Open questions in ancient Greek phonology: some new evidence from enclitics

Philomen Probert
University of Oxford
philomen.probert@wolfson.ox.ac.uk

Abstract: Roussou and Probert (2023: 235–297) put forward some new discoveries bearing on the accentuation of sequences of consecutive ancient Greek enclitics, and a new descriptive claim as to the way in which host words plus sequences of consecutive enclitics were accented. This chapter takes some first steps towards a new account of Greek metrical phonology from which the proposed descriptive facts would follow, and argues that doing so helps us with three open questions in ancient Greek phonology: (a) What phonological principles underly the placement of the Greek word accent, including the restrictions known as the "law of limitation"? (b) Did ancient Greek have "resonant diphthongs"? (c) Is the law of limitation sensitive to the weight of the word-final syllable, or the length of its vowel?

Keywords: ancient Greek, phonology, enclitics, accentuation

1 Introduction[1]

Ancient Greek has a complex system of word accent[2] in which phonological, morphological, and lexical information all play a role. The role of phonology is traditionally seen as a constraining one: the placement of the word accent is not predictable from the phonological shape of the word alone, but phonological factors impose restrictions on the places where the word accent may be found. A long-standing challenge for a phonological description of ancient Greek is to show what plausible phonological principles underlie these restrictions. Several different phonological accounts have been offered, all of them able to account for the main empirical facts. A first open question in Greek phonology is thus which of these accounts, if any, is on the right lines. This chapter takes a new look at this question in the light of some new discoveries bearing on the accentuation of ancient Greek words followed by two or more enclitics, and a new descriptive claim as to the way such sequences were accented in antiquity (Roussou and Probert 2023: 235–297). Two subsidiary questions will be reconsidered at the same time: did ancient Greek have "resonant diphthongs"? And, are the restrictions on the syllable where the word accent can fall (known collectively as the "law of limitation") sensitive to the weight of the word-final syllable, or to the length of its vowel?

Section 2 first provides some background information on ancient Greek accentuation, and Section 3 lays out the three open questions in some more detail. Section 4 then lays out the new descriptive claim on the accentuation of words followed by consecutive enclitics, together with a brief indication of the kinds of evidence on which this is based (the evidence is presented in full in Roussou and Probert 2023: 235–297). Section 5 sketches out the new account of Greek metrical phonology, considers the properties that appear to be essential to any such account, and discusses their implications for our open questions.

[1] I am grateful for discussion with the participants in ICAGL; Oxford colleagues who participated in a brown bag lunch for the presentation of half-baked ideas; Ricardo Bermúdez-Otero, Jose Elias-Ulloa, and Eleanor Dickey. All blame falls on me.

[2] Following the main tradition in relation to ancient Greek, the term "accent" rather than "stress" will be used here, in relation to both surface prominence and (where specified) an abstract underlying feature potentially realisable as surface prominence. On different uses of the terms "accent" and "stress", see Probert (2006: 7–9).

In Sections 2–4, ancient Greek words and phrases are cited both in Greek script and in transcription, while transcription alone is used for the phonological analysis provided in Section 5. The system of transcription used is a transliteration of the orthography and not a strictly phonemic transcription, but what matters for our purposes is that a short vocalic nucleus is represented with a single vowel letter, a long vocalic nucleus with two (or occasionally three), and a consonantal phoneme with a single consonant letter (followed by a superscript ^{h} in the case of the aspirated stops *p*^{h}, *t*^{h}, and *k*^{h}). Syllable divisions within a word are conveyed using a dot. Accents are represented in transcription with an acute accent mark. Since long vocalic nuclei may carry an accent on either their first mora or their second (see Section 2), on an accented long vocalic nucleus the acute appears over the letter representing the accented mora. Where words are given in Greek script, uppercase letters are used where it is useful to leave the accentuation of a word unspecified for the time being.

2 Background information

If enclitics (and proclitics) are left out of account for the moment, ancient Greek words have one main accent, heard in the Hellenistic period as a high pitch on a short vowel, or on the first or second mora of a long vowel or diphthong. In the system of accent marks developed at that time, an acute accent mark represents an accent on a short vowel or the second mora of a long vowel, while a circumflex represents one on the first mora of a long vowel.[3] Ancient grammarians consider any vowel with neither an acute nor a circumflex to have a grave accent; they thus consider many more ancient Greek vowels to have a grave than the ones we write with a grave accent mark today.[4] Our modern conventions for writing ancient Greek derive from the system used in medieval and later manuscripts, where the grave accent mark serves only to represent a neutralisation or lowering of the high pitch on the final syllable of an "oxytone" word (one considered to have an acute on the final syllable as its basic accent), where another non-enclitic word follows with no intervening punctuation. Ancient grammarians refer to the accent as being "put to sleep" under these circumstances, or turning into a grave[5]—but their concept of a "grave" is not limited to this use for a lowered or neutralised acute. It is a broader concept, equivalent to our concept of lack of accent.

Ancient Greek has a set of restrictions known as the "law of limitation", which limit the distance from the end of the word where the main word accent can fall. These may be stated informally as follows, without implying any particular modern analysis:

Law of limitation: informal statement

(a) The word accent does not fall further from the end of the word than the last vocalic mora of the antepenultimate syllable (λεγόμενος/*le.gó.me.nos* 'being said (NOM. SG. M.)' is possible but *λέγομενος/*lé.go.me.nos* is not).
(b) If the final syllable contains a long vocalic nucleus or is closed by a consonant cluster, the word accent does not fall further from the end of the word than the last vocalic mora of the penultimate syllable (λεγομένου/*le.go.mé.nou* 'being said (GEN. SG. M./N.)' and

[3] While making it clear that the circumflex is conceived as an accent on the first mora of a long vowel or diphthong, ancient sources actually provide little evidence for the status of the acute on a similarly long vowel or diphthong. For this reason, some modern scholars take the acute as a simple rather than compound accent, with the whole vocalic nucleus as its domain, regardless of the quantity of that nucleus (so Bally 1945: 13; Sauzet 1989: 91). For a defence of the view taken here, see Dieu (2022: 57–59).
[4] Cf. Probert (2019: 8–12); Dieu (2022: 42–45); Roussou and Probert (2023: 172–173).
[5] Cf. Probert (2019: 49–51); Dieu (2022: 45–53); Roussou and Probert (2023: 174–175).

πομφόλυξ/*pom.p^{h}ó.luks* ‘bubble’ are possible but *λεγόμενου/*le.gó.me.nou* and *πόμφολυξ/*póm.p^{h}o.luks* are not).[6]

The precise formulation of point (b) requires some more discussion in connection with words ending in a consonant cluster, such as πομφόλυξ/*pom.p^{h}ó.luks* ‘bubble’. Such words never appear to be accented further from the end than the penultimate syllable, but it is debated whether this is due to a phonological restriction against forms like *πόμφολυξ/*póm.p^{h}o.luks*, or due to morphological factors affecting the very limited range of Greek word forms with final consonant clusters. We shall come back to this point in Sections 3.3 and 5 below.

Be this as it may, a further restriction known as the “σωτῆρα/*soo.tée.ra* law” may be stated informally as follows:

σωτῆρα/soo.tée.ra law: informal statement

An accent on a long vocalic nucleus in a penultimate syllable must fall on the first vocalic mora if the vowel of the final syllable is short (σωτῆρα/*soo.tée.ra* ‘saviour (ACC. SG.)’ is possible but *σωτήρα/*soo.teé.ra* is not).

Ancient sources[7] give us a set of principles for the accentuation of a host word followed by an enclitic that are a little more complex than those we normally learn today. The ancient principles may be stated as follows, again without implying any particular modern analysis:

Accentuation of a host word followed by an enclitic: principles according to ancient sources

A host word followed by an enclitic receives an additional accent “from the enclitic” under the following circumstances:

(a) If the host word’s basic accent falls on its antepenultimate syllable: θάλασσά τε/*t^{h}á.las.sá te* ‘and the sea’
(b) If the host word’s basic accent is a circumflex on its penultimate syllable (provided the host word does not end in a consonant cluster): γυναῖκές τε/*gu.nái.kés te* ‘and women’
(c) If the host word’s basic accent is an acute on its penultimate syllable and the host word ends in a trochaic (heavy-light) sequence of syllables when considered in isolation, with no account taken of a single consonant at the end of the word: ἄλλός τις/*ál.lós tis* ‘someone else’[8]
(d) If the host word’s basic accent is an acute on its penultimate syllable and the enclitic begins with σφ-/*sp^h*- (regardless of the metrical shape of the host word): ὅθί σφισι/*hó.t^{h}í sp^{h}i.si* ‘where…to them’, τόξού σφεων/*tóksoú sp^{h}e.oon* ‘of the bow…of them’[9]

[6] This point has a limited set of exceptions of the type πόλεως/*pó.le.oos* ‘city’ (GEN. SG.). These fall outside the scope of this chapter, but I take it that their synchronic status is as a small class of forms whose accentuation is exceptional. A more significant set of exceptions comprises forms whose final vocalic nucleus is a diphthong considered ‘short for accentuation’, such as the nominative plural endings -αι/-*ai* -οι/-*oi*. These diphthongs should probably be considered phonologically monomoraic on some level, but for simplicity forms containing them will not be discussed in this chapter.
[7] See further Roussou and Probert (2023: 172–206).
[8] Some limited disagreement on point (c) is visible in Byzantine sources, but it is clear that (c) belongs to the mainstream set of doctrines going back to antiquity (see Roussou and Probert 2023: 189–190, 201–203).
[9] For these examples, see Sch. *Il.* 6. 367*b*; “*On enclitics 2*”, §e (in Roussou and Probert 2023: 70); “*Charax*”, §t (in Roussou and Probert 2023: 138).

Where none of (a)–(d) applies, the host word simply "keeps" its basic accent: κασσιτέρου τε/*kas.si.té.rou te* 'and of tin', ποικίλος τε/*poi.kí.los te* 'and variegated', πειστικός τε/*peis.ti.kós te* 'and persuasive', κεραυνοῦ τε/*ke.rau.nóu te* 'and of a thunderbolt', κῆρυξ τις/*kée.ruks tis* 'a certain herald'. In addition, a disyllabic enclitic is accented on its second syllable when it follows an unaccented syllable: φίλος ἐστί/*p*^{h}*í.los es.tí* 'a friend is', κῆρυξ ἐστί/*kée.ruks es.tí* 'a herald is'.[10]

3 Open questions

As already mentioned, a central challenge for the synchronic phonological analysis of ancient Greek is to identify the phonological principles underpinning the placement of the Greek word accent. These principles should account for the descriptive generalisations just given, and not least for the law of limitation and its interactions with lexically- and morphologically-specified accentual behaviour. Sections 3.1–3.3 introduce in a little more detail two of the main approaches which have been taken, and concomitantly the three open questions briefly introduced in Section 1.

3.1 What phonological principles underly the law of limitation?

To date, three main lines of analysis have been put forward to account for the placement of the Greek word accent in phonological terms: two relying on the concepts of Metrical Phonology, and one relying on tonal constraints in an Optimality Theory framework. For the purposes of this chapter, I shall limit myself to comparing and contrasting the two Metrical Phonology approaches and asking which of these, if either, is on the right lines. But it is worth noting that a fundamentally different line of approach has been put forward too (Ito and Mester 2017, taken up with modifications by Revithiadou 2018); it should not be assumed *a priori* that either of the Metrical Phonology approaches need be on the right lines.

In surveying the two Metrical Phonology approaches, we shall concentrate on the ways in which they account for the *syllable* on which the word accent falls. To a greater or lesser degree, these analyses also attempt to account for the distribution of second- and first-mora accents (acutes and circumflexes) on long vowels and diphthongs, but the acute/circumflex distinction invariably turns out to require some additional stipulations beyond those governing the syllable on which the accent falls.[11] A proper discussion of this issue is beyond the scope of this chapter, but I shall make the assumption that the principles governing the acute/circumflex distinction are distinct from those determining the accented syllable.[12]

The first of the Metrical Phonology analyses was put forward by Steriade (1988), and taken up with modifications by Halle (1997: 303–308). Under Steriade's version of this analysis, which will

[10] It has been doubted whether the accent of κῆρυξ/*kée.ruks* 'herald' and the similarly-shaped word φοῖνιξ/*p*^{h}*ói.niks* 'Phoenician; purple; date palm' was genuinely a circumflex rather than an acute, and whether the vowel in the final syllable was genuinely short (see West 1990: xlviii). Since κῆρυξ/*kée.ruks* and φοῖνιξ/*p*^{h}*ói.niks* provide the main examples of words with a circumflex on the penultimate syllable and a final consonant cluster, if the accent of these words was in fact an acute then this would cast doubt on the possibility of sequences of the type κῆρυξ τις/*kée.ruks tis* or κῆρυξ ἐστί/*kée.ruks es.tí*. However, both the circumflex and the lack of additional accent before an enclitic are required by the logic of "*On enclitics 3*", §c (in Roussou and Probert 2023: 92–94).

[11] See Steriade (1988: 281–283) with Noyer (1997: 506–507, 508) and Halle (1997: 303); Sauzet (1989: 96). Cf. Ito and Mester (2017: 13 n. 11) with Revithiadou (2018: 3).

[12] Circumstantial evidence pointing in this direction may come from what appears to be dialectal variation in the details of the distribution of acutes and circumflexes, between Doric on the one hand and Attic and Koiné on the other (see Dieu 2022: 582–584).

serve to illustrate the overall thrust of both, foot construction proceeds on the basis that a word-final consonant is first of all set aside as extrametrical. For example, the forms μαθήματος/*ma.t^{h}eé.ma.tos* 'learning, discipline' (GEN. SG.), μάθημα/*má.t^{h}ee.ma* 'learning, discipline' (NOM./ACC. SG.), and μαθημάτων/*ma.t^{h}ee.má.toon* 'disciplines (GEN. PL.)', which are taken to be underlyingly unaccented, would appear after this first derivational step as μαθηματο<ς>/*ma.t^{h}ee.ma.to<s>*, μαθημα/*ma.t^{h}ee.ma*, and μαθηματω<ν>/*ma.t^{h}ee.ma.too<n>*. At a next step, a word-final light syllable is similarly marked extrametrical: μαθημα<το><ς>/*ma.t^{h}ee.ma.<to><s>*, μαθη<μα>/*ma.t^{h}ee.<ma>*, μαθηματω<ν>/*ma.t^{h}ee.ma.too<n>*. Quantity-insensitive left-headed binary feet are then constructed from right to left (except that a unary foot is constructed if a single foot is left over at the beginning of the word): (μα)(θημα)<το><ς>/*(ma).(t^{h}ee.ma).<to><s>*, (μαθη)<μα>/*(ma.t^{h}ee).<ma>*, (μαθη)(ματω)<ν>/*(ma.t^{h}ee).(ma.too)<n>* (underlining here shows the head position in a foot). The word is treated as right-headed, so that the head syllable of the word is the head (i.e. leftmost) syllable of the rightmost foot: this is the syllable where the word accent surfaces (μαθήματος/*ma.t^{h}eé.ma.tos*, μάθημα/*má.t^{h}ee.ma*, μαθημάτων/*ma.t^{h}ee.má.toon*). For word forms such as those just discussed, in which the accent surfaces as far from the end of the word as the law of limitation allows—forms with a so-called "recessive" accent—nothing more needs to be said. Non-recessively accented words, on the other hand, are taken to have one or more underlying accents in their lexical representations, each of which prevents its syllable falling in the non-head position of a foot, and also protects its syllable from extrametricality. On this basis underlying ποικίλος/*poi.kí.los* 'variegated' is footed as (ποι)(κί)<λο><ς>/*(poi).(kí).<lo><s>* and surfaces as ποικίλος/*poi.kí.los*, while underlying μαθηματικός/*ma.t^{h}ee.ma.ti.kós* 'fond of learning; scientific' is footed as (μαθη)(ματι)(κό)<ς>/*(ma.t^{h}ee).(ma.ti).(kó)<s>* and surfaces as μαθηματικός/*ma.t^{h}ee.ma.ti.kós*.

Steriade's analysis was soon criticised on theoretical grounds by Sauzet (1989: 89–90). Firstly, Sauzet objected to extrametricality but not foot construction being sensitive to syllable weight, so that extrametricality cannot be derived from principles otherwise involved in metrical structure assignment. Secondly, and relatedly, he objected to the idea that extrametricality or its absence should depend sometimes on syllable weight (which in Steriade's analysis is not otherwise relevant for metrical structure) and sometimes on underlying accents (which Steriade takes to have other effects on metrical structure too).

In the light of these objections, Sauzet (1989) put forward a competing Metrical Phonology analysis, which was taken up with modifications by Golston (1990).[13] On Golston's version (which can serve to illustrate the overall thrust of both), moraic trochees are first constructed from right to left, that is to say left-headed feet consisting of a single heavy syllable or two light syllables. For the purposes of this rule, a single word-final consonant is treated as not closing the word-final syllable: in effect it is treated as extrametrical, as in Steriade's account.[14] Syllables are left unfooted where they cannot be incorporated into a moraic trochee. On this basis, underlying μαθηματος/*ma.t^{h}ee.ma.tos*, μαθημα/*ma.t^{h}ee.ma*, and μαθηματων/*ma.t^{h}ee.ma.toon* would be footed as μα(θη)(ματο)<ς>/*ma.(t^{h}ee).(ma.to)<s>*, μα(θη)μα/*ma.(t^{h}ee).ma*, and μα(θη)μα(τω)<ν>/*ma.(t^{h}ee).ma.(too)<n>*.[15] The word is then treated as right-headed, so that the

[13] See also Kiparsky (2003), who offers a Stratal Optimality Theory account aimed at capturing the interactions between accentuation, syllabification, and morphology. He builds in Golston's foot structure, but as he points out (2003: 89), for the main thrust of his analysis little depends on the specific mechanism driving the placement of the word accent on the correct syllable and mora.

[14] Although both Sauzet and Golston leave this point implicit, it is alluded to at Golston (1990: 82 n. 14); cf. Probert (2006: 122 n. 35).

[15] The examples Golston himself gives do not include any of the type μα(θη)μα(τω)<ν>/*ma.(t^{h}ee).ma.(too)<n>*, under which, if I am not mistaken, his analysis produces an unfooted syllable between two feet.

leftmost syllable of the rightmost foot emerges once again as the metrically prominent syllable of the word. By contrast with Steriade's account, however, the metrically prominent syllable does not automatically coincide with the position for recessive accent. Instead, the position of the high pitch in a recessive word is due to an HL* tonal melody anchored to the metrically prominent syllable: a high-low sequence whose low tone is anchored to the metrically prominent syllable, and whose high tone associates to the immediately preceding syllable, provided the word contains such a syllable.[16] On this basis our recessive examples surface correctly as μαθήματος/*ma.t^{h}eé.ma.tos*, μάθημα/*má.t^{h}ee.ma*, and μαθημάτων/*ma.t^{h}ee.má.toon*. (Note that in the transcription system used here, the acute accent mark conveys the location of a high pitch; it thus corresponds to Golston's H tone, not his L*.)

While Golston (1990) barely discusses non-recessive words (although see Golston 1990: 76), Sauzet (1989: 103–106) analyses non-recessive accents as due to lexically- or morphologically-specified high pitches present in the underlying representation of a word. Crucially, and by contrast with Steriade's account, underlying high pitches do not affect the foot structure, but an underlying high pitch takes precedence over the one assigned by the HL* tonal melody if it appears to the right of the latter. On this basis (but continuing with Golston's version of the Sauzet-Golston foot structure), underlying ποικίλος/*poi.kí.los* 'variegated' and μαθηματικός/*ma.t^{h}ee.ma.ti.kós* 'fond of learning; scientific' are footed (ποι)(κίλο)<ς>/*(poi).(kí.lo)<s>*, μα(θη)μα(τικό)<ς>/*ma.(t^{h}ee).ma.(ti.kó)<s>*, and surface as ποικίλος/*poi.kí.los* and μαθηματικός/*ma.t^{h}ee.ma.ti.kós*. The underlying high pitches on -κί-/*-kí-* and -κός/*-kós* surface because they fall to the right of those assigned by the HL* tonal melody, which fall on *poi-* and *-ma-* respectively.

In different ways, both Steriade's account and Sauzet's successfully prevent underlying accents from surfacing unless they fall within the "accentable window" described by the law of limitation. The genitive plural superlative form μαθηματικωτάτων/*ma.t^{h}ee.ma.ti.koo.tá.toon* 'most fond of learning (gen. pl.)' can serve to illustrate this point. This form can be taken to have an underlying accent on the same syllable as the positive adjective μαθηματικός/*ma.t^{h}ee.ma.ti.kós* (i.e. the syllable -κω-/*-koo-*, containing a variant of the same morphological material as the underlyingly accented syllable -κό-/*-kó-* of the positive), but the surface accent appears on the following syllable -τά-/*-tá-*. In Steriade's account, the form will be footed as (μαθη)(ματι)(κω)(τατω)<ν>/*(ma.t^{h}ee).(ma.ti).(koo).(ta.too)<n>*, with the placement of κω/*koo* in the strong position of a foot reflecting the underlying accent on that syllable. The word accent will surface on the head syllable of the rightmost foot, giving the correct result μαθηματικωτάτων/*ma.t^{h}ee.ma.ti.koo.tá.toon*. On Sauzet's account (in essence, but again continuing with Golston's version of the foot structure), the underlying form will be footed as μα(θη)(ματι)(κώ)τα(τω)<ν>/*ma.(t^{h}ee).(ma.ti).(koó).ta.(too)<n>* (with an underlying high pitch on κώ/*koó*, not affecting the foot structure), the HL* tonal melody will assign a high pitch to the syllable τα/*ta*, and since this falls to the right of the underlying high pitch on κώ/*koó*, the high pitch that surfaces is the one assigned by the HL* tonal melody: μαθηματικωτάτων/*ma.t^{h}ee.ma.ti.koo.tá.toon*.

The first and largest of our open questions, then, is what phonological principles underly the Greek accent system, including the law of limitation. In particular, can we decide which—if either—of the two approaches just surveyed is on the right lines? A new view of the empirical facts relating to enclitics ought to have implications for the answer.

3.2 Did ancient Greek have "resonant diphthongs"?

[16] For the treatment of shorter words on this analysis, see Sauzet (1989: 94–95).

According to our ancient sources, a word followed by an enclitic receives an additional acute accent on its final syllable under four circumstances (as laid out in Section 2): (a) if the basic accent of the word preceding the enclitic falls on its antepenultimate syllable (θάλασσά τε/*t*^{h}*á.las.sá te* 'and the sea'); (b) if the basic accent of this word is a circumflex on its penultimate syllable (provided this word does not end in a consonant cluster) (γυναῖκές τε/*gu.nái.kés te* 'and women'); (c) if the basic accent of this word is an acute on its penultimate syllable and the word ends in a trochaic sequence of syllables (ἄλλός τις/*ál.lós tis* 'someone else'); and (d) if the basic accent of this word is an acute on its penultimate syllable and the enclitic begins with σφ-/*sp*^{h}- (ὅθί σφισι/*hó.t*^{h}*í sp*^{h}*i.si* 'where…to them').

Following brief suggestions by Wheeler (1885: 126) and Meillet (1893: 239), Wackernagel (1893: 24–25; 1896: 305) suggested that point (c) was originally intended only to apply to host words whose penultimate syllable was closed by one of the continuant consonants ρ/*r*, λ/*l*, μ/*m*, ν/*n*, or σ/*s* (most—but not all[17]—examples in ancient discussions involve one of these consonants), and that point (c) is actually a special case of (b), with the continuant consonant counting phonologically as the second element of a diphthong. Ancient Greek, like Lithuanian, would thus have so-called "resonant diphthongs" ("continuant diphthongs" might be a better term here): syllables closed by a continuant consonant, which is treated as the second element of a diphthong for the purposes of a contrast between different contour accents. A sequence like ἄλλός τις/*ál.lós tis* would then be parallel to one like γυναῖκές τε/*gu.nái.kés te*, with the basic accent of ἄλλος/*ál.los* and that of γυναῖκες/*gu.nái.kes* falling on the first mora of a diphthong, notwithstanding the conventional writing of ἄλλος/*ál.los* with an acute accent and that of γυναῖκες/*gu.nái.kes* with a circumflex.

If all this is correct, points (a)–(c) above almost reduce to a principle that the host word acquires an additional accent on its last vocalic mora if and only if at least one vocalic mora intervenes between (i) the mora carrying the basic accent of the host word and (ii) the last vowel of the host word,[18] as in *t*^{h}*á.l*<u>*a*</u>*s.sá te, gu.nái*<u>*i*</u>*.kés te, ál*<u>*.*</u>*lós tis,* or (for an example with two intervening vocalic moras) κέλ<u>ευ</u>έ τε/*ké.l*<u>*eu*</u>*.é te* 'and order (2. SG. IMPERATIVE)'; underlining here shows the intervening vocalic mora or moras. Nonetheless, not every detail that ancient sources give us on the accentuation of words followed by enclitics is neatly accounted for on this idea. Point (d) above allows for sequences like ὅθί σφισι/*hó.t*^{h}*í sp*^{h}*i.si* (with no vocalic mora intervening between the one carrying the basic accent of ὅθι/*hó.t*^{h}*i* and the last vowel of this word), while under point (b), the special provision for host words ending in a consonant cluster allows for sequences like κῆρυξ τις/*kée.ruks tis* (here a vocalic mora intervenes between the accented mora and the last vowel of the host word, yet no additional accent appears on this last vowel). However, host words ending in consonant clusters occur relatively rarely, as do enclitics beginning with σφ-/*sp*^{h}-. For this reason, Wackernagel's idea (foreshadowed by Wheeler and Meillet) would allow one simple principle to generate the accentuation of a large majority of sequences of enclitics encountered in texts, in a way that matches the accentuation prescribed by ancient discussions.

Wackernagel's "resonant diphthongs" proposal has been generally but not universally accepted (for a different view of sequences of the type ἄλλός τις/*ál.lós tis*, see Steriade 1988: 292), and the question remains whether the proposal is right. This is the second open question to which we shall return.

[17] The most straightforward counter-example known to me is δόξά μοι/**dók.sá moi** 'judgement…to me' at *Epimerismi Homerici ordine alphabetico traditi* η 18.38 Dyck (≈ *Etymologicum Gudianum* 244.21 Sturz). Also noteworthy is τόξά τε/**tók.sá te** 'and bows', on an accented papyrus of the late second or early third century AD (P.Oxy. VI 852 fr. 1, col. ii, line 37); cf. Grenfell and Hunt (1908: 87).

[18] So, in essence, already Wackernagel (1893: 24–25).

3.3 Is the law of limitation sensitive to the weight of the word-final syllable, or the length of its vowel?

The informal statement of the law of limitation given in Section 2 includes the point "If the final syllable contains a long vocalic nucleus or is closed by a consonant cluster, the word accent does not fall further from the end of the word than the last vocalic mora of the penultimate syllable (λεγομένου/*le.go.mé.nou* 'being said (GEN. SG. M./N.)' and πομφόλυξ/*pom.p*^{h}*ó.luks* 'bubble' are possible but *λεγόμενου/*le.gó.me.nou* and *πόμφολυξ/*póm.p*^{h}*o.luks* are not)". As noted in Section 2, however, the precise formulation of this point requires discussion. Since few ancient Greek words end in a consonant cluster, the point mostly applies to words of the type λεγομένου/*le.go.mé.nou,* for which it makes no practical difference whether the weight of the last syllable or the quantity of its vowel is taken to be the factor limiting the accent to a two-syllable window at the end of the word. For an adequate phonological account of the system, on the other hand, we would like to know whether the law of limitation is sensitive to the weight of the final syllable or to the quantity of its vowel.

Traditionally, the long last vocalic nucleus of a word like λεγομένου/*le.go.mé.nou* has been thought responsible for preventing the accent falling on the antepenultimate syllable, but Steriade (1988: 273–275) argues that the relevant factor is instead the weight of the final syllable, on the basis that words ending in a consonant cluster never seem to be accented further from the end than the penultimate syllable (cf. Göttling 1835: 27; Misteli 1868: 107). Most recently, Dieu (2021*b*: 115–118; cf. Dieu 2021*a*: 267–271) argues that the apparent limitation of the accent to the last two syllables in words like πομφόλυξ/*pom.p*^{h}*ó.luks* need not have a phonological basis, and that a morphological basis is at least possible. The question remains, then, whether the law of limitation is sensitive to the weight of the word-final syllable or to the length of its vowel: this is the third of the open questions to which we shall return. In order to inform that discussion, Section 4 lays out the new descriptive claim to be taken into account.

4. New evidence from sequences of consecutive enclitics

When two or more enclitics follow one another in succession, we traditionally learn that each enclitic receives an accent—normally an acute—on its final syllable, except that the last enclitic is unaccented: hence αἰδοῖός τέ μοί ἐσσι/*ai.dói.ós té moí es.si* 'you are respected in my eyes' (*Iliad* 3.172) or εἴ πού τίς τινα/*eí poú tís ti.na* 'if by chance anyone (saw) anyone' (Thucydides 4.47.3). This is normally said to be the main doctrine found in the ancient grammatical tradition—but apparently divergent information is found too. Some modern scholars have rejected the principle we traditionally learn, and have proposed various alternatives.

Against this background, Roussou and Probert (2023: 235–297) argue that evidence from several different directions comes together in a remarkable way if the following was a (or even *the*) linguistically real principle in antiquity:

Accenting host words followed by two or more consecutive enclitics
Apply the accentuation principles relevant to a host word followed by a single enclitic, recursively, on each addition of a new enclitic.

Conceptually, this idea is not new: it was proposed by Göttling (1835: 405) and popularised by Barrett (1964: 426–427). Roussou and Probert's proposal differs, however, because in their view the principles to be applied recursively are, crucially, not just the "accentuation principles relevant to a host word followed by a single enclitic" which we normally apply today, but the entire set of such principles found in ancient sources —that is to say, the principles laid out in Section 2 (in the box headed "Accentuation of a host word followed by an enclitic: principles according to ancient sources"), including those giving rise to ἄλλός τις/*ál.lós tis*, κῆρυξ τις/*kée.ruks tis*, and ὅθί σφισι/*hó.tʰí spʰi.si*.[19] Insisting on this point makes a considerable difference to the output of the recursive system, and it is in this form that the system turns out to be supported by evidence from several different directions. Roussou and Probert (2023: 235–297) call the system in this form the "revised Göttling-Barrett system", and the same term will be used in this chapter. In order to think of the relevant principles as capable of being applied recursively, it will be convenient to state them informally as follows:

Revised Göttling-Barrett system: informal statement

I If the sequence preceding the new enclitic would have an acute or circumflex on its last syllable in isolation, this sequence retains its accent (and any preceding accents) before an enclitic, with no change of an acute to a grave. No accent appears on the new enclitic.

II If the last accent on the sequence preceding the new enclitic is a circumflex on its second-to-last syllable (provided this sequence does not end in a consonant cluster), or an acute on its third-to-last syllable, the sequence retains this accent (and any preceding accents) and acquires an additional acute on its last syllable before an enclitic. No accent appears on the new enclitic.

III If the last accent of the sequence preceding the new enclitic is an acute on its penultimate syllable (or is a circumflex on the penultimate syllable and the sequence ends in a consonant cluster), then:

i. If this sequence ends in a trochaic pattern (before the addition of the new enclitic, and with no account taken of a single consonant at the end of the sequence), and/or the enclitic begins with σφ-/*spʰ*-, the sequence preceding the new enclitic retains its last accent (and any preceding accents) and acquires an additional acute on its last syllable before the new enclitic. No accent appears on the new enclitic.

ii. Otherwise, the sequence simply retains its last accent (and any preceding accents) before the new enclitic. If the enclitic is monosyllabic it appears without an accent; if the enclitic is disyllabic it appears with an acute on its second syllable (or grave, if a non-enclitic word follows without intervening punctuation), or a circumflex in the case of τινοῖν/*ti.nóin* or τινῶν/*ti.nóon*.

[19] A caveat is in order in relation to the principle giving rise to κῆρυξ τις/*kée.ruks tis*. Since no Greek enclitic ends in a consonant cluster, this particular principle never has the opportunity to apply more than once in a sequence comprising a host word followed by enclitics. It is nevertheless part of the recursive system in principle, and is taken to apply wherever an enclitic follows a host word such as κῆρυξ/*kée.ruks*, with a final consonant cluster and a circumflex (first-mora accent) on a long vocalic nucleus in the penultimate syllable.

The revised Göttling-Barrett system may conveniently be illustrated using the phrases ἌΙΔΟΙΟΣ ΤΕ ΜΟΙ ΕΣΣΙ/*ai.doi.os te moi es.si* ‘you are respected in my eyes’ (*Iliad* 3.172), ἜΙ ΠΟΥ ΤΙΣ ΤΙΝΑ/*ei pou tis ti.na* ‘if by chance anyone (saw) anyone’ (Thucydides 4.47.3), and ἌΙ ΚΕΝ ΤΙΣ ΣΕ/*ai ken tis se* ‘if anyone…you’ (*Odyssey* 9.502).

For the example from *Iliad* 3.172, the revised Göttling-Barrett system gives αἰδοῖός τέ μοι ἐσσί/*ai.dói.ós té moi es.sí,* as follows. The host word αἰδοῖος/*ai.dói.os* has a circumflex (first-mora accent) on its penultimate syllable as its basic accent, and the first step is to consider what will happen to this host word before the first enclitic ΤΕ/*te*. By principle II just above, αἰδοῖος/*ai.dói.os* retains its accent and acquires an additional acute on its last syllable before the new enclitic. No accent appears (at this stage) on the enclitic, and so the result is αἰδοῖός τε/*ai.dói.ós te.* Next, we consider what happens to αἰδοῖός τε before the next enclitic ΜΟΙ/*moi.* The sequence αἰδοῖός τε/*ai.dói.ós te* has an acute on its penultimate syllable and (importantly) ends in a trochaic pattern. So by principle III.i, this sequence acquires an additional accent on its last syllable. No accent appears on the new enclitic (at least at this stage), and so the result is αἰδοῖός τέ μοι/*ai.dói.ós té moi.* This new sequence again has an acute on its penultimate syllable, but this time it does not end in a trochaic pattern. By principle III.ii, no additional accent appears on this sequence before the new enclitic ΕΣΣΙ/*es.si,* and this new enclitic acquires an acute accent on its second syllable. The result for the whole sequence is thus αἰδοῖός τέ μοι ἐσσί/*ai.dói.ós té moi es.sí.*

For the example from Thucydides 4.47.3, the revised Göttling-Barrett system gives εἴ που τίς τινα/*eí pou tís ti.na*, as follows. We first consider what should happen to the host word ἜΙ/*ei* before the first enclitic ΠΟΥ/*pou*. From a modern point of view, ἜΙ is a proclitic,[20] but from an ancient point of view it has an acute as its basic accent (εἴ/*eí*). By principle I, εἴ/*eí* retains this acute before the first enclitic ΠΟΥ, giving εἴ που/*eí pou.* This new sequence εἴ που/*eí pou* has an acute on its penultimate syllable and a non-trochaic shape, so by principle III.ii no additional accent appears before the next enclitic ΤΙΣ/*tis:* hence εἴ που τις/*eí pou tis.* This new sequence has an acute on its antepenultimate syllable, so by principle II it acquires an additional acute on its last syllable before the last enclitic ΤΙΝΑ/*ti.na,* and no accent appears on this last enclitic. The result for the whole sequence is thus εἴ που τίς τινα/*eí pou tís ti.na*.

For the example from *Odyssey* 9.502, the revised Göttling-Barrett system gives αἴ κέν τίς σε/*aí kén tís se*, as follows. From a modern point of view, the host word ἌΙ/*ai* is once again a proclitic, but from an ancient point of view it has an acute as its basic accent (αἴ/*aí*). By principle I, the host word retains this accent before the first enclitic ΚΕΝ/*ken*, giving αἴ κεν/*aí ken.* This new sequence has an acute on its penultimate syllable and makes a trochaic pattern. By principle III.i an additional acute therefore appears before the next enclitic ΤΙΣ/*tis,* giving αἴ κέν τις/*aí kén tis*. This new sequence once again has an acute on its penultimate syllable, and once again ends in a trochaic pattern. By principle III.i, this sequence too acquires a new acute before the last enclitic ΣΕ/*se.* No accent appears on this last enclitic, so the result for the whole sequence is αἴ κέν τίς σε/*aí kén tís se.*

A notable feature of this recursive system is that the same syllable may count as light at one point in the calculation, and then as heavy at a later point. In the example ἌΙ ΚΕΝ ΤΙΣ ΣΕ/*ai ken tis se,* for instance, the syllable ΚΕΝ/*ken* counts as light at the point when the metrical shape of αἴ κεν/*aí ken* is being considered before the addition of ΤΙΣ/*tis*: at this point the consonant ν/*n* falls at the end of the sequence under consideration, and a single consonant at the end of the sequence is discounted for the purposes of determining whether principle III.i or III.ii applies. But when the metrical shape of the last two syllables of αἴ κέν τις/*aí kén tis* comes to be considered before the addition of ΣΕ, the ΚΕΝ/*ken* now counts as a heavy syllable: at this point the ν/*n* is no longer at the end of the sequence under consideration, and closes the syllable ΚΕΝ/*ken.*

[20] See e.g. Dieu (2022: 104).

The evidence pointing towards this system (presented fully in Roussou and Probert 2023: 235–297) comes from four directions:

(a) A series of apparently disparate prescriptions found in Greek grammatical and scholarly texts. When combined together, these amount to the system we traditionally learn, plus an apparently bizarre series of exceptions. When all these prescriptions are taken together, so that the system we traditionally learn is applied with *all* the prescribed exceptions, the accentuations produced by these prescriptions turn out to match those produced by the revised Göttling-Barrett system for a very high proportion of sequences of enclitics encountered in actual texts. For the first 100 sequences of host word followed by more than one enclitic in the *Iliad*, for example, applying the system we traditionally learn with all the ancient exceptions gives the same results as the revised Göttling-Barrett system in 93 instances. Roussou and Probert argue that the ancient prescriptions were intended as a series of rules of thumb, produced by one or more scholars who had an implicit feel for the revised Göttling-Barrett system and aimed to approximate its results.

(b) Statements found in the *scholia vetera* ("old" scholia) to Homer, on accents to be placed (or not placed) on specific syllables of specific sequences of enclitics. Roussou and Probert (2023: 260–267) identify sixteen such statements (or eleven, if closely-related statements are counted once each) on the accented or unaccented status of one or more syllables in a sequence consisting of a host word (and specifically its last syllable) followed by more than one enclitic. While the scholia do not comment on the accented or unaccented status of every syllable (and the absence of a comment cannot be assumed to mean the absence of an accent), the information provided never contradicts the predictions of the revised Göttling-Barrett system. Notably, this is so even in those cases where the explicit ancient prescriptions mentioned under (a) would have produced a different result.

(c) The treatment of sequences of enclitics in accented papyri. Roussou and Probert (2023: 269–278) collect 70 sequences of enclitics on accented papyri, after disregarding any sequences for which no accent mark appears on the whole sequence including the host word. Even where one or more accent marks appear, the absence of an accent mark on a given syllable cannot be taken to imply the absence of an accent on that syllable: accent marks on papyri are almost always sporadic. Nonetheless, the accent marks we do find never contradict the predictions of the revised Göttling-Barrett system: that is to say, we never find an accent mark where the revised Göttling-Barrett system predicts that there should be none. Once again, this is so even in those cases where the explicit ancient prescriptions mentioned under (a) would have produced a different result.

(d) The practice of the medieval *Iliad* manuscripts known as Venetus A and B. This turns out to match the predictions of the revised Göttling-Barrett system more closely than it matches those of any other system represented in ancient or modern scholarship (although Roussou and Probert show that the scribes probably had in mind not the revised Göttling-Barrett system itself, but a series of rules of thumb which produces results very close to those of this system).

Ancient sources never explain the revised Göttling-Barrett system *qua* recursive system: as mentioned under (a), the explicit statements that come down to us on the accentuation of sequences with consecutive enclitics take the form of a simple principle (the "traditional" one we usually learn) plus an odd series of exceptions. This makes it unlikely that the revised Göttling-Barrett system is a grammarian's extrapolation from the principles applying to sequences with a single enclitic. It is

likely to be a linguistically real system for which at least some speakers had a feel, implicitly, by the second century AD, when our usable evidence begins.

5. Greek phonology in the light of the revised Göttling-Barrett system

If the correct ancient principle for accenting sequences of enclitics was indeed the revised Göttling-Barrett system, this principle provides an opportunity to test existing proposals as to the phonological system that would account for the placement of the Greek word accent: can any such proposal point us towards a plausible phonological account of the revised Göttling-Barrett system? This section will argue that the proposal of Steriade (1988) can do just that. In order to do so, we shall sketch out a phonological account that incorporates the main components of Steriade's analysis, but takes an Optimality theoretic form, except that constraints are evaluated recursively on the addition of each enclitic to a recursive phonological word.

The following constraints will be relevant:

Rank 1: Undominated constraints

FINAL-CONS-EM: The final consonant in the (recursive) phonological word is extrametrical.[21] This and the two constraints just below correspond directly to key elements of Steriade's account.

FT-HD-L: Feet are left-headed (see e.g. McCarthy and Prince 1993: 90–91 with 145 n. 6).

MAIN-RIGHT: The rightmost foot in the (recursive) phonological word is its head (cf. e.g. Prince and Smolensky 2004: 34).
I assume that MAIN-RIGHT designates the rightmost foot of the word as the head even where this foot is only partially built, as in *(li.gu).(ro<s>* 'shrill'. Here the left bracket before *-ro-* represents a lexically-assigned prominence on that syllable (see below). When the word accent surfaces at all (see Section 2 on oxytone words), it surfaces on the syllable *-ro-*, not on *li-*, suggesting that the final syllable is treated as at least latently the head of the word.

MAX (ACC): If an accent is present in the input, it is present in the output (see e.g. Smith 1998: 187).
This constraint guarantees that enclitics never erase the basic accent with which the host word would surface in isolation, nor do they erase accents induced by earlier enclitics in the chain. (I assume that in order to retain its accent, a syllable needs to remain in the strong position of a foot, although not every syllable appearing in the strong position of a foot acquires an accent.)

ENCLITIC CONSTRAINT: Non-final syllables of enclitics cannot fall in the strong position of a foot.
In ancient Greek, disyllabic enclitics all have the property that their first syllable never carries an accent. Under the revised Göttling-Barrett system, this is so even when the disyllabic enclitic follows an unaccented syllable and is itself followed by another enclitic, as in *eí pér tís sé moi p^{h}ee.sín po.te* or *oú poo po.té*

[21] Under this analysis, as under Steriade's, CVC syllables pattern with CV syllables at the end of the prosodic word, and differently from CVCC syllables. For final consonant extrametricality as the most straightforward way to model phenomena of this kind, see Hyde (2011: 1038–1040).

moi. In these contexts, and only these, the sequence of enclitics includes two consecutive unaccented syllables flanked by accented syllables. The pattern of accented and unaccented syllables then continues after the first syllable of the disyllabic enclitic, as if that syllable were invisible. In the analysis to follow, this property is implemented by ENCLITIC CONSTRAINT, applying to enclitics in general and stipulating that non-final syllables of enclitics cannot fall in the strong position of a foot. While this is an idiosyncratic and hence unsatisfactory constraint as it stands, it is inspired by Revithiadou's (2018: 15) suggestion "that clitics are toneless…but in the environments in question surface with a boundary tone": in essence, the lack of non-final-syllable accent on enclitics is taken to be some sort of manifestation of the fundamentally unaccented character of enclitics.

ALIGN (FT, σ): The boundaries of feet coincide with the boundaries of syllables (see McCarthy and Prince 1993: 99).
This constraint provides a tentative attempt to understand the behaviour of enclitics beginning with *sp*^{h}-. The usual principles of Greek syllabification (here assumed to act as undominated constraints) will mean that the *s*- of *sp*^{h}- is syllabified together with what precedes in at least some instances, and most obviously when the enclitic beginning with *sp*^{h}- follows a vowel. In the Greek grammatical tradition, most examples of words followed by enclitics beginning with *sp*^{h}- are in fact of this type, as West (1966: 441) observes.[22] Being undominated, ALIGN (Ft, σ) is ranked above MAX (MET. STR.), with the result that previously assigned metrical structure can be altered just in case this is necessary in order to prevent a foot boundary interrupting a syllable. The constraint ALIGN (Ft, σ) is usually inactive, but becomes relevant in connection with enclitics beginning with *sp*^{h}-.

Rank 2

MAX (MET. STR.): Metrical structure present in the input is present in the output.
Steriade's (1988: 283–292) account of the accentuation of host words followed by enclitics relies crucially on the preservation of metrical structure assigned at earlier points in a derivation. On the account put forward here, constraints are evaluated on the addition of each new enclitic (and thus at each new layer of the recursive phonological word); the constraint MAX (MET. STR.) ensures that metrical structure is preserved from one step to the next, except where a violation is required by ALIGN (Ft, σ) (on which see just above). Because enclitics are added to the recursive phonological word from left to right, MAX (MET. STR.) effectively gives rise to left-to-right foot formation in strings of enclitics, although on each constraint evaluation ALIGN (PRWD, R, FT, R) (on which see below) encourages the formation of a foot as near to the right edge of the prosodic word as possible.

[22] West's suggestion that all the grammarians' examples are of this type is, however, contradicted by two examples in "*On enclitics 3*", §e (Roussou and Probert 2023: 96): *atreí.deés sp*^{h}*i.si* 'the son of Atreus…to them' and *pol.lá.kís sp*^{h}*e.as* 'often…them'.

FT-BIN: Each foot must be bimoraic or bisyllabic (see e.g. Prince and Smolensky 2004: 56).[23]
One violation is incurred for every foot that is neither bimoraic nor bisyllabic. This constraint thus militates against feet consisting of a single light syllable. Candidates violating this constraint only win out in connection with enclitics beginning with *sp^h-*, as a result of interaction between ALIGN (Ft, σ) and MAX (MET. STR.).

Rank 3

*<σσ> This anti-lapse constraint penalises sequences of two or more unfooted syllables (see Anttila 2002: 216).
One violation is incurred for each pair of consecutive syllables of which neither is incorporated into a complete foot. (A sequence of three such unfooted syllables incurs two violations, one for the first and second unfooted syllable and one for the second and third. By extension of the same principle, a sequence of four unfooted syllables incurs three violations.)

Rank 4

FIN-SYLL(μ)-EM: A final light syllable is extrametrical.[24]
This again corresponds to a key element of Steriade's analysis (although in the analysis to be proposed here, FIN-SYLL(μ)-EM interacts with FT-BIN and *<σσ>). Along lines similar to Steriade's, it will be assumed that material which is extrametrical at one recursion is potentially available for footing at the next.

RANK 5

*FOOT (σ): A foot does not consist of a single syllable (see Elias-Ulloa 2006: 1, *passim*)
One violation is incurred for each monosyllabic foot.

Rank 6

ALIGN (PRWD, R, FT, R): Align the right edge of the prosodic word with the right edge of a foot (cf. McCarthy and Prince 1993: 93).
One violation is incurred for each syllable falling between the right edge of the prosodic word and the rightmost right foot boundary.

As in all the approaches surveyed in Section 3.1, I take words whose surface accent is non-recessive to come with a lexically assigned prominence of some sort. For present purposes I follow Halle (1997: 304) in representing this prominence as a left bracket to the left of the relevant syllable. A violation of MAX (MET. STR.) is incurred if this bracket is erased. No violation is incurred if the left bracket simply remains without a corresponding right bracket: in that case the lexically assigned prominence remains latent, but also remains relevant at the next recursive step.

[23] For simplicity of presentation, I treat this as a single constraint penalising feet which are smaller than two moras or larger than two syllables. Green and Kenstowicz (1995) propose that FT-BIN should rather be decomposed into two constraints, penalising feet which are too small and too large respectively. Differently, Elias-Ulloa (2006: 86 n. 9) tentatively treats GEN (the function which generates candidates for evaluation) as not producing feet larger than two syllables in the first place.

[24] Compare Al-Jarrah's (2011) suggestion that final-syllable extrametricality should be decomposed into separate sub-constraints applying to final syllables consisting of one, two, and three moras respectively (I take syllables consisting of three moras to be irrelevant for Greek), with the extrametricality of final light syllables being universally higher ranked than that of final heavy syllables.

In the tableaux below, undominated constraints are taken for granted, and candidates violating them are not shown, except where it is of particular interest to see how an undominated constraint eliminates certain candidates.

The derivations of the words *pʰi.lán.tʰroo.pos* 'loving people (NOM. SG. M./F.)' and *pʰi.lan.tʰroó.pou* 'loving people (GEN. SG.)' may serve as a first illustration of the way the system assigns recessive accents in the absence of any lexically-assigned prominence, and here also in the absence of any enclitics. In both examples, FT-BIN eliminates candidates with feet that either have more than two syllables or only one mora. *<σσ> then eliminates remaining candidates with two or more consecutive unfooted syllables. In the case of *pʰi.lán.tʰroo.pos*, FIN-SYLL(μ)-EM then eliminates a candidate in which the final light syllable is footed (this syllable counts as light at the end of the domain, because of undominated FINAL-CONS-EM, not shown in the tableau); for *pʰi.lan.tʰroó.pou* this constraint is not relevant, because the final syllable is heavy. For both examples, *FOOT (σ) eliminates any remaining candidates with one or more monosyllabic feet. For *pʰi.lán.tʰroo.pos*, the remaining and thus winning candidate is *[pʰi.(lán.tʰroo).po<s>ω]*. For *pʰi.lan.tʰroó.pou*, two candidates remain in play, but ALIGN (PRWD, R, FT, R) selects *[(pʰi.lan).(tʰroó.pou)ω]* over *[phi.(lán.tʰroo).pouω]*.

By undominated MAIN-RIGHT (not shown in the tableau), the head syllable of the phonological word will be the leftmost syllable of the rightmost foot, and as in Steriade's analysis this syllable surfaces with an accent: the surface forms are therefore *pʰi.lán.tʰroo.pos* and *pʰi.lan.tʰroó.pou*. (Recall that the present analysis does not attempt to account for the vocalic mora on which the surface accent falls, but only the syllable. Accent marks will nevertheless be written over the correct mora.)

Input: [pʰi.lan.tʰroo.posω]

	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
[(pʰi)(lan)(tʰróo).po<s>ω]		*!			***	*
[(pʰi.lan)(tʰróo).po<s>ω]					*!	*
[(pʰi.lan)(tʰróo.po)<s>ω]				*!		
☞ [pʰi.(lán.tʰroo).po<s>ω]						*
[(pʰí.lan).tʰroo.po<s>ω]			*!			**

Input: [pʰi.lan.tʰroo.pouω]

	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
[(pʰí.lan.tʰroo.pou)ω]		*!				
☞ [(pʰi.lan).(tʰroó.pou)ω]						
[(pʰi).(lán.tʰroo).pouω]		*!			*	*
[phi.(lán.tʰroo).pouω]						*!
[(pʰi.lan).(tʰroó).pouω]					*!	*
[pʰi.(lan).(tʰroó.pou)ω]					*!	
[pʰi.lan.(tʰroó.pou)ω]			*!			
[(pʰi).(lan).(tʰroó).pouω]		*!			***	*
[(pʰí.lan).tʰroó.pouω]			*!			**
[pʰi.lan.tʰroo.pouω]			*!**			****

The derivation of *ai.dói.ós té moi es.sí* 'you are respected in my eyes' may provide a first illustration of what happens when the host word has a lexically assigned prominence. From the

second recursion onwards, this derivation will also begin to show what happens when enclitics appear.

First recursion
Input: [ai.(doi.os ω]

	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
[(ai.doi).(ó)<s> ω]	*!	*		*	*	
[(ai).(dói.o)<s> ω]				*!	*	
[(ai).(dói).(o)<s> ω]		*!		*	***	
[(aí.doi).o<s> ω]	*!					*
[(ai).(dói).o<s> ω]					**!	*
[(ai).(doi.(ó)<s> ω]		*!		*	**	
[ai.(dói.o)<s> ω]				*!		
[(aí).(doi.o<s> ω]			*!		*	**
☞ [ai.(dói).o<s> ω]					*	*
[ai.(doi.(ó)<s> ω]		*!		*	*	
[ai.(doi.o<s> ω]			*!			***

The input to the first recursion, *[ai.(doi.os ω]*, has a lexically assigned prominence on its middle syllable, represented as a left bracket preceding that syllable. As a result, the winning candidate is one that would have lost to *[(aí.doi).o<s> ω]* in the absence of this lexically assigned prominence, owing to its violation of *FOOT (σ) (compare the winning candidate *[p^{h}i.(lán.t^{h}roo).po<s> ω]* just above).

The winning candidate *[ai.(dói).o<s> ω]* also prevails over the runner-up *[(ai).(dói).o<s> ω]*, because the latter contains an unnecessary violation of *FOOT (σ). However, nothing significant follows from the choice between candidates with and without an unnecessary monosyllabic foot at the beginning of the prosodic word; the preference seen here may be an artefact of the way in which constraints have been defined. From now on I shall refrain from showing candidates such as *[(ai).(dói).o<s> ω]*, which will be eliminated in the way seen here.

By undominated MAIN-RIGHT, the head syllable of the phonological word will again be the leftmost syllable of the (here trivially) rightmost foot. When this host word appears on its own, without enclitics, its surface form is thus *ai.dói.os*.

Second recursion
Input: [ai.(dói).os te ω]

	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
[ai.(dói).(ós te) ω]				*!	*	
[ai.(dói).(os) (té) ω]		*!		*	***	
☞ [ai.(dói).(ós) te ω]					**	*
[ai.(dói).os (té) ω]		*!		*	**	
[ai.(dói).os te ω]			*!		*	**

The input to the second recursion is *[ai.(dói).os te ω]*, with the first enclitic ready to be incorporated into the phonological word. FT-BIN, *<σσ>, and FIN-SYLL(μ)-EM ensure that the winning candidate is *[ai.(dói).(ós) te ω]*. By undominated MAIN-RIGHT, this candidate has an accent on the head syllable of its rightmost foot, i.e. *os*, but undominated MAX (ACC) ensures that the accent that was in the input

remains (in essence a "cyclic" effect). If our host word surfaces with just this first enclitic, the result will therefore be *ai.dói.ós te.*

Third recursion
Input: [ai.(dói).(ós) te moi ω]

	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
☞ [ai.(dói).(ós) (té moi) ω]					**	
[ai.(dói).(ós) (te) (moí) ω]		*!			****	
[ai.(dói).(ós) (té) moi ω]		*!			***	*
[ai.(dói).(ós) te (moí) ω]					***!	
[ai.(dói).(ós) te moi ω]			*!		**	**

FT-BIN, *<σσ>, and *FOOT (σ) ensure that the winning candidate is *[ai.(dói).(ós) (té moi) ω]*. By undominated MAIN-RIGHT, this candidate again has an accent on the head syllable of its rightmost foot, i.e. *te*, but undominated MAX (ACC) ensures that both accents that were in the input remain.

Fourth recursion
Input: [ai.(dói).(ós) (té moi) es.si ω]

	ENCLITIC CONSTRAINT	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
[ai.(dói).(ós) (té moi) (és.si) ω]	*!				*	**	
[ai.(dói).(ós) (té moi) (es).(sí) ω]	*!		*		*	****	
[ai.(dói).(ós) (té moi) (és).si ω]	*!					***	*
[ai.(dói).(ós) (té moi) es.(sí) ω]			*!		*	***	
☞ [ai.(dói).(ós) (té moi) es.si ω]				*		**	**

This time the undominated ENCLITIC CONSTRAINT becomes active. This constraint rules out all candidates in which the non-final syllable of the enclitic *es.si* falls in the strong position of a foot. As a result, the winning candidate *[ai.(dói).(ós) (té moi) es.si ω]* is one that would have lost to *[ai.(dói).(ós) (té moi) (és).si ω]* in the absence of the ENCLITIC CONSTRAINT, owing to its violation of *<σσ>.

This time undominated MAIN-RIGHT adds no new accents, since no new rightmost foot has been created, but undominated MAX (ACC) ensures that all three accents that were in the input remain. The result for the whole sequence is thus *[ai.(dói).(ós) (té moi) es.si ω]*. When a new phonological word follows, without an intervening pause, the surface accentuation is indeed *ai.dói.ós té moi es.si*, but before pause the surface accentuation is *ai.dói.ós té moi es.sí.* I tentatively take the accent on the final syllable to reflect some sort of boundary tone (cf. again Revithiadou 2018: 15), but a full account of this effect will not be attempted here.

The derivation of *ou.dé ti poó moi* 'and never yet to me' will illustrate two further aspects of the system. Firstly, the second recursion shows how FT-BIN, *<σσ>, and FIN-SYLL(μ)-EM can interact to favour a candidate in which a final light syllable is incorporated into a disyllabic foot with a preceding light syllable. Secondly, the third and fourth recursions show how a foot comprising two heavy syllables arises. On the third recursion, *FOOT (σ) favours a candidate leaving the new enclitic *poo* unfooted over one in which *poo* forms a monosyllabic foot, in a situation where no violation of higher-ranked FT-BIN or *<σσ> arises. On the fourth recursion, *FOOT (σ) favours a candidate with a disyllabic final foot, in a situation where no violation of higher-ranked FIN-SYLL(μ)-EM arises.

First recursion
Input: [ou.(de $_{\omega}$]

	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
[(ou).(dé) $_{\omega}$]		*!		*	**	
☞ [(ou).(de $_{\omega}$]					*	*
[ou.(dé) $_{\omega}$]		*!		*	*	
[ou.(de $_{\omega}$]			*!			**
[ou.de $_{\omega}$]	*!		*			**

Undominated MAIN-RIGHT here designates the partially formed foot (*de* as the head foot of the winning candidate *[(ou).(de $_{\omega}$]*. The point that this foot is only partially formed might be thought relevant in some way to the unaccented form in which *ou.de* surfaces when followed by a new phonological word rather than an enclitic. However, the conditions under which accents surface (or do not surface, or surface in a reduced form) in words with a lexically assigned prominence on the final syllable raise issues beyond the scope of this chapter.

Second recursion
Input: [(ou).(de ti $_{\omega}$]

	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
☞ [(ou).(dé ti) $_{\omega}$]				*	*	
[(ou).(dé) (ti) $_{\omega}$]		*!*		*	***	
[(ou).(dé) ti $_{\omega}$]		*!			**	*
[(ou).(de (tí) $_{\omega}$]		*!		*	**	
[(ou).(de ti $_{\omega}$]			*!		*	**

Third recursion
Input: [(ou).(dé ti) poo $_{\omega}$]

	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
[(ou).(dé ti) (poó) $_{\omega}$]					**!	
☞ [(ou).(dé ti) poo $_{\omega}$]					*	*

Fourth recursion
Input: [(ou).(dé ti) poo moi $_{\omega}$]

	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
☞ [(ou).(dé ti) (poó moi) $_{\omega}$]					*	
[(ou).(dé ti) (poo) (moí) $_{\omega}$]					**!*	
[(ou).(dé ti) (poo) moi $_{\omega}$]					**!	*
[(ou).(dé ti) poo (moí) $_{\omega}$]					**!	
[(ou).(dé ti) poo moi $_{\omega}$]			*!		*	**

The derivation of *kée.ruks tís toi* shows how this system gives the correct result for a host word like *kée.ruks*, with no additional accent appearing on the *-u-* when an enclitic follows. The crucial factor differentiating a host word like *kée.ruks* from one like *ai.dói.os* is that *kée.ruks* ends in a closed and therefore heavy syllable, even when the final consonant is treated as extrametrical. At the first recursion below, final light syllable extrametricality therefore does not come into play.

First recursion

Input: [kee.ruks ω]

	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
☞ [(kée.ruk)s ω]						
[(kee).(rúk)s ω]					*!*	
[(kée).ruks ω]					*!	*
[kee.(rúk)s ω]					*!	
[kee.ruks ω]			*!			**

Second recursion

Input: [(kée.ruk)s tis ω]

	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
[(kée.ruk)(s tí)s ω]		*!		*	*	
☞ [(kée.ruk)s tis ω]						*

Third recursion

Input: [(kée.ruk)s tis toi ω]

	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
☞ [(kée.ruk)(s tís toi) ω]						
[(kée.ruk)(s tis) (toí) ω]					*!*	
[(kée.ruk)(s tís) toi ω]					*!	*
[(kée.ruk)s tis (toí) ω]					*!	
[(kée.ruk)s tis toi ω]			*!			**

The derivation of *tá r^{h}á sp^{h}i*, finally, shows how the undominated constraint ALIGN (FT, σ) may become active in the case of an enclitic beginning with *sp^h-*. At the third recursion, the winning candidate violates MAX (MET. STR.) in order to avoid a foot *(tá r^{h}a)* ending part way through a syllable. The winning candidate also incurs one violation of FT-BIN, in order to achieve a form in which the accent assigned at the previous recursion can still surface.

First recursion

Input: [ta ω]

	ALIGN (FT, σ)	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
[(tá) ω]			*!		*	*	
☞ [ta ω]							*

Second recursion

Input: [ta r^{h}a $_{\omega}$]

	ALIGN (FT, σ)	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
☞ [(tá r^{h}a) $_{\omega}$]					*		
[(ta) (r^{h}á) $_{\omega}$]			*!*		*	**	
[(ta) r^{h}a $_{\omega}$]			*!			*	*
[ta (r^{h}á) $_{\omega}$]			*!		*	*	
[ta r^{h}a $_{\omega}$]				*!			**

Third recursion

Input: [(tá r^{h}a) sp^{h}i $_{\omega}$]

	MAX (ACC)	ALIGN (FT, σ)	MAX (MET. STR.)	FT-BIN	*<σσ>	FIN-SYLL(μ)-EM	*FOOT (σ)	ALIGN (PRWD, R, FT, R)
[(tá r^{h}a) (s.p^{h}í) $_{\omega}$]		*!		*		*	*	
[(tá r^{h}a) s.p^{h}i $_{\omega}$]		*!						*
[(tá) (r^{h}á s.p^{h}i) $_{\omega}$]			*	*		*!	*	
[(tá) (r^{h}a s)(.p^{h}í) $_{\omega}$]			*	**!		*	***	
☞ [(tá) (r^{h}á s).p^{h}i $_{\omega}$]			*	*			**	*
[(tá) r^{h}a s(.p^{h}í) $_{\omega}$]			*	**!		*	**	
[(tá) r^{h}a s.p^{h}i $_{\omega}$]			*	*	*!		*	**

Others will undoubtedly be able to improve on this analysis. However, three elements appear to be essential if the analysis is to accent sequences of enclitics correctly under the revised Göttling-Barrett system. The first is the recursive evaluation of constraints at each new layer of the recursive phonological word, which is of interest in relation to debates over recursion within the phonological word.[25] The revised Göttling-Barrett system often requires us to treat a syllable as light at one step and heavy at the next, as we saw in Section 4, and it is difficult to see how this could be achieved without recursion. Opinions will differ as to whether "recursive phonological word" is the right label for the relevant domain,[26] and no strong claim on this point is intended here. But on the analysis proposed, the accentuation of sequences including enclitics depends on the same identically ranked constraints as the accentuation of "ordinary" words—with the exception of the unsatisfying ENCLITIC CONSTRAINT, which guarantees that the first syllable of a disyllabic enclitic is always unaccented.

The second, and related, point is the preservation of metrical structure from one recursion to the next, combined with the idea that material which is extrametrical on one recursion remains available for footing on a subsequent recursion. In the terms of Steriade's (1988) analysis, the corresponding concepts are structure preservation and the Free Element Condition. This point is crucial to the accentual difference between e.g. *eí pou tis* 'if by chance somebody' and *aí kén tis* 'if somebody' that the revised Göttling-Barrett system requires. Under the proposed analysis, underlying *ei pou tis* is footed as *(eí pou) tis*, while underlying *ai ken tis* becomes *(aí) (kén) tis*. At the second recursion, the inputs are *ei pou* and *ai ken*; at this step *ei pou* counts as ending in a heavy syllable but *ai ken* in a light syllable, owing to undominated FINAL-CONS-EM. FIN-SYLL(μ)-EM therefore allows *(ei pou)* but not *(ai ke)<n>*. At the following step, *ken* counts as a heavy syllable, but it owes its availability for footing (now in the strong position of a foot) to its status as an extrametrical light syllable at the previous step.

[25] See e.g. Miller and Sande (2021), with earlier literature.

[26] See again Miller and Sande (2021, Section 2.2), on recursive phonological words posited to account for clitic behaviour.

The third essential point is that a lexically-assigned prominence affects the foot structure of the host word. For example, the system achieves the results required by the revised Göttling-Barrett system for both *po.lú ge moi* 'much at any rate to me' and *é.ti gé moi* 'yet at any rate to me', by giving the first the foot structure *po.(lú ge) moi* and the second the foot structure *(é.ti) (gé moi)*. These sequences have identically-shaped sequences of light and heavy syllables, but feet fall in different places because *po.lú* has a lexically-assigned prominence (giving rise to a non-recessive accent) while *é.ti* does not. This is an element of Steriade's (1988) analysis that Sauzet's (1989) and Golston's (1990) approach deliberately avoids, but it is key to producing the rhythmic effects required under the revised Göttling-Barrett system. It is therefore unlikely that minor tweaks to the account proposed here would allow it to operate with Sauzet's or Golston's foot structure. Others may be able to propose a more thoroughly different analysis along the lines of Sauzet's and Golston's, but pending such a proposal the new empirical claim taken up here speaks for a phonological system whose backbone is essentially Steriade's account.

This brings us to the second open question raised earlier: did Greek have "resonant diphthongs"? If the proposed analysis is on the right lines, resonant diphthongs do not provide the answer to the problem they were posited to solve. A "trochaic" host word such as *ál.lo<s>* receives an additional accent before an enclitic via the same mechanism which places an additional accent on a trochaic sequence like *oú ke* before another enclitic. While the concept of "resonant diphthongs" would allow us to say that *ál.lo<s>* has a vocalic mora (the syllable-final *l*) intervening between the accented mora and the final vocalic mora of the word, the first syllable of *oú ke* contains an ordinary diphthong accented on its *second* mora. With or without resonant diphthongs, no vocalic mora can be said to intervene between this mora (*ú*) and the final vocalic mora of the sequence (*e*).

The third open question is whether the law of limitation is sensitive to the weight of the word-final syllable or to the length of its vowel. On the proposed analysis, the law of limitation follows from the same mechanisms as accent placement on a host word followed by one or more enclitics, and the limitation of the accent to the last two syllables of a word with final consonant cluster follows "for free" from the same mechanisms again. These mechanisms make reference to syllable weight, via the constraints FT-BIN and FIN-SYLL(μ)-EM; for these to work correctly it is essential that a syllable such as the *-os* of *ai.dói.ós te* counts as heavy, at the point when the recursive phonological word includes the enclitic *te*. The *-os* counts as heavy because it is closed by a consonant, and the last syllable of *pom.p^{h}ó.luk<s>* counts as heavy for the same reason. If we take the underlying form to be *pom.p^{h}o.luks*, with no lexically assigned prominence, the proposed analysis yields the foot structure *pom.(p^{h}ó.luk)<s>*, with the penultimate syllable emerging on phonological grounds as the position for recessive accent.

To sum up, in this chapter we have pursued the consequences for Greek phonology of a new descriptive claim as to the accentuation of host words followed by sequences of enclitics. Doing so turns out to speak in favour of a phonological system similar to that of Steriade (1988), against resonant diphthongs in ancient Greek, and in favour of the weight of the final syllable as the relevant factor for the law of limitation.

References

Al-Jarrah, R. S. (2011) "Extrametricality revisited". *Linguistic and Literary Broad Research and Innovation* 2 (1), 3–35.

Anttila, A. (2002) "Variation and phonological theory". In J. K. Chambers, P. Trudgill, and N. Schilling-Estes (eds.), *The handbook of language variation and change*, 1st edn. Malden: Blackwell, 206–243.

Bally, C. (1945) *Manuel d'accentuation grecque*. Bern: Francke.

Barrett, W. S. (1964) Euripides: *Hippolytos.* Oxford: Clarendon Press.
Dieu, É. (2021*a*) “Dérivation nominale et innovations accentuelles en grec ancien: autour de la loi de Wheeler”. In A. Blanc and I. Boehm (eds.) *Dérivation nominale et innovations dans les langues indo-européennes anciennes*. Lyon: MOM Éditions, 255–274. <dx.doi.org/10.4000/books.momeditions.10880> (accessed 29/01/2023)
Dieu, É. (2021*b*) “Accentuation récessive et accentuation columnale en grec ancien, avec quelques considérations sur la loi de limitation”. In H. A. Fellner, M. Malzahn, and M. Peyrot (eds.) *lyuke wmer ra: Indo-European Studies in Honor of Georges-Jean Pinault.* Ann Arbor–New York: Beech Stave Press, 114–124.
Dieu, É. (2022) *Traité d’accentuation grecque*. Innsbruck: Institut für Sprachwissenschaft der Universität Innsbruck.
Elias-Ulloa, J. A. (2006) *Theoretical aspects of Panoan metrical phonology: disyllabic footing and contextual syllable weight.* PhD dissertation, Rutgers.
Göttling, K. W. (1835) *Allgemeine Lehre vom Accent der griechischen Sprache.* Jena: Cröker.
Golston, C. (1990) “Floating H (and L*) Tones in Ancient Greek”. In J. Myers and P. E. Pérez (eds.), *Arizona Phonology Conference, iii*. Tucson: University of Arizona Linguistics Department, 66–82.
Green, T. and Kenstowicz, M. (1995) “The Lapse Constraint”. Paper presented at the Sixth Annual Meeting of the Formal Linguistics Society of Mid-America. <dx.doi.org/doi:10.7282/T39G5PG5> (accessed 29/01/2023)
Grenfell, B. P. and Hunt, A. S. (1908) *The Oxyrhynchus Papyri VI.* London: Egypt Exploration Fund.
Halle, M. (1997) “On Stress and Accent in Indo-European”. *Language* 73 (2), 275–313.
Hyde, B. (2011) “Extrametricality and non-finality”. In M. van Oostendorp, C. J. Ewen, E. Hume, and K. Rice, *The Blackwell Companion to Phonology*. Malden: Blackwell, 1027–1051.
Ito, J. and Mester, A. (2017) “Ancient Greek pitch accent: anti-lapse and tonal antepenultimacy”. In S. Tanaka *et al.* (eds.), 音韻研究の新展開：窪薗晴夫教授還暦記念論文集 (*New developments in phonological research: Festschrift in Honour of Prof. Haruo Kubozono’s 60th Birthday*). Tokyo: Kaitakusha, 2–18.
Kiparsky, P. (2003) “Accent, syllable structure, and morphology in ancient Greek”. In E. M. Athanasopoulou (ed.), *Selected Papers from the 15th International Symposium on Theoretical and Applied Linguistics, Thessaloniki 4-6 May 2001*. Thessaloniki: Aristotle University of Thessaloniki, 81–106. <https://ejournals.lib.auth.gr/thal/article/view/5674> (accessed 30/01/2023)
McCarthy, J. J. and Prince, A. (1993) “Generalized alignment”. In G. Booij and J. van Marle (eds.), *Yearbook of Morphology 1993*. Amsterdam: Kluwer, 79–153.
Meillet, A. (1893) “Varia”. *Mémoires de la Société de Linguistique de Paris* 8 (3), 235–245.
Miller, T. L. and Sande, H. (2021) “Is word-level recursion actually recursion?”. *Languages* 6 (2), 100. <dx.doi.org/10.3390/languages6020100> (accessed 29/01/2023)
Misteli, F. (1868) “Ueber die Accentuation des Griechischen”. *Zeitschrift für vergleichende Sprachforschung* 17 (2–3), 81–134, 161–194.
Noyer, R. (1997) “Attic Greek accentuation and intermediate derivational representations”. In I. Roca (ed.), *Derivations and constraints in phonology*. Oxford: Clarendon Press, 501–527.
Prince, A. and Smolensky, P. (2004) *Optimality Theory: Constraint Interaction in Generative Grammar.* Malden: Blackwell.
Probert, P. (2006) *Ancient Greek accentuation: synchronic patterns, frequency effects, and prehistory*. Oxford: Oxford University Press.
Probert, P. (2019) *Latin grammarians on the Latin accent.* Oxford: Oxford University Press.

Revithiadou, A. (2018) “Ancient Greek pitch accent: extending tonal antepenultimacy to enclitics and the σωτῆρα words”. In R. Bennett *et al.* (eds.), *Hana-bana* (花々): *A Festschrift for Junko Ito and Armin Mester*. Santa Cruz: UC Santa Cruz. <https://escholarship.org/uc/item/09m654fp> (accessed 30/01/2023)

Roussou, S. and Probert, P. (2023) *Ancient and medieval thought on Greek enclitics*. Oxford: Oxford University Press.

Sandell, R. and Gunkel, D. (2024) “On the representation and realization of the ancient Greek acute: evidence from tone-tune mappings in Ancient Greek music”. *Journal of Greek Linguistics* 24 (1), 78–183.

Sauzet, P. (1989) “L’Accent du grec ancien et les relations entre structure métrique et représentation autosegmentale”. *Langages*, 24^{e} année, n^{o} 95, 81–113.

Smith, J. L. (1998) “Noun faithfulness and word stress in Tuyuca”. In J. Austin and A. Lawson (eds.), *Proceedings of the fourteenth Eastern States Conference on Linguistics ’97*. Ithaca: CLC Publications, 180–191.

Steriade, D. (1988) “Greek accent: a case for preserving structure”. *Linguistic Inquiry* 19 (2), 271–314.

Wackernagel, J. (1893) *Beiträge zur Lehre vom griechischen Akzent*. Basel: Reinhardt.

Wackernagel, J. (1896) “Das Zeugniss der delphischen Hymnen über den griechischen Accent”. *Rheinisches Museum für Philologie*, Neue Folge 51, 304–305.

West, M. L. (1966) Hesiod: *Theogony*. Oxford: Clarendon Press.

West, M. L. (1990) *Aeschyli tragoediae*. Stuttgart: Teubner.

Wheeler, B. I. (1885) *Der griechische Nominalaccent*. Strasbourg: Trübner.