Synchrony in diachronic analysis: the interpretation of <w> in Mycenaean Greek

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Abstract: In historical linguistics, it is very common to interpret the data mainly by means of a diachronic approach. In this article, I will claim that, a combination of various linguistic methods, including a synchronic analysis and cross-linguistic parallels, leads to better motivated conclusions. I will illustrate this claim with a case study: the interpretation and analysis of <w> in Mycenaean Greek. This consonant is traditionally interpreted as a glide [w]. However, the interpretation as an approximant [ʋ] corresponds better with the diachronic and synchronic processes of the language itself and is additionally supported by cross-linguistic parallels from various languages.
Key words: historical linguistics, Mycenaean Greek, glides

1. Introduction

In historical linguistics it is very common to interpret the data mainly by means of diachronic reconstructions and etymologies. In this article I will claim that a detailed knowledge of the synchronic grammatical system is also important and can provide crucial evidence for the interpretation and theoretical analysis of the language. Also cross-linguistic parallels of similar linguistic phenomena will contribute to better motivated conclusions concerning the diachronic and historical facts. The combination of these linguistic approaches eventually leads to methodologically more consistent results.

In order to illustrate this claim, I will present a case study from the phonology of Mycenaean Greek (±1250 b. C.): the interpretation of the consonant conventionally transcribed as <w>. This case is of special interest for two reasons: a) the language raises interpretational questions due to its sparse sources and its unique orthographic system by means of syllabograms and b) the phonology of glides is one of the ongoing debates in generative phonology (cf. Levi 2004 among others).

I will argue that the consonant <w> can better be interpreted as the labial approximant [ʋ] instead of the labial glide [w]. I will claim that the traditional arguments in favor of the interpretation as [w] are based on insufficiently motivated assumptions and therefore weak from a methodological point of view. The proposed interpretation as [ʋ] is more in harmony with diachronic and synchronic phonological processes and additionally supported by cross-linguistic parallels.

The structure of this article is as follows: in the next section I will present a short overview of the language, its sources and its orthographic system. In section 3, the traditional interpretation of Mycenaean <w> and its problems are given, followed by the evidence provided by synchronic phonotactics. This argumentation can be split up by the phonological system of the language itself (section 4) and cross-linguistic parallels (section 5). I will close with the conclusions in the last section.

2. Overview of the language and its orthographic system

Mycenaean Greek is the language of the so-called Mycenaean culture, which flourished in the south of today's Greece around 1400-1200 b.C. The language is attested on

approximately 7000 clay tablets which were used for purpose of the administration of the political centers, the palaces. After every administrational year, the tablets were melted in water and the clay was re-used for the tablets of the new administrational year. Thanks to the destruction of the palaces by fire, the tablets of the last administrational year were burnt and thus preserved. This happened in the period 1250-1200 b.C. As a result, the tablets from every finding spot have the same chronology.[1]

With respect to its geographical distribution, most tablets have been found in Pylos (Peloponnese) and Knossos (Crete). Other minor finding places are Tiryns, Mycenae (both Peloponnese) and Thebes (mainland Greece) among others. Though geographically scattered, the language shows a remarkable linguistic unity; variation within the language can hardly be contributed to geographical diversity (see for a more detailed discussion of variation Risch 1966; Vis 2008, 2009).

Thanks to the decipherment of the tablets by Michael Ventris and John Chadwick in 1952, it is known that the language is a form of Greek (Ventris & Chadwick 1972 [1956]). The language was written in a system of syllabograms of the (C)V-type, called Linear B[2]. This orthographic system didn't meet the linguistic structure of the language resulting in several interpretational problems. When reading the linear B tablets, one should have in mind the following orthographic features: 1) laryngeal distinctions are not always reflected in orthography, 2) there's no orthographic distinction between long and short vowels, nor between [l] and [r], 3) coda's are omitted, 4) onset clusters are spelled in full, using more than one syllabogram while repeating the vowel of the nucleus. It should also be noted that the Latin transcriptions are conventional and don't reflect the exact phonetic realization.

The segmental inventory of the language is given at (1) below (following Vis 2008):

(1) The segmental inventory of Mycenaean Greek

	Labial	Coronal	Velar	Labiovelar	Palatalized
Stops:	p, p^h, b	t, t^h, d	k, k^h, g	k^w, k^{wh}, g^w	k^j,g^j
Fricatives:		s			
Nasals:	m	n			
Approximants:	ʋ	r, l			r^j, l^j
Glides:		j			

Remarkable is the large inventory of stops and complex segments, while there is only one fricative in the language. The palatalized interpretations are not accepted by all scholars and alternative proposals include several kinds of affricates for the palatalized velar stops and the consonantal sequences [rj] and [lj] for the approximants (a discussion of these problems is out of the scope of this article, see Vis 2008 for more details). Another interpretational discussion concerns the labial consonant, which is conventionally transcribed as <w>. This sound is usually interpreted as a glide [w]. In the remainder of this article, it will be claimed that the interpretation as an approximant [ʋ] is more consistent with the synchronic and diachronic phonological processes of the language.

3. The diachronic approach
One of the linguistic problems of Mycenaean Greek is the phonetic interpretation of the consonant, which is conventionally transcribed as <w>. Mycenaean <w> corresponds

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[1] Some of the inscriptions found in Knossos stem from two earlier destructions of the palace (Driessen 1990). These are however few in number and don't show any linguistic divergence.
[2] There are a few syllabograms consisting of CCV, which are <dwe>, <twe>, <two>, <nwa> and <pte>.

with reconstructed *w of the Proto-Indo-European etymologies and the symbol <F> (digamma) of some ancient Greek dialects.[3] For the Proto-Indo-European and ancient Greek segments, the glide [w] is assumed to be the phonetic realization. However, this interpretation is based solely on assumptions of a sound of a reconstructed phase of the language which is dated approximately 3000 years earlier (see Beekes 1995 for a discussion of the chronology of Proto-Indo-European) or the possible realization of a later stage of the language. For that reason, the motivation for the interpretation of Mycenaean <w> seems methodologically weak and additional support is needed.

Moreover, this interpretation has been subject to discussion (Szemerenyi 1966; Galavotti 1988). The main argument stems from the pre-Greek neutralization of the labiovelars $*k^w$ and the consonantal sequence *k+w. In this period previous to the Mycenaean inscriptions, the Proto-Indo-European sequence *kw merged with the labiovelars. The result is that in Mycenaean Greek, original *kw and the labiovelars are identical (see Sihler 1995 among others). This is supported by the orthography, in which both are written as <q>, which is the conventional transcription for the labiovelars:

(2a)   PIE *hikwos > Myc. hikk^{w}os (orth. <i-qo>)   'horse'
(2b)   PIE *kwas > Myc. –kk^{w}as (orth. <qa>)   'property'

Due this neutralization, it is not expected that the sequence <k+w> still occurs in Mycenaean Greek. However, the data contradict this assumption:

	Latin transcription	*Phonetic transcription*	*Translation*
(3a)	te-tu-ko-wo-ha	[t^{h}et^{h}uk<w>oha]	'completely made$_{neut. acc. pl.}$'
(3b)	o-da-ke-we-ta	[odak<w>enta]	'provided with teeth$_{neut. acc. pl.}$'
(3c)	pa-ra-ke-we	[barak<w>ei]	'smaragd$_{dat.}$'
(3d)	a-pu-ko-wo-ko	[ampuk<w>orgoi]	'workers with "ampukes"'[4]

A possible interpretation of these data is that the difference between the words at 3) and words with an original labiovelar may not be a phonological one and that the phonetic sound [k^w] may be written in two different ways. Assuming orthographic inconsistency is arbitrary and contradicts the systematic nature of the facts. First, the examples at 3) have an alternative spelling (see section 4.1.), whereas the words with an original labiovelar always surface with the symbol <q>. This implies a systematic difference between both sets of words. Moreover, in Mycenaean orthography the complex consonants, like the labiovelars, are never written with two syllabograms. For example, complex [r^j] as in the syllable [r^{j}a] is never written as *<ra-ja> but always with its own syllabogram <ra$_2$> (subscript <$_2$> stems from the time that the interpretation of this syllabogram was still controversial).

As a result, it can be concluded from the examples at 2) and 3) that there exists a sequence <kw> parallel to the labiovelars. This observation suggests that either the sequence <kw> or the labiovelars should be interpreted in a different way than traditionally is assumed. As will be made clear in the next sections, the sequence <kw> should better be interpreted by [kʋ] which is not subject to the diachronic merger with the labiovelars.

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[3] Ancient Greek <F> has been preserved in many dialects when it occurred between two vowels. In other positions in the word, it has usually disappeared before the time of the earliest inscriptions (see Buck 1955; Schmitt 1977 for more data). It should be noted that in modern Tsakonian, ancient <F> has been preserved as the fricative [v], e.g. [vane] 'lamb' < warnion (Browning 1983).
[4] The exact interpretation of the word "ampukes" is not clear (Diccionario Micenico, s.v.)

4. The synchronic approach

In this section, three synchronic features of Mycenaean phonology will be discussed, which point to the interpretation of <w> as the labial approximant [ʋ] instead of the glide [w]. These features are the systematic relation of <w> with the vowel [u], syllabic phonotactics, and asymmetries with respect to hiatus resolution.

4.1. Alternation with [u]

In Mycenaean Greek, a frequent alternation of <w> with the vowel [u] is attested:

	Input	*Outputs*	*Orthography*	*Translation*
(4a)	/barakuei/ >	[baraku<w>ei]	pa-ra-ku-we	'smaragd$_{dat.}$'
		[barak<w>ei]	pa-ra-ke-we	
(4b)	/duo:/ >	[du<w>o:]	du-wo	'two'
		[d<w>o:]	dwo	
(4c)	/odakuenta/ >	[odaku<w>enta]	o-da-ku-we-ta	'with teeth$_{pl.}$'
		[odak<w>enta]	o-da-ke-we-ta	

This systematic relation with the labial vowel [u] provides a clear indication for a labial place of articulation of <w>. The manner of articulation however cannot be concluded from these data. Consequently, based only on this alternation alone, possible interpretations of <w> may be any labial consonant. Of these possibilities, stops and nasals can be excluded, given that they are rendered by other syllabograms. This leaves open the possible interpretations of <w> as a fricative [f] or [v], approximant [ʋ] or glide [w]. Syllabic phonotactics provides support concerning the manner of articulation.

4.2. Syllabic phonotactics

Mycenaean orthography reflects syllabic structure. More specifically, all onset consonants are written, whereas the coda consonants are omitted (Steriade 1982; Vis 2008). Based on the data, it can be concluded that <w> can form tautosyllabic clusters with a following approximant [r] or [l] or with a preceding nasal [n]. When an approximant precedes, the sequence is heterosyllabic (syllabic boundaries are marked with '.'):

(5a)	wi-ri-no =	[<w>ri.nos]	'skin of ox'
(5b)	wo-ro-ma =	[<w>lo:.ma]	'fringe'
(5c)	pe-ne-we-ta =	[spʰe:.n<w>en.ta]	'with wedges$_{acc. pl.}$'
(5d)	ko-wo =	[kor.<w>os]	'boy'
(5e)	ka-wa-do-ro =	[kal.<w>na.dros]	'proper name'

Assuming that tautosyllabic consonantal clusters in onset position have a decreasing consonantal strength (Lass 1984), these data indicate that the relative consonantal strength of the segment <w> is in between that of the nasal [n] and the approximants [l] and [r], yielding thus the partial scale of consonantal strength: n > <w> > l, r. The interpretation of <w> as the glide [w] would imply that the onset clusters *[wr], *[wl] are tautosyllabic. This interpretation however constitutes a violation of the universal scale of consonantal strength according to which approximants are stronger than glides (Lass 1984): n > l, r > w. In some languages the scale of consonantal strength can be violated, but in Mycenaean Greek consonantal sequences with reverse consonantal strength (e.g. [rp], [nt], [rm] etc.) are always heterosyllabic.

An interpretation of <w> as a fricative [f] or [v] leads to similar problems. In this case, onset clusters like *[nv] / *[nf] (see e.g. [sp^{h}e:n<w>enta] at 5c) would be analyzed as tautosyllabic which violate the scale of consonantal strength according to which fricatives are stronger than nasals.

An interpretation of <w> as a labial approximant [ʋ] however doesn't violate the scale of consonantal strength. This interpretation would yield the tautosyllabic onset clusters [ʋr] and [ʋl]. According to the scale of consonantal strength, these clusters consist of members with the same strength. This is in harmony with the syllabic phonotactics of the language. In Mycenaean Greek, consonants with the same consonantal strength are well-formed tautosyllabic clusters, as long as a labial consonant precedes a coronal one. If not, the consonantal sequence is heterosyllabic, which may trigger deletion of the first consonant. This principle is supported by clusters which consist of two obstruents or nasals.

obstruent + obstruent:
(6a) [ra.pte:r]   ra-pte   'dress-maker'
(6b) [po.p^{h}i] < /dp/   po-pi   'base$_{instr.}$'

nasal + nasal:
(6c) [a.mni.sos]   a-mi-ni-so   'placename'
(6d) [e.mis.t^{h}os]   < /nm/ e-mi-to   'with wage'

approximant + aproximant:
(6e) [ʋlo:.ma]   wo-ro-ma   'fringe'
(6f) [ʋri.nos]   wi-ri-no   'skin of ox'
(6g) [kor.ʋos]   ko-wo   'boy'
(6h) [kal.ʋandros]   ka-wa-do-ro   'proper name'

It can be argued that from a typological point of view, the labial approximant [ʋ] is more unusual in the segment inventory of a language than a labial glide [w]. The interpretation of <w> as a glide however would imply another typological peculiarity: reverse consonantal strength in onset clusters. Moreover, the interpretation as [ʋ] is supported by other features of labial segments, which will be discussed in the next section.

4.3.   Asymmetric phonotactics
The above proposed interpretation of <w> as the approximant [ʋ] implies an asymmetry between a coronal **glide** [j] vs. a labial **approximant** [ʋ] on the other. A closer look at the data however shows that this asymmetry is systematic and can also be found in the orthography of diphthongs and the phonological processes with which hiatus is resolved.

Diphthongs with labial [u] as second member are written in full. When coronal [i] is the second member of a diphthong, this is usually omitted in orthography, although the orthographic system has the possibility to reflect them:

	Phonetic realization	*Orthography*	*Translation*
(7a)	[eleut^{h}eros]	e-re-u-te-ro	'free from taxes'
(7b)	[apukekaumenos]	a-pu-ke-ka-u-me-no	'burnt'
(7c)	[hek^{h}ei]	e-ke *not* e-ke-i	'have$_{3.s.}$'
(7d)	[peraigolahija]	pe-ra-ko-ra-i-ja *not* pe-ra-i-ko-ra-i-ja	'placename'

Based on the orthography of diphthongs, it can be concluded that in diphthongs labial [u] is more prominent than coronal [i]. A similar conclusion can be drawn from the application of phonological processes in order to avoid hiatus.

In Mycenaean Greek, underlying hiatus is resolved. The language exhibits several strategies in order to avoid the sequence of two vowels, like diphthong formation, anaptyxis of a homorganic consonant and consonant formation (see Vis 2008 for a detailed discussion of hiatus resolution in Mycenaean Greek). For the purpose of this study, the latter is of interest. In the underlying sequences /uV/ and /iV/, the first vowel changes into a consonant. However, underlying /u/ surfaces as an autonomous segment [ʋ], whereas underlying /i/ is realized as the secondary articulation of the previous consonant [ʲ].

	Input		*Output*	*Translation*
(8a)	/ksenua/	>	[ksenʋa]	'foreign$_{acc.\ pl.}$'
(8b)	/barakuei/	>	[barakʋei]	'smaragd$_{dat.}$'
(8c)	/kʰalkia/	>	[kʰalkʲa]	'bronze$_{acc.\ pl.neut.}$'
(8d)	/turion/	>	[turʲon]	'cheese'

The observation that labial /u/ and not coronal /i/ is related to an autonomous segment is consistent with the data presented so far. Several aspects of the phonology of Mycenaean Greek point to differences in prominence between labial and coronal segments. The consequences of this difference are resumed below:

a)   The labial consonant precedes the coronal one in tautosyllabic clusters which consist of consonants with the same manner of articulation (obstruents, nasals, approximants).

b)   Diphthongs with labial [u] are written in full, whereas coronal [i] as a second member of a diphthong is usually omitted.

c)   In avoiding hiatus, labial /u/ is realized as an autonomous segment whereas underlying /i/ surfaces as a secondary articulation.

The interpretation of <w> as a stronger approximant [ʋ] instead of a weaker glide [w] is in harmony with these observations.

5.   Cross-linguistics parallels

In the previous sections it has been claimed that in Mycenaean Greek labial consonants have more consonantal strength than their coronal counterparts. The consequences for several aspects of the synchronic phonological system of Mycenaean Greek have been discussed. This discussion has resulted in a more consistent interpretation of the consonant conventionally transcribed as <w> as an approximant [ʋ]. This conclusion is also in harmony with the diachronic data because it explains why the Mycenaean sequence [k<w>] didn't merge with the labiovelar [kʷ] just as original Proto-Indo-European *kw did. Mycenaean [k<w>] should be interpreted as [kʋ] and therefore differs from the labiovelars, unlike original *kw.

Differences in consonantal strength between labial and coronal consonants are not uncommon cross-linguistically. In several languages, the phonotactics between labial and coronal consonants show asymmetries which point to the same tendency. In this section, a few examples will be presented from classical Greek, post-classical Greek, Armenian and Dutch.

In classical Greek there is a systematic asymmetry with respect to diphthongs. Diphthongs with the vowel [i] as second member when inherited from PIE are short at

the end of the word in poetic verse. Diphthongs with second member [u] on the other are always long. Moreover, coronal diphthongs at the end of the word participate in deletion just as short vowels do. Labial diphthongs group together with long vowels and never undergo deletion. Third, the diphthongs [ai] and [oi] are short for stress assignment (West 1982, 1987).

In post-classical Greek, the labial member of diphthongs has changed into the fricative [v]: [au], [eu] > [av], [ev]. Diphthongs with [i] as their second member result in monophthongs: [ei], [oi], [ai] > [i], [e] (Browning 1985).[5]

In Armenian, the vowel /u/ alternates with the fricative [v], whereas underlying /i/ surfaces as a glide [j] (Vaux 1998):

/u/ alternates with fricative [v]:
(9a)   /lezui/ >   [lezvi]   'longue$_{gen.}$'
(9b)   /katuit^{h}s/ >   [katvit^{h}s]   'cat$_{abl.}$'
(9c)   /dzuer/ >   [dzəver]   'eggs'

/i/ alternates with glide [j]:
(9d)   /biur/ > [bjur]   'money'
(9e)   /liard/ > [ljard]   'liver'
(9f)   /niut^h/ > [njut^h]   'subject'

In Dutch labial [ʋ] can form tautosyllabic consonantal clusters with [r], whereas coronal [j] cannot (van der Torre 2003):

(10a) [ʋreːt]   'cruel'
(10b) [ʋraŋ]   'bitter'

These cross-linguistic observations point all to the tendency that labial segments are more prominent and more consonantal than their coronal counterparts.[6]

6. Conclusions

In this article, it has been claimed that in historical linguistics a diachronic approach should be combined with synchronic linguistic methods in order to come to better motivated conclusions. Also cross-linguistic parallels can provide additional support. This claim has been illustrated by a case study: the interpretation of Mycenaean Greek <w>.

During the discussion of this case, it has been claimed that the traditional diachronic approach is based on assumptions and reconstructions of much earlier or much later historical phases of the language. Consequently, this approach cannot provide more than an approximate interpretation of <w> as 'something like a labial glide'. On the other hand, synchronic data like phonotactics of the language itself and cross-linguistic parallels provide stronger evidence and point to the interpretation of Mycenaean <w> as a labial approximant [ʋ]. This interpretation suggests that labial approximants are stronger and more consonantal than coronal segments: [ʋ] vs. [j]. This suggestion is

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[5] Exception is the diphthong [ou] which has changed to a monophthong [u]. This monophthongization can be explained by the fact that both articulations [o] and [u] are very close to each other.
[6] Asymmetries between coronals and labials are observed also with respect to vowel features (van der Hulst 1989). A theoretical analysis of these observations lies out of the scope of the present study. Valuable suggestions for the mental representation of coronals and labials can be found in van der Hulst 1989.

consistent with the systematic differences of the phonotactics and orthography of labial and coronal segments, which include: a) the differences in the orthography of diphthongs, b) the formation of tautosyllabic consonantal clusters, and c) the application of different phonological processes in order to resolve hiatus.

The same interpretation is also supported by a diachronic process. The Mycenaean sequence [k<w>] doesn't participate in the neutralization between the older Proto-Indo-European sequence *kw and the labiovelar *k^w. This suggests that there is a systematic difference which is explained when <w> is interpreted as the approximant [ʋ].

Moreover, cross-linguistic data suggest a general tendency of labial consonants to be more consonantal or stronger than their coronal counterparts. Support in favor of this generalization can be found in classical Greek, post-classical Greek, Armenian and Dutch among others.

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