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ARTICLE

The phonological status of Swedish *au* and *eu*: Proposals, evidence, evaluation

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Abstract

Most modern studies of Swedish phonology take the view that the underlying vowel inventory of Central Standard Swedish comprises nine, rather than seventeen or eighteen, mutually contrasting vowel phonemes. A residual problem of a classic phonological type concerns the borrowed entities, rendered in traditional Swedish orthography as *au* and *eu*, whose 'status in the vowel system is unclear' (Riad 2014:42). The present paper scrutinizes earlier and current phonological interpretations of these entities, adduces evidence for and against each proposal, and concludes that the case for treating them as phonemic diphthongs /V͡V/, as /VC/-sequences, or as monosyllabic /V̯V̯/-sequences is weak and that they should in the first place be viewed as underlying heterosyllabic vowel sequences /VV/, subject to a special phonological stipulation valid for a borrowed sub-domain of the lexicon. Typologically, Central Standard Swedish should continue to be subsumed under the category of languages that lack phonological diphthongs.

Keywords: analytic criteria; borrowed phonology; cross-linguistic comparability; diphthongs; morpheme templates; phonological adaptation; phoneme inventory; Swedish; phonological typology

1. An unresolved residual issue in descriptions of the Swedish vowel phoneme system

1.1 Justifying phonological units: A background perspective

Descriptions of the phonology of individual languages lay the indispensable foundations for phonological theory, phonological typology, areal phonology, contrastive phonology, phonology in second language acquisition, and other fields of general phonological inquiry.[1] In the past, a long, well-established structuralist tradition of linguistic research centered on ascertaining and justifying phonological units, typically phonemes, in various languages, and on describing the systems of which those phonemes form a part. A subsequent dominant, generative, school focused on phonological processes, and its successor, Optimality Theory, on constraints. Neither of the latter two has felt much need to substantiate their assumptions about phonological units and systems. Yet units and systems are as

/i/	/y/	/ʉ/	/u/
/e/	/ø/		/o/
/ɛ/			/a/

Figure 1. The system of simple underlying vowels in Swedish.

essential as rules or constraints, and comprehensive descriptions must account for both. With more databases of phoneme inventories and phoneme types now being built up (UPSID, PHOIBLE, EURPhon, SegBo, etc.), the descriptive underpinnings of these are becoming critical. To achieve cross-linguistic comparability, the primary descriptions of phonological units and systems must be well founded and complete, a desideratum that holds equally for numerous other applications of descriptive phonology. In line with the search for completeness, this paper will discuss an unresolved, somewhat marginal, but not entirely inconsequential issue in Swedish phonology that has recently resurfaced in the literature.

1.2 Recapitulating a few basics of Swedish vowel phonology

For ease of reference and before addressing the issue itself, some elementary facts of Swedish vowel phonology may be recalled. Since the early 1970s there has been growing agreement among scholars who have paid more than limited attention to Swedish phonology that Central Standard Swedish possesses a vowel phoneme system consisting of the nine units reproduced in Figure 1.[2]

In process approaches to phonology, the system in Figure 1 presupposes a limited set of general rules, which account for the profusion of segments on the phonetic surface. Disregarding more special cases, the following processes affect all or some selection of the nine vowels, with several processes potentially applying to one and the same segment:

(1) a. All stressed syllables are lengthened. When lengthening affects the syllable nucleus, long allophones of all the vowels in Figure 1 arise. Leaving aside the problem of how to treat a few scattered expansions of the general rules, vowel length is thus not phonological in Swedish. Specifically, no long vowel phonemes need to or should be set up in addition to the vowel phonemes of Figure 1 (Eliasson & La Pelle 1973).

b. Quality adjustments (vowel dispersion) govern the location in the vowel space of all vowel allophones, most markedly of the allophones of /ʉ/ ([ʉ̟ː, ʉ̟, ɵ]), /a/ ([ɑː, a]), /e/ ([e(ː), ɛ̝] (if [ɛ̝], often transcribed as schwa [ə], is assigned to /e/), /o/ ([oː, ɔ]), and /ø/ ([øː, œ]).

c. Frequent diphthongization (offgliding), in particular of the long high (or near-high) vowel allophones [iː, yː, ʉ̟ː, uː] into [iːʲ, yːᶣ, ʉ̟ːᵝ, uːʷ], respectively (Elert 1970:56, 1980, 1989:40–41; Riad 2014:37, 41; but see also Pelzer & Boersma 2019) (these allophones are omitted in Table 1).

d. Lowering of /ɛ/ and /ø/ to [æ] and [œ], respectively, before [r] and postalveolars, i.e. [ɽ, ɖ, ʂ, ɳ, ɭ].

Traditional work on Swedish phonetics accordingly presents up to twenty-four major vowel qualities, as schematized in Table 1.[3] The vowel [ʉ̟ː] is near-high. The distribution of the three /ʉ/-variants is described in detail by Lyttkens & Wulff (1916:69–85) and

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Table 1. The phonetic vowel inventory of a conservative variety of Central Standard Swedish

		Front					Central	Back	
		Unrounded		Outrounded		Inrounded			
		Long	Short	Long	Short	Long	Short	Long	Short
High		iː	ɪ	yː	ʏ	ʉ̟ː		uː	ʊ
							ʉ̟		
Higher		eː	e	øː			ɵ	oː	
mid					œ		ɛ̠		
Lower	Narrow	ɛː	ɛ						ɔ
mid	Wide	æː	æ	œː	œ				
Low			a					ɑː	

Note: Narrow transcription, heavily schematized; vowel qualities of special concern to the following discussion are shaded.

Riad (2014:28–29); all three occur e.g. in the word *muskulatur* [məskʉ̟laˈtʉ̟ːr] 'musculature'. The units [ʉ̟ː, ʉ̟, ɵ, uː, ʊ, oː, ɔ] are all inrounded, though to varying degrees, with [oː, ɔ] being the least rounded. Most Central Swedish speakers nowadays neutralize the short vowels [e] and [ɛ]. Some speakers additionally adopt other changes that need not concern us here. The retracted [ɛ̠] (Riad 2014:22), used in post-stress syllables as in the second syllable of *väder* [ˈvɛːdɛ̠r] 'weather', corresponds to the vowel traditionally transcribed as schwa ([ə]). For ease of representation, the sounds [ɪ, ʏ, ʊ] will in the following simply be rendered in broad transcription as [i, y, u], except that [ʊ] as part of a diphthong will be kept in narrow transcription. Given the preceding considerations, the set of underlying vowels in Swedish and the general productive processes affecting these vowels seem well defined.

1.3 The place of au *and* eu *in the Swedish vowel phoneme inventory*

Occasionally, however, a residual problem surfaces in descriptions of the Swedish vowel phoneme system. In his thorough and comprehensive exposition of the phonology of Swedish, Riad (2014:42) observes:

> There are three diphthongs [in Swedish], written <au>, <eu>, and <ou> or <oa>. They occur almost exclusively in loans and have marginal distribution. Their status in the vowel system is unclear. They could be analysed as combinations of single short vowels, but it would then not be obvious which two vowels combine in each of them.

The question whether phonetic diphthongs in various languages should be interpreted as unitary phonemes or phoneme clusters was eagerly debated in structuralist phonology (Trubetzkoy 1935, 1939; Martinet 1939, etc.), and the general issue remains relevant in any description of languages possessing such sounds.[4] As for Swedish, the question is whether this language, too, includes underlying diphthongs

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and, if not, how the corresponding phonetic entities should be understood phonologically. Since among the three diphthongs mentioned by Riad, 'The third diphthong is possibly not assimilated into Swedish phonology' (Riad 2014:43), the present paper will focus on the other two, which for convenience we refer to by their orthographic forms *au* and *eu*.[5] In the manner of Riad (2014:42), typical examples of diphthongal pronunciations are given in (2):[6]

(2) *Stressed*

a.	<au>	paus	[pa͡ɵs]	'pause' (n.)
		scout	[ska͡ɵt]	'scout'
		sauna	[ˈsa͡ɵna]	'sauna'
		nautisk	[ˈna͡ɵtisk]	'nautical'
		kentaur	[kɛnˈta͡ɵr]	'centaur'
b.	<eu>	neutrum	[ˈne͡ɵtrəm]	'neuter'
		euro	[ˈe͡ɵru]	'euro'
		Eufrat	[ˈe͡ɵfrat]	'Euphrates'

Unstressed

c.	<au>	auktion	[a͡ɵkˈɧuːn]	'auction'
		augusti	[a͡ɵˈgɵsːti]	'August' (month)
		automat	[a͡ɵtɔˈmɑːt]	'automatic machine'
		mausoleum	[ma͡ɵsɔˈlèːɵm]	'mausoleum'
d.	<eu>	neutral	[ne͡ɵˈtrɑːl]	'neutral'
		eustakisk	[e͡ɵˈstɑːkisk]	'Eustachian'
		europé	[e͡ɵruˈpeː]	'European' (n.)
		reumatism	[re͡ɵmaˈtisːm]	'rheumatism'

When phonetically transcribed, diphthongal or optionally diphthongal *au*/*eu* will be represented here by [a͡ɵ] and [e͡ɵ], respectively, except where attention is drawn to alternative pronunciations such as [a͡ʊ, ɑ͡ʊ, e͡ʊ, ɛ͡ʊ] or in direct quotations from other sources, whose original transcriptions will usually be retained.[7] Varying pronunciations, including non-diphthongal ones, regularly occur (see NSU and SSU) and we will consider many of these as we go along. The number of words containing *au* is relatively high (the number of morphemes, of course, less so), whereas *eu* is not all that common (compare Noreen 1903–1924 II:60, 61). The transcription practices of three Swedish pronunciation dictionaries, one old (and to some extent normative) and the two current ones, are shown in Table 2.[8]

The phonetic entities corresponding to written *au*/*eu* have been described phonologically in four major ways, as shown in Table 3.[9] While analysis 1 views *au*/*eu* as unitary, indivisible phonemes, the other proposals see *au*/*eu* as each consisting of two separate phonemes. Analyses of type 2 view the second element of *au*/*eu* as a consonant. Analyses 3–4 take it to be a vowel, but differ on how they assess the syllabicity of that vowel. Whereas analysis 3 posits that the vowel does not form a separate syllable, analysis 4 implies that it can be syllabified independently of the preceding *a*- or *e*-. The term BISYLLABIC will here be used of the latter analysis, but with no implication that syllable structure is necessarily a property of underlying forms. Rather syllabification is assumed to be a lower-level process that applies in the course of phonological derivations.

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Table 2. Transcription practices for *au*, *eu* in three Swedish pronunciation dictionaries

		SOU (1911) (See SOU:10)	NSU (1997) as explained by Elert (1997:28)	SSU (2003) (See SSU:35)
au	Pronunciation norm chosen for dictionary entries	[ɑ͡ʊ̯] ([ʊ̯] approximate IPA equivalent only)	[a͡u]	[a͡ɵ]
	Alternative pronunciations mentioned in introductory section	[a͡ɵ], [a͡ʉ̯]. Sometimes split into two vowels. Occasionally [av]	[ɑːɵ], [ɑːʉ̯] common in strongly stressed syllables	[ɑ͡ɵ]; [a͡ʊ], [ɑ͡ʊ]
eu	Pronunciation norm chosen for dictionary entries	[ɛ͡ʉ̯]	[ɛ͡u]	[ɛ͡ɵ]
	Alternative pronunciations mentioned in introductory section	[œ͡ʉ̯], [e͡ʉ̯]. Sometimes split into two vowels. Occasionally [ɛv], [ev]	[eːʉ̯] in weakly stressed syllables (e.g. in *eufori* 'euphoria'). (Remark: In actual dictionary entries, transcriptions with [ɛ̯v] also occur)	[ɛ͡ʊ]

Note: SOU and SSU transcriptions converted into regular IPA.

Table 3. Major types of phonological analyses considered or proposed for Swedish *au*/*eu*

	1. Phonemic diphthongs /V͡V/	2. /VC/-sequences		3. Monosyllabic /VV̯/-sequences	4. Bisyllabic /VV/-sequences
		a. /Vv/	b. /Vw/		
au	/a͡ɵ/	/av/	/aw/	/aʉ̯/	/aʉ/
eu	/e͡ɵ/	/ev/	/ew/	/eʉ̯/	/eʉ/

This paper takes each of the positions of Table 3, together with the reasons put forward to support them, as a point of departure for a more detailed discussion of the phonological status of Swedish *au*/*eu*. Since structuralists showed a particular concern for issues of this sort, prime attention will be accorded to their work. But because reflections on the Swedish case have often been interjected into treatments of other themes, the arguments have not always been fully pursued, and alternative analyses have not been discussed at length. It therefore remains to develop the implications of the proposals more fully, as well as to adduce new considerations and evidence, which may enable a better-founded choice along the spectrum of possible analyses.

2. Unitary underlying diphthongs?

2.1 Views expressed

The first to adopt a diphthongal phonemic analysis of *au*/*eu* was Sigurd (1965). Although he lists no phonemic diphthongs in his inventory of Swedish vowel

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Table 4. Sigurd's (1965) apparent phonemic interpretations of *au* and *eu* in non-compound words

	Pre-stress position:	Stressed position:		Post-stress position:
	Phonemic diphthongs	Phonemic diphthongs	Phonemic sequences	Phonemic sequences
au	au	au	—	a~~u~~
eu	eu	(eu)	eːu	e~~u~~

Note: Sigurd's transcriptions retained here.

phonemes (1965:21), elsewhere in the same work he operates with two such entities: in his own transcription, *au* and *eu*. Morpheme-internally, his practice is largely identical to analysis 1 of Table 3. He apparently assumes a phonemic diphthong *au* in stressed position, as in *paus* 'pause' and in the root morphemes of *aula* 'auditorium' and *fauna* 'fauna', but is uncertain about the existence of the diphthong *eu* in the same position, since he finds just one good example, *neutrum* 'neuter' (1965:142; compare also 145, 164). On the other hand, he evidently thinks that both diphthongs occur in syllables BEFORE the one carrying the principal stress, as in *augusti* 'August' (month), *europé* 'European' (n.), etc. (1965:144; compare also 133, 145, 164). In post-stress syllables, on the other hand, he proposes the vowel sequences /a~~u~~/ and /e~~u~~/ (with /~~u~~/), as in *Kapernaum* 'Capernaum', *linoleum* 'linoleum', and *petroleum* 'petroleum' (1965:161). The sequence interpretation also appears for *eu* in stressed position in *museum* 'museum', *Matteus* 'Matthew', and *Pireus* 'Piraeus' (1965:159), but he gives no corresponding examples for *au* (1965:160). Judging from his data, he regularly postulates phonemic sequences rather than phonemic diphthongs whenever a morpheme boundary can be considered to separate the components of *au*/*eu*.[10] His way of phonemicizing *au*/*eu* in simplex (i.e. non-compound) words is summed up in Table 4.

Besides Sigurd, a few other scholars assume phonemic diphthongs for Standard Swedish. Dahlstedt (1967:28) speaks of 'The only stable diphthong /au/ in Swedish,' as opposed to 'the Sw[edish] phoneme sequences /ejj/∼/äjj/ and /ajj/'.[11] Linell (1973:8) postulates 'two genuine diphthongs, /au/ … and /eu/', adding, though, that they are 'very marginal and will henceforth be ignored'. Lindqvist (2007:73) notes that 'as the only Germanic language, Swedish does not – except in some loanwords – possess phonological diphthongs'. Accordingly, he assumes the customary nine vowel phonemes for Swedish, and explicitly restricts the two phonological diphthongs '/au̯, eu̯/' to specific lexeme groups belonging to the borrowed stratum of the vocabulary (2007:98). Quite marginalized phonemic diphthongs have also been alluded to. Bruce (2010) thinks that 'with some limited exception, today's Swedish has no true phonological diphthongs' (2010:119) and that 'true diphthongs as contrasting vowel phonemes are rare in Swedish as it is spoken today' (2010:120). Similarly, according to Frid et al. (2012:85), 'Swedish has – with only a few exceptions – no true phonological diphthongs.' The latter two publications do not specify what the exceptional diphthongs are.

None of the authors mentioned carry out any extensive linguistic analysis to support their adoption of some variant or other of the phonemic-diphthong solution, and the reasons for choosing this solution are not always made explicit. At least four considerations should be examined as to whether they call for special treatment

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of *au*/*eu*: (i) the fact that diphthongal pronunciations of *au*/*eu* occur, (ii) the quality of the first component, *a*-, of *au*, (iii) the varying quality of the second component, i.e. the offglide *u*-, of *au*/*eu*, and (iv) the behavior of *au*/*eu* with respect to stress. We shall discuss these in turn.

2.2 Diphthongal realizations

Unless good reasons exist for violating phonological naturalness, an essential condition for regarding *au*/*eu* as single indivisible phonological units is that they can indeed be pronounced as diphthongs, at the very least in some positions and styles. Without doubt, this is the prime motive behind the phonemic-diphthong position. That diphthongal pronunciations occur is easy to observe and is backed up by the authority of phoneticians, both in the past and in modern times. Among scholars who, from a phonetic point of view, have described *au*/*eu* as diphthongs, we may mention Sweet (1879 [1913:372]), Lyttkens & Wulff (1889:26*; SOU:10), Witting (1959:92, 109, 120), Bergman (1966:11), and Elert (1997:27–28). Furthermore, like the older SOU, the recent SAOL (xxi, passim) and the two modern pronunciation dictionaries NSU and SSU routinely furnish examples of diphthongal pronunciations. The notion of diphthong also underlies the recommendations for hyphenation of *Svenska skrivregler* (2008). While the work allows word divisions such as *soci-al* 'social', *jubile-erna* 'the jubilees', and *muse-um* 'museum', it advises against dividing the words *faun* 'faun', *geist* 'go, drive' (n.), *soul* 'soul music', and *rauk* 'stone formation' (2008:84). Yet the attempt to justify *au*/*eu* as diphthongs phonologically by referring to their phonetically diphthongal nature will be complicated by two further phonetic considerations.

First, there is the noted fact that *au*/*eu* are often pronounced not as unitary diphthongs but as vowel sequences. For example, Noreen (1903–1924 II:59, 60, 62, IV:8–9) observes that the *u*-DIPHTHONGS, which are found in loanwords, tend to be replaced by non-diphthongal vowel sequences as these loanwords become assimilated (see Sections 5.2 and 6.3).[12] Risberg (1932–1936 I:56) says that the pronunciation with hiatus is the usual one in *paus*, *Paulus*, *Europa*, and the like. Dahlstedt (1962:18) speaks of occasional 'pronunciations with hiatus of the type *a´ula* (trisyllabic) and *pa´us* (bisyllabic)'.[13] Some authors have in fact completely rejected the idea of diphthongs in Swedish. Malmberg (1960:69, 1968:58) unequivocally asserted that, except for the frequently diphthongal pronunciation of long high vowels, such sounds are absent in the standard language. Somewhat later, Elert (1970:88) expressed a similar view. Although the latter positions may be too extreme, it is clear that, rather than as pure diphthongs, *au*/*eu* are quite commonly realized as vowel sequences.

Second, while Lyttkens & Wulff (1889), for instance, may seem to assume only two phonetic diphthongs in Swedish, the same authors in a later work (SOU:11) recognized several *i*-DIPHTHONGS in addition to *au*/*eu*, and the same is true of Sweet (1879 [1913:372]) and Noreen (1903–1924 II:58–63).[14] Examples are [a͡i] along with [aj:] in *aj* 'ouch!' and [ɛ͡i] along with [ɛj:] in *säg* 'say!' (imperative). If a diphthongal pronunciation alone were a sufficient condition for postulating phonemic diphthongs, then these phonetic *i*-diphthongs would be candidates for the same kind of interpretation. But the modern scholars who regard *au*/*eu* as

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special unitary phonemes have not interpreted the phonetic *i*-diphthongs in a parallel fashion.[15]

In sum, the reliance on diphthongal realization as a criterion faces two difficulties: (i) diphthongal pronunciations occur in morphemes of the type *aj*/*säg*, without necessarily resulting in the postulation of phonemic diphthongs, and (ii) in many morphemes the putative PHONEMIC diphthongs *au*/*eu* are not always realized as PHONETIC diphthongs. Ideally, to be consistent the phonemic-diphthong solution should assume phonemic diphthongs throughout, but when this does not hold, it requires some process of diphthong fission. Descriptively, the necessity of a process of diphthong fission must be weighed against the advantage of a reverse process of diphthong formation that operates especially in fast speech and unstressed position (see Section 6.5). Most strikingly, however, the descriptions positing phonemic diphthongs do not provide examples of contrasts with sequences. Such contrasts seem indispensable for positing phonemic status for *au*/*eu*.

2.3 The quality of a- *in* au

Whether the scholars who assumed phonemic *au*/*eu*-diphthongs had other arguments in mind is uncertain. Their case would be stronger if the components of the putative diphthongal phonemes were specific or unique to these. One fact, therefore, that might be considered is how the first element of *au* is realized phonetically. Lyttkens & Wulff (1885:78) observed that 'the low ɐ forms a diphthong with *ω*, or ũ . . . , thus ɐ*ω* or ɐũ', while giving as examples not only *faun* 'faun', *bautasten* '(kind of) memorial stone', and *kautsjuk* (i.e. *kautschuk*) 'rubber', where the diphthong occurs in a stressed environment, but also *paulun* 'canopy', *augusti* '(month of) August', and *auktion* 'auction', where the diphthong is unstressed.[16]

To this, we may add that the back quality of *a*- in *au* in stressed position in a given morpheme may optionally remain in unstressed position after stress relocation. Outside the realm of diphthongs, the vowel quality [ɑ] will regularly appear when the vowel is stressed and long, while the quality [a] will occur in most other instances, as the examples in (3) illustrate:

(3)	drama	[ˈdrɑ̀ːma]	'drama'
	dramatisk	[draˈmɑːtisk]	'dramatic'
	dramatik	[dramaˈtiːk]	'dramatic art'
	dramatisera	[dramatiˈseːra]	'dramatize'

Also in the case of *au*, there is a tendency for the quality [ɑ] to occur in unstressed position (narrow transcription):

(4)	auktor	[ˈɑ͡ɐ̯ktɔr], [ˈɑ̝͡ɐ̯ktɔr]	'author'
	auktorer	[ɑ͡ɐ̯kˈtuːrɐ̯r]	'authors'
	auktorisera	[ɑ͡ɐ̯ktɔriˈseːra]	'authorize'
	auktorisation	[ɑ͡ɐ̯ktɔrisaˈɧuːn]	'authorization'

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At first glance the optionally retracted variant [ɑ] in *au* might be seen as signaling a special structural connection with the following [ʊ] or [ɵ]. Yet, as Lyttkens & Wulff (1885:78 fn. 2) suggest, the backing must be an effect of coarticulation with the following sound segment.[17] The adjustment of [a] before [ʊ] has counterparts in other languages. For instance, in Modern Icelandic the quality of [a] in [au] is a little retracted as compared to the slightly fronted quality of [a] in [ai] (Einarsson 1927:21). Similarly, Kohler (1977:176, Figure 13 [1995:175, Figure 11]) notes a backed articulation of *a-* in German *au*. Korlén & Malmberg (1960:88) further observe about the German *au* that 'The starting point of [au] is ... somewhat retracted in comparison to [ai] due to the influence of the following [u] (approximately Sw[edish] long *a* in *bada* ['bathe']).' Likewise, Ambrazas (1997:29) notes that the first element of the Lithuanian diphthong *au* is partially assimilated to its second element in the context of circumflex (rising) tone. An example is *šauk* [ˊʃɔuːk] 'shout!' (with circumflex tone) as compared to *šauk* [ˋʃɑˑʊk] 'shoot!' (1997:56; both imperatives, transcriptions slightly adjusted). Hence the backed onset in Swedish *au* signals no special PHONOLOGICAL connection with the offset.

2.4 The quality of -u *in* au/eu

The nature of the second portion of *au*/*eu* is more multifaceted, as orthographic *u* in this instance may reflect two distinct phonemes. Riad (2014:42–43) remarks that

> there is disagreement on what sound the written <u> corresponds to, making an analysis in terms of combinations of single vowels quite different for the two dictionaries: NSU /ɑu/, /eu/; SSU /ɑʉ/, /eʉ/.

As indicated in Table 2 above, both dictionaries allow for alternative pronunciations. In his introduction to NSU, Elert (1997:28) notes that that work has chosen to transcribe DIPHTHONGAL *au*/*eu* as '[a͡u]' and '[ɛ͡u]', but that the second component of BISYLLABIC *au*/*eu* is often realized as [ɵ] or [ʉ̯]. SSU, for its part, represents the offglide of *au*/*eu* as [ɵ], but says that 'with certain speakers it can, however, have a quality which is considerably closer to the vowel in *ost*, for which reason transcriptions such as [a͡ʊ] and [E͡ʊ] might also have been used' (SSU:35; compare the SSU:551 transcription [ʊsːt] 'cheese'). Thus the discrepancy between the two dictionaries primarily represents alternative choices of pronunciation norm as transcriptional standard.[18]

Orthographically, the [ʊ]-pronunciation stands out as it fails to correspond to the normal sound value of Swedish <u>. Whether chronology is involved, such that pronunciations with [ʊ] were previously more frequent, is not known. For his time, as far as *au* is concerned, Noreen (1903–1924 II:60) partly questions them: 'It seems to me likely that *ɷ* [i.e. in this case ʊ] can actually occur individually, even though this is probably not particularly common.' The present-day geographical and sociolectal spread of the [ʊ]-pronunciation is similarly undetermined.

The Swedish [ʊ]-pronunciation is more clearly than the [ɵ]-pronunciation a trace of the original donor-language diphthongs (for classical times, see Allen 1965:60, 63, 1968:76), underlining the special connection between the two parts

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of *au*/*eu*. Phonologically, however, its survival suggests no special phonemic status of *au*/*eu*. In an alternative scenario (Section 5), its presence alongside the [ɵ]-pronunciation amounts mainly to postulating varying lexical representations /au/ ~/aʉ/ and /eu/~/eʉ/, depending on the speaker.

Hence neither the phonetic character of the first diphthong component nor that of the second one carries much weight as evidence in favor of the phonemic-diphthong interpretation of *au*/*eu*.

2.5 *The behavior of* au/eu *before pre-stressed suffixes*

The previous considerations are purely phonetic in nature. A further, conspicuous, characteristic of *au*/*eu* is clearly phonological. Note the following data:

(5)	kaos	[ˈkɑːɔs]	'chaos'	kaotisk	[kaˈuːtisk]	'chaotic'
	Israel	[ˈìːsraɛl]	'Israel'	israelisk	[israˈeːlisk]	'Israeli' (adj.)
	poesi	[pueˈsiː]	'poetry'	poetisk	[puˈeːtisk]	'poetic'
	myopi	[myɔˈpiː]	'myopia'	myopisk	[myˈoːpisk]	'myopic'

These examples, all of which contain contiguous vowels, illustrate the general rule that the derivational suffix *-ísk* '-ish' causes the main stress to fall on the closest preceding vowel of the word.[19] But *au* behaves differently:

(6)	nautik	[na͡əˈtiːk]	'art of navigation'	nautisk	[ˈna͡ətisk]	'nautical'
	aeronaut	[ærɔˈna͡ət]	'aeronaut'	aeronautisk	[ærɔˈna͡ətisk]	'aeronautic'
	hydraulik	[hydra͡əˈliːk]	'hydraulics'	hydraulisk	[hyˈdra͡əlisk]	'hydraulic'

Here the stress does not fall on the [-ɵ], which is the last vowel element before the pre-stressed suffix *-ísk*, but on the [a-].[20] The same holds true of *au* before the suffix *-iker*: *nautiker* [ˈna͡ətikɐ̯r] 'navigator'. In fact, the *u* in *aeronautisk* and *hydraulisk* may even be dropped in casual speech: [ærɔˈnɑːtisk] and [hyˈdrɑːlisk] (also in *hydraulik* [hydraˈliːk]) (NSU:7, 488). The other entity, *eu*, does not seem to occur frequently as a diphthong in derivations with *-ísk* and *-íker*. Words such as *propedeutisk* [prupeˈdɛfˑtisk, -ˈdɛvˑtisk] 'preparatory' and *farmaceutisk* [farmaˈsɛfˑtisk, -ˈsɛvˑtisk, -ˈsɛpˑtisk] 'pharmaceutical' are commonly pronounced with [ɛfˑ], [ɛvˑ], etc., rather than [ɛ͡ɵ] (or perhaps [e͡ɵ]) (see Section 3.2). But when the latter, diphthongal, pronunciations do occur, they are stressed on their first, not their second component (compare SSU:218, 600). These facts of stress placement obviously favor the phonemic-diphthong solution.

2.6 *Sigurd's (1965) treatment of* eu *in unstressed versus stressed position*

What has just been said applies in general to both *au* and *eu*. A further comment should be added on the precarious status of *eu* in Sigurd's (1965) analysis (see Section 2.1). Postulating a phonemic diphthong *eu* before, but not in, stressed position has certain disadvantages. First, it eliminates the phonotactic parallelism with the other diphthong *au*, which Sigurd assumes in both positions. Second, it

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Table 5. Vowel quality contrasts in different positions in non-compound words in a variety of Swedish according to Sigurd (1965)

		Post-stress syllables		
Pre-stress syllables	Stressed syllables	First	Second	Third
i	i	i	e	e
e	e	e	a	a
y	ɛ	a	o	
ø	y	o	(i)	
a	ø	ʉ	(ʉ)	
o	a	(y)		
ʉ	o			
au	u			
eu	ʉ			
	au			
	(eu)			

Note: Adapted from Sigurd (1965:145, similarly 1965:164). Sigurd's transcriptions retained, but quantity distinctions eliminated.

is not consistent with Sigurd's observation (1965:143–145) that the systems of vowel phonemes in the positions before and after stressed vowels are considerably reduced in comparison with the system in stressed position. See Table 5.[21] A new and marginal phoneme might not be expected to appear in pre-stress position. Third, this assumption requires adding to the grammar an alternation between a sequence of two vowel phonemes in [ˈneːʉtrɵm] and a phonemic diphthong in [neo͡ˈtrɑːl] and its derivatives, an alternation which, moreover, would not be matched by a corresponding interchange in *paus* [ˈpa͡ɵs] 'pause' (n.) vs. *pausera* [pa͡ɵˈseːra] 'pause' (v.). Thus, if a phonemic diphthong /e͡ɵ/ is assumed at all in pre-stress position, these three considerations would favor postulating /e͡ɵ/ in stressed environments, too. Fourth, the diphthongal [e͡ɵ] rather than the non-diphthongal [eʉ]/[eɵ] in unstressed position may simply illustrate a tendency to weaken the articulation of vowel sequences in this environment (see Section 6.5).

2.7 Summary and concluding remarks

The main considerations for and against viewing *au*/*eu* as underlying diphthongs that have been discussed thus far are summed up in Table 6.

A few additional comments may be in order. The sequential fluctuation of the phonetic realizations of the Swedish putative phonemic diphthongs *au*/*eu* (Table 6, point 1) is startling when the latter are compared to the diphthongs of many other languages. For instance, whether they are phonemic or not, Standard German diphthongs do not fluctuate sequentially (compare Werner 1972:32–34). German *Pause* 'pause' is [ˈpa͡ʊzə], not optionally *[ˈpa.ʊzə], with [a] and [ʊ] assigned to two different syllables. While the diphthongal realization of Swedish *au*/*eu* is no doubt the prime reason for the /V͡V/-interpretation, this evidence is highly ambiguous (see

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Table 6. Some potential pros and corresponding cons of a phonemic-diphthong analysis

	Pros	Cons
1. Sequential realization in speech chain (Section 2.2)	Often diphthongal, i.e. monosyllabic	a. Bisyllabic pronunciations are common b. Phonetic *i*-diphthongs are not generally analyzed as phonological diphthongs
2. Quality of <a> in *au* (Section 2.3)	The optionally retracted variant [ɑ] might conceivably be taken to signal a special structural connection with the following [ʊ] or [ɵ]	The backed articulation is merely a coarticulation effect, triggered by the following segment. Similar coarticulations are found in several other languages
3. Quality of <u> in *au*/*eu* (Section 2.4)	The optional quality [ʊ], retained unadapted from the donor languages, underlines the special character of *au*/*eu*	Lexically representable as /u/, it does not constitute evidence for diphthongs at the phonological level
4. Behavior with respect to pre-stressed suffixes (Section 2.5)	In *-isk* and *-iker* derivations, [a͡ɵ], [e͡ɵ] act as units and the second portion [ɵ] is in general not stressable	
5. Assumption of /e͡ɵ/ in unstressed, but possibly not in stressed, position (Section 2.6)		The assumption destroys the distributional parallelism with *au*, posits a new phoneme in unstressed position, creates a stress-conditioned diphthong/sequence alternation /e͡ɵ/~/e͡ʉ/ not matched in *au*, and does not consider the possibility of diphthong formation in unstressed environments

Section 5.2). The sequential fluctuation makes *au*/*eu* rather volatile phonemes, a fact that contrasts with the permanence of most undisputed phonemes such as /i/, /y/, and /u/.

As for the optionally retracted quality of *a* in *au* (Table 6, point 2), it is relevant to recall Raffelsiefen & Geumann's (2016:155) observation that 'Diphthongs, which are defined by a movement from a starting position to a different finishing position within the syllable, appear to be particularly prone to coarticulation among its two members.' Thus the [ɑ]-pronunciation offers little support for a phonemic-diphthong interpretation of *au*.

The [ʊ]-pronunciation of *u* in *au*/*eu* (Table 6, point 3) differs from the [ɑ]-pronunciation in being, not primarily articulatorily, but sociolectally or stylistically based. Many *au*/*eu*-words have entered the language through written texts, yielding reading pronunciations with [ɵ], i.e. [a͡ɵ], [e͡ɵ], etc. The unadapted [ʊ]-pronunciation, on the other hand, reflects a stronger (mediated) influence from the phonetics of the donor languages. To this extent, it might be seen as a sign of the unitary nature of *au*/*eu*; but, again, the circumstance provides little support for assuming phonemically indivisible diphthongs. On the contrary, the varying [ʊ]/[ɵ]-realizations 'indicate the lack of stability for diphthongs in Swedish' (Riad 2014:43).

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Furthermore, as Ladefoged & Maddieson (1996:322) observe, 'The kinds of vowels that occur as targets in diphthongs are no different from those that occur as single vowels'. That is, no diphthong components are specific to diphthongs. This holds true of Swedish *au*/*eu* as well.

In regard to stress placement before pre-stressed suffixes (Table 6, point 4), *au*/*eu* act as unitary vowels, which does support treating them monophonemically. In a bivocalic interpretation, the assignment of stress must include a special provision that eliminates the *-u* in most morphemes as a candidate for stress placement when it appears immediately after *a-* and *e-* (see the end of Section 6.6). In the phonemic-diphthong analysis, on the other hand, the non-stressability of *-u* simply follows from the definition of phonemic diphthongs as unitary entities.

The assumption of unstressed, but possibly not stressed, /e͡ə/ (Table 6, point 5) makes /e͡ə/, as Sigurd (1965) is aware, a very marginal phoneme, hence raising the question of whether it can be totally eliminated in the analysis.

In sum, the diphthongal realizations, especially in stressed position, and the non-stressability of *-u* before pre-stressed suffixes constitute the major arguments in favor of the phonemic-diphthong solution.

3. Underlying /VC/-sequences?

3.1 Au/eu *as underlying* /av/, /ev/

Several alternatives to a pure diphthong solution appear in the literature. One of the more distinct ones is the /VC/-analysis 2a in Table 3 above, proposed by Hoard (1966:14), at least for many instances of *au*/*eu* in stressed position:

> Swedish has two phonetic diphthongs [ɑʉ] or [ɑʊ] and [eʉ] ... Phonemically, however, these phonetic diphthongs may be analyzed as the clusters /avː/ and /evː/. This solution has two advantages: (1) it avoids the setting up of phonemic diphthongs i[n] Swedish, (2) it fills out the distribution of /v/ which otherwise would not have a long allophone ... Examples of these clusters are /avːla/, [ɑʉla] '(lecture) hall', and /ˣnevːtrum/, [ˣneʉtrʊm] 'neuter'.[22]

The proposal has parallels elsewhere, as when Jakobson (1962:223) phonemicizes Slovak *pravdou* [pra͡udo͡u] (instrumental) '(by) truth'[23] as /pravdov/, or when Heike (1972:43–44) suggests that German *blau* [bla͡u] 'blue' might be phonemicized as /blav/. Neither of Hoard's reasons is compelling, however. First, no /VC/-sequences need to be set up in Swedish to avoid postulating phonemic diphthongs. As we will see, other scholars suggest other possibilities (Sections 4, 5, and recall Table 3). Second, while the argument that /v/ lacks a long allophone is essentially correct (compare Lyttkens & Wulff 1916:242–246, Danell 1937:71–72), occasional exceptions exist. Long *v*'s occur optionally, for instance, in [ˈhɐ̀vːʊd] for *huvud* [ˈhʉ̀ːvʊd] 'head', [ˈstœvːɐ̠l] for *stövel* [ˈstøːvɐ̠l] 'boot', usually in *kaviar* [ˈkavːiar, ˈkavˑjar] 'caviar', and obligatorily in *vovve* [ˈvùvːɐ̠] 'dog' (from the interjection *vov*! [ˈvuvː] 'bow-wow!'). Thus the hole in the pattern that Hoard wants to exploit is not entirely clear-cut. Actually, the [avˑ] of [ˈkavˑjar] contrasts phonetically with the [a͡ə] of the word *kauri* [ˈka͡əri] 'cowrie'. Hoard´s analysis obliterates this

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distinction by representing both as /avː/ (with prosodic /ː/). This choice, in turn, requires *kaviar* to be lexically specified as an exception to the /avː/ → [a͡ɵ] rule that is needed in his analysis (*[ˈka͡ɵˑjar] is not a possible pronunciation of this word).

3.2 [V͡ɵ]~[Vv] *alternations*

Strikingly, however, Hoard does not refer to the link between [ɵ] and [v] illustrated by the alternations in (7):

(7) a. a͡ɵ ~ av (af)

tautologi	[ta͡ɵtɔlɔˈgiː], [tavtɔlɔˈgiː], [taftɔlɔˈgiː]	'tautology'

b. e͡ɵ ~ ev (ɛv)

eufemism	[e͡ɵfeˈmisˑm], [ɛ(v)feˈmisˑm]	'euphemism'
pseudonym	[(p)se͡ɵdɔˈnyːm], [(p)sɛvdɔˈnyːm]	'pseudonym'

In these examples, the second component of *au*/*eu* varies freely with the consonant *v* (before a voiceless stop optionally devoiced into *f*), which provides much better support for the /Vv/ analysis than Hoard's own arguments.

3.3 *Limitations*

Nevertheless, the data in (7) fail to establish the /Vv/-analysis as a viable alternative. Two complications arise. One concerns the range of the [ɵ]~[v] alternation in the lexicon. The other relates to the creation of remote segments in non-alternating morphemes and the introduction of underlying word-final clusters that never surface phonetically in the words in question.

First, the [ɵ]~[v] alternation does not appear freely in words containing *au*/*eu*, but is limited to a subset of them, largely those of Greek origin (Noreen 1903–1924 II:61). Moreover, the number of items that allow varying [ɵ]~[v]-pronunciations may have diminished since the time Noreen published his list of examples (1903–1924 II:61–62).[24] Regarding the pronunciation of the graphemic sequence *eu*, Widmark (1972:31) observes:

> It seems to me as if pronunciation habits are in the process of stabilizing in two directions: either, in accordance with Classical Greek, the pronunciation *ev*-, which is probably normal, e.g. in *neuros* ['neurosis'], or a pronunciation completely in accordance with the spelling, as in *neutrum*.

Second, since the [ɵ]~[v] alternation is lexically restricted, it cannot be generalized to all instances of *au*/*eu* without additional support. The larger body of non-alternating *au*'s and *eu*'s includes well-established words that in Hoard's analysis would end up with phonetically remote underlying SEGMENTAL forms, such as:

(8)

aula	/avl+a/	[ˈa͡ɵla]	'(lecture) hall'
fauna	/favn+a/	[ˈfa͡ɵna]	'fauna'
haubits	/havbits/	[ˈha͡ɵbits]	'howitzer'

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These words are never pronounced with [v]. The analysis in (8) undesirably increases the number of abstract relations between the phonological and phonetic levels.

Moreover, the move introduces novel final clusters:

(9)	faun	*/favn/	[ˈfa͡ɵn]	‘faun’
	Paul	*/pavl/	[ˈpa͡ɵl]	‘Paul’[25]
	paus	*/pavs/	[ˈpa͡ɵs]	‘pause’ (n.)
	scout	*/skavt/	[ˈska͡ɵt]	‘scout’

No *-vn*, *-vl*, *-vs*, or *-vt* clusters appear in final position in free morphemes, the *-vd* in *hävd* [ˈhɛvˑd] ‘tradition’ being the only synchronically homomorphemic *-v*C-sequence to occur in this environment.[26] Besides, remote representations of the type /avl+a/ for *aula* – or /avːla/, if Hoard’s length prosodeme is kept – require some further clarification as to how they relate to the type *avla* [ˈɑ̀ːvla] ‘breed’, as the /v/ of the latter’s underlying form /avel+a/ (< *avel* ‘breeding’) is not subject to vocalization. Finally, the direction [ɵ] → [v] of the alternation process seems more natural in Swedish than /v/ → [ɵ], as it aligns the morphs more neatly with Swedish phonotactics generally (Section 6.2).[27]

In sum, while drawing on the [ɵ]∼[v] alternation may at first sight seem an interesting idea, the /Vv/-solution is not sufficiently supported by other facts and, in addition, unnecessarily increases abstractness.

3.4 Underlying /aw/, /ew/

A related option is to analyze the second component of *au*/*eu* as a separate phonemic semivowel or glide, /w/. In his review of Sigurd (1965), Haugen (1967:806) touches on this possibility but promptly rejects it, for ‘if one is to regard *au* and *eu* as VC, it requires positing a phoneme /w/ which occurs nowhere else’. Borrowings such as *speedway*, *squash*, *swimmingpool*, *Wales*, *weekend*, etc. commonly keep their original pronunciation with [w], but do not support introducing an abstract entity /w/ into the phonological representations underlying the entirely different instances of phonetic *au*/*eu*. Besides, when loans with English [w] are borrowed, the [w] is either retained as [w, ʊ̯] (compare Elert 1970:106 and, especially, Aktürk-Drake, forthcoming) or turned into [v] (Noreen 1903–1924 IV:332); it is not turned into [ɵ]. Note also Bergman’s (1966:56–57) transcriptions oäl´sisk for *walesisk* ‘Welsh’, vi´kend for *weekend*, and vis´ky for *visky*/*whisky* ‘whisky’.[28] No structure-internal facts, morphophonemic, distributional, or other, justify an underlying /w/, distinct from the diphthong component [ʊ], in *au*/*eu*. Furthermore, /w/ neither accounts for the alternative diphthong component [ɵ], nor for the fact that *au*/*eu* can be realized as bisyllabic sequences.

4. Underlying /VV̯/-sequences?

4.1 Haugen’s (1967) unified view of quantity and diphthongs

As an alternative to Sigurd’s (1965) phonemic-diphthong analysis, Haugen (1967:806) instead proposes analyzing *au*/*eu* as monosyllabic sequences of two short

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vowels, that is, analysis 3 in Table 3 above.[29] He couples this suggestion to the description of two other phenomena in the language: V*j*-sequences, which may be realized as diphthongs (i.e. *i*-diphthongs), and the quantity of vowels.[30] In fundamentally the same fashion as he treats *au*/*eu*, he interprets V*j*-sequences as phonological '/Vi/, with a short NON-SYLLABIC vowel in the second position' (emphasis added). He adds that 'By this analysis both vowels in the sequences can be identified with a previously existing short vowel' (1967:806). In a further step, he lines up his analysis of *au*/*eu* and the V*j*-sequences with his treatment of the long vowels and long consonants, all of which he considers to be geminates. Thus the three types of vowel nuclei will be alike in that they will all consist of a monosyllabic sequence of two short phonemes, here represented as /V̯u̯/, /V̯i̯/, and /VV/, where the second /V/ is qualitatively identical to the preceding /V/. How strong are the parallels between the *u*-diphthongs, on the one hand, and the *i*-diphthongs and the long vowels, on the other?

4.2 Parallel with i-diphthongs

The strength of the parallel that Haugen draws with *i*-diphthongs depends on how one views the linkage between the vocoid [i] and the approximant/fricative [j]/[ʝ] (see Riad 2014:59–60 for the distribution). Witting (1959:108–109, 119–120) had broached the issue of whether single morpheme-final *j* as in *haj* 'shark' should be regarded as a consonant phoneme or a realization of the vowel phoneme /i/, and had settled for the former, albeit not with entirely conclusive arguments. From a phonotactic point of view, the decision to reanalyze *j* as /i/ is made difficult since it appears after postvocalic sonorants as in the imperatives *tälj* 'carve!', *tänj* 'stretch!' (Lindqvist 2007:42). Underlying forms such as */tɛli/, */tɛni/ clash head on with the normal structure of native morphemes (Section 6.2). Moreover, the latter decision would lead to the question of whether the *j* in initial prevocalic position as in *ja* 'yes' should then be analyzed as /i/, too. But also underlying forms of the type */ia/ deviate from normal underlying morpheme structure, and in addition require this /i/ to be marked as non-syllabic. Thus the analysis of V*j*-sequences as *i*-diphthongs is not straightforward. This being so, the comparison with long vowels becomes especially crucial for the proposal to analyze *au*/*eu* as monosyllabic vowel clusters.

4.3 Parallel with long vowels

4.3.1 The internal composition of diphthongs and the geminate-vowel theory

Haugen's argument that his analysis of long vowels supports analyzing *au*/*eu* as monosyllabic clusters hinges crucially on the view that long vowels are in fact geminates. It is therefore necessary to determine whether the geminate-vowel analysis itself is valid, an undertaking rendered difficult by a contradiction in Haugen's presentation of gemination. For the greater part of his discussion, he seems to understand the term 'gemination' more or less in its ordinary phonological sense, meaning that genuinely long sounds in Swedish (such as *i* in *vis* 'wise' and *ss* in *viss* 'certain') correspond to two identical segments at the phonological level. Towards the end of his discussion, however, he considers lengthening to be prosodic: 'In the case of neither consonants nor vowels does gemination mean actual repetition, only

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that more of the same be added' (Haugen 1967:806). But since the second portion of V<*u*>- and the V*j*-sequences cannot be equated to a prosodic feature, only his first approach will be considered here. We will comment on the geminate-vowel analysis in relation to three kinds of facts: (i) segmental phonotactics, (ii) morphological evidence, and (iii) the occurrence of length in relation to stress. Subsequently, we will see whether the geminate-vowel approach supports the monosyllabic-cluster analysis of *au*/*eu*.

4.3.2 Segmental phonotactics

Interpreting both long vowels and long consonants as underlying geminates creates the expectation that geminate vowels and geminate consonants should be freely combinable. For instance, Suomi et al. (2008:39) observe for Finnish:

> contrastively short and long vowels can occur before and after both contrastively short and long consonants . . . and the contrasts exist in stressed as well as unstressed syllables

But Central Standard Swedish has what is termed compensatory length, such that in e.g. monomorphemic stressed ˈV(C)-rhymes with at most one consonant, either the vowel is long or else the following consonant (if any), but not both at the same time. According to widely accepted views in phonology, this complementary distribution should lead us to represent only one of the two complementary facts at the phonological level, either the underlying equivalent of phonetic vowel length or the underlying equivalent of phonetic consonant length. But since the consonants may with good reason be regarded as geminates (Haugen 1967:806) whereas the vowels may not, it follows that vowel gemination is unnecessary.

A further phonotactic consideration relates specifically to vowel nuclei. In regular native Swedish morphemes, sequences of unlike vowels never occur (see Section 6.2). Hence the native lexicon contains no intra-morphemic sequences of different vowels (e.g. *ao*, *oa*, etc.) that could provide a parallel for treating phonetically long vowels ([ɑː], [oː], etc.) as consisting of two identical vowel phonemes (/aa/, /oo/, etc.). Nor do the intra-morphemic vowel clusters that appear in borrowings offer any such evidence. Actually, vowel sequences in foreign morphemes may themselves include phonetically long vowels, which, in the geminate-vowel analysis, complicates underlying representations, sometimes multiply. Thus the word *kaos* 'chaos' would need to be represented as /kaaoos/ or the like, because of shifting length in [ˈkɑːɔs] and *kaotisk* [kaˈuːtisk] (recall (5) in Section 2.5 and see Section 4.3.4).

Finally, long vowels and diphthongs do not match distributionally in as much as (fully) long vowels do not occur in unstressed syllables, whereas diphthongs occur in both stressed and unstressed syllables.

4.3.3 Lack of morphological evidence for geminate vowels

Moreover, morphological evidence for vowel gemination is missing. In several languages, the combination of two identical vowels that belong to different

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morphemes results in a phonetically long vowel. For instance for Finnish, Trubetzkoy (1939 [1962:170]) views the final long vowels in the partitive forms *kukkaa* 'flower' and *leipää* 'bread' as 'sicher polyphonematisch' ['definitely polyphonematic'], because they contain an internal morpheme boundary (< *kukka* 'flower' and *leipä* 'bread' + partitive allomorphs *-a*, *-ä*, respectively), and by analogy extends the biphonemic analysis to all long vowels in the language, that is, also to non-alternating, morpheme-internal ones.[31] For Sanskrit, Allen (1953:58; see also 1972:30) refers to forms such as *nāsti* 'is not' < *na* 'not' + *asti* 'is', and *sādhūktam* 'well spoken' < *sādhu* 'good' + *uktam* 'spoken', where, again, the resulting long vowels include a morphological boundary. Swedish possesses no process that converts two identical adjacent vowels into a single long one.

4.3.4 Length in relation to stress shifts

Finally, unlike the situation in Finnish (see the quote in Section 4.3.2), structurally relevant length in Swedish is obviously dependent on stress: it occurs only in stressed syllables. The geminate-vowel hypothesis accordingly faces a difficulty in regard to shifting stress, as in *motor* [ˈmùːtur] 'motor', *motorer* [muˈtuːr̲ər] 'motors', *motorism* [mutuˈrisːm] 'motorism'. Applying the geminate-vowel analysis, these words would, in terms of a process model of phonology, have derivations such as those in (10):

(10)	Underlying form	/muutuur/	/muutuur+er/	/muutuur+ism/
	Stress and tone assignment	ˈmùutuur	muuˈtuurer	muutuuˈrism
	Coalescence of stressed geminate Vs	ˈmùːtuur	muuˈtuːrer	—
	Degemination of unstressed geminates	ˈmùːtur	muˈtuːrer	mutuˈrism
	Phonetic forms	[ˈmùːtur]	[muˈtuːr̲ər]	[mutuˈrisːm]

If, instead, geminate coalescence is taken to precede stress placement, the stress rules would have to be supplemented with a rule shortening long unstressed vowels. In either case, geminates appear underlyingly and are subsequently reduced in positions that have not been assigned stress.

On the other hand, a vowel-lengthening approach results in the following derivations:

(11)	Underlying forms	/mutur/	/mutur+er/	/mutur+ism/
	Stress and tone assignment	ˈmùtur	muˈturer	mutuˈrism
	Lengthening	ˈmùːtur	muˈtuːrer	mutuˈrisːm
	Phonetic forms	[ˈmùːtur]	[muˈtuːr̲ər]	[mutuˈrisːm]

A comparison of the derivations in (10) with those in (11) illustrates the formal drawbacks of assuming geminate vowels rather than vowel lengthening.

First, phonological forms are more complex in the geminate-vowel analysis. The simple /mutur/ is replaced by the representation /muutuur/. That longer representations should be more costly than shorter ones is acknowledged by a good many linguists, including Chomsky & Halle (1968), whose very first universal marking convention [*u* seg] → [-seg] (1968:404) expresses precisely the notion that 'short

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lexical items are simpler than long ones' (1968:408), and Prince & Smolensky (1993:196), whose constraint '*SPEC: Underlying material must be absent', operative in language learning, favors representations 'with fewest featural and segmental specifications'. Second, while both the geminate-vowel and the vowel-lengthening analysis presuppose stress rules, the geminate-vowel analysis requires two rules regulating quantity, fusion of stressed geminates and degemination of unstressed geminates, compared with a single rule in the alternative. Third, as the geminate-vowel analysis entails a large number of remote segment clusters that have to be converted into single long segments, it is less felicitous, not only with respect to morpheme length and the number of rules, but also in regard to economy of derivational processing.

Aside from these formal considerations, the assumption of vowel geminates obscures the crucial factual link between stress and length, as stress actually triggers vowel length, given the appropriate segmental conditions. Hence phonetic vowel length must not be reflected in underlying representations.

4.4 Summary and conclusion

In several languages such as Finnish, phonetically long vowels may be understood as sequences of two short vowel phonemes. In Swedish, long vowels cannot be split up in this fashion. Facts of distribution, morphophonemics, and stress assignment fail to support, and even contradict, such a proposition. Underlying vowel geminates deviate from the patterns characteristic of native Swedish phonology and increase descriptive complexity. Length in Swedish vowels is assigned by rule, and no vowel length or any equivalent thereof occurs in the underlying representations of native morphemes. Consequently, an analysis of Swedish long vowels as underlying geminates will not in turn support the analysis of *au*/*eu* as monosyllabic clusters /V$\underset{\smile}{\text{V}}$/. Furthermore, this solution also lacks decisive parallels elsewhere in the language. Finally, there remains the question of whether a useful empirical distinction can be drawn between underlying diphthongs, as in analysis 1 in Table 3, and monosyllabic vowel clusters, as in analysis 3. Like analysis 1, the /V$\underset{\smile}{\text{V}}$/-analysis will neatly handle the *-ísk*/*-íker* pattern, however (Section 2.5).

5. Underlying /VV/-sequences?

5.1 An across-the-board bisyllabic analysis

To recap, the diphthong analysis of *au*/*eu* implies that, phonologically speaking, the two parts of *au*/*eu* are firmly glued together, and that the parts cannot be equated with phonemes occurring elsewhere in the language's phoneme inventory. The non-diphthongal interpretations of *au*/*eu* take such identification to be possible. Hoard (1966) eliminates the need for phonological diphthongs by identifying the second component of *au*/*eu* with the consonant /v/. Haugen (1967) argues that the component is a vowel phoneme and that this vowel phoneme belongs intrinsically to the same syllable as *a*- and *e*-. Thus he rejects the indivisibility assumption of the diphthong analysis, but retains its assumption of underlying monosyllabicity. The remaining option, analysis 4 of Table 3, also drops the underlying monosyllabicity assumption. That is, the components of *au*/*eu* constitute two separate underlying

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units that, at a lower level, may either be syllabified into two different syllables or alternatively joined together as diphthongs.

In fact, most accounts of Swedish phonology include only monophthongs in their phoneme inventories, which implies that *au*/*eu* are tacitly viewed as combinations of two ordinary vowel phonemes. But one researcher has quite explicitly advocated a strict, across-the-board bisegmental analysis of *au*/*eu*. Reviewing Sigurd (1965), Elert (1966:193) says:

> In his book, Sigurd does not discuss it as a problem but, contrary to traditional manners of description, he introduces the concept of diphthong in the description of such words as *paus* 'pause' and, with some doubts, *neutrum* 'neutre' (p. 142). The only possible way of describing such vowel sequences in Swedish is to ascribe the two vowels to different syllables.

In Elert (1970:88), he reasserts this position:

> In principle all vowels can be combined, and a very large number of the possible combinations of vowel–vowel are represented, even those with identical vowels. There is no reason to treat vowel sequences in loanwords, e.g. *aula*, *Europa*, etc., any differently. They are non-diphthongal in Swedish, even if the donor language has a diphthong in the corresponding words.

As is evident from the heading of the relevant section in Elert ('Restrictions on phoneme sequences in monomorphemic words', 1970:87), this statement refers to how *au*/*eu* are to be interpreted phonologically.

5.2 Bisyllabic realizations

The first and foremost argument in favor of analysis 4 is that *au*/*eu* are commonly pronounced as bisyllabic sequences. Such pronunciations are repeatedly mentioned in the literature, old and new (Noreen 1903–1924 II:60–61, 62; Risberg 1932–1936 II:111; Elert 1997:28, etc.). Comparing with the Finland-Swedish exclusively diphthongal pronunciations, Bergroth (1924:54) says that in Central Standard Swedish bisyllabic pronunciations of *au* are exceedingly common: '*Pā-ul*, *Lā-ura*, *Brā-un*, *A-ulin*, *centā-ur*, *a-udiens*, *pa-ulun*, and so forth'. Bisyllabic, besides diphthongal, pronunciations of *au*/*eu* may also occur with the same individual speaker (Risberg 1932–1936 I:56–57). With some speakers they may even, on the whole, be more frequent than the diphthongal pronunciations (compare Gjerdman 1954:383, Elert 1997:28). Moreover, many diphthongal realizations of *au*/*eu* (optionally or sometimes perhaps even obligatorily) seem to depend on segmental context, speech tempo (allegro pronunciation), rhythm, etc. (compare Section 6.5). Hence the individual and sociolectal variability with respect to diphthong/sequence pronunciations and the phonetic tendency towards diphthongal pronunciation in specific environments circumscribe the domain in which to look for unquestionably underlying diphthongs. Noreen (1903–1924 IV:9) observes about the words with *au* that 'hardly very many exist which do not appear with both a more foreign and an adapted Swedish pronunciation'. Given the possibly limited domain of invariably

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Table 7. Pronunciations of *kaus* 'grommet' and *kaos* 'chaos' in three Swedish dictionaries

	kaus		*kaos*		
	[a͡u]	[a͡ɵ]	[ɑ:ɔ]	[a:ɔ]	[ɑ:ʊ]
NSU	ka͡us		ˈkɑ:ɔs	ˈka:ɔs	—
SSU		ka͡ɵs	ˈkɑ:ɔs	—	ˈkɑ:ʊs
SO	ka͡us		—	—	ˈkɑ:us

diphthongal *au*/*eu*, the recurring bisyllabicity provides rather strong evidence for a biphonemic treatment of *au*/*eu* in general. Besides, such a view of *au*/*eu* will agree with the normal syllabification patterns of Swedish, which, in precise and careful pronunciation, favor dividing adjacent vowels between separate syllables (Gårding 1967:30 fn. 4).

5.3 Lack of contrast between diphthongs and corresponding vowel sequences

The two-vowel interpretation of *au*/*eu* comes rather naturally, moreover, by virtue of Elert's (1970:88) argument that NO PHONOLOGICAL CONTRAST exists between a diphthongal and a bisyllabic pronunciation of these entities. Although the idea that Swedish has phonemic diphthongs involves the implicit claim that such contrasts do occur, minimal pairs have not been cited (end of Section 2.2), and seem hard to come by. The closest approximation found in the present study involves the word *kaus* 'gutter ring, grommet' in comparison with particular pronunciation variants of the word *kaos* 'chaos'. See Table 7.[32]

All three dictionaries in Table 7 view *au* in *kaus* as diphthongal and *ao* in *kaos* as bisyllabic, and they represent the first component of *au* as a front [a]. NSU, in addition, recognizes that also *ao* in *kaos* may alternatively be pronounced with [a:]. SSU and SO, moreover, record [u]-pronunciations of <o> in *kaos*. Hence, if [a:]-pronunciations in *kaos* can be combined with [u]-pronunciations, yielding phonetic [(*)]['ka:us], this bisyllabic pronunciation would contrast minimally with the diphthongal pronunciation [ka͡us] of *kaus*.[33] Nonetheless, this constructed minimal pair is not of much avail in assessing /a͡u/ as a potential independent phoneme more generally.

In addition, the identification of the constituent parts of the alleged phonemic diphthongs with simple vowel phonemes is straightforward. No part of *au*/*eu* is unique – both can be found elsewhere (recall Ladefoged & Maddieson 1996:322 and see also Haugen 1967:806). Thus the old structuralist aim of reducing the inventory of phonemes as far as possible encounters no obstacle here, turning 'suspicious' sound matter into two separate phonemes that are present in the inventory anyway. This holds both for the pronunciation type [a͡ʊ]/[e͡ʊ] and for the pronunciation type [a͡ɵ]/[e͡ɵ] (Section 2.4). The former will combine /a/ and /u/, the second /a/ and /ʉ/.

5.4 Vowel sequences in Swedish: Native and borrowed

Additionally, Elert (1970:88) draws a parallel to vowel sequences in Swedish. These are of two distinct types: (i) native, which always involve a morpheme

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boundary (see Section 6.2), and (ii) borrowed, which are frequent both across morpheme junctures and within morphemes. Examples of the former type are *li-e* 'scythe' (pl. *liar*), *ry-a* 'long-pile rug' (pl. *ryor*), *tjo-a* 'holler' (v.; < *tjo* interj.). Examples of the latter, within morphemes, include:

(12)	[ˈV:V]:	bio	[ˈbiːu]	'cinema'
	[VˈV:]:	etui	[etɥˈiː]	'case'
	[VˈV]:	duell	[dɥˈɛlː]	'duel'
	[VV . . . ˈ]:	aorist	[aɔˈrisːt]	'aorist'
	[ˈ . . . VV]:	polio	[ˈpuːliu]	'polio'

Following Elert's argument, all vowel sequences, whether morpheme-internal or not, will be analyzed in precisely the same way.

5.5 Lengthening of the first component of au/eu in stressed position

A further piece of evidence is how *au*/*eu* behave in relation to vowel lengthening. When *au*/*eu* are pronounced as diphthongs, the first diphthong component is in principle relatively short. But when they are pronounced as vowel sequences, their first component is lengthened in stressed position, as in [ˈpɑːʊs], [ˈsɑːʊna], [ˈneːɥtrʊm].[34] Lengthening does not affect *au*/*eu* evenly as a whole, but primarily only their first elements. This contrasts, for instance, with how long and short diphthongs are distinguished in Icelandic. No measurements of the internal durational properties of Icelandic diphthongs seem to exist, but it appears that lengthening is distributed more or less equally over the two components of Icelandic long diphthongs (Magnús Pétursson, pers. comm. 31 January 2022). Hence the prolongability of precisely the first component of Swedish *au*/*eu* suggests that these two components are not indivisibly glued together, but function separately.

5.6 No morphophonemic alternation with simple vowel phonemes

Still another consideration is that Swedish *au*/*eu* do not participate as units in morphophonemic alternations. Compare that Schane (1973:20) suggests that English vowel alternations as in *profane* vs. *profanity* or Spanish vowel alternations as in *miente* 'he lies' vs. *mentir* 'lie' (v.) and *duermo* 'I sleep' vs. *dormir* 'sleep' (v.) may be taken to support a functionally unitary interpretation of English and Spanish diphthongs. Strong verb alternations of the type *schneiden* 'cut' (v.) vs. *schnitt* 'cut (past)' and *saugen* 'suck' vs. *sog* 'sucked' provide Ternes (1999:102) with the same sort of argument for German. The strength of this kind of argument may be debated, but suffice it to note that no similar situation arises in Swedish. No instances of *au*/*eu* alternate morphophonemically with simple vowels.

5.7 Consonantization of offglide and offglide deletion

Beyond bisyllabic realizations, two further, related, kinds of free variation yield additional clues to the composite nature of *au*/*eu*. The first is the [ʊ]~[v] alternation or process [ʊ] → [v] referred to in Section 3.2. A second kind of variation in *au*/*eu* involves the optional loss of the second segment of these sequences, i.e. [ʊ] → Ø:

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Table 8. Sequential pronunciation variation involving *au/eu*

	(1) Diphthong	(2) Two vowels	(3) Vowel plus consonant	(4) Single vowel
Stressed	a͡ɵ	ɑːɵ	avː	ɑː
Unstressed	a͡ɵ	aɵ	av (af)	a
Stressed	e͡ɵ	eːɵ	evː/ɛvː [a]	—
Unstressed	e͡ɵ	eɵ	ɛv	e

[a] [evˑ], or in narrow transcription [e̬vˑ], occurs in *euro* 'euro' in dialects that contrast short and long [e] and [ɛ].

(13) a. *au* ~ *a*

August	[ˈa͡ɵgɵst]	[ˈɑːgɵst]	'August' (man's name)
augusti	[a͡ɵˈgɵsˑti]	[aˈgɵsˑti]	'August' (month)
auktion	[a͡ɵkˈɧuːn]	[akˈɧuːn]	'auction'

b. *eu* ~ *e*

Europa	[e͡ɵˈruːpa]	[eˈruːpa]	'Europe'
europé	[e͡ɵruˈpeː]	[eruˈpeː]	'European' (n.)
reumatism	[re͡ɵmaˈtisˑm]	[remaˈtisˑm]	'rheumatism'

The three types of variation are summed up in Table 8. All these types of variation indicate that *au*/*eu* are not truly indivisible phonemic diphthongs.

5.8 Cases with an intervening morpheme boundary

Morphological structure, too, plays a role in the assessment of *au*/*eu*. As is clear from Sigurd's (1965) practice (see Section 2.1 above), several borrowings in *-um* require a bisegmental interpretation of orthographic *eu* on morphological grounds:[35]

(14)

museum	[mʉˈsèːɵm]	'museum'
museet	[mʉˈsèːɛ̱t]	'the museum' (or *museumet* [mʉˈsèːɵmɛ̱t])
museer	[mʉˈsèːɛ̱r]	'museums' (or *museum* [mʉˈsèːɵm])
museichef	[mʉˈsèːiˌɧɛːf]	'museum director'
museal	[mʉseˈɑːl]	'museum' (adj.)

Here the *eu* is obviously split between two different morphemes, a fact reinforced by the assignment of tonal accent (i.e. 'accent 2') in stressed position. Equivalent data for orthographic *au* do not seem to exist, but note that Latin or Latinized proper names in archaic and set expressions may occasionally show traces of Latin inflection: *Nikolaus* [nikɔˈlɑːɵs], genitive *Nikolai* [nikɔˈlɑːi], *Olaus* [uˈlɑːɵs], genitive *Olai* [uˈlɑːi]. The nominative forms *Nikolaus*, *Olaus* rhyme perfectly with bisyllabically pronounced *paus* [ˈpɑːɵs] 'pause', but differ from the latter in that they clearly contain a grammatical boundary between the *a* and the *u*. Correspondingly, NSU indicates no diphthongal pronunciations for any of these.[36]

5.9 Au/eu *with stressed* -u *in words of non-Western origins*

As we have seen (Section 2.5), *au*/*eu* resist taking stress on their second component, contrary to the pattern of many uncontested vowel combinations. Compare, for

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example *etui* [etɥˈiː] 'case' and *fluidum* [ˈflɥːidɔm] 'fluid', where the same underlying vowel combination /ɥi/ is stressed on its second and its first member, respectively. There are exceptions, actual or potential, to the typical first-component stress of *au*/*eu*, however. First, we consider three specific examples of *au*, then one of *eu*, with some of their cross-linguistic equivalents.

One is the toponym *Nauru* (in Micronesia; formerly *Pleasant Island*; once under German rule). According to NE 14 (71), the name is pronounced '[naʉːˊrɵ]' (i.e. [naˈɥːrɥ]), with the same stress pattern as German *Nauru* [naˈuːru], which mirrors the Nauruan name of the island, [næoˈero], a word of unknown etymology (Hughes 2020:4 and pers. comm. 2 January 2022).

A further item is *aul*, this one of Turkic origin, which SAOB (II: column A 2686) translates as 'Kyrgyz tent village' and transcribes (converted into IPA) as [ɑˈɥːl] or [aˈɥːl], both 'without diphthongization'.[37] The diphthongal pronunciations [a͡ɵl] and [ɑ͡ul] are also mentioned. *Duden* (176) represents the word *Aul* in German with a diphthong, while Russian has *aul* [aˈul] (Avanesov & Ožegov 1959:37).

A third, potential, example is the word family *gagauz*, *gagauzisk*, and *Gagauzien* (in Moldova, formerly part of the Soviet Union). The word *gagauziska* 'Gagauz (language)' is transcribed 'gaˈga͡ɵsıska' in SSU (276), perhaps following the transcription [-gaᵘ-] of NE 7 (294). The recorded English pronunciations vary. The *Oxford Dictionary of English* (715) gives [gəˈgaʊz]. The *Collins English Dictionary* (662) renders the name of the language as *Gagauzi* with the phonetic transcription '(gəˈgɔːzɪ)'.[38] The *Longman Pronunciation Dictionary* (295), on the other hand, gives [ˌgægɑːˈuz]. The *Concise Dictionary of World Place-Names* gives the transcription '(Găgăuzia)' for the corresponding place-name.[39] In the Gagauz language itself, *gagauz*, an ethnonym of obscure origin and not the original self-designation, is pronounced with stress on the *u*. The Gagauz specialist Astrid Menz (pers. comm. 12 January 2022) confirms this account: 'eine diphthongische Aussprache des -au- ist tatsächlich ausgeschlossen, das Wort hat drei Silben, die Betonung liegt auf der letzten Silbe: ga-ga-ˈuz'.[40] German, and Russian follow the latter pattern, thus German *Gagause* [gagaˈuːzə] 'Gagauz man' (*Duden*:347) and Russian *gagaúz* 'Gagauz man', *gagaúzskij* 'Gagauz' (adj.) (Avanesov & Ožegov 1959:102). Given the Gagauz pronunciation, it is likely that Swedish orthoepists will eventually admit the same accentuation.

The graphic sequence *eu*, finally, occurs in the word family *aleut* 'Aleut (person)', *aleutiska* 'Aleut woman', and *Aleuterna* 'the Aleutian Islands'. For *aleut* and *aleutiska*, SSU (63) suggests the pronunciations [aˈlɛ͡ɵt]/[aˈlɛf:t] and [aˈlɛ͡ɵtıska]/[aˈlɛf:tıska] (where the symbol ɛ corresponds to IPA ɛ). The English pronunciation, in contrast, is *Aleutian* [əˈluːʃən], the German one *Aleuten* [aleˈuːtn̩] (*Duden*:145). Since Russia owns some of the Aleutian Islands, it is also of interest to note that the Russian morpheme *aleut* and its derivatives are always stressed on the *u* (i.e. *aleút*, Avanesov & Ožegov 1959:28). In Swedish, too, the toponym is often pronounced with the stress on the *u*: [aleˈɥːtɛ̱ɳa] (but also [aˈlɛvˈtɛ̱ɳa]), similarly the ethnonym *aleuter* [aleˈɥːtɛ̱r] 'Aleutian (person)' (compare NSU:15).

In conclusion, the dominant first-component stress of *au*/*eu* in words of the type *paus*/*neutrum* reflects conditions in the languages (most commonly Greek, Latin, German, etc.) from which the words in question were borrowed. When words originate from other more remote sources, second-component stress in *au*/*eu* is entirely

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possible. Consequently, the origin of a word will co-determine the treatment of the orthographic sequences *au*/*eu*.

5.10 Variable metrical treatment of au/eu

Owing to its special character and requirements, poetry will not necessarily yield conclusive information. Nevertheless, it is worthy of note that Risberg's (1932–1936 II:108–110) extensive sampling of vowel sequences in metrically bound verse appears to yield little evidence that the metrical treatment of *au*/*eu* differs from that of other, uncontested, vowel sequences. Dieresis, the dissociation of vowel combinations into their constituent elements in two different syllables, is amply attested in this material, but the opposite phenomenon of syneresis, i.e. combining the two vowels into one syllable, is also found fairly often. This is true of ordinary vowel clusters as well as the more special cases of *au*/*eu*. Examples involving *au*/*eu* are:[41]

(15) a. x / x / x / x / x
Man hört | hur mång|en **au**k|tor skri|ker (Johan Henric Kellgren)
'We have heard how many an author screams.'

b. x / x / x / x / x / x
Och Sa|**u**ls själ | var fylld | av sorg | till ran|den (Gustaf Fröding)
'And Saul's soul was filled with sorrow to the brim.'

c. x / x / x / x
Lugn stod | han mot | **Eu**ro|pa (Esaias Tegnér)
'He stood calm against Europe.'

d. x / x / x / x / x /
För vi|te män | i **E**|**u**ro|pas mitt (Gustaf Fröding)
'For white men in the middle of Europe.'

Thus, whereas *au* in *auktor* 'author' in (15a) is securely contained within one syllable, the *au* of *Saul* in (15b) is divided between two syllables. Similarly, whereas *eu* in *Europa* 'Europe' in (15c) is treated as a single syllable nucleus, the same entity in *Europas* 'Europe's' (15d) constitutes two different syllables. Nor does Risberg indicate any difference between uncontested vowel combinations and *au*/*eu* when commenting on his data, but observes quite generally (1932–1936 II:108):

> in loanwords ... often names, especially those of Greco-Roman or Romance origin, in which two vowels combine, the two vowels may be treated as sustaining two syllables or only one syllable, all according to taste and ease. Thus we often find that, in one and the same author, the same, or at any rate fully equivalent, words are sometimes used one way, sometimes the other.

Hence metrical information underlines the extensive variability of the diphthongal vs. sequential character of *au*/*eu*.

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5.11 Summary

A good deal of evidence can be adduced in favor of viewing diphthongal *au*/*eu* as underlying vowel sequences. These entities are very often segmentalized phonetically speaking. They do not contrast with the corresponding vowel sequences. They largely, though not entirely, pattern like undisputed vowel combinations in borrowed morphemes. Their first component is lengthened in stressed position, not the whole diphthong as in Icelandic. They do not alternate with single vowels as in English, German, and Spanish, and fulfill no morphological function. Their second component may disengage itself, turning into *v* or zero. In some cases, underlying diphthongs cannot be posited because, in addition to being normally pronounced as bisyllables, the two elements are divided by a morpheme boundary. Sporadically, new borrowings may enter the language, in which the second component of *au*/*eu* is stressable. Metrically, *au*/*eu* are variously treated as diphthongs and sequences. In comparison, the prime arguments for postulating monophonemic diphthongs (Sections 2.2 and 2.5) are weak.

6. Avoidance, adaptation, and integration of diphthongs in Swedish

6.1 The deep-seated aversion to underlying diphthongs in Swedish

The notorious resistance to phonemic diphthongs in Central Standard Swedish is striking. Bergroth (1924:54) mentions the 'prominent anti-diphthongal tendency in standard Swedish'. SOU (10) notes that 'In general the Swedish standard language does not cherish diphthongs.' Concerning *au*, Noreen (1903–1924 II:61 fn. 3) comments on 'How foreign the diphthong appears to the rank and file of society'. Dahlstedt (1967:26) holds that 'To the Swedish standard language diphthongs are basically foreign . . . and only /au/ has through loanwords gained a secure foothold in our language.' But even with respect to *au*, he speaks of 'the alien status of this sound sequence to a genuinely Swedish linguistic consciousness' (Dahlstedt 1962:18). Pamp (1972:33), finally, describes *au* as 'un-Swedish'. Historically, the East Scandinavian monophthongization swept through the region in the early Middle Ages (Marklund 2018 with references). Low-level phonetic offgliding and rapid-speech diphthong formation have not radically altered the disinclination towards underlying diphthongs. According to Braunmüller (2007:36) and Lindqvist (2007:73), Central Standard Swedish is now unique among the Germanic languages in lacking underlying diphthongs in its native morpheme inventory. Areally, it is completely surrounded by languages with diphthongs (compare Ternes 1998:144, Eliasson 2000:37–39).

6.2 The two native Swedish root-morpheme templates

From a synchronic point of view, the Central Swedish aversion to foreign diphthongs is phonotactically deeply rooted. Only two general canonical types of underlying root morphemes exist in the native Swedish lexicon, monovocalic (16a) and bivocalic (16b) (adapted from Eliasson 2009:59):[42]

(16) a. $+C_0{}^3VC_0{}^{2(3)}+$
b. $+C_0{}^3VC_1{}^{2(3)}vL+$

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Swedish monovocalic root morphemes, e.g. *å* [oː] 'stream' (n.), *tår* [toːr] 'tear', *ork* [ɔrˑk] 'strength', *strand* [stranˑd] 'shore', include 0 to 3 onset consonants, have one and only one vowel in the nucleus, and 0 to 2, sometimes 3, coda consonants. Karlsson (2013:49) and Eliasson (2014:70) list the occurring shapes. The latter mentions no instance of VCCC; Karlsson (2013:50) registers the item *ilsk* 'angry', etymologically an *-sk*-derivation (Hellquist 1980 I:403) like a number of other *-sk*-formations with synchronically unidentifiable roots (Eliasson 2009:75). Generally, the set of morpheme-final -CCC clusters is extremely constrained, many of these being loans or else due to special language-internal developments (Eliasson 2009:60, 75–79), a fact that in combination with the low number of CCC- onsets explains why the type *CCCVCCC is unattested. Karlsson (2013:49) details the number of items in the different canonical classes (CVCC 1437 instances, CCVCC 821, CVC 778, etc.), in his analysis a total of 4114 monovocalic root morphemes, only 149 (3.6%) of which begin with CCC- and a mere 82 (2%) contain a final -CCC combination (2013:49, 50). A fair degree of cluster complexity is thus possible with consonants, but none with vowels.[43]

Bivocalic root morphemes, e.g. *virvel* [ˈvìrˑvɛ̲l] 'whirl' (n.), *bolster* [ˈbɔlˑstɛ̲r] 'feather bed', and *vatten* [ˈvatːɛ̲n] 'water', are built in essentially the same way as monovocalic ones, but with the addition of a non-stressable, unstable vowel (V), most often [ɛ] (in certain morphemes not realized phonetically, because the conditions for its appearance do not arise), followed by *l*, *n*, or *r*. It is worth noting, however, that in native bivocalic root morphemes one medial consonant is compulsory, thus avoiding hiatus.[44]

Significantly, then, in neither of the two basic types of native root morphemes, nor in any other related lesser type in the native lexicon, is it ever the case that two vowels combine intra-morphemically: a vowel never follows a vowel in a native Swedish morpheme. Nor is the vowel V in the formulas (16a) and (16b) ever natively an indivisible underlying diphthong. Finally, no vowel length exists underlyingly (equated, for instance, to two moras) that might provide a parallel for positing diphthongal nuclei, too, at the underlying level.

6.3 Adaptation strategies for foreign diphthongs

The morpheme patterns in (16) recur over and over again in the Swedish lexicon. While the elements in their onsets and post-V codas are largely optional, the template nucleus obligatorily consists of one single vowel, with no allowance for complex nuclei. The analogical force of this pattern seems to be so strong that it largely counteracts the adoption of foreign diphthongs. Three major adaptation strategies affect *au*/*eu*:

(17) a. *Bisyllabification* (dieresis): [a͡ɵ], [e͡ɵ] (or [a͡ʊ], [e͡ʊ]) → [a.ɵ], [e.ɵ]
b. *Consonantization of offglide*: [ɵ] → [v] (sometimes devoiced to [f])
c. *Offglide deletion*: [ɵ] → Ø

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Risberg (1932–1936 I:56) elucidates the first two processes as follows (emphasis added):[45]

> In the pronunciation of foreign languages or of words borrowed or derived from foreign languages, especially by persons whose own language does not have the same diphthongs or no true diphthongs at all (like our standard Swedish language of today), it ... occurs to a large extent that either *u* and *i* are actually CONSONANTIZED into *v* or *j* ... OR else that the diphthong is BROKEN UP INTO TWO VOWELS, EXPIRATORILY SEPARATE, EACH CARRYING ITS OWN SYLLABLE, AND WITH HIATUS ... Naturally, the original diphthong, composed of two vowel sounds ... is also preserved in many cases, especially by persons with language training or in certain dialects.

Bisyllabification is reinforced by lengthening of the first component of *au*/*eu* in stressed position (Section 5.5). Beyond *au*/*eu*, (optional) consonantization of [i̯] to [j] regularly appears in imported *i*-diphthongs, e.g. *guide* [ˈgaj̯ːd] 'guide' (n.) (< English *guide*), *geist* [ˈgaj̯ːst] 'go, drive' (n.) (< German *Geist* 'mind; spirit'), and *pojke* [ˈpɔj̯ːkɛ̯, ˈpɔj̯ːkɛ̯] 'boy' (< Finnish *poika* 'boy'). A possibly illusory hapax-legomenon-type strategy is dropping of the diphthong head, the most sonorous part:

(18) *Deletion of diphthong head*: [a] → Ø

In the standard language, (18) is, it seems, only attested in the widespread, very frequent pronunciation [restɥˈraŋː] of *restaurang* 'restaurant', instead of [restaə̯ˈraŋː].[46] All adaptation strategies are partly dependent on whether the syllable in question is stressed or not, and individual words vary as to the extent to which they undergo the processes. Lindqvist (2007:95) notes that 'Die Art der Anpassung an das zentrale Lautsystem ist weitgehend lexemgebunden.'[47]

6.4 Swedish diphthong avoidance in second language acquisition and learning

Interestingly, the fundamental tendency to remodel foreign diphthongs extends to Swedes' second language acquisition and learning. The same modifications we just noted in loanword adaptation also appear here: (i) diphthong fission (dieresis), (ii) consonantization of offglide, and (iii) lengthening of diphthong head in stressed position.

Dieresis and, in stressed syllables, concomitant lengthening of the diphthong head frequently occur among Swedes learning German. In a prescriptive statement, Martens & Martens (1961:79, emphasis added) say concerning Standard German diphthongs:

> Die Diphthonge sind einsilbig. Sie haben also die sprachliche Quantität eines Einzelvokals. Der erste Teil der Zwielaute [ae, ao, ɔø] (also [a-, a-, ɔ-]) ist stärker betont als der zweite Teil, DARF ABER AUF KEINEN FALL GEDEHNT WERDEN.
>
> ['The diphthongs are monosyllabic. They thus have the linguistic quantity of a single vowel. The first part of the diphthongs [ae, ao, ɔø] (i.e. [a-, a-, ɔ-]) is more strongly stressed than the second part, BUT MUST ON NO ACCOUNT BE LENGTHENED.']

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Hence the component parts of the German diphthongs should essentially both be short. Correspondingly, Gejrot (1960:8) advises Swedish speakers learning German that the *a* in German *au* should be pronounced as '**Dark a** as in Sw[edish] "far" ["father"], **but short**'. The pronunciation *[ˈhaːus] for German *Haus* [ˈha͡ʊs] 'house', with Swedish-induced dieresis and lengthening, is a typical error.

As for consonantization, we may first note that in second language learning Swedes frequently consonantize the offglides of foreign *i*-diphthongs, since *j*, the Swedish consonant generally associated with the semi-vowel [i̯], is often rendered as a fricative, [j]. Hjorth & Lide (1958:4) say that German '**ai**, **ei** are pronounced [ai], ... note, not with ***j***, as in Sw[edish] "aj" ["ouch!"]'. Similarly, Korlén & Malmberg (1960:87) warn against mispronouncing the German diphthong [ai]: 'Swedes must ... carefully see to it that, under all circumstances, the final element becomes vocalic (*i*, or possibly *e*), never a consonantal [j] as in Swedish *aj*, *kaj* ["quay"], etc.'[48] In the same vein, Malmberg (1966:47–50 passim) cautions against producing fricative offglides in the English *i*-diphthongs [e͡i̯, a͡i̯, ɔ͡i̯], but also in the English *u*-diphthongs [a͡u̯] and [o͡u̯].

6.5 Diphthongal realizations in unstressed position and rapid speech

At the level of articulation, the difference between diphthongs and vowel sequences constitutes a continuum, affected by factors such as speech rate (rapid vs. lento speech), speech rhythm, and stress (unstressed vs. stressed position). Generally, given the 'reduction of the vowel space at faster speech rates' (Petersen 2018:iii, 248), certain vowel clusters may in rapid speech tend to be realized as diphthongoids (i.e. elements somewhere along the continuum between monophthongs and diphthongs) or even as fully fledged diphthongs. Regarding unitary or bivocalic realizations of Swedish *au*/*eu*, Gjerdman (1954:383) refers to sentence rhythm as a factor (emphasis added):

> The line between the two pronunciations is ... not always easy to draw. Most often it is perhaps the RHYTHMIC CONDITIONS IN THE SURROUNDING LINGUISTIC MATERIAL that determine what pronunciation appears.

Moreover, it is striking to observe the recurring reference in the literature to *au*/*eu* in unstressed vs. stressed syllables. Noreen (1903–1924 IV:9), for instance, says that 'the diphthong is relatively frequent in less common or more recent loanwords, ABOVE ALL IN WEAKLY STRESSED SYLLABLES' (emphasis added). His examples include (i) *paulun* 'four-poster bed', *eunuck* 'eunuch', (ii) *autograf* 'autograph', *eufemism* 'euphemism', *pseudonym* 'pseudonym', and (iii) *automobil* 'automobile', *tautologi* 'tautology', where *au* and *eu* at varying distances to the final stressed syllable are often pronounced as diphthongs. The frequent reference to stress conditions raises the suspicion that some of the diphthongs in unstressed position or in rapid speech, rather than reflecting underlying diphthongs, may actually result from low-level phonetic processes. This assumption may solve Sigurd's (1965:142) problem with the precarious diphthong *eu* in *neutrum* vis-à-vis the derivative *neutral* (see Sections 2.1, 2.6, and 5.1 above). If the *eu* in *neutrum* [ˈne͡øʉ̯trɔm] is actually /eʉ̯/,

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the diphthongal quality in *neutral* [neə̯ˈtrɑːl] may simply reflect the appearance of /eʉ/ in unstressed position immediately before the syllable carrying the main stress. Diphthongal realizations in unstressed position do not infallibly indicate that the entities concerned are diphthongs phonologically.

6.6 How well integrated are au/eu *with the Swedish phoneme system?*

What criteria should be applied in determining whether or not *au*/*eu* are part of the Swedish phoneme system? Especially the notion of contrast is crucial to phonology. Grossman et al. (2020:5317) remark on segment borrowing in general:[49]

> **Phonological segment borrowing** is a process in which a certain sound becomes a contrastive segment in a language, or in which a marginal segment in a language becomes contrastive in more domains and environments, due to lexical borrowing.

The first and foremost requirement, then, is that the units under discussion actually CONTRAST WITH NATIVE PHONEMES. This is the case in Swedish with certain other borrowed sounds. When the loanword *bag* [ˈbæːg, ˈbæg:, ˈbɛg:, ˈbag:] 'bag' (see NSU:85, SSU:95) retains its English vowel quality [æː], it forms a sub-minimal pair with the native *väg* [ˈvɛːg] 'way' with [ɛː]. Similarly, the word *twist* 'twist' (dance), when pronounced [ˈtwisːt] in Swedish, forms a minimal pair with *tvist* [ˈtvisːt] 'dispute'.[50] In both instances, a borrowed sound contrasts with native sounds. In principle, diphthongal *au*/*eu*, too, contrast with native segments (*faun* [ˈfaə̯n] 'faun' vs. *fan* [ˈfɑːn] 'the Devil', *fån* [ˈfoːn] 'fool', etc.). Nevertheless, they fail to contrast with non-diphthongal *au*/*eu*, occurring rather in free variation with these (Sections 5.2 and 5.3). Hence they enjoy no totally independent status in the Swedish phoneme inventory.

Another criterion is whether the putative phonemes HAVE ENTERED THE NATIVE LEXICAL STOCK (Campbell 1996:99). But the diphthongs *au*/*eu* only show up in loans and in an interjection (*mjau* 'miaow'). If appearance in the native lexicon is a must for nativized phonemehood, diphthongal *au*/*eu* cannot be part of the Swedish phoneme system.

Nor are diphthongal *au*/*eu* easily accommodated under the assumption of a coexistent phonemic system in a limited foreign (largely classical) stratum of the Swedish lexicon.[51] The two units do not contrast with corresponding sequences even there. Rather than as separate indivisible phonemes, they are, therefore, perhaps best accounted for by a special descriptive stipulation valid for a borrowed sub-domain of the lexicon, possibly something like (19):

(19) *Au*/*eu*-sequences in lexically specifiable or lexically marked morphemes are optionally pronounced as diphthongs

LEXICALLY SPECIFIABLE refers to lexical and phonological clues to the more or less specific non-native origin of a given word and hence clues to its pronunciation (compare Tamm 1887). LEXICALLY MARKED refers to item-specific lexical marking.

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Table 9. Basic characteristics of various phonological interpretations of Swedish *au*/*eu*

	Type of phonological analysis			
	1. Diphthong /V͡V/	2. Sequence /VC/	3. Monosyllabic /VV̯/	4. Bisyllabic /VV/
a. Bisegmental	–	+	+	+
b. /V/ as second segment	(inapplicable)	–	+	+
c. Syllabically separable	–		–	+

7. Summary and conclusion

The borrowed entities written *au*/*eu* in Swedish are variously pronounced as diphthongs ([a͡ɵ, a͡ʊ]/[e͡ɵ, e͡ʊ], etc.), bisyllabic sequences ([aɵ]/[eɵ], etc.), and, in certain words, even as vowel-consonant combinations ([av]/[ev], etc.) or single vowels ([a]/[e], etc.). They have been interpreted phonologically in four major ways: as (i) phonemic diphthongs, (ii) /VC/-sequences, either /Vv/ or, merely hypothetically, /Vw/, (iii) monosyllabic /VV̯/-sequences, where /V̯/ is a non-syllabic vowel, and (iv) bisyllabic /VV/-sequences, with two structurally equivalent vowels (Section 1.3). The four types of analysis with their defining properties are summarized in Table 9 (compare Table 3 in Section 1). Analysis 1 considers diphthongal *au*/*eu* to be indivisible, unitary phonemes in contrast to the other analyses, which treat them as consisting of two separate phonemes. Analyses of type 2 take the second part of *au*/*eu* to be a consonant, in analyses 3–4 it is a vowel. Analysis 3 shares the idea that *au*/*eu* are monosyllabic with 1, but the idea that they are bivocalic with 4, while excluding the suggestion of analysis 2 that the second diphthong element is consonantal. Analysis 4, finally, treats *au*/*eu* as underlying bivocalic sequences, whose parts belong to two different syllables or are separately syllabifiable. Which alternative is to be preferred?

Analyses 2 and 3 encounter major difficulties when they are placed within the larger structure of the language. The prime piece of evidence for a /VC/-type analysis, specifically the /Vv/-analysis, is the free variation between [V͡ɵ] and [Vv] in a subset of words, but neither the /Vv/-analysis, nor the alternative /Vw/-solution are easily aligned with certain other phonological facts (Sections 3.3 and 3.4). The variation [ɵ]~[v] is more conveniently seen as consonantization, synchronically speaking, and Swedish has no [w] distinct from [ʊ̯] and separate from ordinary [w] in English loans. Analysis 3, moreover, is to a considerable extent motivated by the distributional parallel with V*j*-sequences which are said to consist of two short monosyllabic vowels and by the parallel with long vowels which are seen as geminates. However, the interpretation of V*j*-sequences is not straightforward (Section 4.2) and the view of Swedish vowel length as gemination is implausible (Section 4.3). For the rest, analysis 3 may be said to share advantages and disadvantages above all with analysis 1. Consequently, analysis 1 (the /V͡V/-analysis) and analysis 4 (the /VV/-analysis) emerge as the main contenders.

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The characteristics in (20) suggest that *au*/*eu* are unitary, indivisible phonemic diphthongs:

(20) a. Frequent diphthongal realizations.
b. The diphthong offset *-u* remains unstressable in derivations with the pre-stressed suffixes *-ísk* '-ish' and *-íker* '-ician'.

The considerations in (21) favor the view that *au*/*eu* are best regarded as phonological sequences:

(21) a. No phonological contrast obtains between diphthongs and the corresponding vowel sequences.
b. *Au*/*eu* are actually very often pronounced as bisyllabic sequences.
c. The first diphthong component can be independently prolonged in stressed position.
d. In a certain set of words, the second diphthong component can be turned into *v* or reduced to zero in the manner of a separate segment.
e. Swedish phonotactics accommodates no native phonemic diphthongs, thereby providing no natural slot for the importation of foreign diphthongs.
f. The number of morphemes containing *eu*, optionally pronounced as a diphthong, is quite limited, hence constituting only weak support for assuming a new phoneme.
g. Diphthongal pronunciations of *au*/*eu* may to some extent ensue automatically in unstressed position and rapid speech.
h. The metrical treatment of *au*/*eu* vacillates between diphthongs and sequences.

Facts (20a) and (20b) indicate that there is something special about *au*/*eu* in Swedish. These facts must be accounted for. The question is whether they are best described by assuming separate indivisible phonemes in a lexical sub-domain or by a special descriptive stipulation, perhaps such as (19) above. The advantage of the latter approach seems to be strong. The absence of minimal pairs demonstrating contrasts between diphthongal *au*/*eu* and the corresponding sequences is a crucial argument against assuming phonemic diphthongs and in favor of an interpretation as sequences of vowel phonemes (21a). Rampant free variation of several kinds occurs between diphthongal and non-diphthongal pronunciations, making the former highly unstable units (21b–d). The components of *au*/*eu* can be modified individually in four partly intertwined adaptation processes, viz. bisyllabification (21b), head lengthening (21c), offglide consonantization or offglide deletion (21d), contrary to what should hold for unitary, indivisible diphthongs. Phonotactically, diphthongs clash head on with the two native underlying root-morpheme templates, allowing only monophthongs as syllable nuclei (21e). Despite frequent low-level phonetic diphthongizations, no phonemic diphthongs have since the time of the early medieval monophthongization made their way into the native standard lexicon, and apart from an isolated interjection, *au*/*eu* never show up outside the realm of borrowings. Lexically, the small set of morphemes with *eu* would make /e͡ʊ/ a particularly precarious phoneme (21f). Diphthongal pronunciations of *au*/*eu* in unstressed position and rapid speech may in part be

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phonetic in nature (21g). The variable metrical treatment of *au*/*eu* further underlines the unstable character of these entities (21h).

The case for regarding *au*/*eu* as unitary phonemes, to some extent nativized in Swedish, is thus weak. While the facts in (20) must be accounted for in any description of Swedish phonology, the considerations in (21) – most particularly, the lack of diphthong/sequence contrasts and the wide-ranging compositional and sequential variability of the diphthongs – suggest that *au*/*eu* should in the first place be analyzed as bivocalic sequences that are independently syllabifiable. By the same token, the existence of these entities does not alter the typological classification of Swedish as a language without phonemic diphthongs.

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Notes

1 The phonetic transcriptions in this paper follow the *IPA Handbook*. Where phonetic accuracy is not required, a broad transcription is often used. Slashes // mark phonemic transcriptions, square brackets [ ] phonetic ones. Spelling is indicated by italics or angle brackets < >. The asterisk * signals an ungrammatical or unattested form; a syllable break is marked by a period. The abbreviations n., pl., and v. stand for 'noun', 'plural', and 'verb', respectively. All translations of quotations from non-English sources are by the author. The paper draws in part on the discussion of diphthongs in Eliasson (1970:195–218).

2 See Eliasson & La Pelle (1973), Hellberg (1974:84 and passim), Eliasson (1985:121, 2010a:9), Garlén (1988:60–61, 76–78, 107), Löfstedt (1992:94, 2010:8), Riad (1992:282, 2014:17, 21), Braunmüller (2007:35), Lindqvist (2007:98), Karlsson (2013); likewise, Hasselmo (no date:8, 38–41), Andersson (1994:272–273), Gårding & Kjellin (1998:37), Lindblad (1999:3), Aktürk-Drake (2014:168 or 2015:52–53), etc. Previously, Elert (1955:142), in a brief statement, had postulated nine vowel phonemes, but he later prefers other alternatives. Recent accounts positing phonologically distinctive vowel quantity do not usually base their decision on a comprehensive, in-depth examination of the data. Fundamental hurdles to the latter analysis are (i) the total lack of strictly minimal morpheme pairs demonstrating segmental phonemic quantity differences in vowels, as the alleged minimal contrasts are always dependent on the shortness or length of the following consonant, if any ([V:(C)] vs. [VC:]/[VC·]), and hence (ii) that the prosodic V/C duration ratio constitutes the perceptually significant durational clue (Eliasson 2010a:9, 23–27). Cross-linguistic databases of phoneme inventories need to take note of these considerations (e.g. Moran et al. 2019 and Nikolaev 2019, who in effect only list the major Swedish vowel types, not the phonemes).

3 See Lindqvist (2015:116–117) for transcriptional issues, however.

4 See e.g. Árnason (1980:189–191, 198–200, 207–209, 217) for Icelandic and other languages, and Werner (1972:32–35), Meinhold & Stock (1980:87–88), Becker (1998:126–139), and Ternes (1999:101–103) for German. Additional concerns regarding diphthongs are discussed by, for instance, Sánchez Miret (1998), Raffelsiefen & Brackhane (2014), Raffelsiefen & Geumann (2016, 2018), Raffelsiefen et al. (no date), Petersen (2018), the latter with an extensive bibliography, and Golston & Krämer (2020).

5 As Elert (1997:28) mentions, the letter sequences <au>, <eu> also occur in certain words with pronunciations other than those of concern here, such as *chauvinist* [ʃɔviˈnis·t] 'chauvinist', *charmeuse* [ʃarˈmø:s] 'charmeuse', and *freudiansk* [frɔjdiˈɑ:nsk] 'Freudian'. We disregard these cases here.

6 The only seemingly native word in the Swedish lexicon with an *au*-diphthong is the onomatopoeic interjection *mjau*, *miau* [ˈmj͡au] (SSU:493: mjaʊ) 'miaow' (Lindqvist 2007:95). The word *rauk* 'pillar-shaped stone formation' is borrowed from Gotlandic (Wessén 1968:334). The word *bautasten* '(kind of) memorial stone' comes from Icelandic (Tamm 1887 [1966:5], Hellquist 1980 I:58).

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7 Regarding the notation [e͡ɵ], compare that when *eu* is bisyllabified, when it is stripped of its *u*, or when its *u* is turned into *v*, the vowel quality [e] emerges in at least some of the dialects that distinguish short [e] and short [ɛ] phonologically.
8 All three dictionaries use a bottom tie bar (‿) to indicate diphthongal pronunciation. The re-transcription [o̯] in [ɑ͡o̯] (Table 2, SOU column, top) is an approximate rendition of a special SOU symbol, denoting a sound intermediate between [u] and [o], with a tongue position reminiscent of that of [o], but with greater rounding (Lyttkens & Wulff 1885:87, 1912:33). In the speech of their time, these authors discerned this sound quality primarily in the plural ending *-or*.
9 The feature of length is disregarded in this classification of solutions.
10 The terms COMPONENTS or ELEMENTS of diphthongs refer to (perceived) phonetic targets. Acoustically, the diphthong trajectory is seamless and no precise boundary can be drawn between its parts.
11 Compare also Dahlstedt (1967:26). Note also that, in his widely used glossary, Östergren (1953:3) cares to mention only one phonetic diphthong, *au*: 'In words such as *āula*, *āu* in general denotes a diphthong; thus the word *aula* is bisyllabic and the *u* most closely resembles an intermediate sound between *u* and *v*.' Here no mention is made of *eu*, although this entity does appear in the glossary in the word *nēutrum* (1953:76; with the transcription *ēu*, which is exactly parallel to that of *āula*, but also, however, to *kāos* 'chaos', etc.).
12 The process may to some extent proceed on a word-by-word basis. Thus Noreen (1903–1924 II:61) notes that the pronunciation of the word *centaur* 'centaur' is 'perhaps still always with a diphthong'.
13 The accent sign indicates that the preceding vowel is stressed. Before hiatus, the vowel will also be long.
14 Lyttkens & Wulff (1885:161) recognized no *i*-diphthongs: 'In the standard language, there are no diphthongs with *i*, but instead *j* is always used, and foreign words and proper names with the diphthongs ai, äi, etc., are usually pronounced with aj, äj, etc., e.g. Ajno (Finnish name) for Aino.'
15 The analysis in Section 4.2 below considers the *i*-diphthongs to be bisegmental. Witting (1959:108–109) provides some discussion of how to interpret them phonologically.
16 Lyttkens & Wulff's [ɐ, ω, ŭ] stand for IPA [ɑ, u, ɵ], respectively. On the quality of the first component of *au*, see also Lyttkens & Wulff (1889:26*).
17 In the case of *eu* pronounced as [ɛ͡ʊ], Lyttkens & Wulff (1885:56) do not explicitly refer to coarticulation.
18 See also Riad (2014:42). Raffelsiefen et al. (no date) discuss similar issues in the transcription of German diphthongs.
19 Wessén (1965:149), Eliasson (1985:115–117), Riad (2014:203). When *-isk* is added to a compound stem, the pre-suffixal syllable will, of course, carry secondary stress: *sydlaotisk* ['sy̌ːdlaˌuːtisk] 'South Laotian'.
20 The pronunciation *[naˈu̯ːtisk], etc., is not acceptable in the standard language. Compare Noreen (1903–1924 II:61), however, on what was in his days a 'vulgar but not unusual pronunciation [kaˈu̯ːkasøs; SE]' for *Kaukasus* ['kaɵ͡kasøs] 'the Caucasus'.
21 Table 5 is modified with regard to quantity. In common with many early phonological descriptions of Swedish, Sigurd posits both long and short vowel phonemes in stressed syllables. Riad (2014:296) optionally adds diphthongal *au*, which may occur in names of the type *Schartau* ['ʃaˑt͡aɵ], to the first post-stress position.
22 As NSU (798) notes, the word *neutrum* is sometimes pronounced with tonal accent (i.e. 'accent 2'). Hoard's actual phonemic and phonetic transcriptions of the word for 'neuter' are /ˣnev:trom/ and [ˣneʉtrum], respectively. I have changed these particular transcriptions to agree with the facts and his transcriptional practice elsewhere. For the phoneme /ʉ/, he writes /u/, but keeps [ʉ] and [ɵ] for its allophones. The colon in his phonological transcriptions stands for a special, autonomous syllable-level length prosodeme, i.e. a suprasegmental, not a segmental, entity (Hoard 1966:8, 14, 51).
23 Jakobson transcribes this as [praʉdoʉ].
24 A short list is also found in Sigurd (1965:133).
25 NSU (862) transcribes the name *Paul* as '[ˈpoːl]' or '[ˈpa̯ul]', but it may also be pronounced [ˈpɑːʊl] with a hiatus or syllable break between the two vowels. For his time, Noreen (1903–1924 II:60) considers the bisyllabic pronunciation of the name to be 'as good as universally prevailing'. Similarly, Bergroth (1924:54) says that in Central Standard Swedish the pronunciation '*Pā-ul*' is extremely common.
26 See Lyttkens & Wulff (1916:245–246) and Sigurd (1965:71, 72).
27 Compare Witting's (1959:92) remark that 'More or less in conflict with the rules of sound-combination governing the main body of Sw[edish] words are such names as *Paul* (with the diphthong [ɑʊ] as in the "foreign" words *aula*, *paus*, *fauna* etc. . . .)'.
28 That is, IPA ['uɛlˑsisk], ['viːkɛnd] (compare Bergmann 1966:5), and ['visˑky], respectively.

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29 This may partly correspond to what Andersen (1972:18) calls a SEQUENTIAL DIPHTHONG, i.e. 'a sequence of segments, usually forming part of the same syllable' (1972:18) as opposed to a SEGMENTAL DIPHTHONG, i.e. 'a single segment whose central phase is acoustically heterogeneous in its temporal development' (1972:18).

30 This position is in line with Hjelmslev's (1948–1950) idea of Danish [j] as a realization of the vowel *i* (1948–1950:18) and Danish long vowels as 'identity' diphthongs (1948–1950:19) as well as the Danish Romanist Knud Togeby's (1965:43) view that 'De même que les diphtongues, les voyelles longues sont, dans la plupart des langues (dans toutes ?), décomposables en deux voyelles brèves' ['Like diphthongs, long vowels in most (if not all) languages can be split into two short vowels'].

31 On Finnish quantity, see, in addition, Karlsson (1969).

32 Data from NSU (569, 577), SSU (379, 387), and SO (https://svenska.se/so/?sok=kaus&pz=1; accessed 22 July 2022). Phonetic transcriptions harmonized with ordinary IPA.

33 Actually, the SO online pronunciations of *kaus* and *kaos* seem to differ less with respect to diphthongal articulation vs. bisyllabicity than with respect to the quality of the first vowel, [a] versus [ɑ], respectively.

34 Compare (2) in Section 1.3. In his texts providing samples of Swedish pronunciation, Danell (1937:82, 83) explicitly recognizes this fact in the case of *au*, when he consistently transcribes the word *pauser* 'pauses' with a length mark underneath the *a*. Similarly, Östergren (1953) always writes stressed *au*/*eu* with an indication of length (a macron) above their first components: *āula* (1953:3, 13), *āuktor* (1953:13), *clown* transcribed 'klāun' (1953:20), *fāun* 'faun' (1953:33), *flāu* 'slack' (1953:34), *kāutschuk* (1953:53), *māuser* 'Mauser rifle' (1953:70), *pāus* (1953:83), *nēutrum* (1953:76), etc., just as he writes *kāos* (1953:51), *stōisk* 'stoic' (1953:111), *Sūomi* 'Suomi' (1953:113), etc.

35 Similarly, *jubileum* [jʉbiˈlèːəm] 'jubilee', *mausoleum* [maʊ̯sɔˈlèːəm] 'mausoleum', *lyceum* [lyˈsèːəm] 'lyceum, high school'. The mass nouns *linoleum* 'linoleum' and *petroleum* 'petroleum' lack forms without *-um*.

36 Nor, of course, are compounds of the type *extrauterin* [ˌɛkstraˌʉtɛˈriːn] 'extrauterine' pronounced with diphthongs (compare Bendz 1972:38).

37 https://www.saob.se/artikel/?seek=aul&pz=1 (accessed 26 June 2022). Actually, SAOB renders the variant pronunciation [ɑˈʉːl] with the symbol for a LONG retracted *a* (i.e. IPA [ɑː]), but apparently it is the quality rather than the length of the vowel that is aimed at by the choice of symbol.

38 https://www.collinsdictionary.com/dictionary/english/gagauzi (accessed 23 June 2022).

39 https://www.oxfordreference.com/view/10.1093/acref/9780191905636.001.0001/acref-9780191905636-e-2447?rskey=zGUbKe&result=1 (accessed 30 June 2022).

40 '[A] diphthongal pronunciation of -au- is actually excluded, the word has three syllables, the stress is on the last syllable: ga-ga-'uz.'

41 From Risberg (1932–1936 II:109–110). Graphic scansion, boldface, and translations added. The slash / marks the stressed syllable (ictus) in rhythmic scansion, x the unstressed syllable, and the pipe symbol | the boundary between two feet. Authors' names are given in parentheses.

42 C = consonant, V = vowel, ᴠ = unstable vowel, usually [ɛ], L = /l/, /r/, or /n/. The plus sign + marks a morpheme boundary.

43 Note also that the historical Peninsular Scandinavian chain shift of long back vowels produced no diphthongs in Standard Swedish. Specifically, the high [uː] did not diphthongize as in English and German, but was fronted, even at the cost of introducing a typologically unique two-way rounding distinction in the high front vowels (Eliasson 2010b). Nor did the shift produce diphthongs in Norwegian, where these might have been more expected in view of the preservation of old diphthongs in the language. The preference for keeping monophthongs in the shift, therefore, seems to have been strong.

44 An exception, in the special category of names, that synchronically violates this pattern, is *Joar*, but historically this is a compound, Runic Swedish **ioar**, etc. (compare Old West Nordic *jór* 'horse' plus a last element *-ar*). From the beginning of the fourteenth century the name was often written with a hiatus-breaking <u> or <w> (*Jowarus*), later also <g(h)> (*Joghar*) (*Sveriges medeltida personnamn* 15:800), but the form *Joar* eventually won out. Other names with contiguous, synchronically homomorphemic vowels are typically borrowings, e.g. *Boel* (originally Danish), *Joel* (< Hebrew), *Nial* (subsidiary form of *Njal* < Icelandic < Celtic), *Paul* (< Latin), etc. See also Otterbjörk (1970) under the respective entries. I thank one of the *NJL* reviewers for important information on this point.

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45 See also discussions in Noreen (1903–1924 IV:8–9), Braunmüller (1980:33–34, 40 [1995:15, 24], 2007:37), Fries (1983:115–117), and Lindqvist (2007:95). On the phonological analysis of Latin diphthongs, see e.g. Cser (1999).

46 But not in *restaurera* [restaə͡ʊˈreːra] 'restore' and its derivatives (NSU:941). Since the word *restaurang* is borrowed from French *restaurant* [ʁɛstɔˈʁɑ̃], the Swedish pronunciation with [aə͡ʊ] must be a reading pronunciation (compare Pamp 1972:33). The replacement of [aə͡ʊ] by [ʉ̞] may perhaps have been aided by occasional [ɔ]-pronunciations. Östergren (1953:99, 1981 III:687), Wessén (1968:343), and NSU (940) all mention this pronunciation (not in SOU:318, however). Optionally, [ɔ]-pronunciations of *au* also occur in *restauration* 'restoration' (NSU:941), but in this case no [ʉ̞]-pronunciation of the *au* is listed. Pamp (1972:33) thinks that 'the pronunciation *å* [i.e. in this case [ɔ]] of the spelling *au* is even more contrary to Swedish pronunciation habits' than a diphthongal pronunciation. A common corresponding word with *eu* in the same position does not seem to exist.

47 'The manner of adaptation to the core of the sound system is largely tied to individual lexemes.'

48 Conversely, German learners of Swedish tend to replace Swedish V*j*-sequences by V*i*-sequences (Hammarberg 1988:65).

49 An almost identical formulation appears in Eisen (2019:8).

50 See Aktürk-Drake (forthcoming) on /w/ in Swedish.

51 On the role of lexical strata in loanword adaptation, see Uffmann (2015:661–662).

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