Factors of perceptibility of glides in hiatus
Anya Lunden, College of William & Mary
lunden@wm.edu

Most languages have at least one glide phoneme. The acoustic signature of glides also phonetically occurs when moving from a higher vowel to a lower one. Such sequences are generally taken to be instances of hiatus, the abuttment of heterosyllabic vowels. Evidence is presented that the key component of whether or not a glide is perceived is the length of the first vowel, rather than the presence or absence of the acoustic components of a glide.

An acoustic [j] results in the transition of a [i] or [e] to another vowel, a [w] from the transition of a [u] or [o] to another vowel (see the white circles in (1) and (2), which show the formant transitions that are like [j]-like, resulting from the sequence [i.a]). Two multiple forced choice (MFC) perception experiments were run in order to test the hypothesis that a major factor in whether or not a glide is perceived to be present appears to be the length of the preceding vowel. In both studies, subjects heard a sentence with a nonce word in it and had to decide whether or not the nonce word included a glide ([j] or [w]) or not. Stimuli were synthesized with MROLA (with both a male voice and a female voice). No glide was synthesized, just an adjacent [i] and [a], which the synthesizer produces, like a natural speaker would, with formant transitions that share characteristics of a glide. The only difference between stimuli within each experiment was the length of the vowel before the acoustically-present glide. The first study (N=65) tested whether subjects reported hearing the nonce word “ost” or the nonce word “yost”/“wost” following a word that ended in a [i] or [u] (i.e. I saw a happy (y)ost there). In Study 1, the preceding vowel varied in 10 ms intervals from 60 to 180 ms. The second study (N=80) took the final syllable of the word preceding the nonce word in Study 1 and made a single nonce word (i.e. I saw a pi(y)ost there). In Study 2 (Within Words) the preceding vowel varied in 30 ms intervals from 30 to 180 ms. Two examples of extremes from Study 1 are given in (1) and in (2).

Both studies found a correlation between the length of the first vowel in the hiatus sequence and the likelihood of subjects to report hearing a word with a glide, as show in (3) and in (4). The effect is stronger in Study 1, as the presence/absence of a glide is contrastive word initially but not in the word-internal environment of Study 2 (“ost” and “yost” are potentially two different words of English, whereas “piost” and “piyost” are not). This finding is consistent with the findings of Davidson and Erker (2014), who show that what has been reported to be glide insertion in English is actually not different from the sequence of two vowels without “glide insertion,” based on comparing durations of the entire vowel-vowel sequence (with any intervening glide), and true vowel-glide-vowel sequences are longer.

The studies’ findings suggest that we either should not find within-word contrasts of glide/no glide in languages, or, if we do, that we should expect to see the contrast realized through length of the first vowel. Typological research is ongoing.

The linear increase seen in (3) and (4) is somewhat surprising, as we expect sound perception to be categorical. I suggest that we find linear perception in cases where the contrast is between the presence of a sound and the absence of a sound. A similar study with excrescent stops in English will be shown to support this hypothesis.
(1) Study 1: 60 ms [i] preceding formant transitions (circled) to [a]

(2) Study 1: 180 ms [i] preceding formant transitions (circled) to [a]

(3) Study 1: Between words
(i.e. “happy (y)ost”)

(4) Study 2: Within words
(i.e. “pi(y)ost”)

References