Perceptual and Judgment-Based Experiments on Scottish Gaelic Svarabhakti

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3. Does the svarabhakti vowel count as a syllable nucleus?
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4. Does the svarabhakti vowel alter the syllabification of a word?
   • Experiment on the affiliation of the consonant preceding the svarabhakti vowel (Experiment 2)
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The Svarabhakti Vowel

Not all pronounced vowels are orthographically present in Scottish Gaelic. Rather, a vowel may be said to be inserted in certain environments: (Borgstrøm, 1937; Clements, 1986):

eg, sealg : /ʃalk/ → [ʃalak]

There is a contrast between these vowels and those that exist in the orthography. Orthographic vowels are said to be underlying:

eg, pealag : /pjalak/ → [pjalak]

This non-underlying vowel is usually referred to as a svarabhakti vowel.
Several claims have been made about the phonological/psychological status of the svarabhakti vowel:

- Svarabhakti vowels, unlike underlying vowels, do not contribute to the syllable count of a word (Borgstrøm, 1937; Clements, 1986; Smith 1999).

- Syllabification of an intervocalic consonant is different preceding an underlying vowel vs. a svarabhakti vowel. There is some controversy as to how the two differ, however. Borgstrøm (1940) claims that preceding an underlying vowel, the consonant should be the coda of the first syllable. Preceding a svarabhakti vowel, the consonant does not affiliate to the left. Smith (1999) makes the opposite claim for Leurbost Gaelic. (More on this later)
What does it mean to contribute to syllable count?

In English, vocalic units usually each add one syllable to the syllable count of a word:

eg, the word *banana* has three vocalic units, and three syllables.

Do svarabhakti vowels count as a syllable?

- If no, then underlying vowels are predicted to add one syllable each to the syllable count, svarabhakti vowels are predicted not to (eg, *balk* should count as one syllable in this case)
- If yes, then the number of syllables in a word should be the same as the number of vowels, regardless of whether the vowel is svarabhakti or underlying (in this case, *balk* should count as two syllables)
Experiment 1: Method

1. Participants were asked to give the Scottish Gaelic translation of an English word. (This avoided biasing the speaker, either by the orthography, or by potential mispronunciations by the experimenter.) If the word was unfamiliar, it was discarded.

2. All participants were monolingual in Scottish Gaelic until age 5.

3. Participants were then asked to count the number of syllables in a word of Scots Gaelic; syllable count was recorded by the experimenter.
Coding and Hypotheses

- Syllable count responses were coded for the number of extra syllables beyond the underlying number of vowels. That is,
- /pjalak/ = 2 underlying syllables
- /∅alk/ → [jalak] = 1 underlying syllable.
• Hence, the null hypothesis is that a svarabhakti vowel will not be counted as a syllable

Stats were run on the number resulting from the difference between the count given by the participant and the underlying count. By the null hypothesis, then, there should be no significant difference between the number of extra syllables counted (i.e., more than expected giving the underlying number of vowels) for each word type (whether the word contained a svarabhakti vowel or not).
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• Stats were run on the number resulting from the difference between the count given by the participant and the underlying count
• By the null hypothesis, then, there should be no significant difference between the number of *extra* syllables counted (ie, more than expected giving the underlying number of vowels) for each word type (whether the word contained a svarabhakti vowel or not)
Results for Experiment 1

- ANOVAs by subject and by item show a significant difference:
  - by subject ($F_1(1, 16) = 112.664, p<0.001$), and
  - by item ($F_2(1, 15) = 27.847, p<0.001$).
Two basic conclusions from Experiment 1:

1. Words containing a svarabhakti vowel are more likely to be counted as having an *extra* syllable than words not containing a svarabhakti vowel.
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1. Words containing a svarabhakti vowel are more likely to be counted as having an *extra* syllable than words not containing a svarabhakti vowel

2. However, the mean difference of 0.584 means that speakers only count a svarabhakti vowel as a syllable roughly 50% of the time.
It may be that the svarabhakti vowel adds something like half a syllable; indeed, some participants gave answers like ”one and a half syllables” for the syllable count, although this had not been given to them as an option (these responses were excluded from analysis). As our experiment was designed for categorical responses, it cannot be determined from our results how much a svarabhakti vowel contributes to the syllable count, only that it does more often than would be expected if it did not add to the syllable count at all.
Final thoughts on Experiment 1

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Results were replicated in a second experiment in which subjects were asked to "knock" the number of beats in a word. These results will not be gone over here, but you may ask me about them later if you are interested.
Experiment 2: Affiliation of the intervocalic consonant

- The usual syllabification of Scots Gaelic is VC.V: an intervocalic consonant will syllabify as the coda rather than as the onset. Thus, affiliation is to the left - the intervocalic consonant affiliates with the previous vowel. (Borgstrøm, 1940)

- If speakers are asked to give the syllables of a word, it is possible that the consonant preceding a svarabhakti vowel will also affiliate to the left, but Borgstrom (1940) predicts that it will not.

- Note that Smith (1999) in fact predicts the opposite, at least in the Leurbost dialect: that the consonant will affiliate to the right when followed by an underlying vowel, but will affiliate to the left when followed by a svarabhakti vowel.

- Experiment 2 examines what happens to a consonant preceding a svarabhakti vowel; will it affiliate to the left, or not?
Experiment 2: Method

- Stimuli were a subset - the disyllabic words - of those used in the counting experiment.
- Participants were asked for the first syllable of the word; responses were recorded by the experimenter, using the International Phonetic Alphabet
- Again, all participants were monolingual in Scots Gaelic until the age of 5.
- Responses were later coded 'yes' or 'no' as to whether the first syllable contained the intervocalic consonant or not.
Results for Experiment 2

- ANOVAs by subject and by item showed a significant difference:
  - by subject ($F_1(1, 15) = 10.283, p = 0.006$), and
  - by item ($F_2(1, 9) = 33.499, p < 0.001$).
Conclusions for Experiment 2

1. The intervocalic consonant affiliates to the left significantly less often if followed by a svarabhakti vowel (44% vs. 73%).

2. However, the consonant still affiliates to the left fairly often, even when followed by a svarabhakti vowel.

Note: We also ran a related experiment as to whether the intervocalic consonant more frequently affiliated to the right when followed by a svarabhakti vowel, independent of whether it affiliated to the left. The results, however, were not significant, and are not discussed here.
General conclusions

Based on these two experiments, we have shown:

- Svarabhakti vowels do contribute something more than zero but less than one syllable to the syllable count.
- The consonant preceding a svarabhakti vowel does affiliate to the left somewhat less than 50% of the time, which is less often than a consonant preceding an underlying vowel.
These results extend the conclusions made by previous studies of the svarabhakti vowel in Scots Gaelic:

- The literature is essentially supported
  - There is indeed a difference in syllable count between a word containing a svarabhakti vowel and a word containing only underlying vowels
  - There is also a difference in consonant affiliation when the consonant is followed by a svarabhakti vowel vs. an underlying vowel.
"Big picture" conclusions

These results add to the conclusions made by previous studies of the svarabhakti vowel in Scots Gaelic:

• But it is a little more complicated than what has been claimed:

  • The svarabhakti vowel does add something to syllable count - approximately a half syllable. A word with a svarabhakti vowel has more "stuff" than would be expected, given the number of underlying vowels. It behaves neither as a full vowel, nor as nothing, as was claimed by Hall (2006).

  • The consonant preceding a svarabhakti vowel affiliates less often to the left, but it can, and it does a little less than 50% of the time.