintaining the same (auditory) quality. (See Table 7) Although an analysis of the difference in the formants of the geminate vs. simple vowels is outside the scope of this paper, it is reasonable to assume that the results of such a comparison would prove similar to those already found for Czech. That is, the relative placement of the geminates to one another would be the same as that of the simple vowels to each other, but the longer vowels would create a larger boundary within which the shorter vowels would be enclosed.<sup>8</sup> In languages which do not contrast long and short vowels, it is common to see differing vowel lengths depending on such factors as vowel height and surrounding consonants. However, the speaker's vowel duration measurements show that duration differences within the simple vowels are less consistent than differences between these and their geminate counterparts. (See Table 6) In other words, while the "short" vowels may be anywhere between 0.055385 and 0.111595 seconds in length while the "long" vowels vary between 0.120129 and 0.323745 seconds, (i.e. almost overlapping, as in between /u/ in /kulo/ and /i:/ in /hi:p:a/, the geminate is always longer than the simple vowel to which it corresponds, even if the ratio is not always 1:2.

#### *d. Diphthongs*

Diphthongs occur only in the first syllable of a word, which is also the syllable that always carries the principal stress.<sup>9</sup> Anywhere else in a word, combinations of vowels, either those listed in Tables 8 & 9 or other combinations, are considered to form two separate syllables.

There are several potential ways to classify diphthongs in Finnish. The first, and most superficial, is to list them according to the first vowel of each pair. It turns out that each of the eight vowels has two associated diphthongs, thus creating a total of 16. However, this listing proves inadequate when one notes that the pairings involve each of the 8 simple vowels in non-uniform ways. (i.e. /ai/ & /au/ vs. /yi/ & /yø/) In addition, 13 of these carry a stress on the first of the pair while the others carry the stress on the second. None of the six vowels involved in these three diphthongs is the same, thus leading to the conclusion that it is not a factor intrinsic to the vowels themselves that determines the type and quality of the diphthongs. Next one might look at which vowels are allowed in the second position. For the diphthongs with stress on the first vowel, the most common second vowel is /i/ with 7, next is /u/ with 4 followed by /y/ with 2. For those with the stress on the second vowel, there is one with each of /e/, /o/, and /y/ in the final position. Once again, vowel-intrinsic statistics fail to reveal a coherent pattern.

Another approach involves what is commonly known as "vowel harmony."<sup>10</sup> Within this framework, the simple vowels are divided into three classes: hard, soft and neutral, with /a/, /o/, /u/, in the first, /æ/, /ø/, /y/ in the second and /e/, /i/ in the third. From here it is noted that members of the "hard" and "soft" categories cannot co-occur. Instead they can only appear with other members of the same category or with one of the "neutral" vowels. (This rule holds not only within a diphthong, but also across an entire word.) While this classification may be helpful for teaching the possible sound combinations in Finnish, it does little more than describe the

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<sup>8</sup> As shown in figure comparing simple and geminate vowels in check on class notes page: <http://www.ling.yale.edu/ling120/Prosody/duration.html>

<sup>9</sup> Renfors, Agnes. *Finnish Self-Taught* London: E. Marlborough & Co. Ltd., n.d. (First edition preface 1910, Second edition preface 1932).

<sup>10</sup> for instance: Eliot, p. 6.

facts. The main problem is that the categories do not always correspond to particular areas of the formant chart, parameter settings, or groupings of constrictions.<sup>11</sup>

The last method I will propose is the study of the rounding and height parameters for each pairing.<sup>12</sup> Looking at the diphthongs whose stress falls on the second vowel, a pattern immediately emerges: both vowels in each pair maintain the same rounding parameter setting, and in each case the vowel height drops slightly from High to Mid-high. (In addition, the fronting parameter remains the same within the diphthong.) Thus, the high front rounded vowel /y/ forms a diphthong with the mid-high front rounded vowel /ø/ which carries the stress, but not vice-versa. In the case where the opposite ordering of the vowels occurs, such as /uo/ and /ou/, the stress switches to the first of the two for the raising motion. However, this is merely a description and not a generalization. While it is true that only pairs in which the second vowel is lower have a stress on the second vowel, like the “vowel harmony” approach, it fails to explain why other pairings such as /ue/ do not occur as diphthongs.<sup>13</sup>

A final note about diphthongs specific to the speaker’s production: while in running speech the second vowel does not always sound like it has achieved the full quality it would have if it stood alone, the target is nevertheless the same. And in fact, it is more the /i/ than the /u/ or any of the other second-position vowels that might not reach the full intended height.

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<sup>11</sup> An exception to this might be that “hard” vowels are formed in the back while “soft” vowels are farther front, but this does not fit exactly with my classification of /æ/ as a central vowel, nor does it explain why /e/ and /i/, both vowels that are higher and more to the front than members of the “soft” category should be called “neutral.”

<sup>12</sup> Alternatively, one could use the Quantal Theory, substituting in constriction, rounding, jaw height and tenseness parameters.

<sup>13</sup> As opposed to separate syllables, which may be possible.