The identity of non-identified sounds: glottal stop, prevocalic /w/ and triphthongs in Vietnamese*

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The phonemic status of the glottal stop has been an issue in many languages of North America and Asia. In Vietnamese, the glottal stop has a distributional restriction in that it occurs only syllable-initially. Whether researchers include it in the initial consonantal inventory varies, and its status has received no systematic analysis. Another sound in dispute is the identity of /w/, the only segment that can occur between the initial consonant and the nucleus vowel. Whether /w/ is a segment, a secondary feature of the initial consonant, or a prosodic feature is an open matter. Its questionable status relates to a third question: Do triphthongs really exist in Vietnamese ʔ. This paper addresses these three interrelated issues and argues that /w/ is an independent phoneme, the initial glottal stop is best treated as a phoneme, and such triphthongs are phonetic.

0. Introduction

The phonemic status of the glottal stop has been an issue in many languages of North America (Macaulay and Salmons 1995, Ulrich 1993) and Asia (San 1966). In Vietnamese, the glottal stop has a distributional restriction in that it occurs only syllable-initially. It has received some attention by researchers, but whether it is included in the initial consonantal inventory varies, and there has been no systematic analysis of its status (Đoàn 1977). Another sound in dispute is the identity of /w/, the only segment that can occur between the initial consonant and the nucleus vowel. Whether /w/ is a segment, a secondary feature of the initial consonant, or a prosodic feature remains an open matter. The status of /w/ relates to a third question: Do phonemic triphthongs really exist in Vietnamese ʔ. Triphthongs have received scant attention in the literature, their status unclear to researchers who have perhaps limited experience with the language. This paper addresses three interrelated issues in Vietnamese phonology: Is the glottal stop phonemic or phonetic ʔ. What is the nature of the prevocalic /w/ and its domain ʔ. And are there phonemic triphthongs in Vietnamese ʔ.

Drawing mainly from the cluster simplification in Southern dialects and patterns of reduplication, I provide evidence to suggest that the initial glottal stop does exist in Vietnamese, and is best treated as a phoneme. My argument supports the view that the prevocalic /w/ is a segment. This clarification in turns lends credence to my view that 'triphthongs' are phonetic.

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Section 1 provides the language background. Section 2 examines the issue of the initial glottal stop and demonstrates how the glottal stop is a phoneme. Section 3 discusses the prevocalic [w]. Section 4 clarifies the status of triphthongs in the language, and their relationship with /w/, to show that triphthongs are clearly phonetic. Section 5 is the conclusion.

1. Language background

Table 1 shows the initial consonants in the Hanoi dialect (a representative of Northern dialects). The orthography of each sound is in italics, next to the IPA symbol, which is in slashes //. Where it is not different from the phonetic symbol, the orthography is not shown. Some sounds in Table 1 are represented with more than one letter, often according to their environment. For example, the velar nasal is written as *ngh* before front vowels, e.g., *nghe* /ŋɛ1/[1] 'to listen, *nghĩ* /ŋi6/ 'to think', and as *ng* elsewhere, e.g., *ngủ* /ŋu5/ 'to sleep'. The glottal stop is left blank in the orthography, e.g., *áo* /ʔa:w3/ ‘blouse’.

	/tʰ/ *th*			
	/t/	/c/ *ch*	/k/ *c, k, q*	/ʔ/
/b/	/d/ *đ*			
/f/ *ph*	/s/ *x*		/x/ *kh*	/h/
/v/	/z/ *d, gi, r*		/ɣ/ *g, gh*	
	/l/			
/m/	/n/	/ɲ/ *nh*	/ŋ/ *ng, ngh*	

Table 1. The initial consonant inventory in the Hanoi dialect

The initial inventory in Southern dialects, represented by the Saigon dialect in this paper, is in Table 2. There are a few discrepancies between Table 1 and Table 2: the Saigon dialect does not have /v/ or /z/ but it has /j/ and three retroflexes /ʈ/, /ʃ/ and /ʐ/. Our focus is the approximant /w/, listed as a labial sound in the initial inventory of the Saigon dialect (Thompson 1959, Huỳnh 1999:75). Adopting the view that glottal stop is phonemic I will argue that /w/, as in the Hanoi dialect (Northern), functions as a prevocalic segment, i.e., it always follows some consonant; therefore, it should not be listed in the initial consonant inventory.

[1] As tones are not a focus of this paper, for simplification, they are represented with numbers, i.e., 1 is used for *ngang,* the high level tone, 2 for *huyền,* the low level tone, 3 for *sắc1,* the rising tone, 4 for *nặng1,* the falling tone with glottalization, 5 for *hỏi,* the falling-rising tone, 6 for *ngã,* the falling-rising tone with glottalization, 7 for *sắc2,* the rising tone in stop-final syllables, 8 for *nặng2,* the low falling tone in stop-final syllables.

labial	alveolar	retroflex	palatal	velar	glottal
	/tʰ/ *th*				
	/t/	/ʈ/ *tr*	/c/ *ch*	/k/ *c, k, q*	/ʔ/
/b/	/d/ *đ*				
/f/ *ph*	/s/ *x*	/ʃ/ *s*		/x/ *kh*	/h/
	/l/	/ʐ/ *r*	/j/ *v, d, gi*	/ɣ/ *g, gh*	
/m/	/n/		/ɲ/ *nh*	/ŋ/ *ng, ngh*	

Table 2. The initial consonant inventory in the Saigon dialect

Table 3 shows the vowel inventory in the Hanoi dialect. Only two vowels, /a/ and /ɤ/ contrast in length. There are three diphthongs: /iə/, /ɯə/, /uə/. Each diphthong is written differently depending on its position in the syllable, e.g., the front diphthong /iə/ is written as *iê* medially or *ia* finally.

/i/	/ɯ/ *ư*	/u/
/e/ *ê*	/ɤ/ *â* /ɤː/ *ơ*	/o/ *ô*
/ɛ/ *e*	/a/ *ă* [aː] *a*	/ɔ/ *o*
/iə/ *iê, ia*	/ɯə/ *ươ, ưa*	/uə/ *uô, ua*

Table 3. The vowel inventory in the Hanoi dialect

Southern dialects have a slightly different vowel inventory, e. g., there are three long vowels, /iː/, /ɯː/, and /uː/, instead of diphthongs (see Phạm 2006 for discussion). Nonetheless, only the inventory of Northern dialects will be shown, as this difference is not germane to the paper.

The syllable structure of Vietnamese is as in (1) in which C_1 stands for an initial consonant, V for a single vowel, or a diphthong. C_2 can be a consonant or a glide. Tone is obligatory in any syllable. [w] is the only segment that can occur between an initial consonant and the rhyme, e.g., *toán* /twaːn3/ ‘mathematics’, and *huệ* /hwe4/ ‘lily’. There are no consonant clusters in the language, except this Cw, i.e. a consonant with the prevocalic /w/. The syllable structure is as in (1a) if the glottal stop is a phoneme, and as in (1b) if it is not. In (1a) a minimal syllable is CV with a tone, while other segments are optional. In (1b) the minimal syllable is V with a tone. This paper argues for the syllable structure in (1a).

(1) a. $C_1(w)V(C_2)$ b. $(C_1)(w)V(C_2)$

2. Is the glottal stop phonetic or phonemic?

This section provides evidence that the initial glottal stop is best treated as phonemic.[2] It offers a simple explanation for cluster simplification in Southern dialects, and in reduplication. First, two views on the phonemic status of glottal stop will be introduced: One view treats the glottal stop phonetically, the other phonemically.

The glottal stop occurs before the nucleus vowel in onsetless syllables, as shown in (2).

(2) a. *ở* /ʔɤ5/ 'to stay'
b. *anh yêu em* 'I love you'
/ʔaɲ1 ʔiəw1 ʔɛm1/
1st, sing, mas.love.2nd sing, fem[3]

The fact that the glottal stop is not shown in the standard orthography gives the impression that it is not there, i.e., that it is not a 'sound'. Without providing a rationale for their position, many authors do not include the glottal stop in the initial inventory (e.g., Nguyễn Đăng Liêm 1967, Nguyễn Đình Hoà 1997, Hoàng Thi Châu 1989, Hữu et al 1980, Cù et al 1977, Vương et al 1994, Huỳnh 1999). As Piggott (1992) comments on Mixtec, the glottal stop is traditionally assumed to be a "default segment that fills a position which otherwise lacks phonetic content". In Vietnamese, the glottal stop occurs in onsetless syllables beginning with a vowel or semi-vowel, as shown in (3). If the glottal stop is presumed to be predictable, a phonological rule is needed to account for its occurrence:

(3) Phonological processes: A glottal stop [ʔ] is inserted before words that begin with a vowel or the semi-vowel /w/.

ăn /an1/ 'to eat' → [ʔan1]

uỷ /wi5/ 'to delegate' → [ʔwi5]

Nguyễn Đình Hoà (1997:19) states that the glottal stop has no phonological function, and is predicted in onsetless syllables. Thompson (1959) includes the glottal stop in the initial inventory of the Saigon dialect, but notes that it is in free variation with zero before a vowel (1959:461). Kirby (2005) shares this view does not include it in the inventory.

Among authors who view the glottal stop as a phoneme, Ferlus (1999) includes it in the initial consonant inventory merely because it can be heard clearly (Ferlus, personal communication). Đoàn (1977), Lê Văn Lý (1948), Thompson (1965), Hoàng & Hoàng (1977), Mai et al (2006) are among those who treat the glottal stop as a phoneme; however, Đoàn is the only author who discusses the issue, albeit briefly, providing accompanying phonological evidence.

Thompson (1965:21) does not include the glottal stop in the inventory of the Hanoi dialect, but he does have a note for linguists: "A more rigorous systematization of consonantal elements

[2] For simplification all syllables are put in slashes //, although the phonemic status of glottal stop is argued throughout the paper. The bracket squares [ ] for phonetic representation are used where necessary.

[3] 'mas' stands for masculine, 'sing' for singular, 'fem' for feminine, 'onoma' for onomatopoeic.

would recognize glottal stop as a phoneme". However, his assessment is derived from distributional reasoning: because [b] is initial only and [p] final only, they must belong to the same phoneme, and so [b] and [d] are predictable allophones of /ʔp/ and /ʔt/ respectively. Nguyen (1997:20) simply points out that /p/ in modern Vietnamese can be identified at the beginning of several loanwords from French, such as *pin* 'battery,' and *po-ke* 'poker.' As Thompson admits, this analysis, i.e. /ʔp/ is realized as [b] and /ʔt/ is realized as [d], presses us to reconsider the tone system, one that has not been undertaken in any modern work in Vietnamese. Although Thompson's analysis eliminates two syllable-initial phonemes, /b/ and /d/, it creates many consonant clusters, leading to a complicated consonant inventory (see Đoàn 1977:167 for details).

According to Đoàn, the glottal stop has all the characteristics of being a phoneme, and functions like any other initial consonant (1977:159). If it is indeed a phoneme, he adds, then /h/ has its stop counterpart. Doan's interpretation would allow for a simpler and more consistent description of reduplication patterns, including cases in (4). In (4a), the initial consonant /l/ alternates with an initial glottal stop while the rhyme is reduplicated. In (4b), the initial glottal stop is reduplicated while there is alternation in the rhyme:

(4) Reduplication with an initial glottal stop

a.	*lục ục* /luk8 ʔuk8/	'dully' (onomat)
b.	*inh ỏi* /ʔiŋ1 ʔɔj5/	'deafening noise'
c.	*uể oải* /ʔwe5 ʔwaːj5/	'be tired, weary'

In (4b-c) no element is 'reduplicated' in the syllables beginning with the glottal stop, e.g., /ʔuk8/ in (4a) if its existence is not acknowledged. In (4a) the rhyme is reduplicated, while in (4b) the initial glottal stop is reduplicated. Đoàn concludes that if the glottal stop is a phoneme we have a simpler syllable structure, wherein an initial, a vowel and a tone are obligatory in any syllable; it also delineates a stripped-down version of 'onsetless' syllables, i.e. syllables that start with the prevocalic /w/, e.g., *oanh* [ʔwaɲ1] 'oriole' would be transcribed as /ʔwaɲ1/, not as /waɲ1/.

The next section will substantiate the argument that the glottal stop in Vietnamese should be seen as phonemic, using supporting evidence from Southern dialects.

2.1 The glottal stop in Southern dialects

The data in (5) are from the Hanoi (Northern) dialect. Their phonetic representation is shown in brackets. In (5a) and (5b) each syllable starts with the initial glottal stop. The only difference between the words in (5a) and (5b) is that in the latter, [w] follows the glottal stop.

(5) The Hanoi dialect

a.	*ang* /ʔaːŋ1/	'a measure unit'	b. *oang* /ʔwaːŋ1/	'loud (voice)'
	án /ʔaːn3/	'sentence, trial'	*oán* /ʔwaːn3/	'resent'
	ác /ʔaːk7/	'be cruel'	*oác* /ʔwaːk7/	'loud' (onoma)
	yên /ʔiən1/	'peaceful, safe'	*uyên*/[ʔwiən1/	'profound'

The examples in (5) do not actually reveal anything about the phonemic status of the glottal stop; it is predictable in syllables without an onset.

The data in (6) show that unlike the examples in (5b), [w] can occur initially in the Saigon dialect. The words in (6b) do not start with a glottal stop, as in the Hanoi dialect. The only difference between (6a) and (6b) is the alternation between glottal stop and [w] before the vowel. In other words, it seems these two sounds form a minimal pair in the Saigon dialect.

(6) The Saigon dialect

a. *ang* [ʔaːŋ1]	'a measure unit'	*b. oang* [waːŋ1]	'loud (voice)'
án [ʔaːŋ3]	'sentence, trial'	*oán* [waːŋ3][4]	'resent'
ác [ʔaːk7]	'cruel'	*oác* [waːk7]	'loud' (anoma.)
yên [ʔiəŋ1]	'peaceful, safe'	*uyên* [wiəŋ1]	'profound'

Thompson does not include the prevocalic [w] in the tables of initial consonants of any dialect, but noted that the prevocalic is different in the Saigon dialect because it is not preceded by a glottal stop (1965:93).

If the glottal stop and [w] in (6) form a minimal pair, the glottal stop is a phoneme. We are also forced to acknowledge that [w] is an initial consonant, but we must ask why it is only in the Southern dialects that we find it in the initial position. The next section will show that the glottal stop is a phoneme, but for another reason. The words in (6b) actually start with a glottal stop, followed by /w/. A simplification process reduces the cluster /ʔw/ to [w]. The 'minimal pair' of glottal stop and /w/ is just an illusion. /w/ does not function as an initial consonant in any dialect of the language.

2.2 Simplification of consonant clusters /Cw/ in Southern dialects

As mentioned above, the only cluster in Vietnamese is Cw in which C is a consonant. Southern dialects do not retain this cluster. The cluster Cw is reduced to one element. Depending on which consonant forms the cluster Cw, there are two patterns in this simplification process. In one pattern the consonant is deleted and /w/ remains. In the other, /w/ is deleted while the consonant remains. Examples of the first pattern are given in (7). The consonant is either *k* /k/, *ng* /ŋ/, *kh* /x/, or *h* /h/, which is lost in simplification. The first column shows the words in the Hanoi dialect, the second column shows the same words in the Saigon dialect. The final consonant inventory is slightly different between the Hanoi and Saigon dialects (see Phạm 2006), but it does not affect issues discussed in this paper.

(7) Cw with a velar or glottal

Hanoi dialect with /Cw/		Saigon dialect with [w]
a. *huyền*	[hwiən2] 'black'	[wiəŋ2]
b. *hoa*	[hwa1] 'flower'	[wa1]
c. *quyền*	[kwiən2] 'right'	[wiəŋ2]
d. *quê*	[kwe1] 'homeland'	[we1]

[4] Depending on the vowel quality a final coronal or palatal in the Hanoi dialect can surface as a velar in the Saigon dialect. This paper does not concern with the final consonant.

e. *nguy*	[ŋwi1] 'dangerous'	[wi1] or [ŋwi1]
f. *khoan*	[xwaːn1] 'to postpone'	[faːŋ1] or [xwaːŋ1]
g. *khỏe*	[xwɛ5] 'be healthy'	[fɛ5] or [xwɛ5]

All the consonants in (7) are either velars or glottals. The cluster *go* /ɣw/ is very rare, seen only in *goá* /ɣwa3/ 'widowed'. The cluster *khw* /xw/ is special in that /w/ is lost, but the surviving consonant changes: *kh* /x/ becomes *ph* /f/ as shown in (7 f, g) (Huỳnh 1999). This pronunciation of *khw* is observed only in rural Southern dialects, and it does not occur in the speech of educated speakers (Nguyễn 2005, Cao and Lê 2005). *ngw* /ŋw/ shows greatest loss in rural varieties. However, the simplification of clusters /kw/ and /hw/ in Southern dialects is very noticeable among Saigon speakers, even in the speech of announcers on television and radio, regardless of their educational background (Nguyễn 2005).

For the second pattern of simplification the consonant remains and the prevocalic [w] is deleted. The consonants in this pattern are either alveolar or palatal sounds such as *th* /tʰ/, *x* /s/, *s* /ʃ/, *d* /z/, *l* /l/, *tr* /ʈ/, *ch* /c/ and *t* /t/.[5]

(8) Cw with an alveolar or palatal

Hanoi dialect	Saigon dialect
a. *tuyển* [twiən5] 'select'	[tiəŋ5]
b. *tuýp* [twip7] (Fr. *type*) 'kind, sort'	[tip7]
c. *thuyền* [tʰwiən2] 'boat'	[tʰiəŋ2]
d. *thuê* [tʰwe1] 'to rent'	[tʰe1]
e. *xuyến* [swiən3] 'bracelet'	[siəŋ3]
f. *suyễn* [ʃwiən6] 'asthma'	[ʃiəŋ5] or [siəŋ5]
g. *xoài* [swaːj2] 'mango'	[saːj2] or [sɔj2]
h. *duyên* [zwiən1] 'charm'	[jiəŋ1]
i. *luyện* [lwiən4] 'to train'	[liəŋ4]
j. *truyện* [ʈwiən4] 'story'	[ʈiə4]
k. *choáng* [cwaːŋ3] 'be shocked'	[caːŋ3]

[5] Instead of looking at the initial consonant as the environment for cluster simplification in Southern dialects, Huỳnh (1999) and Cao and Lê (2005) look at the rhyme: /w/ is eliminated before a front or central vowel. This description, however, does not provide much insight into the simplification process. First, because this is a process involving the deletion of one element in the cluster /ʔw/, the relationship between the initial consonant and /w/ must be closer than that between /w/ and the vowel. Second, the prevocalic /w/ does not occur before back rounded vowels or diphthong /u, o, ɔ, uə/, front or central vowels are not the trigger of /w/ deletion. In *thué* 'tax' [tʰwe3] (North) - [tʰe3] (South) and *Hué* 'capital of central Vietnam' [hwe3] (North) - [we3] (South), both syllables *thué* and *Hué* have a front vowel, /e/; however, /w/ is retained in the latter but not in the former.

According to Huỳnh (1999) and Nguyễn (2005), cases from (8) in the Saigon dialect result from the elimination of the prevocalic /w/, which, according to Huỳnh (1999), results from neutralization. No details are provided. Huỳnh goes even further, claiming that there is no prevocalic /w/ in the Saigon dialect (1999:163). They recognize the pattern in (8) but do not in (7) or in (9) below, i.e., they do not account for the pattern involving /kw/ and /ʔw/. The prevocalic /w/ is deleted only when the initial consonant is a coronal or palatal sound, as shown in (8). When the consonant in Cw is a glottal stop, and /w/ is retained; it behaves like consonants in the first group and the glottal stop is lost in the Southern dialects. More examples are given in (9).

(9) Cw with a glottal stop

Hanoi dialect	Saigon dialect
a. *uyển* [ʔwiən5] 'deep, profound'	[wiəŋ5]
b. *oai* [ʔaːj1] 'be majestic'	[waːj1]
c. *oanh* [ʔaŋ1] 'oriole'	[wan1]
d. *oan* [ʔaːn1] 'grievance, injustice'	[waːŋ1]

Furthermore, the analysis such as that in Huỳnh (1999) and Nguyễn (2005) also implies that /w/ occurs as an initial consonant in the Saigon dialect in (7) and (9); therefore, it has to include /w/ in the initial inventory.[6] The next section will discuss in detail what this prevocalic /w/ is.

If we accept that the glottal stop is a phoneme, it is simpler to account for the reduplicative patterns shown in (4), as pointed out by Đoàn (1977). In these cases, the initial consonant, i.e., the glottal stop, is reduplicated.

When the reduplicative form involves the cluster /ʔw/, we observe the same pattern of simplification: the glottal stop is deleted. Most reduplicative forms in (10) have a base, which is underlined. In (10a-c), the initial glottal stop shows up in both the Hanoi and Saigon dialects. However, where there is /ʔw/ in the Hanoi dialect, the cluster simply appears as [w] in the Saigon dialect. In (10d-f) the initial glottal stop is reduplicated, but there is also simplification of /ʔw/ > [w]. In (10f), the first syllable has a single consonant; the glottal stop is repeated in the Saigon dialect. The second syllable, however, has a cluster /ʔw/, which occurs as [w] in the Saigon dialect, as predicted.

(10) Simplification of /ʔw/ in reduplication

	Hanoi dialect	Saigon dialect
a. *<u>óng</u> ả* 'shining'	[ʔɔŋ3] [ʔa5]	[ʔɔŋ3] [ʔa5]
b. *<u>ầm</u> ĩ* 'noisily'	[ʔɤm2] [ʔi6]	[ʔɤm2] [ʔi5]
c. *<u>ốm</u> o* 'to pine away'	[ʔom3] [ʔɔ1]	[ʔom3] [ʔɔ1]
d. *oa <u>oa</u>* 'to wail (infant)'	[ʔwa1] [ʔwa1]	[wa1] [wa1]
e. *uể <u>oải</u>* 'weary'	[ʔwe5] [ʔwaːj5]	[we5] [waːj5]
f. *ấm oé* 'to speak with dispute'	[ʔɤm3] [ʔwɛ3]	[ʔɤm3] [wɛ3]

[6] One can argue on the same grounds that there is no reason to exclude glottal stop in (5) from the initial consonant inventory in the Hanoi dialect.

If we do not recognize the cluster simplification, we cannot explain why it is only the prevocalic [w] that is reduplicated in (10d-f) in the Saigon dialect.

In sum, the view that includes the glottal stop in the initial inventory has a number of advantages over the opposite view. First, it does not need a rule to insert a glottal stop before a vowel or [w] in the Hanoi dialect. Consequently, it does not have to explain why this rule is needed only before a vowel but not before /w/ in the Southern dialects. Second, we are not forced to include the prevocalic [w] in the initial consonant inventory in the Saigon dialect. Third, it gives a consistent analysis of the cluster /ʔw/ in simplification, i.e., the glottal stop behaves like /h/, its continuant counterpart. Finally, this view provides a simpler and consistent explanation for the reduplication pattern that involves the initial glottal stop, alone or in a cluster.

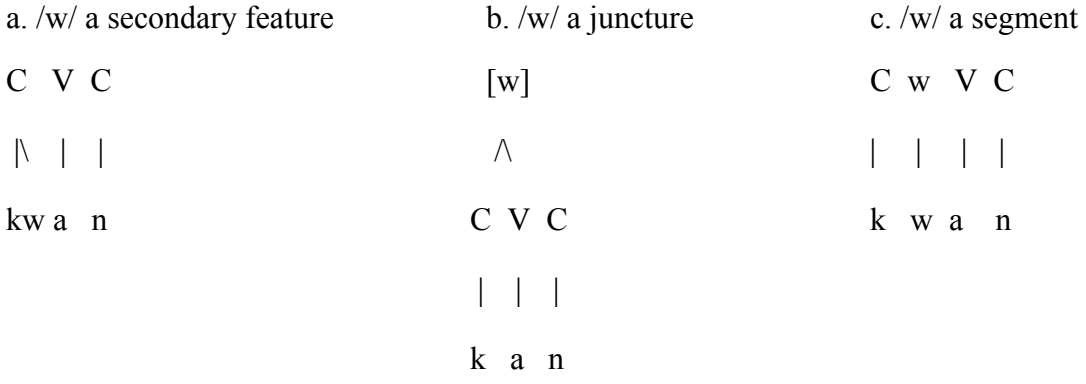
The next section discusses the identity of the prevocalic /w/, and the so-called triphthongs.

3. The identity of prevocalic /w/

This section examines various views about the prevocalic /w/, and argues for the segmental status of the sound. Recognizing /w/ as a segment provides us with a straightforward description of cluster simplification, and clears the way to understanding that triphthongs are phonetic.

We have seen in Section 2 that /w/ is the only sound that can follow an initial consonant to form the sole consonant cluster Cw in Vietnamese. Because of its unique distribution in this position there are different views as to what /w/ is: (i) /w/ is a secondary feature of the initial consonant, (ii) /w/ is a rounding juncture between the initial consonant and the rhyme, and (iii) /w/ is a segment. Representations of the syllable *quăn* [kwan1] 'curly' showing these three views are given below. The following sections will elaborate on each of these.

(11) Representations of CwVC *quăn* [kwan] 'curly' from three views



Another possible analysis is for the prevocalic /w/ to be treated as a feature of the vowel. This analysis would have to include 7 more diphthongs in the inventory; for example, a single vowel /i/ would contrast with a diphthong /wi/; however, nobody has adopted this analysis (Đoàn 1977).

3.1 /w/ is secondary feature of the initial consonant

Because the prevocalic position is restricted to /w/, the view shown in (11a) treats /w/ as a secondary feature [round] of the initial consonant (Hoàng et al 1962).[7] Examples in (7) and (8) in Northern dialects are said to start with a labialized consonant. Accordingly, the difference between (12a) and (12b) is seen to be in the initial consonant: a plain consonant versus a labialized consonant.

(12)	a. labialized C^w		b. plain C	
	tuyên /t^{w}iən1/	'to announce'	*tiên* /tiən1/	'fairy'
	quê /k^{w}e1/	'homeland'	*kê* /ke1/	'to prop up, steady'
	hoài /h^{w}aːj2/	'always'	*hài* /haːj2/	'harmony/comedy'

With few exceptions, /w/ can follow any consonant[8]. Lê (1948), as pointed out by Đoàn (1977), states that the rounding feature of the initial consonant can also be seen in syllables without the prevocalic /w/, as in *núi* /nuj3/' mountain', due to the effect of the rounded vowel on the initial consonant. Therefore, according to Lê, the rounding feature of initial consonants such as those in (12a) has to be recognized as phonemic. However, Lê does not list the prevocalic /w/ or labialized consonants as phonemes.

Several outcomes of their analysis are problematic: First, this solution almost doubles the initial consonant inventory since every plain consonant demands a labialized counterpart. Moreover, this view's ability to explain certain reduplicative processes is limited as shown in the following section where labialization freely patterns with either the initial consonant or with the rhyme, or is deleted. Furthermore, it cannot account for the two patterns of cluster simplification in the Saigon dialect presented in Section 2, especially when the labialized feature, secondary to the consonant, is retained when the consonant is deleted. Finally, giving /w/ the status of being a secondary feature of the initial consonant does not explain why that secondary feature moves as a group with the rhyme in word games and certain reduplication patterns, as shown in section 3.2.

3.2 /w/ is a prosodic feature

Nguyễn Phan Cảnh (1985:18) proposes that the prevocalic /w/ functions like a juncture that connects the initial consonant to the rhyme. In this view there are three 'junctures' in the language; examples are given in (12). The first juncture connects the vowel to the final consonant through a relationship of 'tense' "*chặt*" and 'lax' "*lỏng*". The contrast between *tám* and *tắm* in (13a) is one between a long /aː/ and the short /a/ in modern works in Vietnamese linguistics; however, in Nguyễn's view the contrast is between 'tense' and 'lax'. The second juncture connects the initial consonant and the rhyme. In (13b), in modern works *hoài* and *hài* differ in that the prevocalic /w/ occurs only in the former, but in Nguyễn's view the difference lies in whether or not each has a rounding juncture. /w/ is not listed in the initial consonant inventory in Nguyễn's view. In modern works that assume there are six tones in Vietnamese, the contrast in (13c) is between a final nasal

[7] Kirby (2005) treats /w/ as a secondary articulation but from his phonetic, not phonemic, description.

[8] [w] does not follow labials, except in a few loanwords, e.g. *buýt* /bwit7/ (French 'bus') 'bus', *phuy* /fwi/ (French 'fût'). /w/ follows /n/ in a few borrowings, e.g., *noa* /nwa1/ 'child' *(thê noa), noãn* /nwaːn/ 'egg' (from Chinese). /w/ follows /ɣ/ only in one word *goá* /ɣwa3/, alternated with *hoá* /hwa3/, 'widowed' (Đoàn 1977).

and a final voiceless stop. Nguyễn, on the other hand, posits the presence or absence of voicing: if the juncture is present, the final is realized with a nasal; if it is absent, the final consonant surfaces as a stop.[9]

(13)

	Nguyễn 1985	Modern works
a. *tám* /taːm3/ 'eight' - *tắm* /tam3/ 'shower'	tense/ lax	long vowel/ long vowel
b. *hoài* /hʷaːj2/ 'always'- *hài* /haːj2/ 'harmony '	rounding	prevocalic /w/
c. bán /baːn/ 'to sell'- bát /baːt 'bowl'	voicing	nasal / voiceless stop

Nguyễn's view is similar to that in (11a), where /w/ is not regarded as a segment; however, it differs from the view in (11a) in that /w/ is some sort of feature which associates with both the onset and the rhyme, and is independent of the initial consonant. In this respect it is close to the concept of a 'floating feature'. Although not adopted by others, Nguyễn's proposal creates a neat system of 'three relations' in order to replace the vowel length, prevocalic /w/ and the final voiceless stop. The glottal stop is not included in this system; therefore, it is not clear what the rounding juncture connects the vowel to in an onsetless syllable.

3.3 /w/ is an independent segment

This is the most common view (Hoàng and Hoàng 1975, Emeneau 1951, Thompson 1965); however, slightly different accounts exist. According to Nguyễn (1997) and Mai et al (2006), the feature of lip rounding in syllables such as *tuấn* /twɤn3/ 'a proper name', *ngoan* /ŋwaːn1/ 'well-behaved' is called '*âm đệm*' (medial sound). Nguyễn (1997) and Cù et al (1977) group /w/ with the rhyme.

This paper adopts the view that the prevocalic /w/ is best treated as an independent phoneme, and that its domain can be either the onset or the rhyme, using evidence from a word game and a productive process of reduplication.

[9] Nguyễn's approach assumes a 6 tone system (see Pham 2003 for discussions about six-tone and eight-tone views). Nguyễn assumes that there are only three nasals in the final consonant inventory; the absence of 'voicing juncture' will make these final nasals surface as voiceless stops. It is not clear why he needs both 'voicing juncture' and final nasals in the system.

3.3.1 Reduplication: depreciatory pluralization

In Northern Vietnamese there is a process of reduplication called 'depreciatory pluralization'. This process is very productive. In this process, the initial consonant of the base, underlined below, is reduplicated while the reduplicative always surfaces with the rhyme *iếc* [iək], as shown in (14).

(14)	*cơm* /kɤːm1/ 'cooked rice'	>	*cơm kiếc* /kɤːm1/ /kiək7/
	học /hɔk8/ 'to study'	>	*học hiếc* /hɔk8/ /hiək7/
	giỏi /zɔj5/ 'well, skillful'	>	*giỏi giếc* /zɔj5/ /ziək7/

In (15), when the initial consonant is followed by the prevocalic /w/, only the consonant is reduplicated. The prevocalic /w/ does not accompany it (the ill-formed reduplicative is shown with *).

(15)	*toán* /twaːn3/ 'mathematics'	>	*toán tiếc* /twaːn3/ /tiək7/ */twiək7/
	thuế /tʰwe3/ 'tax'	>	*thuế thiếc* /tʰwe3/ /tʰiək7/ */twiək7/
	quê /kwe1/ 'homeland'	>	*quê kiếc* /kwe1/ /kiək7/ */kwiək7

This process clearly demonstrates that the prevocalic /w/ is independent of the initial consonant. It does not move with the initial consonant in (15). However, /w/ does not always behave like this. The next section presents a word game in which the prevocalic /w/ can pattern with either the initial consonant or with the rhyme.

3.3.2 Word game

In Vietnamese there is a game in which two syllables switch off their tones, or initial consonants, or both. Some examples are given in (16). In (16a) the two syllables switch their tones. This phrase is a familiar joke about corruption and bribery in bureaucracy. In another common joke about the cost for becoming 'industrialized' (16b), the two syllables exchange their initial consonants. In (16c), a criticism of the government's empty promises, the two syllables switch their initial consonants and tones.

(16)	a. *đầu tiên* /dɤw2/ /tiən1/ 'first'	>	*tiền đâu* /tiən2/ /dɤw1/ 'where is the money?'
	b. *hiện đại* /hiən4/ /daːj/ 'modern'	>	*hại điện* /haːj/ /diən4/ 'heavily used electricity'
	c. *chính phủ* /ciŋ3/ /fu5/ 'government'	>	*chú phỉnh* /cu3/ /fiŋ5/ 'uncle who tricks'

(17) presents the data in which the words in the game consist of the prevocalic /w/ (Lê and Lê 2005). Most words in the right column are nonsense. The prevocalic /w/ can either move with the initial consonant or separate from the consonant to combine with the new rhyme, as seen in (17b-d). For example, /x/ in the cluster /xw/ in (17b and d) moves with or without /w/. In (17b), the whole cluster

/xw/ in /xwaːj1/ and the initial /m/ in /mɤ6/ can be switched, resulting in /xwɤ1/ /maːj6/; or only /x/ in /xw/ is switched, resulting in /xɤ1/ /mwaːj6/. The latter is more natural and preferable.[10]

(17) a. *ông ngoại* /ʔoŋ1/ /ŋwaːj4/ > *oai ngộng* /ʔwaːj1/ /ŋoŋ4/ or /ŋoŋ1/ /ʔwaːj4/
'maternal grandfather'
b. *khoai mỡ* /xwaːj1/ /mɤ6/ > *khơ moãi* /xɤ1/ /mwaːj6/ or /xwɤ1/ /maːj6/
'a type of potato'
c. *xoài tượng* /swaːj2/ /tɯəŋ4/ > *xường toại* /sɯəŋ2/ twaːj4/ or /tɯəŋ2/ swaːj4/
'a type of mango'
d. *khoai lang* /xwaːj1/ /laːŋ1/ > *khang loai* /xaːŋ1/ /lwaːj1/ or /xwaːŋ1/ /laːj1/
'sweet potatoes'

Nguyễn (1997), among others, groups /w/ with the rhyme. The examples in (17) show this division is not rigid: /w/ could also pattern as one unit with initial consonants, although the relationship between /w/ and the rhyme is more intimate than that between /w/ and the initial onset.

Reduplication of depreciatory pluralization and the word game clearly show that /w/ exists autonomously and can move independently with or without the original initial consonant. One can still argue that /w/ functions as a floating feature that can associate with any initial consonant or rhyme in the word game. However, as we have seen in section 2, /w/ can surface as the initial segment in Southern dialects. If /w/ is a floating feature, it needs a rule such as the one in (3) to insert a glottal stop into the onset slot for *oanh* [ʔwaŋ] 'oriole' in Southern dialects. If /w/ is a floating feature, we need some other rule to prevent /w/ from occurring in reduplication with the rhyme /–iək/ in 3.3.1.

The representation of /w/ as a segment, shown in (11c), groups /w/ with the initial consonant in the onset. When the consonant is deleted in simplification, /w/ functions as an initial consonant but only in this context, i.e., simplification of cluster; otherwise /w/ can never occur on its own as an initial consonant. In the word game, /w/, is an independent segment, not a secondary feature, and it can move freely either with the initial consonant or with the rhyme.

The view that the prevocalic /w/ is a segment has a number of advantages over the other views. First, it can provide a simple and straightforward explanation for the cases in which /w/ occurs initially in Southern dialects. This view treats the prevocalic /w/ and the final glide /w/ as the same phoneme. Finally, this view offers a simple explanation as to how the prevocalic /w/ can move independently from the cluster Cw in reduplication and in the word game without a triggering rule.

Another advantage of treating /w/ as an independent phoneme is that it destroys the myth that there are phonemic triphthongs in the language. This issue is discussed in the following section.

[10] Vietnamese phonotactics does not allow the possibility of *ŋwoŋ in (17a), because the prevocalic /w/ does not occur before back vowels.

4. Triphthongs are phonetic

'Triphthongs' are assumed to be 'vowel consequences' by some authors who are interested in simply describing the language. The formal literature on Vietnamese linguistics does not use the term, but leaves the issue vague nonetheless. This makes it difficult for some language teachers in answering students' questions on the matter. It is especially problematic for scholars less familiar with the language when they have to review journal articles or grant proposals. This section will clarify that triphthongs in Vietnamese are simply combinations of the prevocalic /w/ and a diphthong, or a diphthong and a final glide, or the prevocalic and a vowel with a final glide. Therefore, unlike diphthongs, triphthongs are not phonemic units in Vietnamese phonology.

First let us be clear about which sequences of vowels are phonemic and which are phonetic according to distributional restrictions and patterning in phonological processes.

A phonemic diphthong is a sequence of two vowels that occupy the nucleus, i.e., the coda can be empty or occupied; for example, *tia* /tiə1/ 'jet of light, water' and *tiên* /tiən1/'fairy', respectively. Elements in a phonemic diphthong pattern together as the whole entity in reduplication, e.g., /iə/ in *huyên thuyên* /hwiən1/ /t^{h}wiən/ 'talkative', or in the word game, e.g. /ɯə/ in *tượng* /tɯəŋ4/ in (17c). I adopt the approach of Đoàn (1977), Nguyễn (1997) among others, in asserting that there are three phonemic diphthongs in Vietnamese, as shown in Table 3. A diphthong is a combination of a high vowel and [ə]. This schwa is not listed separately in the table because it occurs only in diphthongs.

Besides these phonemic diphthongs there are several phonetic diphthongs. Although they are called 'diphthongs', such sequences might occupy the whole rhyme and do not allow any final consonant to follow, for example *eo* [ɛw] in *mèo* /mɛw/'cat'. Such sequences are listed in many works as 'diphthongs', for example *uy* [wi], *uê* [we], *oe* [wɛ], *uơ* [wɤː], *uâ* [wɤ], *oă* [wa], *oa* [waː], *ui* [uj], *eo* [ɛw], *iu* [iw]. As seen, however, these sequences are combinations of the prevocalic /w/ and a vowel, or a vowel and the final glide.

The Vietnamese triphthongs are a sequence of a (phonemic) diphthong and a glide, or /w and a vowel followed by a glide. These sequences are grouped into 3 types.

4.1 Types of triphthongs

Type 1 includes the prevocalic /w/ and a diphthong. The three-element sequence of this type can occupy the nucleus with or without a final consonant. Only the front diphthong /iə/ can occur in this type. Examples are given in (18a-b). Type 2 includes a diphthong and a glide (18c-f). The three elements of this type occupy the whole rhyme, both the nucleus and coda. Like syllables ending in a glide, this type of triphthong does not allow a final consonant. There are four possible combinations: *iêu* /iəw/, *ươu* /ɯəw/[11], *ươi* /ɯəj/, *uôi* /uəj/. Type 3 (18g-h) includes the prevocalic /w/, a vowel and a glide. This combination also occupies the whole rhyme. It does not allow a consonant to follow. Other possible combinations include *uây* [wɤj], *uơi* [wɤːj], and *oay* [waj], among these rhymes *uơi* [wɤːj] is an accidental gap.

[11] /ɯəw/ is pronounced as [iəw] in the Hanoi dialect and as [ɯːw] or [uːw] in the Saigon dialect.

(18) prevocalic /w/ + /iə/

a.	*khuya*	/xwiə1/	'late at night'
b.	*tuyết*	/twiət7/	'snow'
c.	*yêu*	/ʔiəw1/	'love'
d.	*lười*	/lɯəj2/	'be lazy'
e.	*hươu*	/hɯəw1/	'deer'
f.	*chuối*	/cuəj3/	'banana'
g.	*ngoài*	/ŋwaːj2/	'outside'
h.	*ngoẻo*	/ŋwɛw5/	'to die, informal'

4.2 Triphthongs are phonetic

The view that treats triphthongs as phonemic implies that the prevocalic /w/ is a feature of the rhyme. Hữu and Vương (1980) group /w/ with the rhyme, separate from the onset. Even though phonetically the prevocalic /w/ can occupy the nucleus of a syllable in certain environments; it does not do so in other types of syllables. For example, when /w/ occurs in an open syllable with a diphthong such as *khuya* /xwiə1/ 'late at night', /w/, together with the first element of the vowel, forms the peak of the syllable, i.e., the nucleus. However, it does not occupy the peak of the syllable in *khuyên* /xwiən1/ 'advise', where the diphthong occupies the whole nucleus (Đoàn 1977). The issue is whether or not in phonological processes, triphthongs behave as one unit, i.e., all elements can be grouped together and function as a single vowel.

In reduplication and the word game, the three elements in a triphthong do not always move together as an entity, unlike the three (phonemic) diphthongs. One element of the triphthong, often the prevocalic /w/, can be lost in the word game, as in (19a-b). However, if the triphthong is a combination of a diphthong and a final glide, no element can be omitted, as in (19c). This is because the diphthong functions as the nucleus, and the final glide functions as a coda, and both form the rhyme. In the cases of (19a-b) the prevocalic /w/ can be deleted, because it can move either with the consonant or with the rhyme; in neither is it not obligatory to fill the onset slot or the coda slot.

(19) a.	*khuỷu tay* /xwiw5/ /taːj1/	'elbow'	>	/xaːj1/ or /xwaːj1/ /tiw5/
b.	*đêm khuya* /dem1/ /xwiə1/	'late at night'	>	/dwiə1/ or /diə1/ /xem1/
c.	*người yêu* /ŋɯəj2/ /iəw1/	'lover'	>	/ŋiəw2/ /ɯəj1/

The marginal functional load of the prevocalic /w/ can be seen in variations of certain reduplicative forms. For example, both *huyên thuyên* /hwiən1 tʰwiən1/ 'talkative' and *huyên thiên* /hwiən1 tʰiən1/ are acceptable, although the latter lacks /-w-/ in the second element, /tʰiən1/. Many reduplicative forms of the same type have this variation.

If a triphthong that is formed with a true diphthong and a final glide keeps all elements in the word game, one can argue that in such cases, this triphthong is phonemic. This reasoning, however, is still far from convincing because in such cases, the final glide occupies the coda position; therefore, it cannot be omitted.

In summary, triphthongs are not a phonological unit in Vietnamese. The combined elements act as separate phonemes, having the freedom to move around, and combine with others to form a syllable. The prevocalic /w/ is involved in many of these "fake" triphthongs; however, we can also see how independent this prevocalic /w/ is, even within its 'cluster'.

5. Conclusion

This paper presents evidence to clarify the status of the glottal stop, the prevocalic /w/ and so-called 'triphthongs' in Vietnamese. First, it shows that the glottal stop is phonemic. This analysis allows for a straightforward account of the simplification of the consonant cluster Cw in Southern dialects. The phonological process of simplification shows that the glottal stop patterns with its fricative counterpart /h/. Second, evidence to define the status of prevocalic /w/ as an independent segment in the cluster is presented though reduplication and a word game. The prevocalic /w/ can form certain sequences that are identified as 'triphthongs' in the language. Finally, these tripthongs are shown to be phonetic sequences that do not have any phonological status.

References

Cù, Đình Tú, Hoàng Văn Thung & Nguyễn Nguyên Trứ. 1977. Ngữ âm học tiếng Việt hiện đại (Phonology of the Modern Vietnamese). Hanoi: Publisher of Education.

Cao Xuân Hạo, Lê Minh Trí. 2005. "Tiếng Sài gòn và cách phát âm của các phát thanh viên HTV" (The Saigon dialect and pronunciation of announcers on Saigon Television). In Tiếp xúc ngôn ngữ ở Việt Nam (Language contact in Vietnam), pp. 153–187. Hồ Chí Minh: Nhà Xuất bản Khoa học Xã hội.

Đoàn, Thiện Thuật. 1977. Ngữ âm tiếng Việt (Vietnamese Phonology). Hà Nội: Đại học và Trung học chuyên nghiệp.

Emeneau, M.B. 1951. Studies in Vietnamese (Annamese) grammar. Berkeley: University of California Publications in Linguistics.

Ferlus, Michel. 1999. "Sư biến hoá của các âm tắc giữa trong tiếng Việt" (Spirantization of medial obstruents in Vietnamese). In Giao lưu Văn Hoá Ngôn Ngữ, pp. 116–46. Hà Nội.

Hoàng, Thị Châu. 1989. Tiếng Việt trên các miền đất nước: Phương ngữ học (Vietnamese language in different geographical areas: Dialectology). Hà Nội: Khoa học xã hội.

Hoàng Tuệ, Lê Cận and Cù Đình Tú. 1962. Giáo trình về Việt ngữ. Tập 1 (Textbook on the Vietnamese language, book 1). Hanoi: Nhà Xuất bản Giáo dục.

Hoàng Tuệ and Hoàng Minh. 1975. Remarques sure la structure phonologique du Vietnamien. Hà Nội: Vietnamese Studies, 40, pp. 67–97.

Hữu Quỳnh & Vương Lộc.1980. Khái quát về lịch sử tiếng Việt và ngữ âm tiếng Việt hiện đại (Introduction to the history and phonology of modern Vietnamese.) Hanoi: Publisher of Education.

Huỳnh, Công Tín. 1999. Hệ thống ngữ âm tiếng Sài Gòn so với phương ngữ Hà Nội và một số phương ngữ khác ở Việt Nam (Phonemic system of the Saigon dialect compared to other dialects in Vietnam). Doctoral dissertation. University of Social Sciences and Humanities of National University. Hồ Chí Minh city.

Hữu Quỳnh and Vương Lộc. 1980. Khái quát về lịch sử tiếng Việt và ngữ âm tiếng Việt hiện đại (Introduction to the history and phonology of contemporary Vietnamese). Hanoi: Nhà xuất bản Giáo dục.

Kirby, James. 2005. A brief phonetic description of Northern Vietnamese. ms, University of Chicago.

Lê, Trung Hoa and Hồ Lê. 2005. Thú chơi chữ (Art of word game). Hanoi: Nhà xuất bản Khoa Học Xã Hội.

Lê, Văn Lý. 1948. Sơ thảo ngữ pháp Việt Nam (Introduction to Vietnamese Grammar). Paris: Huong Son.

Mai, Ngọc Chừ, Vũ Đức Nghiệu, and Hoàng Trọng Phiến. 2006. Cơ sở Ngôn ngữ học và Tiếng Việt (Introductory Linguistics and Vietnamese), 7th edition. Hà Nội: Nhà Xuất Bản Giáo Dục.

Macaulay, Monica and Joseph C. Salmons. 1995. The phonology of glottalization in Mixtec. International Journal of American Linguistics, Vol. 61, pp. 38–61. The University of Chicago Press.

Nguyễn Phan Cảnh. 1985. Základy Vietnamsčtiny (Essentials of Vietnamese). Praha:Státní Pedagogickké Nakladatelství.

Nguyễn Đình Hoà. 1997. Vietnamese. Amsterdam/Philadelphia: John Benjamins Publishing Company.

Nguyễn Văn Huệ. 2005. Một số đặc điểm ngữ âm của tiếng Sài Gòn (Some phonemic characteristics of the Saigon dialect). In Một số vấn đề về phương ngữ xã hội (Some social issues of dialects), Trần Thị Ngọc Lang (ed). Hochiminh city: Nhà Xuất Bản Khoa Học Xã Hội.

Nguyễn Đăng Liêm 1967. Phonemic sequences in Vietnamese. Zeitschrift fur Phonetik, Sprachwissenschaft, und Komunikationsforschung. 20: 4. 325–334.

Piggot, G. L. 1992. Variability in feature dependency. Natural Language and Linguistic Theory 10, 33–37.

Phạm, Andrea Hoà. 2003. Vietnamese tone – A reanalysis. New York: Routledge.

Phạm, Andrea Hoà. 2006. Vietnamese Rhyme. Southwest Journal of Linguistics, Vol 25, 107–142.

San Lin Yen. 1966. "Notes on the initials 'ying' and 'yu' in Ancient Chinese: was there a contrast, the glottal stop versus the zero-consonant in Ancient Chinese Initials?'. In T'oung Pao, 2nd series, Vol 52. Livr. 4/5, pp. 254–260.

Thompson, Laurence E. 1959. Saigon phonemics. Language, 35 (3), 454–476.

Thompson, Laurence E. 1965. A Vietnamese grammar. Seatle: University of Washington Press.

Ulrich, Charles H. 1993. The glottal stop in Western Muskogean. International Journal of American Linguistics, Vol. 59:4, Muskogean Languages of the Southwest, pp. 430–441.

Vương, Hữu Lễ and Hoàng Dũng. 1994. Ngữ âm tiếng Việt (Vietnamese phonology). Hanoi: Giaoduc.