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AN UNKNOWN CORRELATION IN HEXAMETRIC POETRY AND THE INTERPRETATION OF THE *BREVIS IN LONGO* PRINCIPLE

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RESUMEN: El objetivo de este artículo es mostrar que (algunos) poetas hexamétricos de la Grecia Antigua no eran indiferentes a la cantidad de la sílaba final del verso, estudiando la correlación entre esa cantidad y los diferentes finales de palabra posibles en el cuarto pie del verso. Los resultados del estudio sugieren que en algunos poetas había una cierta preferencia por la "coherencia rítmica" en el segundo colon, lo que indica que, incluso si había una "indiferencia composicional" respecto a la cantidad de la última sílaba, no había "indiferencia efectiva".

PALABRAS CLAVE: Hexámetro dactílico; *Brevis in Longo*; Métrica griega antigua; diéresis bucólica; cesura heptemímera; Homero; Apolonio de Rodas; Nono.

UNA CORRELACIÓN DESCONOCIDA EN LA POESÍA HEXAMÉTRICA Y LA INTERPRETACIÓN DEL PRINCIPIO BREVIS IN LONGO

ABSTRACT: The goal of this paper is to show that (some) Ancient Greek hexametric poets were not indifferent to the quantity of the final syllable of the verse, by studying the correlation between that quantity and the different possible word ends in the fourth foot of the verse. The results of the study suggest that in some poets there was a certain preference for "rhythmic coherence" within the second colon, which indicates that, even if there was "compositional indifference" regarding the quantity of the last syllable, there was not "actual indifference".

KEYWORDS: Dactylic Hexameter; *Brevis in Longo*; Ancient Greek Metrics; Bucolic Diaeresis; Hepthemimeral Caesura; Homer; Apollonius Rhodius; Nonnus.

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Introduction

The final syllable of the dactylic hexameter has been traditionally left aside in the quantitative analysis of the metre.[1] For the most part, scholars have assumed that its alleged "indifference" meant that the number of long and short vowels (or heavy and light syllables, see below) in the last location of the line was merely a product of chance, since poets did not care about the quantity of the final syllable. This has led to a universal disregard for the data regarding the sixth foot of Archaic and Hellenistic hexameter in basically all statistical studies. It is only when we get to Nonnus that the final syllable seems to start to matter, allegedly because of the influence of the disappearance of quantitative oppositions in the language.[2]

This paper will present data that suggest that some poets paid attention to the quantity of the final syllable of the hexameter since Homer.[3] It will not convince many scholars that such an extended methodological principle as the actual indifference (see below on "actual" vs. "compositional" indifference) of the final syllable is incorrect. However, I hope it will suffice to at least cast some doubt on its up until now mostly unquestioned validity.

1. *Brevis in longo*[4]

There are two connected but independent problems when studying the final syllable of the hexameter. First, whether poets and listeners (or readers) of hexametric poetry cared about or even noticed the quantitative oppositions at the end of the line. Second, if they cared, which syllables were considered heavy and which syllables were considered light.[5]

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[1] E.g. in O'Neill (1942) or Van Raalte (1986). O'Neill, however, provides information about the quantity of the final syllable in his corpus in his table 29.

[2] See Maas (1962, 16-17) and Magnelli (2016, 361-63, with numerous references). See also Allen (1967, 59-60), with a different (though not completely different) explanation of the data.

[3] I have used the samples and analysis systems published in <https://greekmps.wordpress.com>. The reader can check the editions used and the exact composition of each sample in the documents available in <https://greekmps.wordpress.com/data-and-tools/samples>.

[4] I will use *brevis in longo* as if it simply meant that the poets could place both light and heavy syllables at the end of the line. That will allow avoiding "indifference", which is a word I rather reserve for the interpretations of the principle. Note that "*brevis in longo*" usually means "a short syllable followed by a rest that makes up the time of a long" (Leedy 2014, 8), that is, it involves only one aspect of the indifference and its phonetic explanation. In my use, the term covers the general phenomenon and says nothing about its explanation.

[5] Since there are two different "quantities" involved here (vocalic and syllabic), I will use the dual terminology introduced by Allen (1973, 53-55): "heavy" and "light" are used for syllabic quantity (that is, (C)VV(C) and (C)VC vs. (C)V) and "long" and "short" for vocalic quantity (that is, (C)VV(C) vs. (C)V(C)).

The first problem must be dealt with axiomatically, given the fact that we have no direct evidence to solve it.[6] Since it is an unquestionable fact that poets could place at the end of the verse either heavy or light syllables (not only in hexameters and not only in Ancient Greek poetry), the question is if this indifference was "actual", meaning that the listeners or readers were actually unaware of the opposition or at least that they did not care about it,[7] or "compositional", meaning that the poets could place either heavy or light syllables at the end of the line, but the listeners or readers noted the difference. In the first case, we would expect not to find evidence of a preference in the quantity of the final syllable at all; if we found such a preference, we would seek an explanation that did not depend on the actual quantity of the syllable. In the second case, we would not be surprised if we found some tendency in the distribution of quantities in the final location of the verse; if, on the other hand, we found no evidence of a preference, we would assume that the compositional indifference has led to metrical indifference, which is not uncommon in other locations. In this case, the quantity of the final syllable would be analogous to phenomena like Bulloch's bridge in Homer, which is not an active rule.[8]

The second problem is much more complicated, since it determines how we must analyse the data. Some scholars consider that syllables at the end of the verse ending in a consonant should be considered heavy, as if they were closed.[9] Other scholars consider that at the end of the verse those syllables should be considered light, since there is no following consonant to close the syllable.[10] Nobody (actual indifference of the final location apart) would question that βουλή (*Il.* 1.5) at the end of the line is a spondee or that ἔθηκε (*Il.* 1.2) at the end of the line is a trochaic ending word; the problem is how should we count a word like Ἀχιλῆος (*Il.* 1.1).

I have decided that the best strategy is not to solve the problem, but to analyse the data in both scenarios. Fortunately, with the system used in this study, this is not only possible but actually rather simple. Given that the results will vary sometimes from one scenario to another, I will analyse each group of outcomes, and leave to the reader the ultimate decision on which one should be accepted.[11]

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[6] However, we do have indirect evidence (see Quint. 9.4.93 and Luque Moreno 2005, 119n19).

[7] A position explicitly held by Nagy (1990, 439-40) and implied in the extended notation "–" for the final syllable in textbooks like Maas (1962), Korzeniewski (1968), West (1982) and Sicking (1993).

[8] "When the hexameter of Callimachus has word boundary after 3rd biceps, it must have not only regular caesura but also a bucolic diaeresis" and there has to be a syntactic break "at either the caesura or the bucolic diaeresis or both" (Devine and Stephens 1984, 12). The rule was presented in Bulloch (1970).

[9] Irigoin (1967), followed by Allen (1973, 204-207).

[10] See Dale (1964, 20n9).

[11] There is a third possible interpretation that I will not consider here. Given that Ryan (2011) has recently demonstrated that the Homeric hexameter was sensible to multiple levels of syllabic quantity (though I disagree with the interpretation of the data he provides regarding the *longum*:*biceps* ratio), it might be that this also applied to the final syllable. In that case, correlations that oppose (C)V(C) to (C)VV(C) could be considered correlations of "vocalic quantity" and correlations that oppose (C)V to (C)VC and (C)VV(C), correlations of "syllabic quantity". Both types could coexist in the history of a metre and even within the same poet between different locations.

Besides the problem of final "closed" syllables, there is the problem of final diphthongs, particularly with the light diphthongs αι and οι. Here, I have used the same strategy of not solving the issue. With diphthongs, there are three alternatives; for two of them (the accentual determination of the quantity described in <https://greekmps.wordpress.com/prosodical-bases/syllabic-structure-and-code/> and considering all diphthongs as heavy syllables) I have used an automated system of analysis. Except for the sample of Theocritus,[12] I have also divided manually (that is, not using the automated system of analysis) between light diphthongs and heavy diphthongs.[13]

When the alternatives for final closed syllables and final diphthongs are put together, there are six different interpretations of the quantity of the final syllable to take into account. It would have been easier simply to reject most of them and choose one to conduct all tests, but in the absence of evidence I prefer to leave the decision to the reader. While the validity of the results is unquestionable (at least in principle) when the different scenarios show ample coherence, it depends fundamentally on the reader's opinion on the quantity of final syllables in the hexameter when there is no coherence.

Since I will be referring to the different interpretations constantly, table 1 presents them with a simple system of references:

Interpretation of the final syllable	Reference
Final closed syllables counted as light, accentually defined quantity of diphthongs	Scenario A1
Final closed syllables counted as heavy, accentually defined diphthongs	Scenario B1
Final closed syllables light, all final diphthongs counted as heavy	Scenario A2
Final closed syllables heavy, all final diphthongs heavy	Scenario B2
Final closed syllables light, diphthongs with standard quantity	Scenario A3
Final closed syllables heavy, diphthongs with standard quantity	Scenario B3

TABLE 1 – Interpretations of the quantity of the final syllable of the verse and references.

2. Detecting caesurae

This paper will be concerned with the correlation between the presence of the bucolic diaeresis in a verse and the quantity of the final syllable. I have used (for the first part of the analysis) two possible oppositions in the fourth foot of the verse: presence vs. absence of bucolic diaeresis and presence of bucolic diaeresis vs. presence of hepthemimeral caesura.

Since I have used automated systems to detect caesurae, the results may differ from the ones that can be obtained by manually analyzing the verses. The system counts a

[12] I have excluded Theocritus because of his numbers in the other four scenarios.

[13] See Smyth (1956, §169): "final –αι and –οι are regarded as short (...). But in the optative [they] are long [and] also in the locative οἴκοι."

bucolic diaeresis when there is a lexical word ending at the end of the fourth foot of the hexameter not followed by enclitic (see <https://greekmps.wordpress.com/prosodical-bases/clisis> for the meaning of "lexical" and "enclitic" here; the actual number is probably lower since the system is designed to detect accentual clisis and not rhythmic clisis).[14] It counts a hepthemimeral caesura when there is a lexical word ending in the fourth *longum* of the verse not followed by enclitic and there is no lexical word ending at the end of the fourth foot (in other words, bucolic diaeresis trumps hepthemimeral, which is coherent with what we know about their frequencies in the hexameter).[15] Note that the minor inconveniences that this system has should not affect the outcome of the analysis, given that what I will study is the correlation between the breaks in the fourth foot and the quantity of the final syllable, and if there is some deviation in the estimations it affects verses with heavy final syllable and light final syllable uniformly. In any case, table 2 presents the estimated percentages of caesurae in the fourth foot provided by the system:

	Estimated bucolic	Estimated hepthemimeral	Other verses	Total verses analysed
Iliad	638 (52.25%)	358 (29.32%)	225 (18.43%)	1221
Odyssey	677 (53.60%)	357 (28.27%)	229 (18.13%)	1263
Callimachus	599 (64.06%)	180 (19.25%)	156 (16.68%)	935
Apollonius	559 (61.84%)	164 (18.14%)	181 (20.02%)	904
Theo. (buc.)	500 (80.39%)	53 (8.52%)	69 (11.09%)	622
Theo. (other)	649 (53.24%)	328 (26.91%)	242 (19.85%)	1219
Theo (*Id.* XI)	47 (58.02%)	23 (28.40%)	11 (13.58%)	81
Nonnus	476 (53.97%)	176 (19.95%)	230 (26.08%)	882

TABLE 2 – Estimations of breaks in the fourth foot of the samples analysed. Percentage of each number in its sample is shown between parentheses.[16]

[14] See Devine and Stephens (1994, 352-53) for the distinction between "accentual" and "rhythmic" clisis in Ancient Greek. Simply put, accentual clitics are atonic and tonally dependent on a lexical word, while rhythmic clitics constitute an appositive group (usually referred to as a "metrical word") with lexical words. All accentual clitics are rhythmic clitics, but not vice versa. In Ancient Greek, e.g., τε, ἐν and περί are accentual (and rhythmic) clitics, and δεῦρο, τῆς and τόνδε are rhythmic clitics.

[15] Therefore, *Il.* 1.521 νεικεῖ, καί τέ μέ φησι μάχῃ Τρώεσσιν ἀρήγειν and 1.559 τιμήσῃς, ὀλέσῃς δὲ πολέας ἐπὶ νηυσὶν Ἀχαιῶν count as cases of "hepthemimeral caesura", but *Il.* 1.570 ὄχθησαν δ' ἀνὰ δῶμα Διὸς θεοὶ Οὐρανίωνες and 1.578 πατρὶ φίλῳ ἐπίηρα φέρειν Διί, ὄφρα μὴ αὖτε count as cases of "bucolic caesura". Note that the system cannot account for the fact that in 1.570 there is a stronger break between Διὸς and θεοὶ than between θεοὶ and Οὐρανίωνες: in order to get better results, we would eventually need to manually input that information.

[16] Compare these with Van Raalte (1986, 86-87) percentages of bucolic diaeresis, based only upon the figures provided by O'Neill for words ending at position 8 (that is, at the end of the fourth foot) in the hexameter (except for Nonnus; for this poet Van Raalte analysed 150 verses himself), which do not take clisis into account:

It should be noted that I have also used an estimation to identify verses without bucolic diaeresis based on the absence of words ending at the end of the fourth foot. This means that there is always a difference between the total of the tables opposing presence vs. absence of bucolic diaeresis and the total verses analysed. In order to reduce the possibility of miscalculations, I have preferred to do this instead of simply assuming that all verses in which the system does not detect a bucolic diaeresis do not have bucolic diaeresis.[17]

3. Influence of the break in the fourth foot on the quantity of the final syllable

Table 3 is an example of the methodology used to analyse the correlation between the break in the fourth foot and the quantity of the final syllable:

	Light final syllable	Heavy final syllable	Total
4th with bucolic diaeresis	162	438	600
4th without bucolic diaeresis	83	403	486
Total	245	841	1086

TABLE 3 – Correlation between presence of bucolic diaeresis and quantity of the final syllable in the *Iliad*. All final closed syllables and all final diphthongs were considered heavy (scenario B2). χ^2 test (random distribution) = 15.1 ($p<0.0001$); $\Omega = 1.80$.[18]

	Word-end at 8
Iliad	61.7%
Odyssey	59.0%
Callimachus	66.8%
Apollonius	61.4%
Theocritus	76.2%
Nonnus	58.0%

The numbers are consistently lower in my table, which is not surprising, but the only important difference in the hierarchy is in *Iliad*, which is in the eight position with the data used here and in the third with Van Raalte's.

[17] Therefore, e.g., *Il.* 1.512 ἀλλ' ἀκέων δὴν ἦστο· Θέτις δ' ὡς ἥψατο γούνων, has not been included neither as a case of "verse with bucolic" nor as a case of "verse without bucolic", since there is a word-end at the end of the fourth foot (ὡς), but it is the word-end of a proclitic. *Il.* 1.516 ὅσσον ἐγὼ μετὰ πᾶσιν ἀτιμοτάτη θεός εἰμι is a good example of a verse counted by the system as a "verse without bucolic" and the previous line, *Il.* 1.515 ἢ ἀπόειπ', ἐπεὶ οὔ τοι ἔπι δέος, ὄφρ' ἐῢ εἰδέω, a good example of a "verse with bucolic".

[18] I have always calculated Ω (the odds ratio) with the formula (11/12)/(21/22), where the first digit is the row and the second digit is the column. This means that in every case Ω shows how more likely is it to find a light final syllable in the case described in the first row than in the case described in the second row. If the outcome is positive, it is more likely; if it is negative, it is less likely. See Agresti (2007, 28-30): "The odds are nonnegative, with value greater than 1.0 when a success is more likely than a failure. When odds = 4.0, a success is four times as likely as a failure. The probability of success

Table 4 shows the same correlation, but opposing presence of bucolic diaeresis vs. presence of hepthemimeral caesura. Surmise abbreviate.

	Light final syllable	Heavy final syllable	Total
Bucolic diaeresis	162	438	600
Hepthemimeral	67	291	358
Total	229	729	958

TABLE 4 – Correlation between type of break in the fourth foot and quantity of the final syllable in the *Iliad*. All final closed syllables and all final diphthongs were considered heavy (scenario B2). χ^2 test (random distribution) = 8.46 (p=0.0036); Ω = 1.61.

In both cases, the null hypothesis that the distribution is random can be rejected at the 1% level of significance. This is also the case in all other scenarios in the analysis of *Iliad* (in scenario A2 for the opposition bucolic/hepthemimeral, however, the null hypothesis can be rejected only at the 10% level of significance). The Ω values show overwhelming coherence (that is, they are close in value and always higher than 1): they range from 1.29 (scenario A3) to 1.80 (scenario B2) in the opposition bucolic/no-bucolic and from 1.30 (scenario A2) to 1.61 (scenario B2) in the opposition bucolic/hepthemimeral. This means that it is at least almost 30% more likely to find a light heavy syllable when there is bucolic diaeresis than when there is not. In some interpretations, more than 60% more likely.

Since it would be cumbersome to present all tables produced for each poet, I have published them in an online document. However, the compiled data can be found in the appendix. Tables 5 and 6 summarize the Ω values in each text for each scenario. Italics indicate that the null hypothesis can be rejected only at the 10% level of significance, underlined indicates rejection at the 5% level of significance and bold font, rejection at the 1% level of significance.

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is 0.8, the probability of failure is 0.2, and the odds equal 0.8/0.2 = 4.0. We then expect to observe four successes for every one failure. When odds = 1/4, a failure is four times as likely as a success. We then expect to observe one success for every four failures."

For a simple description of the χ^2 test made by philologists (which I condense here), see Jones and Gray (1972, 192-9): "A common method for measuring the difference between samples is the 'chi square test'. [It] indicates how much a particular frequency (…) deviates from some standard (…). The standard procedure [is] to set up [a] 'null hypothesis' (…) [and] If enough (…) criteria are found [that is, there is a *significant* difference between the samples], the hypothesis is rejected; otherwise it is retained."

	Scen. A1	Scen. B1	Scen. A2	Scen. B2	Scen. A3	Scen. B3
Iliad	*1.33*	***1.70***	*1.30*	***1.80***	*1.29*	***1.58***
Odyssey	1.00	*1.38*	1.04	***1.53***	0.97	*1.31*
Callimachus	1.00	1.10	1.15	*1.45*	0.96	1.05
Apollonius	1.13	*1.45*	1.18	***1.71***	1.04	*1.31*
Theocritus (buc.)	0.71	0.68	0.88	0.88	-	-
Theocritus (other)	0.86	1.04	0.94	1.22	-	-
Theocritus (*Id.* 11)	0.83	0.69	0.86	0.68	-	-
Nonnus	1.39	*1.95*	1.42	***2.22***	1.34	*1.76*

TABLE 5 – Ω values for the 2x2 tables showing the correlation between presence vs. absence of bucolic diaeresis and quantity of the final syllable by sample, with different interpretations of the quantity of the final syllable (see table 1).

	Scen. A1	Scen. B1	Scen. A2	Scen. B2	Scen. A3	Scen. B3
Iliad	*1.32*	***1.56***	*1.30*	***1.61***	*1.35*	***1.56***
Odyssey	1.14	*1.37*	1.19	***1.53***	1.12	*1.31*
Callimachus	1.09	1.10	1.15	1.22	1.11	1.11
Apollonius	***1.74***	*1.42*	***1.67***	*1.47*	***1.72***	1.37
Theocritus (buc.)	0.67	0.67	0.81	0.83	-	-
Theocritus (other)	0.86	1.09	0.98	*1.39*	-	-
Theocritus (*Id.* 11)	0.74	0.78	0.79	0.80	-	-
Nonnus	***4.66***	***6.61***	***4.85***	***8.15***	***4.77***	***8.34***

TABLE 6 – Ω values for the 2x2 tables showing the correlation between presence of bucolic diaeresis vs. presence of hepthemimeral caesura and quantity of the final syllable by sample, with different interpretations of the quantity of the final syllable (see table 1).

The numbers of the *Odyssey* are clearly not as coherent as the ones of the *Iliad*. The main difference is found between scenarios with closed final syllable light (type A) and scenarios with closed final syllable heavy (type B). We can interpret the results in at least two distinct ways: on the one hand, it is possible that the only quantity that is considered in the *Odyssey* is the syllabic quantity; on the other, perhaps the vocalic quantity was less important for this correlation than the syllabic quantity, which is most likely rhythmic (see below). In any case, we can draw two conclusions from the Ω values of the tables of the *Odyssey*: first, the coherence of the Ω values in the positive outcomes with those of the *Iliad* suggests that, if there was a tendency, it had the same direction in both poems (combining bucolic diaeresis with light final syllable). Second, if it is real, the tendency is weaker in the second poem than in the *Iliad*.

The diversity of outcomes in the Hellenistic samples is not surprising. Callimachus and Theocritus show no preferences regarding the quantity of the final syllable,[19] with one peculiar coincidence: in both, scenario B2 shows less than 10% chance of being the result of random distribution, in Callimachus in the opposition bucolic/no-bucolic and in Theocritus' non-bucolic poems in the opposition bucolic/hepthemimeral. In both cases, the direction of the preference is that shown by the Homeric poems.

Apollonius has more interesting numbers. His results are very coherent through the scenarios in the opposition bucolic/hepthemimeral, and similar to those of the *Odyssey* in the opposition bucolic/no-bucolic. The Ω values are higher than 1.3 in all positive outcomes and always higher than those of the *Odyssey*. Of the poets studied, he is the most faithful follower of Homer.

Finally, Nonnus is by far the strictest author of the ones analysed in tables 5 and 6 (which, of course, is true in more ways than one; see Magnelli, 2016). In the opposition bucolic/no-bucolic he shows numbers similar to Homer (numbers in scenarios type A are closer to those of the *Iliad*, but non-significant as those of the *Odyssey*) and Apollonius, but in the opposition bucolic/hepthemimeral he clearly takes things to the extreme. No scenario produces an Ω value below 4.5, which means that in his work it is at least 4.5 times more likely to find the combination bucolic diaeresis + light final syllable than to find the combination hepthemimeral + light final syllable.

4. Identifying the rhythmic tendencies

Homer, Apollonius and Nonnus have shown a preference for combining bucolic diaeresis and light final syllable. However, we cannot be sure if that is because they actually preferred that combination, or because they preferred to avoid or use another. Since a preference for combining hepthemimeral caesura with final heavy syllable would produce the same outcome, it is necessary to verify what is happening in each case, in order to properly interpret the observed tendencies.

To do this, I have analyzed two more oppositions in each scenario: bucolic diaeresis vs. no word end in the fourth foot and hepthemimeral caesura vs. no word end in the fourth foot. By excluding one break from each analysis, we can be sure that, if there is any effect, it is being caused by the remaining one. Also, if the Ω values in both oppositions have the same sign, we will know that the effect is produced by the absence of word end in the fourth foot. In any case, though the numbers considered here are smaller, these tests should help us identify the actual rhythmic tendencies that are influencing the distribution of quantities and words in the hexameter.

The Ω values with each scenario, using the same method as in tables 5 and 6 to signal significativity, are shown in table 7.

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[19] Fantuzzi (1995), also discovers several coincidences between these two poets, though he considers that the bucolic poems are the most Callimachean. Brioso Sánchez, 1976/7, concluded, however, that the more Callimachean poems were the "epic" *Idylls*.

		Scen. A1	Scen. B1	Scen. A2	Scen. B2	Scen. A3	Scen. B3
Iliad	Bucolic	1.19	*1.61*	1.20	***1.76***	1.11	*1.43*
	Hepth.	0.90	1.03	0.92	1.10	0.82	0.92
Odyssey	Bucolic	*0.70*	1.16	*0.77*	1.36	*0.70*	1.18
	Hepth.	***0.56***	0.85	*0.64*	0.89	*0.62*	0.90
Apollonius	Bucolic	0.90	***1.91***	0.96	***2.51***	0.80	*1.64*
	Hepth.	***0.52***	1.34	*0.58*	*1.71*	***0.47***	1.20
Nonnus	Bucolic	0.82	1.15	0.85	1.31	0.77	0.98
	Hepth.	***0.18***	***0.17***	***0.18***	***0.16***	***0.16***	***0.12***

TABLE 7 – Ω values for the 2x2 tables showing the correlation between presence of bucolic diaeresis vs. no word end in the fourth foot and quantity of the final syllable (rows "bucolic") and the correlation between presence of hepthemimeral caesura vs. no word end in the fourth foot and quantity of the final syllable (rows "Hepth.") by sample, with different interpretations of the quantity of the final syllable (see table 1).

These numbers clearly imply that there are different tendencies in each text. In the *Iliad*, the only significant results are the ones in the first row: that suggests that in this poem the active tendency was a preference for the combination bucolic diaeresis + light final syllable (as in *Il.* 1.531, ... διέτμαγεν· ἡ μὲν ἔπειτα or 1.547 … ἀκουέμεν οὔ τις ἔπειτα). From the rhythmic point of view, this seems to indicate a preference for combining a feminine break within the colon with a feminine break at the end of it.[20] It could also be that the poet tried to preserve the descending rhythm produced by the bucolic diaeresis throughout the second colon. In any case, it seems likely that some sort of "rhythmic coherence" is behind these numbers. The fact that they only affect the bucolic diaeresis could be explained by its proximity to the sixth foot (which is perhaps not quite convincing) or by the fact that it is a metron diaeresis, a type of break which stichic verses tend to avoid.[21]

In the *Odyssey*, the results are highly incoherent with the ones in the previous section. Scenarios type B, which were the ones that produced significant outcomes there, are non-significant here, and the Ω values do not indicate that one tendency is stronger than the other. However, in scenarios type A, which were non-significant before, a significant tendency to avoid combining a caesura in the fourth foot with a light final syllable appears

[20] Accepting compositional indifference as the proper interpretation of the *brevis in longo* principle means that we have to deal with the rhythmic or perceptual difference between heavy and light final syllables. I have assumed that, even if the marked element in the sixth foot was always the *longum* (something that has been questioned by David 2006, 101-2), heavy final syllables gave the verse a stronger, more masculine ending, especially since light final syllables would have been clearly associated with the feminine break in the third foot. This assumption helps to interpret the data that I will present, but it may need to be revised when more data regarding distribution of quantities in the final syllable of different Ancient Greek metres becomes available.

[21] See Sicking (1993, 53 and 55).

here. In other words, when we consider final closed syllables heavy, there seems to be a slight tendency to prefer the combinations bucolic + light final syllable (as in *Od.* 1.410 ...οἴχεται, οὐδ' ὑπέμεινε or 1.413 …ἀπώλετο πατρὸς ἐμοῖο) and hepthemimeral + heavy final syllable (O*d.* 1.425 ...θάλαμος περικαλλέος αὐλῆς or 2.348 ...προσέφη θάλαμόνδε καλέσσας). This can be explained using the same criteria as in the case of the *Iliad* (that is, rhythmic coherence within the second colon).[22] However, when we consider final closed syllables light, there seems to be a tendency to prefer the combinations no word end in the fourth foot + light final syllable (*Od.* 2.380 ...ἐϋρραφέεσσι δοροῖσι or 2.390 ...ἐΰσσελμοι φορέουσι) and caesura in the fourth foot + heavy final syllable. The only interpretation of this second possible outcome I can think of is that it is the result of an avoidance of the echo produced in the combination heavy final syllable in the fifth *longum* + heavy final syllable at the end of the verse (*Od.* 3.302 ...κατ' ἀλλοθρόους ἀνθρώπους), since in Homer more than 70% of the lines (271 out of 376) that have no word end in the fourth foot have word end in the fifth *longum*.

The outcomes for Apollonius suggest two conclusions: in his poetry, both caesurae shared a common preference against verses with no word end in the fourth foot (only 57% of which have word end in the fifth *longum*) and significant results do not help to decide if the active tendency was to combine bucolic + light final or hepthemimeral + heavy final syllable. We cannot properly interpret the first conclusion without making a decision regarding the interpretation of final closed syllables, since the sign of the Ω values changes between scenarios that consider them heavy (type B) and scenarios that consider them light (type A). On the other hand, since in every scenario the Ω value is higher in "Bucolic" than in "Hepth." – note that the lowest ratio between the values is 1.37 (=1.639/1.198) for scenario B3 –, I believe that it is quite likely that in Apollonius both tendencies regarding the combination of caesura with final quantity (bucolic + light; hepthemimeral + heavy) coexisted. Apollonius takes on Homer's preference for rhythmic coherence within the second colon, and reinforces it.

Once again, Nonnus' numbers are the most peculiar. He shows no preference for the combination bucolic diaeresis + light final syllable (except for a slight non-significant one in scenarios B1 and B2), but has an extreme tendency to combine hepthemimeral with heavy final. I believe that this is not simply an adoption of the rhythmic coherence we have seen in Homer and Apollonius, but the result of an avoidance of the combination hepthemimeral + light final syllable, which, in the best case scenario (scenario A3), occurs only 7 times in Nonnus' sample.[23] This avoidance is probably caused by the notable preference for heavy

[22] Note that the Ω value is always higher in "Bucolic" than in "Hepth." in scenarios type A too, which suggests that even in those cases there is a preference for rhythmic coherence.

[23] In *Dyon.* 5.262 (…φέρων ἐδίδαξε βοτῆρας), 8.120 (…βροτῶν θελκτήρια κεῖται), 10.386 (…φέρων μνηστῆρας ἀγῶνος), 11.340 (…τεοὶ γεγάασι φονῆες; this case would perhaps be excluded by a system sensitive to rhythmic clisis), 12.274 (…γέρων ἐκλίνατο φοῖνιξ), 13.219 (…ἅτε στενάχουσα τοκῆα; again, a debatable case) and 16.264 (...Νέμεσις δ' ἐγέλασσεν ἰδοῦσα). Note that only the last two examples are unambiguous combinations of hepthemimeral + light final syllable, since the final syllables in the other five would be counted as heavy in at least one of the possible scenarios considered.

final syllables in Nonnus: a combination hepthemimeral + light final would imply a stronger break within the second colon than at the end of it, and this seems to contradict the basic principles of this poet's hexameter.

5. Conclusions

While it may be possible to explain the numbers analysed in the previous sections without rejecting actual indifference of the final syllable, it seems to be unnecessary. Compositional indifference in the sixth foot does not contradict what we know about the hexameter or about Ancient Greek metrics, and it easily accounts for the results presented here. In Callimachus and Theocritus, it has led to metrical indifference regarding the correlation between the fourth and the sixth foot (we do not know – yet – if it has led to absolute metrical indifference). In Homer (at least in the *Iliad*) and Apollonius, however, it coexists with a tendency to produce a rhythmically coherent second colon, in which the poets preferred to combine feminine with feminine (or descending with descending) and masculine with masculine. Finally, in Nonnus, for whom we already knew compositional indifference did not lead to metrical indifference, we have found what might even be considered a new rule of his hexameter, an avoidance of the combination hepthemimeral + light final syllable, and we explained it assuming that the avoided combination emphasises too much the weaker ending in a poet that clearly preferred strong endings for his line.

As noted in the introduction, some scholars might not be convinced that the tests presented in this paper suffice to rule out actual indifference of the final syllable in the hexameter (much less in Ancient Greek poetry in general). However, the burden of proof is now in their field. Either they have to find a scenario that produces uniformly random results (none of the scenarios used here does that), or they must find another explanation for the correlations observed. If that does not happen, a whole new aspect of the hexameter (and of Ancient Greek metre in general) is open: by accepting compositional indifference as the proper interpretation of the *brevis in longo* principle, we need to start analysing what has each poet done with it.

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Appendix

Since it would be cumbersome to include every table produced for this study, but the data should be available for its consultation, I have included in this appendix two tables, each with the number of verses with heavy or light syllables with different types of fourth foot by scenario and by poet. The first table shows number of verses with bucolic diaeresis and without bucolic diaeresis (see sec. 2 for the meaning of "without bucolic"). The second table shows the number of verses with bucolic diaeresis, with hepthemimeral and with no word end in the fourth foot. I have included a column "total" in each table: note that it adds up the verses considered in each table, not the total number of verses in the sample.

Sample	Scenario	Bucolic diaeresis		No bucolic diaeresis		Total
		Heavy final	Light Final	Heavy final	Light Final	
Iliad	Scenario A1	290	310	269	217	**1086**
	B1	404	196	378	108	
	A2	324	276	294	192	
	B2	438	162	403	83	
	A3	272	328	251	235	
	B3	386	214	360	126	
Odyssey	Scenario A1	299	335	224	251	**1109**
	B1	428	206	352	123	
	A2	301	333	254	221	
	B2	462	172	382	93	
	A3	279	355	206	269	
	B3	408	226	334	141	
Callimachus	Scenario A1	290	284	156	153	**883**
	B1	413	161	228	81	
	A2	335	239	191	118	
	B2	458	116	263	46	
	A3	269	305	142	167	
	B3	392	182	214	95	
Apollonius	Scenario A1	190	355	112	186	**843**
	B1	362	183	221	77	
	A2	226	319	136	162	
	B2	398	147	245	53	
	A3	176	369	99	199	
	B3	348	197	208	90	
Theocritus (buc.)	Scenario A1	281	196	51	50	**578**
	B1	362	115	69	32	
	A2	311	166	63	38	
	B2	392	85	81	20	
Theocritus (other)	Scenario A1	313	298	227	251	**1089**
	B1	462	149	365	113	
	A2	342	269	260	218	
	B2	491	120	398	80	

Theocritus (*Id.* 11)	Scenario A1	19	22	10	14	**65**
	B1	29	12	15	9	
	A2	22	19	12	12	
	B2	32	9	17	7	
Nonnus	Scenario A1	401	66	354	42	**863**
	B1	419	48	374	22	
	A2	409	58	360	36	
	B2	427	40	380	16	
	A3	390	77	345	51	
	B3	408	59	366	30	

Sample	Scenario	Bucolic diaeresis		Hepthemimeral		No word end on 4th		Total
		Heavy final	Light Final	Heavy final	Light Final	Heavy final	Light Final	
Iliad	Scenario A1	290	310	198	160	100	90	**1148**
	B1	404	196	273	85	146	44	
	A2	324	276	216	142	111	79	
	B2	438	162	291	67	157	33	
	A3	272	328	189	169	91	99	
	B3	386	214	264	94	137	53	
Odyssey	Scenario A1	299	335	180	159	69	108	**1150**
	B1	428	206	264	93	128	53	
	A2	301	333	203	154	83	98	
	B2	462	172	287	70	142	39	
	A3	279	355	167	190	64	117	
	B3	408	226	251	106	123	58	
Callimachus	Scenario A1	290	284	95	85	56	64	**874**
	B1	413	161	133	47	83	37	
	A2	335	239	111	69	74	46	
	B2	458	116	149	31	101	19	
	A3	269	305	89	91	49	71	
	B3	392	182	127	53	76	44	
Apollonius	Scenario A1	190	355	79	85	48	100	**857**
	B1	362	183	121	43	117	31	
	A2	226	319	89	75	60	88	
	B2	398	147	131	33	129	19	
	A3	176	369	74	90	41	107	
	B3	348	197	116	48	110	38	

Theocritus (buc.)	Scenario A1	281	196	26	27	22	20	**572**
	B1	362	115	36	17	30	12	
	A2	311	166	32	21	25	17	
	B2	392	85	42	11	33	9	
Theocritus (other)	Scenario A1	313	298	156	172	90	96	**1125**
	B1	462	149	253	75	135	51	
	A2	342	269	182	146	99	87	
	B2	491	120	279	49	144	42	
Theocritus (*Id.* 11)	Scenario A1	19	22	9	14	2	3	**69**
	B1	29	12	15	8	2	3	
	A2	22	19	11	12	2	3	
	B2	32	9	17	6	2	3	
Nonnus	Scenario A1	401	66	170	6	175	35	**853**
	B1	419	48	173	3	191	19	
	A2	409	58	171	5	180	30	
	B2	427	40	174	2	196	14	
	A3	390	77	169	7	167	43	
	B3	408	59	173	3	183	27	

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