

LAWS AND RULES IN INDO-EUROPEAN

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CLARENDON • PRESS

OXFORD

UNIVERSITY PRESS

Great Clarendon Street, Oxford OX2 6DP

Oxford University Press is a department of the University of Oxford.
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Published in the United States

by Oxford University Press Inc., New York

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First published 2012

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British Library Cataloguing in Publication Data

Data available

Library of Congress Cataloging in Publication Data

Data available

Typeset by SPI Publisher Services, Pondicherry, India

Printed in Great Britain

on acid-free paper by

MPG Books Group, Bodmin and King's Lynn

ISBN 978-0-19-960992-5

1 3 5 7 9 10 8 6 4 2

Origins of the Greek law of limitation

PHILOMEN PROBERT

II.1 Introduction

This chapter proposes a historical account of the Greek 'law of limitation', the restrictions on the distance from the end of the word where the accent may fall.¹ At the same time, the chapter proposes an origin for the behaviour of some word-final diphthongs as 'short for accentuation' and others as 'long for accentuation'.

II.1.1 *The law of limitation*

Some languages have a word accent whose position is straightforwardly predictable: for example, the accent always falls on the word-initial syllable. In classical Latin, the position of the accent is likewise predictable, although it follows a more complex rule: the penultimate syllable is accented if this syllable is heavy, otherwise the antepenultimate; or, if the word is too short for these rules to apply 'normally', the initial syllable is accented. By contrast, the position of the ancient Greek accent is not predictable from the shape of a word alone, and yet there are some restrictions on its placement—some positions in the word where (with one limited group of exceptions) we can be sure not to find the accent. These restrictions are known collectively as the 'law of limitation', and may be stated as follows:

¹ It is a pleasure to offer John Penney a chapter that originated at the Oxford Comparative Philology Seminar, to which John has given so much over so many years. I am grateful for comments from participants in this seminar and its sister seminar in Cambridge; and to Eleanor Dickey and Andreas Willi, for discussion of the written version.

The accent does not fall further from the end of the word than the antepenultimate syllable, or the penultimate if the final syllable is heavy. For the purposes of this law, a single word-final consonant does not count towards syllable weight.

(An accent as far from the end of the word as the law of limitation allows is called 'recessive'. Further restrictions regulate the occurrence of acute and circumflex accents; we shall return to these shortly.)

The law of limitation is common to all Greek dialects for which we have evidence, except possibly Thessalian (which would, however, have innovated vis-à-vis the other Aeolic dialects).² The law may well have arisen before the main dialect divisions of historical times, although caution is necessary because accentual phenomena can spread. The law of limitation has a small number of exceptions apparently resulting from Attic-Ionic quantitative metathesis having occurred *after* the limitation of the accent: πόληος 'of the city' > πόλεως. Since there are metrically guaranteed examples of quantitative metathesis in Homer, the law of limitation predates the latest stages of the Homeric tradition, and may be considerably older still. It is clear that it is an innovation of Greek, not inherited from Indo-European.

11.1.2 *The choice between acute and circumflex accent on a long vowel or diphthong*

Accented long vowels and diphthongs were accented either on their first half (first 'mora'), or on their second; in the former case the accent is represented as a circumflex (σοφοῦ), in the second as an acute (σοφούς). Short vowels were simply accented or unaccented: an accent on a short vowel is represented as an acute (σοφός).³

On accented final syllables the choice between circumflex and acute is morphologically based: certain endings take a circumflex if accented at all (e.g. gen. pl. -ῶν), others an acute (e.g. acc. pl. -ούς). On non-final syllables the choice between circumflex and acute is phonologically determined: a long accented vowel or diphthong in the penultimate syllable takes a circumflex if the final syllable has a short vowel (σωτήρα, πολυπίδαξ); other accented long vowels in non-final syllables take an acute (σοφώτατος, ἀνθρώπους). But the scope of the rule prescribing a circumflex in words of shape σωτήρα (the 'σωτήρα rule') appears to differ from one dialect to another: neither Doric nor Boeotian applied the rule to all instances to which it applied in Attic and *koiné*. Nevertheless, it has been argued persuasively that, in some form and at some period,

² See Probert (2006: 72–4), with literature.

³ The grave accent, a sandhi variant of the acute, is not relevant here.

the *σωτήρα* rule operated in these dialects too (for Boeotian, see Hermann 1918: 274–5; for Doric, Hinge 2006: 124–8).

I remain agnostic as to how acutes and circumflexes were distributed on non-final syllables at an early stage, such as when the law of limitation came into existence. The *σωτήρα* rule may have existed in some form already, or it may be a later development. Alternatively, the *σωτήρα* rule and law of limitation arose together. In what follows I shall attempt to account for the origins of the restrictions as to the number of syllables from the end of the word where the accent might fall (the law of limitation as defined under 11.1.1), leaving aside the origins of the *σωτήρα* rule.

11.1.3 Final diphthongs

Diphthongs count as long vocalic nuclei for the purposes of poetic metre,⁴ and in general they are treated as long vowels by the accentuation rules. But in absolute word-final position, in Attic and *koiné* (on Doric see section 11.4.1), the diphthongs *-αι* and *-οι* ‘count as short’ for the purposes of the accentuation rules only in indicatives, subjunctives, imperatives, infinitives, and nominatives plural. In optatives, locative adverbs, and some interjections, final *-αι* and *-οι* ‘count as long’. Thus *βούλομαι* ‘I want’ (indicative), *βούλωμαι* ‘I might want’ (subjunctive), *παίδευσαι* ‘educate!’ (imperative), and *ἄνθρωποι* ‘people’ (nominative plural) allow an acute on the antepenultimate syllable. The forms *παιδεῦσαι* ‘to educate’ (aorist infinitive) and *οἵκοι* ‘houses’ (nominative plural) allow a circumflex on a long vowel in the penultimate syllable. By contrast, the acutes on the *-εϋ-* of *παιδεύοι* ‘may he educate’ (present optative) and *παιδεύσαι* ‘may he educate’ (aorist optative) show that the final diphthong ‘counts as long’, as does the circumflex on the final diphthong of the locative adverb *Μεγαροῖ* ‘at Megara’ and the interjection *αἰαῖ*.

11.2 Historical accounts of the law of limitation

There have been many attempts to formulate the law of limitation, in synchronic terms, in such a way that it emerges naturally from some simple and plausible principle.⁵ The problem is inherently tricky and there is still little or no agreement on the details of the phonological analysis from which the law

⁴ A complication not immediately relevant (but see the appendix) is that in Homer any word-final long vowel or diphthong may be treated as light before a word-initial vowel, and the diphthongs *-αι* and *-οι* especially favour this treatment, evidently because the *-ι* may be interpreted as consonantal between vowels. See Hartel (1874), Chantraine (1958: 88–9).

⁵ For discussion, see Probert (2006: 108–12, 120–3).

of limitation should follow. Considerably less attention has been devoted to uncovering the historical processes that might have given rise to the law of limitation, but the question has been approached especially by Lucidi (1950) and Kuryłowicz (1968: 86).

Among earlier suggestions, one might mention Hermann's view (1923: 88-9) that the law of limitation arose in two stages: first a restriction to the last three syllables (irrespective of any vowel quantities or syllable weights), then a second restriction to the last three vocalic morae in words with heavy final syllable.⁶ While this account breaks the law of limitation down into two simpler innovations instead of one complex one, we are not told what motivated the initial restriction of the accent to the last three syllables, or the subsequent further restriction.

Like Hermann, Lucidi (1950) regards the law of limitation as arising in essentially two steps, but his first step (1950: 82) is the restriction of the accent to the last three vocalic morae (so πόλεμος, πολέμου, ἀνθρώπου, but *ἀνθρώπος not ἀνθρωπος, *λεγήτον not λέγητον). At this stage Lucidi assumes the continued existence of forms such as *δώρον, with inherited acute accent on the penultimate. After this first step, he takes processes of compensatory lengthening to have given rise to forms such as φέρουσα (< *φέρουσα), so that some words with a long vowel in the penultimate syllable now had the accent four vocalic morae from the end (1950: 84, 86).

Lucidi then posits a second step for Attic-Ionic and Aeolic (but not Doric): in every word with a short vowel in the final syllable and a long accented vowel in the penultimate, the accent was retracted by one vocalic mora. Thus, words such as *ἀνθρώπος and *λεγήτον became ἀνθρωπος and λέγητον, while *δώρον became δῶρον (1950: 85-6). This second step thus produced both the law of limitation in its eventual form and the σωτήρα rule. Aeolic, Doric, and Attic subsequently underwent further innovations, which need not concern us here.

Lucidi proposes several possible motivations for his second step. Firstly, he suggests that there was a tendency for the length of the vowel in a final syllable to be confused with the weight of the syllable, and that this confusion led to a wider reinterpretation of the restrictions on the accent as based on syllable weight rather than vowel quantity (1950: 83-4, 86). If so, forms like *ἀνθρώπων might have come to follow those like λέγοντα (with a heavy penultimate syllable providing no obstacle to an accent on the antepenultimate). Secondly, the appearance of forms such as φέρουσα would have contributed to the loss of the perception that a long vowel in the penultimate syllable prevented the accent falling on the antepenultimate (1950: 86). Thirdly, Lucidi (1950: 88 n. 1) allows the possibility of some substrate influence.

⁶ A somewhat similar account already in Pedersen (1905b: 340-1).

Kuryłowicz (1968: 86) gives a different account, appealing to an idea that with the rise of the acute/circumflex distinction (which Kuryłowicz takes to be a Greek innovation) a syllabic sequence $x \cup$ had become equivalent to —. A trisyllabic word of the form $\acute{x} x \cup$ (e.g. λέγομεν, ἄνθρωπος) might then be reanalysed as accented on the syllable immediately preceding the 'end-complex' $x \cup$ (equivalent to —). The idea that words were accented either on the end-complex or on the preceding syllable was then generalized from words of shape $x x \cup$.

Both Lucidi's account and Kuryłowicz's still suffer from somewhat inadequate motivation. As motivation for his initial three-mora rule, Lucidi (1950: 92) suggests that early Greek had a secondary accent on the antepenultimate vocalic mora, but independent evidence for this secondary accent is lacking. Kuryłowicz assumes that the law of limitation was due to reanalysis of words of shape $x x \cup$. But why should words of this shape have been so influential? In addition, Kuryłowicz's account requires an equivalence between the syllabic sequences $x \cup$ and —, for which the only evidence appears to be the details of the law of limitation (see Kuryłowicz 1968: 84).

Both Lucidi's account (in its second step) and Kuryłowicz's, however, appeal to the fact that some words 'obeyed' the law of limitation before this law came into effect. This point is worth taking seriously, since a promising model for many types of linguistic change is the reanalysis of existing forms, followed by the extension of a new regularity extracted from these forms.⁷ The suggestion offered here retains and extends the point that some words already 'obeyed' the not yet existing law of limitation.

11.3 A new suggestion

We might expect early Greek to have had approximately the second-declension noun paradigm shown in Table 11.1, with an accent on the first syllable throughout.⁸

⁷ Cf. (on syntactic change) Harris and Campbell (1995: 61–119).

⁸ The stage represented is one in which the nom. pl. ending is already $-οι$ (not $*-ās$), and Osthoff's Law has already taken place (hence dat./instr. pl. $-οις$, not $*-ōis$). Different decisions on these points would not affect the argument much (but on the nom. pl. ending see section 11.4), and I do not mean to claim that the replacement of nom. pl. $*-ās$ by $-οι$, or Osthoff's Law, can necessarily be brought into a relative chronology with the law of limitation. I do not attempt a reconstruction of the dual forms, the old ablative, the old instrumental singular, or the old dative plural; but such forms as one might reconstruct for these slots (e.g. abl. sg. $Φοίκω$) would not affect the argument.

Table 11.1 Early Greek paradigm of *Φοῖκος* 'house' (cf. Skt *vésa-* 'house')

	Singular	Plural
Nom.	<i>Φοῖκος</i>	<i>Φοῖκοι</i>
Acc.	<i>Φοῖκον</i>	<i>Φοῖκους</i>
Gen.	<i>Φοῖκοιο</i>	<i>Φοῖκων</i>
Dat./Instr.	<i>Φοῖκῳ</i>	<i>Φοῖκοις</i>
Loc.	<i>Φοῖκοι</i>	<i>Φοῖκοισι</i>

Note: In this paradigm and further paradigms below, the distribution of acutes and circumflexes shown is guided by the historically attested forms; no claim is made about any prehistoric distribution of acute and circumflex accents.

What is of interest here is not only that all these forms of a root-accented noun with fairly short stem already 'obey' the law of limitation. They do so in a non-trivial way. Most of the forms in the paradigm are disyllabic, but the trisyllabic forms (*Φοῖκοιο* and *Φοῖκοισι*) happen to have a light final syllable and therefore also 'obey' the law of limitation. If one reckons the position of the accent from the end of the word, the accent falls on the penultimate syllable in all forms with a heavy final syllable, and on the antepenultimate only in trisyllabic forms with a light final syllable.

In the verbal system, underived thematic verbs such as *τρέπω* behave remarkably similarly. It is normally assumed that finite verbs were unaccented in some syntactic positions in early Greek and accented in others, as in Vedic (see e.g. Sihler 1995: 238–9, Meier-Brügger 2002: 184; but cf. section 11.5 below). In accented positions, the present indicative active of *τρέπω* would have been accented on the non-ablauting *e*-grade root throughout, and would have 'obeyed' the law of limitation in the same non-trivial way as the forms of *Φοῖκος*: sg. 1. *τρέπω*, 2. *τρέπεις*, 3. *τρέπει*, du. 2. *τρέπετον*, 3. *τρέπετον*, pl. 1. *τρέπομεν*, 2. *τρέπετε*, 3. (early Greek) *τρέποντι*. Not only the present indicative active, but most of the originally root-accented finite forms and infinitives—those built on the thematic present stem *τρέπε/ο-* or the sigmatic aorist stem *τρέψ-*—would have behaved in the same way. These forms are shown in Table 11.2, approximately as they would have looked in accented position, with an accent on the root. An asterisk indicates that the relevant form does not have the accent in its historical position, i.e. does not already 'obey' the law of limitation. The singly and doubly underlined forms end in *-αι* or *-οι*, and will be discussed in due course. Unaugmented forms of the imperfect and aorist indicatives are shown, since I assume that the augment was an independent particle until relatively late in the prehistory of Greek, and was often absent at an early period.⁹ The future optative is omitted, as this is not attested until the fifth century (Schwyzer and Debrunner 1950: 337).

⁹ Cf. the total or almost total absence of the augment from Mycenaean, and the preponderance of unaugmented past indicatives in Homer (see Chantraine 1958: 483–4, with important caveats) and the *R̥gveda* (Macdonell 1916: 122).

Skt *vésa-* 'house')

Plural
<i>Φοῖκοι</i>
<i>Φοίκονς</i>
<i>Φοίκων</i>
<i>Φοίκους</i>
<i>Φοίκουσι</i>

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-accented noun with in a non-trivial way. llabic forms (*Φοῖκοιο* e also 'obey' the law he end of the word, heavy final syllable, ht final syllable.

τρέπω behave remark- unaccented in some s in Vedic (see e.g. on 11.5 below). In o would have been would have 'obeyed' ms of *Φοῖκος*: sg. 1. *τρέπομεν*, 2. *τρέπετε*, ive, but most of the uilt on the thematic d have behaved in ately as they would an asterisk indicates l position, i.e. does y underlined forms mented forms of the at the augment was of Greek, and was itted, as this is not o: 337).

and the preponderance of important caveats) and

Table 11.2 Early present and aorist active and middle finite forms and infinitives of *τρέπω* 'turn', shown with root accentuation

(pres. ind. act.)		(fut. ind. act.)	
Sg.	Du.	Sg.	Du.
1. <i>τρέπω</i>		<i>τρέψω</i>	
2. <i>τρέπεις</i>	<i>τρέπετον</i>	<i>τρέψεις</i>	<i>τρέφετον</i>
3. <i>τρέπει</i>	<i>τρέπετον</i>	<i>τρέψει</i>	<i>τρέφοντι</i>
(pres. subj. act.)		(pres. opt. act.)	
Sg.	Du.	Sg.	Du.
1. <i>τρέπω</i>		<i>τρέποιμι</i>	
2. <i>τρέπῃς</i>	<i>τρέπητον</i>	<i>τρέποις</i>	<i>τρέποιτον</i>
3. <i>τρέπῃ</i>	<i>τρέπητον</i>	<i>τρέποι</i>	* <i>τρέποιτην</i>
(aor. subj. act.)		(aor. opt. act.)	
Sg.	Du.	Sg.	Du.
1. <i>τρέψω</i>		<i>τρέψαιμι</i>	
2. <i>τρέψῃς</i>	<i>τρέψητον</i>	<i>τρέψαις/-εας</i>	<i>τρέψαιτον</i>
3. <i>τρέψῃ</i>	<i>τρέψητον</i>	<i>τρέψαι/-ειε</i>	* <i>τρέψαιτην</i>
(unaugmented impf. ind. act.)		(unaugmented aor. ind. act.)	
Sg.	Du.	Sg.	Du.
1. <i>τρέπον</i>		<i>τρέψα</i>	
2. <i>τρέπες</i>	<i>τρέπετον</i>	<i>τρέψας</i>	<i>τρέψατον</i>
3. <i>τρέπε</i>	* <i>τρέπετην</i>	<i>τρέψε</i>	* <i>τρέψατην</i>
(pres. ind. mid.)		(fut. ind. mid.)	
Sg.	Du.	Sg.	Du.
1. <i>τρέπομαι</i>		<i>τρέπομαι</i>	
2. <i>τρέπαι</i>	<i>τρέπεσθον</i>	<i>τρέψομαι</i>	<i>τρέψεσθον</i>
		<i>τρέψαι</i>	

(continued)

Table 11.2 Continued

<u>3. <u>τρέπεται</u></u>	<u>τρέπεται</u>	<u>τρέπεται</u>	<u>τρέπεται</u>	<u>τρέπεται</u>
(pres. subj. mid.)				
Sg.				
1. <u>τρέπωμαι</u>				
2. <u>τρέπῃαι</u>				
3. <u>τρέπῃται</u>				
(aor. subj. mid.)				
Sg.				
1. <u>τρέψωμαι</u>				
2. <u>τρέψῃαι</u>				
3. <u>τρέψῃται</u>				
(pres. ipn. act.)				
Sg.				
1. <u>τρέψωμην</u>				
2. <u>τρέψω</u>				
3. <u>τρέπετο</u>				
(pres. ipn. mid.)				
Sg.				
1. <u>τρέψωμαι</u>				
2. <u>τρέψω</u>				
3. <u>τρέπετο</u>				
(pres. ipn. act.)				
Sg.				
1. <u>τρέψωμην</u>				
2. <u>τρέψω</u>				
3. <u>τρέπετο</u>				
(pres. ipn. mid.)				
Sg.				
1. <u>τρέψωμαι</u>				
2. <u>τρέψω</u>				
3. <u>τρέπετο</u>				
(infinitives)				
τρέπειν, <u>τρέψαι</u> , <u>τρέπεσθαι</u> , <u>τρέψασθαι</u>				

^a The alternative classical form τρέπεσθαι appears too late to be relevant (see Chantraine 1961: 270). Likewise the alternative 3pl. aor. ipn. act. τρέψασι, 3pl. pres. ipn. mid. τρέψωσιν, and 3pl. aor. ipn. mid. τρέψωσιν.

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As the asterisks show, not all of these forms already 'obey' the law of limitation. But some of the exceptions are very rare in attested Greek and likely to have been rare at every period: third person dual optatives (*τρέποιτην, *τρέψαιτην, *τρέποισθην, *τρέψαισθην), third person dual imperfect and aorist indicatives (*τρέπετην, *τρέψατην, *τρέπεσθην, *τρέψασθην), and third person dual imperatives (*τρέπετων, *τρέψατων, *τρέπεσθων, *τρέψασθων). The remaining exceptions are first person plural middle forms (*τρέπομεθα (pres.), *τρέψομεθα, *τρέπωμεθα, *τρέποιμεθα, *τρέψωμεθα, *τρέψαιμεθα, *τρέπομεθα (impf.), *τρέψαμεθα), first person singular middle forms with secondary ending (*τρέπομην, *τρέψαιμην, *τρέπομην, *τρέψαμην), and third person singular and plural imperatives (*τρέπετω, *τρέποντων, *τρέψατω, *τρέψαντων, *τρέπεσθω, *τρέπεσθων, *τρέψασθω, *τρέψασθων). Although the first person forms, in particular, will have been fairly frequent in certain kinds of discourse (such as first-person narrative), these forms are heavily outnumbered, at least in their paradigm, by forms that already 'obey' the law of limitation.

A similar point could be made about other common paradigms. If reduplicated presents were originally accented on the reduplication, as in Vedic (cf. Ringe 2006a: 37–8, 40), the present and imperfect indicative paradigms of ἵστημι 'set up' would have looked roughly as shown in Table 11.3.

Table 11.3 Early present and imperfect indicative forms of ἵστημι 'set up', shown with accent on the reduplication

(pres. ind. act.)			(unaugmented impf. ind. act.)		
Sg.	Du.	Pl.	Sg.	Du.	Pl.
1. ἵσtām̃i		ἵσταμεν	ἵσtān		ἵσταμεν
2. ἵσtās	ἵστατον	ἵστατε	ἵσtās	ἵστατον	ἵστατε
3. ἵσtāt̃i	ἵστατον	ἵσταντι	ἵσtā	*ἵστατην	ἵσταν
(pres. ind. mid.)			(unaugmented impf. ind. mid.)		
Sg.	Du.	Pl.	Sg.	Du.	Pl.
1. ἵσταμαι		*ἵσταμεθα	*ἵσταμην		*ἵσταμεθα
2. ἵστασαι	ἵστασθον	ἵστασθε	ἵστασο	ἵστασθον	ἵστασθε
3. ἵσtatai	ἵστασθον	ἵστανται	ἵστατο	*ἵστασθην	ἵσταντο

Apart from sigmatic aorists (accented on the root, as discussed), and some other root-accented (or 'Narten') paradigms, most other athematic verbal paradigms originally accented the syllable before the ending in singular active forms, otherwise the ending (see Ringe 2006a: 35–6, 40). The shape of Greek verbal endings ensures that most such forms will not even have been 'recessive' when

^a The alternative classical form τρέπεσθων appears too late to be relevant (see Chantraine 1961: 270). Likewise the alternative 3pl. aor. ipv. act. τρέψασιον, 3pl. pres. ipv. mid. τρέψασθων, and 3pl. aor. ipv. mid. τρέψασθων.

accented,¹⁰ let alone 'violated' the law of limitation (so e.g. 1sg. *δαμνάμι, 1pl. *δαμναμέν). The same is true for most suffixed thematic present forms, since most thematic suffixes were accented on the thematic vowel (see Ringe 2006a: 28–9, 39–40).¹¹

In order to show that a high proportion of early Greek words 'obeyed' the law of limitation *avant la lettre*, however, we require not only that the majority of forms in some common nominal and verbal paradigms already 'obeyed' the law of limitation, but that the majority of forms in actual early Greek discourse did so. We do not, of course, have a wide variety of early Greek texts, and we cannot always reconstruct prehistoric accentuation, but we do have some early Greek, especially the Homeric poems, and internal or comparative evidence often shows where the attested accentuation is due to one of the main Greek accentual innovations: the law of limitation or the recessive accentuation of most finite (and some non-finite) verb forms. The following extract from the *Iliad* shows an attempt to reconstruct the pre-law-of-limitation accentuation, with particular attention to the forms whose attested accentuation is most likely to be innovated: forms attested with recessive accent, if the recessive accent does not fall on the word-initial syllable, and all recessive verb forms. Asterisks show where the reconstructed position for the accent is not the historically attested one. No attempt has been made to reconstruct unaccented verbs, since it is doubtful whether we really know their distribution in early Greek (cf. also section 11.5); the distribution found in Vedic would make *ἔᾱ (line 2), τρέπεν (line 3), τρέπεν (line 7), and ἐέλετο (line 8) unaccented.

Zeús δ' ἐπεὶ οὖν Τρώας τε καὶ Ἑκτορα νηυσὶ πέλασσαν¹²,
τοὺς μὲν *ἔᾱ¹³ παρὰ τῆσι πόνον τ' ἐχέμεν καὶ οἰζὺν
νωλεμέως¹⁴, αὐτὸς δὲ πάλιν τρέπεν¹⁵ ὅσσε φαεινῷ

¹⁰ Except for active singular forms such as unaugmented 1sg. aor. στήν < *steh₂-m, which are technically recessive, but only because they are so short.

¹¹ Cf. the sample Indo-European verb, noun, and adjective paradigms laid out by Ringe (2006a: 35–40, 47–52), in which the majority of forms already 'obey' the law of limitation.

¹² An old *s*-aorist built on an *e*-grade root *pelh₂- (see Chantraine 1968–80, s.v. πέλας); old root accentuation is expected.

¹³ The etymology and history of ἔᾱω are unclear. The verb may originally have had an athematic present stem ἔᾱ- (cf. Chantraine 1958: 305, 1968–80, s.v. ἔᾱω), but the imperfect ἔᾱ (with long *ā*) is most easily explained as contracted from thematic *ἔᾱ(υ)έ. Since most *ḱe-/ḱo- presents and imperfects were originally accented on the suffix *ḱe-/ḱo-, the accentuation *ἔᾱ should tentatively be assumed here for early Greek.

¹⁴ Cf. the related adverb νωλεμές (originally acc. sg. neuter of an *s*-stem adjective).

¹⁵ An underived thematic present: root accentuation is expected. So also in line 7.

νόσφιν, ἐφ' ἱπποπόλων¹⁶ Θρηκῶν *καθορωμενός¹⁷ αἶαν
 Μυσῶν τ' ἀγχεμάχων¹⁸ καὶ ἀγανῶν Ἰππημολγῶν
 γλακτοφάγων¹⁹ *Ἀβίων²⁰ τε *δίκαιοτατων²¹ *ἄνθρωπων²².
 ἐς Τροίην δ' οὐ πάμπαν ἔτι τρέπεν ὅσσε φαεινῶ
 οὐ γὰρ ὁ γ' *ἄθανατων²³ τιν' ἐέλεπετο²⁴ ὃν κατὰ θυμόν
 ἐλθόντ' ἢ Τρώεσσιν ἀρηξέμεν ἢ Δαναοῖσιν. (*Iliad* 13. 1-9)

(The distribution of acutes and circumflexes is again guided by the historically attested forms and is not intended to be significant. No attempt has been made to reconstruct pre-law-of-limitation rules for the accentuation of words followed by enclitics; in the first line *Τρώας* is printed as attested, with a second accent due to *τε*, but no significance is to be ascribed to this accent.)

This extract contains 69 word tokens, or 46 if enclitics,²⁵ proclitics and monosyllabic pronoun forms,²⁶ and elided δ(έ) are excluded. Of these 46 full word tokens, only six have the accent somewhere other than its historical

¹⁶ Accentuation on the second member of the compound is expected for a verbal governing compound in which the second member has active meaning. In Vedic, such compounds have the accent on the final syllable. In Greek, the accent appears on the penultimate syllable instead if this syllable is light. The divergence between Greek and Vedic is likely to be due to retraction of the accent in Greek, although the details have been disputed (see Probert 2006: 93-4). Thus the form *ἱπποπόλων* will have been preceded by an earlier **ἱπποπολῶν*. I do not claim to know which of these forms existed when the law of limitation came in, but the essential point is that neither would 'violate' the not yet existing law.

¹⁷ Participles in -μενο- (IE **-mh₁no-*) are likely to have inherited an accent on the last syllable, as found in Vedic perfect participles in -ānt- (<**-mh₁nó-*) and some Greek present and aorist participles lexicalized as nouns: Σωζομενός, Ὀρχομενός, Στησαμενός, Τεισαμενός, Φαμενός, δεξαμενή 'reservoir', and εἰαμενή 'meadow' (cf. Probert 2006: 92).

¹⁸ In spite of the attested nom. sg. masc./fem. ἀγχεμάχος (for the accent see [Arcadius] 102. 5, 103. 15 Schmidt), inherited accentuation on the second member is expected for a verbal governing compound whose second member has active meaning; cf. n. 16. For the inconsistent accentuation of -μάχος compounds as attested, cf. Risch (1974: 207).

¹⁹ An even older form will have been *γλακτοφαγῶν (see n. 16).

²⁰ Historical Ἀβίων is due to the law of limitation; cf. nom. sg. Ἀβίος.

²¹ It is difficult to reconstruct a pre-law-of-limitation position for the accent here, but the historical paradigm shows that the accent on the syllable -τα- is due to the law of limitation (cf. nom. sg. masc. δικαιότατος). Vedic superlatives in -tama- (the closest Vedic equivalents to the Greek superlatives in -τατο-) do not follow a simple accent rule, but are rarely accented on the suffix -tama- (see Macdonell 1916: 454).

²² Historical ἀνθρώπων is due to the law of limitation; cf. nom. sg. ἀνθρωπος.

²³ Historical ἀθανάτων is due to the law of limitation (cf. nom. sg. masc./fem. ἀθάνατος); accentuation on the privative prefix is expected for a privative bahuvrīhi compound.

²⁴ Probably not an augmented form but an unaugmented thematic imperfect, with the same prothetic vowel as in the Homeric present ἐέλεπται (see Lejeune 1972: 174-5). If so, the accent should already have been on the root. If, however, ἐέλεπετο is an augmented form, the accent should have been on the augment at an early stage (*ἐελεπετο).

²⁵ τ(ε), γ', τιν'.

²⁶ ἐπεί, καί, τοὺς, παρά, ἐφ', ἐς, οὐ, ὅ, ὅν, κατά, ἦ.

position. Of these, only four actually 'violate' the later law of limitation: **Ἀβίων*, **δίκαιοτατων*, **ἄνθρωπων*, **ἄθανατων*. The other two (**ἑᾶ* and **καθορωμενός*) will acquire recessive accentuation when this is generalized to most finite and some non-finite verb forms, but the prehistoric accentuation is nearer to the end of the word and therefore compatible with the later law of limitation.

Such evidence as we have thus suggests that a sizeable proportion of early Greek word tokens already 'obeyed' the law of limitation. The law of limitation might, therefore, have originated with a reanalysis of the situation as one where the law of limitation actually existed as an operative part of the grammar. For this reanalysis to survive and for the resulting regularity to be extended across the vocabulary, the law of limitation needed to be synchronically plausible or at least possible. This chapter will not explore possible synchronic analyses, but it is clear from the very existence of the law of limitation that a viable synchronic analysis was available to speakers.

We have so far left the double accentual treatment of word-final *-αι* and *-οι* out of the discussion. The next section proposes a historical explanation for this double treatment that would, if correct, provide further support for our reanalysis-based account of the law of limitation.

11.4 Word-final *-αι* and *-οι*

In Table 11.2, the forms of *τρέπω* that end in *-αι* or (in one instance) *-οι* have all been underlined. All already 'obey' the law of limitation in its eventual form, but some (given double underlining) do so only by virtue of the fact that their final diphthong somehow 'counts short' for the purposes of accentuation: indicatives *τρέπομαι*, *τρέπαι*, *τρέπεται*, *τρέπονται*, *τρέψομαι*, *τρέψαι*, *τρέψεται*, *τρέψονται*; subjunctives *τρέπωμαι*, *τρέπηναι*, *τρέπηται*, *τρέπωνται*, *τρέψωμαι*, *τρέψηναι*, *τρέψηται*, *τρέψωνται*; and infinitives *τρέπεσθαι*, *τρέψεσθαι*, *τρέψασθαι*. Others (given single underlining) 'obey' the law of limitation just as if they ended in an ordinary long vowel or diphthong: optatives *τρέποι*, *τρέψαι*; aorist imperative middle *τρέψαι*; aorist infinitive active *τρέψαι*. What is striking here is that the words in the first list coincide almost entirely with the verbal forms whose final *-αι* counts as 'short' for the purposes of the accent. Of eight indicative, eight subjunctive, four infinitive forms and one imperative ending in *-αι*, all the indicative and subjunctive forms and three of the infinitives have the root as the antepenultimate syllable, so that the prehistoric root accentuation looks just like the historical recessive accentuation, with final *-αι* counting as 'short' for the purposes of the accent. The much shorter second list, by

contras
diphtho

Altho
diphtho
ment of
may be
Indicati
(-ομαι,
monosy
τρέψαι
(-οι, -σ
subjunc
-εσθαι,
Instead
all these
for acc
interpre
the rean
vowel-p
Optativ
diphtho
receive

The
locative
add to t
(as *Φοῖβε*
root the

27 I us
whether
28 In
have gen
sequence
preconso
somewha
tively, th
recessive
variants
the law
'accentua
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phonolog

contrast, includes both the optatives ending in *-αι* or *-οι*, the forms whose final diphthongs we are accustomed to consider 'long' for accentual purposes.

Although the match between the two lists and the two kinds of final diphthongs is not perfect, the striking correlation suggests that the 'short' treatment of indicative and subjunctive *-αι*, and the 'long' treatment of optative *-αι/-οι*, may be due to the terminations that happen to occur in verbal paradigms. Indicative, subjunctive, and infinitive *-αι* occur in disyllabic terminations²⁷ (*-ομαι*, *-εαι*, *-εται*, *-ονται*, *-ωμαι*, *-ηαι*, *-ηται*, *-ωνται*, *-εσθαι*, *-ασθαι*) as well as in monosyllabic terminations (e.g. *κείμαι* 'I lie', *κείται* 'he lies', *κείνται* 'they lie', *τρέψαι* 'to turn') while optative *-αι/-οι* occurs only in monosyllabic terminations (*-οι*, *-σαι*). One might have expected the plethora of root-accented indicatives, subjunctives, and infinitives in *-ομαι*, *-εαι*, *-εται*, *-ονται*, *-ωμαι*, *-ηαι*, *-ηται*, *-ωνται*, *-εσθαι*, and *-ασθαι* to have prevented our reanalysis of early Greek accentuation. Instead, the reanalysis was tailored to fit the evidence: a feature common to all these forms, namely the final diphthong, was interpreted as counting 'short' for accentuation. (The potential for *-οι* and *-αι*, however pronounced, to be interpreted phonologically as *-οι̯* and *-αι̯* may well have facilitated this aspect of the reanalysis, by allowing some final *-οι* and *-αι* diphthongs to be treated as vowel-plus-consonant sequences at some level of synchronic representation.²⁸) Optatives in *-αι* and *-οι*, on the other hand, offered no evidence that their final diphthongs counted as 'short', and accordingly their final diphthongs did not receive such a 'short' analysis.

The accentually 'long' treatment of final *-οι* in locative adverbs—i.e. old locative singulars—becomes explicable on the same basis. These old locatives add to the basic stem only the syllable *-οι*, so that if the citation form is disyllabic (as *Φοῖκος*) the locative is disyllabic too (as *Φοίκοι*), and so if the accent is on the root the locative is accented on the penultimate syllable, just like the optatives

²⁷ I use the word 'termination' here for the part of the verb following the root (regardless of whether this should be considered the synchronic 'ending').

²⁸ In recent work, the words with accentually 'short' final diphthongs are sometimes taken to have generalized prevocalic sandhi variants in *-οι̯* and *-αι̯*, accented as if they ended in a -VC sequence (e.g. **leik^uetoj̯*), while the words with accentually 'long' final diphthongs generalized preconsonantal variants in *-οι* and *-αι* (such as locative **woi^ukoi*) (so Olander 2009: 68–9; somewhat differently Nagy 1970: 137–8; differently again Bonfante 1986: 375–6). Alternatively, the variants with *-οι̯* and *-αι̯* were not themselves generalized at any stage, but the 'hyper-recessive' accentuation of forms such as prevocalic **leik^uetoj̯* was generalized to the preconsonantal variants (Jasanoff 2009: 56 n. 23). The suggestion I offer here does not allow for a stage at which the law of limitation was already in effect but the split (along morphological lines) between 'accentually short' and 'accentually long' final diphthongs had yet to be established. However, I find it very likely to be relevant that a high vowel as second element of a diphthong was phonologically interpretable as either consonantal or vocalic.

τρέποι and τρέψαι. In other words, the short *o*-stem nominals that provided evidence for the law of limitation did not provide any evidence against an ordinary 'long' treatment of the locative singular termination *-οι*.

This analysis does not explain the accentually 'short' treatment of nominative plural *-οι/-αι*, or of *-αι* in imperatives. We might note that *o*- and *ā*-stem nominative plural endings *-οι* and *-αι* are original only in pronominal forms, such as *τοί* and *ταί*—monosyllables for which it may be meaningless to ask whether the diphthongs counted as 'long' or 'short'. In *o*- and *ā*-stem nouns and adjectives the endings *-οι* and *-αι* are secondary (although pre-Mycenaean) replacements for inherited **-ōs* and **-ās*. Conceivably the law of limitation was in place by the time *-οι* and *-αι* spread to nouns and adjectives, and nominative plural *-αι* then followed the majority of word-final *-αι* diphthongs in being counted as 'short' for the purposes of the accent. Nominative plural *-οι* would have been the first example of word-final *-οι*, as opposed to *-αι*, counting 'short' for the accent, but in view of the parallelism that Greek developed between the *o*-stem and *ā*-stem declensions it would not be surprising if this *o*-stem ending copied the word-final *-αι* of the *ā*-stem nominative plural. Furthermore, nominative plural *-οι* and *-αι* were treated as accentually 'long' in Doric (see Hinge 2006: 127), perhaps also a sign that the accentual treatment of nominative plural *-οι/-αι* was determined at a late stage and on a dialect-specific basis.

The origins of the aorist middle imperative in *-αι* are unclear; the form may be identical in origin to the aorist infinitive active (τρέψαι), and if so this original identity may account for the 'short' treatment of the final diphthong in both forms. At some stage, the recessive accentuation that was generalized through the verbal system would affect the middle imperative (cf. trisyllabic βούλευσαι) but not the active infinitive (cf. βουλεῖσθαι) (cf. Chantraine 1961: 272).

Some accounts of the accentual treatment of final *-αι* and *-οι* suggest that there was at some relevant stage some prosodic difference, beyond the rules of accentuation, between the accentually 'short' and 'long' final diphthongs.²⁹ Hermann (1923: 101) suggested that it was worth investigating the prevocalic metrical treatment of accentually 'short' and 'long' final *-αι/-οι* before vowels

²⁹ So recently Olander (2009: 68–9), envisaging a stage at which a generalized prevocalic sandhi variant *-ai#/-oi#* (giving the forms with 'accentually short' final diphthong) contrasted with the generalized preconsonantal variant *-ai#/-oi#* (giving the forms with 'accentually long' final diphthong). If such a stage existed in the prehistory of the Homeric poems, one might expect to find the 'accentually short' final diphthongs treated as light before a vowel more often in Homer than the 'accentually long' ones.

in Homer, but did not investigate this question himself.³⁰ A brief treatment of this question is provided in the appendix; on the basis of the evidence summarized there, Homer does not appear to provide evidence for a difference in length or weight between accentually 'short' and 'long' final *-αι/-οι*. While not proving that there was never any length or weight distinction, these Homeric data are certainly compatible with a morphological account such as is offered here.³¹

11.4.1 Two questions

Although no attempt is made here to account for the attested distribution of acute and circumflex accents, their eventual distribution raises two questions for the suggested origins of the double treatment of final *-αι* and *-οι*. These cannot be treated here in detail, but I sketch them briefly, with possible answers.

Firstly, why do nominatives plural with *accented -αι* or *-οι* (e.g. σοφαί, σοφοί) have an acute, while locatives singular with *accented -οι* (e.g. Μεγαροί) have a circumflex? Although some difference between two types of final diphthong might seem to be indicated, the accentuation of these endings is in line with that of other nominal endings: nominative and accusative endings with *accented* long vowels regularly have an acute accent (nom. sg. *-ᾱ́*, acc. sg. *-ᾱ́ν*, nom./acc. du. *-ᾱ́*, acc. pl. *-ᾱ́ς*; nom./acc. du. *-ῶ*, acc. pl. *-οῦς*), while endings of other cases with *accented* long vowels regularly have a circumflex (gen. sg. *-ᾱς*, dat. sg. *-ᾷ*, gen./dat. du. *-αῖν*, dat. pl. *-αῖς*, dat. sg. *-ῶ*, gen./dat. du. *-οῖν*, gen. pl. *-ῶν*, dat. pl.

³⁰ For the optative and nom. pl. endings Hartel (1874: 371) suggested that either no distinction, or even the opposite of the expected distinction (optative *-οι/-αι* less readily treated as heavy), was observable, but also did not investigate the matter in detail. Hermann (1923: 100) claims that among all *accented* final long vowels and diphthongs, those with a circumflex are treated as heavy more readily than those with an acute, but apparently fails to control e.g. for the disproportionate incidence of the long diphthongs *-ῶ*, *-ῇ*, *-ῶ* (genuinely prone to heavy treatment: see Hartel 1874) among circumflexed final long vowels and diphthongs.

³¹ A survey of attempts to account for the double accentual treatment of final *-οι* and *-αι* cannot be attempted here; for literature see Meier-Brügger (1992: 285–6) and Olander (2009: 66–9), and add Jasanoff (2009: 56 n. 23). It is, however, worth noting that the morphological facts crucial to the present account resemble some that have long been noticed. Thus, paradigmatic pressure has been held to account for the accentuation of *κελεύοι* like *κελεύοις*, but *λείπεται* like *λείπει* (see Risch 1975: 473, Jasanoff 2009: 56 n. 23; the possibility of *λείπεται* in the first place is sometimes motivated in terms of a prevocalic sandhi variant **leik'etoj*, *accented *léik'etoj*: see n. 29). For the account offered here the crucial point is rather the monosyllabic character of the termination *-οι* and the disyllabic character of *-εται*, combined with the overall tendency for Greek nominal and verbal terminations to be either (a) monosyllabic or (b) disyllabic with a light second syllable. But just these facts also give rise to paradigms in which *κελεύοι* stands beside *κελεύοις*, and *λείπεται* beside *λείπει*. A quite different account, due to Kiparsky (1967: 124–8), is summarized by Willi, this volume, p. 261.

-οῖς). Whatever the ultimate reasons for this distribution,³² its application included endings consisting of the diphthongs -αι and -οι.

Secondly, whatever the antiquity of the *σωτήρα* rule, why does it treat the same final diphthongs as 'short' as does the law of limitation, if there is nothing really 'short' about these final diphthongs? Here the answer may lie in the way in which the double accentual treatment of final diphthongs came to be interpreted synchronically. Even if 'accentually long' final -αι and -οι were never actually longer than their 'accentually short' counterparts, their different treatment by the law of limitation could have come to be interpreted in terms of an abstract length distinction, with the distribution of acute and circumflex accents coming to be tied to vowel length on this abstract level. Moreover, one of the main dialect divergences in the application of the *σωτήρα* rule lies in the treatment of final diphthongs. In Doric, the only final diphthongs to have been treated as 'short' by the law of limitation were the middle endings -ται, -σθαι, etc., but these were treated as 'long' by the *σωτήρα* rule (hence e.g. *μαρτύρεται* but *δραμείται* < **δραμέεται*; see Hinge 2006: 127). Conceivably both Attic-Ionic and Doric had, at one stage, (i) the law of limitation and (ii) a basic *σωτήρα* rule tied to vowel lengths on the phonological surface. But then Attic-Ionic, but not Doric, adjusted the *σωτήρα* rule to match the abstract vowel length distinction implied by the law of limitation.

11.5 A further suggestion: origins of recessive accentuation in the Greek finite verb

It was suggested in section 11.3 that most Greek verbal (as well as nominal) forms already 'obeyed' the law of limitation before this law was in force, either because they were already 'recessive' or because they were accented nearer to the end of the word than the position for 'recessive' accentuation. Furthermore, verb forms built on underived thematic present stems or sigmatic aorist stems were mostly 'recessive' already. From the earliest attested stages, thematic presents and sigmatic aorists are particularly well represented in Greek. One might, therefore, wonder whether the recessive accentuation of most finite verb forms arose as part of the same reanalysis of early Greek accentuation as the law of limitation itself.

³² On this question, see Jasanoff (2004: 247–9 with 248 n. 2, 253 n. 15).

The standard explanation of recessive accentuation in the Greek finite verb is that old unaccented verb forms became recessive as a consequence of the law of limitation, with the law of limitation being interpreted as limiting the length of a word-final unaccented sequence (Wackernagel 1877). This explanation requires an Indo-European starting-point for the unaccented verb forms of Vedic. Recent work on Vedic, however, accounts increasingly for the distribution of accented and unaccented verbs in terms of Vedic itself (Klein 1992, Hock forthcoming), while retaining some element of Indo-European origin. The suggestion made here for Greek would, while not demonstrating either presence or absence of unaccented verbs for Indo-European, eliminate the Greek evidence for Indo-European unaccented verbs.³³

11.6 Conclusion

The reconstructions of early Greek nominal and verbal morphology and accentuation presented here are, of course, subject to numerous uncertainties. If they are at least broadly correct, however, a large proportion, probably a majority, of early Greek word tokens 'obeyed' the law of limitation before this law was even in force. Not only did a large proportion of early Greek word tokens already 'obey' the law of limitation, but they did so in such a way that if the position of the accent was reckoned from the end of the word (perhaps because an accent affected primarily the pitch contour at the end of the word), the law of limitation was suggested especially strongly: the accent fell on the penultimate syllable in forms with a heavy final syllable, and on the antepenultimate in trisyllabic or longer forms with a light final syllable.

Appendix: Homeric treatment of final -αι and -οι before vowels

The data summarized in Table 11.4 would appear to show a slightly greater preference for light treatment of 'accentually short' -οι and -αι.

³³ Hock's (forthcoming) account of ancient Greek as well as Vedic verbal accentuation is economical in a different way. I have not been able to take this article fully into account, and I am currently agnostic as to whether Hock's account is preferable to the one offered here, or even ultimately compatible with it.

Table 11.4 Words with accentually 'long' or 'short' final -ou/-ai^a

	Treated as light before vowel	Treated as heavy before vowel
With 'accentually long' diphthong: Optatives in -ou/-sau Locative οἴκοι 'at home' (Tokens from <i>Iliad</i> and <i>Odyssey</i> ^b)	78 (92%)	7 (8%)
With 'accentually short' diphthong: Nom./voc. pl. forms in -ou/-ai Infinitives in -ai, -μεναι 1sg., 2sg., 3sg., and 3pl. forms in -μαι, -αι, -ται, -νται Imperatives in -σαι (Tokens from <i>Iliad</i> 1-4 and <i>Odyssey</i> 1. 1-4. 549 ^c)	468 (94%)	30 (6%)

^a Tokens collected are those found before vowels, including aspirated vowels but not vowels preceded by etymological *f*. Forms other than those listed in the left-hand column (e.g. *καί*, *πόποι*) are excluded, as are all monosyllabic pronoun forms including *οἱ*, *αἱ*, *τοί*, *ταί*, *οἷ*, *αῖ*. Many of the excluded forms are proclitics, enclitics, interjections, and words whose final -ai or -oi cannot be securely identified as accentually 'short' or 'long'. Word tokens with elided final diphthong (which are very infrequent) are disregarded.

^b Collected from Prendergast and Marzullo (1962) and Dunbar and Marzullo (1962), and checked against West (1998-2000) and Von der Muehl (1962).

^c The proportion of Odyssean to Iliadic lines in this sample equals the proportion of lines in the *Odyssey* to that in the *Iliad*. Any differences in occurrence or treatment of final diphthongs between the *Iliad* and *Odyssey* should thus not affect comparison between the two rows of the table.

The discrepancy seen here is, however, not statistically significant.³⁴ Furthermore, it turns out that over half of our prevocalic word tokens with 'accentually short' final diphthongs are *only* usable in the hexameter if the final diphthong is treated as light (276 out of 498 prevocalic word tokens with 'accentually short' diphthongs, or c. 55%). By contrast, only 17 of the 85 prevocalic word tokens with 'accentually long' diphthongs (20%) require light treatment of the final diphthong. The difference here is due to the preponderance, among words with 'accentually short' final diphthongs only, of disyllabic terminations with light penultimate syllable, especially verbal -ομαι, -εαι, -εται, third person plural -αται, and Aeolic infinitive -μεναι. When these follow a heavy syllable, the word must be placed before a vowel, with the final syllable treated as light. This need to place many words with an 'accentually short' final diphthong before a vowel, with light treatment of the diphthong, in fact follows from precisely the tendency for words with 'accentually short' final diphthongs to be shaped differently from those with 'accentually long' final diphthongs.

³⁴ $\chi^2 = 0.60$; $p = 0.44$.

If the metrical treatment of 'accentually short' final diphthongs is genuinely to be compared with that of 'accentually long' final diphthongs, words of the same metrical shape need to be compared. Table 11.5 shows the treatment of disyllabic word tokens in our sample beginning with a consonant (not including *h*, but including etymological *F*), and with light first syllable.

Table 11.5 Disyllabic words with initial consonant, light first syllable, and accentually 'long' or 'short' final -*oi*/*ai*

	Treated as light before vowel	Treated as heavy before vowel
With 'accentually long' diphthong: Forms as in Table 11.4 (Tokens from <i>Iliad</i> and <i>Odyssey</i>)	37 (95%)	2 (5%)
With 'accentually short' diphthong: Forms as in Table 11.4 (Tokens from <i>Iliad</i> 1-4 and <i>Odyssey</i> 1. 1-4. 549)	26 (81%)	6 (19%)

This time the 'accentually long' final diphthongs appear to show a greater preference for 'light' treatment than the 'accentually short' final diphthongs: the opposite of the preference that might be expected if 'accentually long' final -*ai*/*oi* were genuinely longer than 'accentually short' final -*ai*/*oi*. There are too few tokens now in the right-hand column of the table for a chi-squared test of statistical significance to be valid. However, it is at least clear that on the basis of the evidence examined here, there is no indication that 'accentually long' final diphthongs are more prone to metrically heavy treatment in Homer than 'accentually short' ones.

⁴ Furthermore, it
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