Homeric -φι(ν) is an oblique case marker*

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Abstract

The synchronic distribution and diachronic trajectory of Homeric -φι(ν) have been the source of long-standing debate, with the result that scholarly opinion has yet to settle on a consensus regarding the morphosyntax of forms realized by this marker. Some maintain that forms in -φι(ν) are adverbs, while others contend that they are nominals (i.e., nouns or adjectives). Evidence from agreement and prepositional phrases shows that the latter analysis is correct. Homeric -φι(ν) is therefore a case exponent. More specifically, it is an oblique case marker that realizes genitive or dative case in the singular, dual, or plural across all three grammatical genders. Since other case markers exist in the language for realizing genitive and dative case, forms in -φι(ν) are an example of morphological OVERABUNDANCE, the realization of a paradigm cell by more than one word form. This synchronic analysis has diachronic consequences, in as much as it now becomes clearer that -φι(ν) continues the instrumental plural case marker */-b$^{\text{ɦ}}$is/ and not the adverbial suffix */-b$^{\text{ɦ}}$i/.

Keywords: Greek; Indo-European; case; morphology; Paradigm Function Morphology

1 Introduction

Archaic Greek possesses a marker -φι(ν) that is most robustly attested in Homer:

(1) καὶ μή τι κότωι ἀγάcηcθε ἕκαcτοc
οὕνεκα δὴ **γενεῆφι** νεώτατός εἰμι μεθ᾽ ὑμῖν.
'Don't bear a grudge at all on account of the fact that I am the youngest **in age** among you.'
Il. 14.111–112

The form of interest, γενεῆφι, is here rendered 'in age'. Although -φι(ν) is most frequent in Homeric Greek, even here it is not particularly common, as the graphs in Figure 1 reveal. (Token frequency measures the number of word forms ending in -φι(ν); type frequency measures the number of lexemes that have a form ending in -φι(ν).) The sharp drop-off in both type and token frequency between the *Iliad* and *Odyssey* suggests a trajectory of decline. Indeed, after Homer forms in -φι(ν) are only sporadically attested.

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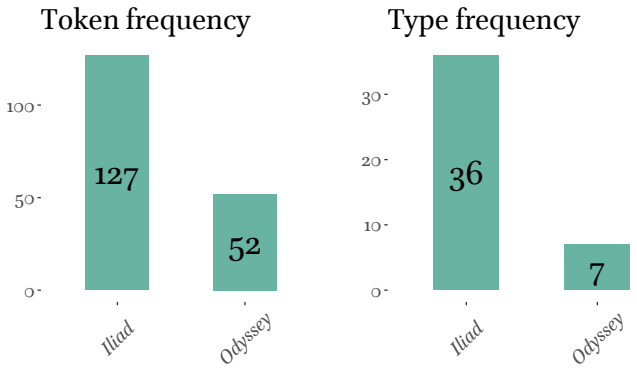

Figure 1: : Frequency distribution of -φι(ν) in the *Iliad* and *Odyssey*

The frequencies of individual φι(ν)-forms further reinforce this picture. Of the forty-three word forms in Figure 2, a little over half are attested twice or less. The troika of ὄχεσφι, ἶφι, and βίηφι alone accounts for almost thirty percent of all tokens. The existence of -φι(ν) at this stage of Greek is thus due primarily to its use among a small handful of lexical items.

One of the central debates in the literature on -φι(ν) concerns the syntactic category of forms bearing this suffix (Schwyzer 1959:550–551, *DMG*[2]:403). Roughly speaking, analyses fall into one of two categories. The first interprets forms in -φι(ν) as adverbs (e.g., Chantraine 1942:§§104–108, Sihler 1995:§257.8 "virtually adverbs," Hajnal 1995:133, Melchert and Oettinger 2009:65–66, Miller 2014:294, Ringe 2017:53). This approach is appealing given that forms in -φι(ν) often exhibit adverbial semantics, as illustrated by γενεῇφι 'in age' in the example above. An alternative analysis contends that -φι(ν) is a case marker (e.g., Delbrück 1893:274, Schwyzer 1959:550, Hajnal 1995:293, Thompson 1998, Ringe 2017:53).[1] According to this analysis, forms in -φι(ν) are nominals, i.e., either nouns or adjectives. The main challenge for accounts of this type is specifying the case that -φι(ν) realizes. Monro (1891:§93), for instance, lists -φι(ν) as an instrumental case exponent. Such a view aligns -φι(ν) with the cognate Mycenaean instrumental case marker <-pi>, but the existence of an instrumental case in Homeric is belied by the data (Rix [1976] 1992:§173).

In this article, I demonstrate that Homeric -φι(ν) is a case marker. It is not, however, an instrumental plural case marker. It is an oblique case marker that serves as an alternate way of marking dative and genitive case in the singular, dual, or plural across all three grammatical genders. Since Homeric Greek possesses other exponents for these cases, the existence of -φι(ν) contributes to Homeric OVERABUNDANCE, the existence of multiple word forms for a single paradigm cell.

Analyses similar to the one presented here have been advanced before (cf. Monro 1891:§154, Lejeune 1958:176, Rix [1976] 1992:§173, Schwyzer 1988:172, Thompson 1998:219, 250, Bartoněk 2003:160, Ruijgh 2011:275), but the full range of the evidence has yet to be presented. Moreover, no one to the best of my knowledge has laid out how -φι(ν) as an oblique case marker fits in to the inflectional morphology of Homeric Greek. To this end, I provide a formal analysis of -φι(ν) in Paradigm Function Morphology (Stump 2001b, Stump 2016a).

One of the central diachronic questions surrounding -φι(ν) is whether it continues the instrumental

[1]Some descriptions are ambiguous. Gamkrelidze and Ivanov (1995:333), for instance, write that "the marker *-$b^h i$...already appears in Mycenaean as an adverbial particle and has the function of a syntactic instrumental case: Myc. Gk. *-pi*, Hom. *-phi*." Jasanoff (2009:138) describes -φι(ν) as an '"adverbial" case form.'

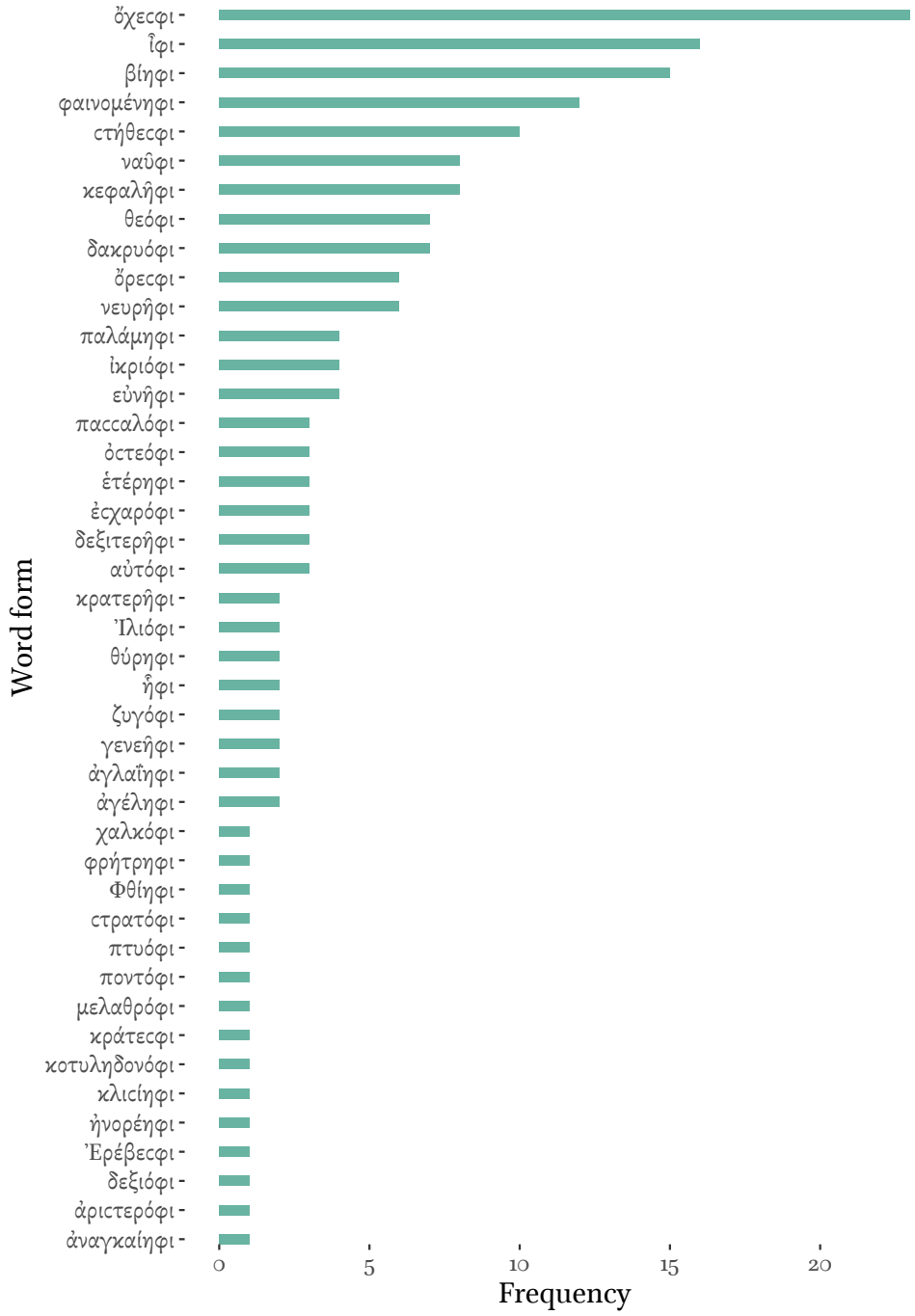

Figure 2: Frequency according to word form

plural exponent */-b^{h}is/ or the adverbial suffix */-b^{h}i/. Debate focuses on two issues, morphosyntax and segmental form. For those who think that forms in -φι(ν) are adverbs, */-b^{h}i/ is the more plausible source. For those who think that -φι(ν) is a case marker, */-b^{h}is/ is the more plausible source. Segmentally, */-b^{h}i/ is a more straightforward ancestral form of -φι(ν), since the difference between them is limited to a regular devoicing sound change. */-b^{h}is/ as the ancestral form of -φι(ν) entails an additional loss of the final sibilant. I argue that */-b^{h}is/ is the source of -φι(ν) and that the final sibilant was lost via analogy to the athematic dative plural -σι(ν).

Finally, I emphasize a critical methodological point. It is at best unfruitful and at worst misguided to investigate linguistic history without explicit synchronic analyses of the phenomenon under investigation (Hale 2007:5). Explicit synchronic analysis requires a formal apparatus for the description of the relationship between morphosyntactic properties and their formal realization. Andersen (1980:3) has made this point specifically with reference to diachronic morphology:

> The lack of a workable theory of synchronic morphology is undoubtedly the greatest obstacle for the student of historical morphology, for without an explicit conception of the nature of morphological structure, one cannot even adequately define the correspondences between successive states of a morphological system which are the raw material the language historian has to interpret. Without such a theory, of couse, also an attempt to classify innovation in morphology may seem a doubtful undertaking.

Indeed, previous scholars have noted that a lot of work in morphological reconstruction is by and large phonological reconstruction over morphemes, with far less attention given to the question of the grammatical properties that they realize (e.g., Anttila 1989:351, Fox 1995:93, 96). In this paper, I demonstrate that closer attention to the relationship between inflectional exponence and morphosyntactic properties resolves a number of long-standing debates concerning the synchrony and diachrony of Homeric -φι(ν).

The remainder of this paper is structured as follows. Section 2 provides an overview of Mycenaean <-pi>. The evidence supports the view that <-pi> realized instrumental nominals in either the plural or dual. Section 3 offers a fresh look at Homeric -φι(ν). Presenting evidence from agreement, prepositional phrases, semantic roles, number, and word order, I argue that -φι(ν) is an oblique case marker. Building on these two sections, section 4 offers an analysis of <-pi> and -φι(ν) in Paradigm Function Morphology. Section 5 then takes up the issue of diachrony and argues that both <-pi> and -φι(ν) are cognate with reflexes of theinstrumental plural exponent */-b^{h}is/. Section 6 brings the paper to a close with a brief reiteration of the main points and concluding remarks.[2]

2 Mycenaean <-pi>

Our understanding of the Mycenaean case system is plagued by uncertainty on account of the ambiguities in the Linear B writing system. There is in fact no consensus on how many cases should be recognized (Thompson 2010:193). Concerning the phonological interpretation of <-pi>, it remains unclear whether <-pi> represents /-p^{h}i/ or /-p^{h}is/ (Melchert and Oettinger 2009:65). Ventris and Chadwick (*DMG*^{2}:403), Hajnal (1995:133), and Miller (2014:294), for instance, interpret <-pi> as /-p^{h}i/. Jasanoff (2009:143), by

[2] I have attempted to survey as much of the scholarship as I could. Given how extensive it is, I have had to be selective.

contrast, maintains that a case marker /-p^{h}is/ survived into Mycenaean beside an adverbial suffix /-p^{h}i/. Barnes (2016:26) likewise contends that <-pi> represents /-p^{h}is/. The evidence is insufficient to decide the matter either way, so I refer solely to the graphic representation of the case marker, i.e., <-pi>. (I take up the diachrony of <-pi> in section 5 below.)

Morphologically, we are on slightly firmer ground. Myceanaean <-pi> is suffixed to athematic-stem (i.e., consonant- and *a*:-stem) nominals (*DMG²*:83, Ruijgh 2011:274). Among thematic nominals, the instrumental plural is <-Co> /-o:is/ (Thompson 1998:243). Opinions vary as to whether <-pi> is suffixed to thematic nominals. If it is, the phenomenon is rarely attested (Lejeune 1972:173–174, Thompson 1998:243–244, Thompson 2010:194).

2.1 Morphosyntax

There has been considerable discussion of the morphosyntax of <-pi>. Debate has focused on issues of semantic role and grammatical number (*DMG²*:403). It is widely agreed that <-pi> can encode the instrumental and location roles (Ruijgh 2011:274) in the plural (Hajnal 1995:139–140):[3]

(2) *Instrument*
.a]a-ra-ru-ja , **a-ni-ja-pi** , wi-ri-ni-jo , o-po-qo , **ke-ra-ja-pi** , **o-pi-i-ja-pi** CUR[
.b i-qi-jo , / a-ja-me-no , e-re-pa-te , a-ra-ro-mo-te-me-no po-ni-ḳi̯[-jo
'(Two) horse-chariots inlaid with ivory, assembled, crimson, equipped **with bridles**, with leather cheek-straps, **with horn bits**. WHEEL-LESS CHARIOT'
KN Sd 4401 (cf. *DMG²*:366)

(3) *Location* (Thompson 1998:228, *DM*:164)
po-to-ro-wa-pi MUL 4 ko-wa 4 ko-wo 3 DA 1 TA 1
'**At Po-to-ro-wa** 4 women 4 girls 3 boys 1 DA 1 TA'
PY Aa 76 (*DMG²*:575 s.v. po-to-ro-wa-pi)

Example (3) shows that it was possible in Mycenaean to encode location with instrumental <-pi> in addition to the locative. Ventris and Chadwick (*DMG²*:403) are surprised by this, and express some support for the analysis of Ilievski (1961, 1970), who argued that examples such as (3) resulted from a syncretism of the ablative and instrumental.

Some scholars maintain that <-pi> can also encode the source semantic role with toponyms (e.g., Hajnal 1995:153, 159, 167, 184–185). The following text is one such alleged example (on which see *DMG²*:185–186):

(4) .1 e-re-ta , pe-re-u-ro-na-de , i-jo-te
.2 ro-o-wa VIR 8
.3 ri-jo VIR 5
.4 po-ra-pi VIR 4
.5 te-ta-ra-ne VIR 6
.6 a-po-ne-we VIR 7[

[3]Doria (1968:772) contends that <-pi> can also encode purpose semantics, but the evidence strikes me as insufficient to substantiate this claim.

.7–.8 *vacat*

PY An 1

The opening of the text is clear: <e-re-ta> /eretai/ 'rowers' are going (<i-jo-te>) toward <pe-re-u-ro-na>. <-de> is the allative postposition that shows up in alphabetic Greek as -δε. The remainder of the text contains toponyms. Starting from the bottom, <a-po-ne-we> and <te-ta-ra-ne> could be dative singulars in /-ei/ or instrumental singulars in /-e:/. <po-ra-pi> is in the instrumental plural. The case of <ri-jo> and <ro-o-wa> is unclear. Unfortunately, it is also not clear how these toponyms should be interpreted. Thompson (1998:228) suggests the following possible readings:

(5) a. 'contributions of men to go as rowers due from...'
b. 'contributions of men to go as rowers; the assessement at...'
c. '...the assessment for...'

The uncertainty surrounding the reading of the toponyms means that we cannot use text An 1 as evidence that <-pi> encoded source semantics.

In a detailed review of the toponym evidence, Thompson (1998:226–238) makes it clear just how difficult the semantic analysis of Mycenaean case forms is. He ultimately concludes (p. 238) that while there is evidence that forms in <-pi> encode the location semantic role, there is no compelling evidence that <-pi> encodes the source role (a conclusion reached earlier by Morpurgo Davies 1966).

The only thing that is certain is that toponyms ending in <-pi> do not encode the instrument semantic role. I myself do not share the sense of surprise that Ventris and Chadwick (*DMG*²:403) report regarding the ability of both instrumental and locative case to encode location. This was, for instance, a possibility in Vedic Sanskrit, where instrumental case is almost always used to denote extent of space with verbs of motion (Delbrück 1888:128–129).[4] Occasionally, it is also attested with a predicate that does not denote motion (e.g., RV 1.103.1).

Turning to the question of dual forms ending in <-pi>, the word for 'two' is attested four times with the case marker <-pi> (Hajnal 1995:57, 105, Thompson 1998:237):

(6) .7 ka-pa-ti-ja , ka-ra-wi-po-ro , e-ke , ke-ke-me-no , o-pe-ro-sa , **du-wo-u-pi** , wo-ze-e , o-u-wo-ze , ⟦to-ṣọ⟧
.8 to-ṣọ[pe-mo GRA]4

PY Ep 704

The interpretation of the texts is unfortunately unclear. Given that we expect a dual ending on word forms of 'two', the existence of <du-wo-u-pi> probably means that the instrumental plural and dual were not distinguished formally.

An anonymous reviewer calls my attention to two secure examples of a form ending in <-pi> that serves as the complement of a preposition. Both come from TH Uq 434 (Aravantinos et al. 2008). Unfortunately, the readings are unclear:

[4] In the domain of derivational morphology, Luschützky and Rainer (2013) investigate a range of languages in which instrumental nouns and place nouns share a derivational pattern.

(7) .1 **pa-ro** , te-qa-jo-i⌊ ⌋**qa-si-re-u-pi**
.9 **pa-ro** [ ]**je-u-pi**

I am agnostic on the interpretation of these lines (for discussion, see López Chala 2017:128–129), although it does seem likely that <pa-ro> encodes the source role here (García Ramón 2016:236).

There may be a third example of a form in <-pi> serving as the complement of a preposition in the following example (Chadwick 1990:158, Ruijgh 2011:274, Miller 2014:309):

(8) *Complement of preposition?*
.a o-ro-me-no
.b ke-ro-wo , po-me , a-si-ja-ti-ja , **o-pi** , ta-ra-ma<-ta->-o **qe-to-ro-po-pi** VIR 1
'Kerowos the shepherd at Asiatia watching **over** the **quadrupeds** of Thalamata. MAN 1'
PY Ae 134 (*DMG*²:169–170)

One interpretation of this passage is that <o-pi>...<o-ro-me-no> is an example of tmesis, according to which <qe-to-ro-po-pi> would receive its case from the verb (Hajnal 2004:167). The following passage is often cited as a comparison:

(9) ἐνθάδε δ᾽ αἰπόλια πλατέ᾽ αἰγῶν ἕνδεκα πάντα
ἐσχατιῇι βόσκοντ᾽. **ἐπὶ** δ᾽ ἀνέρες ἐσθλοὶ **ὄρονται.**
'Here all eleven extensive herds of goads graze at the border. **Over** (them) good men **watch.**'
Od. 14.103–104

As the translation above suggests, ἐπί here can be parsed as a preposition with a null pronoun, as opposed to being a preverb of ὄρονται. So another possibility for example (8) is to parse <o-pi ta-ra-ma<-ta->-o qe-to-ro-po-pi> as a prepositional phrase. On this analysis, <qe-to-ro-po-pi> would receive its case from <o-pi>.

2.1.1 Singular <-pi>?

Given the ambiguities of Linear B it remains unclear if there was a distinct exponent for the instrumental singular. The spellings <-a>, <-o>, and <-e> could conceal instrumental singular forms. Hajnal (1995:150–151) cautiously adopts the view that Mycenaean <-pi> could mark not only the instrumental plural but also the instrumental singular and dual. This behavior is redolent of Homeric -φι(ν) and, farther afield, the Hittite instrumental (Gamkrelidze and Ivanov 1995:333). Hajnal (1995:140) offers three possible pieces of evidence for the view that <-pi> could mark instrumental singular nouns:[5] *<wi-pi>, <ma-ra-pi>, and <e-ru-ta-ra-pi>. I take up the latter two first, since *<wi-pi> requires a

[5]José Miguel Jiménez Delgado (p.c.) also calls my attention to the instrumental plural toponym <su-ki-ri-ta-pi>, the nominative of which is <su-ki-ri-ta>, which has been equated with Σύβριτα (Bennet 2011:149). According to this interpretation, it seems that <-pi> can be suffixed to what is otherwise a singular noun. <su-ki-ri-ta> can also be interpreted as a plural form, however (*DM*:s.v.). Even if we could rule out this possibility, I am not convinced that <su-ki-ri-ta-pi> alone is sufficient to warrant the claim that <-pi> could be suffixed to singular nouns.

longer discussion. To anticipate my conclusion, the data do not justify the view that <-pi> is a marker of instrumental singular nouns.[6]

To begin with the alleged singular color adjectives, consider the following pair of examples:

(10) .3 re[-u-]ḳọ , **ma-ra-pi̱** , pe-ko , a-ko-ro-we
BOS+*SI* 1
'One ox sprinkled[?] **with black** <a-ko-ro-we>'
PY Cn 418.3 (*DMG²*:76–77)

(11) .a **e-ru-ta-ṛạ-pi**
.b pa-we-a , / ke-se-nu-wi-ja , re-u-ko-nu-ka
TELA[3] 35 **158*
'Thirty-five cloaks with white *onukes*, guest-gifts, **with red**'
KN Ld 573 (*DMG²*:318)

Hajnal (1995:148) interprets <ma-ra-pi̱ pe-ko> in example (10) as 'mit Schwarz gesprenkelt'. Even if this is correct (there appears to be no consensus on the interpretation of this phrase), it does not entail that <-pi> is an instrumental singular marker here (cf. Thompson 1998:241–243). Hajnal's interpretation works just as well if <ma-ra-pi̱> is plural 'with black (spots)' vel. sim. The same argument applies to example (11). I see no objection to parsing <e-ru-ta-ṛạ-pi> 'with red' as an instrumental plural, not least because it is modifying a plural head noun 'cloaks'.

Returning to *<wi-pi>, this form is not attested in Mycenaean, but its existence is inferred from the following personal names (Hajnal 1995:140):

(12) *Personal names*
a. <wi-pi-no-o> (KN V 958.3b)
b. <wi-pi-o> (KN Nc 5103)

The first element of these names is interpreted as /wi:pi-/ and identified with Homeric ἶφι 'violently'. The name <wi-pi-no-o> is equated with Homeric Ἰφίνοος and <wi-pi-o> is considered its hypocoristic form (Thompson 1998:243).

Hajnal (1995:290) goes so far as to speak of a "direkte Entsprechung" between Mycenaean <wi-pi-> and Homeric ἶφι. There is no direct correspondence, however, since ἶφι is a word form and <wi-pi-> a stem. This issue aside, the interpretation of *<wi-pi> is anything but straightforward. For one, it is not entirely clear what the name means. Thompson (1998:243) suggests 'he who returns home thanks to his strength'. Ruijgh (2011:275) renders it '(He) who saves with all his forces'. Morphosyntactically, there are two main possibilities: Mycenaean *<wi-pi> was either an instrumental plural noun or an adverb. According to the latter analysis, *<wi-pi> would be an erstwhile instrumental plural that has been lexicalized as an adverb meaning 'with force, violently'. It would thus match Homeric ἶφι (which is discussed in section 3.5 below). If *<wi-pi> was an adverb, then it was neither singular nor plural (*pace* Melchert and Oettinger

[6] If there is no instrumental singular marker in <-a>, <-o>, or <-e>, and if <-pi> cannot be used to realize the instrumental singular, Mycenaean would formally distinguish more cases in the plural than in the singular, which is typologically unusual. Moralejo Álvarez (1992) seizes on this typological tendency in his analysis of the Greek case system.

2009:65, Miller 2014:294) and therefore offers no evidence for a morphosyntactically singular <-pi> in Mycenaean. In short, I concur with Thompson (1998:243) that the evidence does not warrant the conclusion that <-pi> realized the instrumental singular in Mycenaean.

2.2 Interim summary

Despite the many uncertainties in the interpretation of Mycenaean <-pi>, one thing is certain: at this point in the history of Greek, the instrumental case is still alive. This is an essential point for the remainder of my analysis.

3 Homeric -φι(ν)

Comparisons of Mycenaean <-pi> and Homeric -φι(ν) vary widely. Miller (2014:309), for instance, maintains that the Mycenaean exponent was continued "with minor adaptions" in the epic tradition. According to Lejeune (1958:184), Morpurgo Davies (1969:46–47), and Clackson (1994:68–74), however, much greater discrepancy distinuishes <-pi> and -φι(ν). In this section, I argue that -φι(ν) and <-pi> are morphosyntactically far more disparate than previous accounts have acknowledged. My analysis shares key claims with that of Ruijgh (2011:275), who argued that Homeric -φι(ν) is a metrical alternative for the genitive and dative cases in the singular and plural. He did not, however, substantiate this claim or explain how such alternative realizations are even possible. The following sections provide the crucial evidence for the view that -φι(ν) is an underdetermined case exponent.

3.1 Syntactic category

3.1.1 Agreement

In the following examples, a form in -φι(ν) either modifies a noun or is modified by an adjective:

(13) a. τέccαρες ἀθλοφόροι ἵπποι **αὐτοῖcιν ὄχεcφιν**
'four prize-winning horses **with their chariots**'[7]

Il. 11.699 (*Il.* 8.290)

b. ὡc δ' ὅτ' ἀπὸ **πλατέος πτυόφιν** μεγάλην κατ' ἀλωὴν
θρῴcκωcιν κύαμοι μελανόχροες ἢ ἐρέβινθοι
πνοιῇ ὕπο λιγυρῇ καὶ λικμητῆρος ἐρωῇ...
'As when from a **broad winnowing shovel** the dark-skinned beans or pulses spring to the great threshing-floor under the shrill wind and strength of the winnower...'

Il. 13.588–590

c. ἔνθα c' ἐγὼν ἀγαγοῦca ἄμ' **ἠοῖ φαινομένηφιν**
εὐνάcω ἐξείηc.
'I will lead you there with the **breaking dawn** (and) lay you in a row.'

Od. 4.407 (*Il.* 24.600, *Od.* 6.31, 12.24, 14.266, 15.396, 16.269, 17.435)

[7] Ruijgh (2011:274) renders αὐτοῖcιν ὄχεcφιν 'with chariot(s) and all'.

d. οἶνον ἔχων ἐν **χειρὶ** μελίφρονα **δεξιτερῆφι**...
'Holding **in** (his) **right hand** soothing wine...'

Od. 15.148

These examples show that φι(ν)-forms can serve as both targets and controllers of agreement. In example (13a), ὄχεσφιν controls the neuter dative plural agreement on αὐτοῖσι. Likewise, πτυόφιν in example (13b) controls the neuter genitive singular agreement of the adjective πλατέος. By contrast, in examples (13c) and (13d), an adjective in -φι(ν) is the target of dative feminine singular agreement.

I draw two conclusions from the data in example (13). First, forms in -φι(ν) are nouns and not adverbs. If φι(ν)-forms were adverbs, they would not participate in agreement. Second, instrumental is not a possible case value in Homeric Greek. If we were to parse -φι(ν) as an instrumental case marker (whether singular or plural), the adjective δεξιτερῆφι in example (13c) could not agree with dative singular χειρί. The only way to enable the agreement pattern in this example is to allow -φι(ν) to realize feminine dative singular morphosyntactic properties. The same line of reasoning holds for the other examples in (13).

There are two examples of agreement in which both the adjective and the noun bear the suffix -φι(ν):

(14) a. Ἕκτωρ **ἦφι βίηφι** πιθήσας ὄλεσε λαόν.
'Hektor trusting in **his strength** destroyed the host.'

Hom. *Il.* 22.107 (*Od.* 21.314)

b. Κύκλωψ, οὐκ ἄρ' ἔμελλες ἀνάλκιδος ἀνδρὸς ἑταίρους
ἔδμεναι ἐν σπῆι γλαφυρῶι **κρατερῆφι βίηφι.**
'Cyclops, you were on the verge of eating the soldiers of no weak man in your hollow cave **with** (your) **strong force**.'

Od. 9.475–476 (*Il.* 21.501)

One might argue that these examples provide evidence for the existence of instrumental case in Homeric Greek since the adjective and the noun are both marked with -φι(ν). This analysis will not work for ἦφι βίηφι in example (14a), however, since πιθήσας assigns dative case to its complement. It is possible in principle to maintain that κρατερῆφι and βίηφι in (14b) are in the instrumental (plural), but in view of the behavior of φι(ν)-forms elsewhere it is far more parsimonious to interpret them as datives.

3.1.2 Prepositional phrases

Further support that forms in -φι(ν) are nominals comes from the fact that they serve as complements of prepositions (see further Hajnal 1995:303–310, Thompson 1998:220–224):

(15) -φι(ν) *prepositional complements*
a. ἤτοι ὃ μὲν θώρηκα Ἀγαστρόφου ἰφθίμοιο
αἴνυτ' **ἀπὸ στήθεσφι** παναίολον ἀσπίδα τ' ὤμων
καὶ κόρυθα βριαρήν...
'He [= Diomedes] was taking the gleaming coat of mail **from** (the) **breast** of mighty Agastrophos and the shield from his shoulders...'

Hom. *Il.* 11.373–375

b. εἴ περ γάρ χ᾽ εὕρηιcι **παρ᾽ αὐτόφι** βώτορας ἄνδρας
cὺν κυcὶ καὶ δούρεccι φυλάccοντας περὶ μῆλα...

'Even if he find the herdsman **among them** watching over the sheep with dogs and spears...'
Hom. *Il.* 12.302–303

c. ἔνθ᾽ ἐλθὼν **ὑπ᾽ ὄχεcφι** τιτύcκετο χαλκόποδ᾽ ἵππω...

'Coming there he harnessed his two bronze-footed horses **under** the **chariots**...'
Hom. *Il.* 13.23

In each case, a preposition immediately precedes a form ending in -φι(ν), which is uniformly interpreted with the preposition. The most straightforward interpretation of these two properties is that the forms in -φι(ν) are in each case the complement of the preposition. They must therefore be nouns since adverbs cannot be the complement of prepositions in Greek. Apollonius Dyscolus long ago made this very same point (Householder 1981:260).

If -φι(ν) is a case exponent, then the question arises of what case it realizes. Table 1 presents the prepositions that co-occur with a -φι(ν) form and the cases that they assign. Two crucial facts emerge from this table. First, no case is common to all the prepositions. If there were, we could identify -φι(ν) with such a case. Since we cannot, this suggests that -φι(ν) does not realize a single case (Chantraine 1942:§104, Morpurgo Davies 1969:47). Second, the table contains prepositions that exclusively assign genitive case (such as ἀπό, ἐκ/ἐξ, and καθύπερθε) and that exclusively assign dative case (such as ἅμα and cύν), but none that exclusively assign accusative case (such as εἰς). This distribution suggests that -φι(ν) realizes either genitive or dative case, i.e., that it is an oblique case marker.

	CASE ASSIGNED BY PREPOSITION		
PREPOSITION	GENITIVE	DATIVE	ACCUSATIVE
ἀπό	✓		
ἐκ/ἐξ	✓		
καθύπερθε	✓		
πρό	✓		
ἅμα		✓	
cύν		✓	
διά	✓		✓
κατά	✓		✓
ἀμφί		✓	✓
ἐπί	✓	✓	✓
παρά	✓	✓	✓
πρός	✓	✓	✓
ὑπό	✓	✓	✓

Table 1: Prepositions with complements in -φι(ν)

3.2 Semantics

3.2.1 Semantic role

Homeric forms in -φι(ν) encode a wider range of semantic roles than Mycenaean <-pi> (Delbrück 1893:275–276, Schwyzer 1959:551):[8]

(16) a. *Benefactive*
κρῖν᾽ ἄνδρας κατὰ φῦλα κατὰ φρήτρας, Ἀγάμεμνον,
ὡς φρήτρη **φρήτρηφιν** ἀρήγῃι, φῦλα δὲ φύλοις.
'Separate (the) men according to tribes, according to clans, Agamemnon, so that clan help **clan**, tribes tribes.'
Il. 2.362–363

b. *Location* (Thompson 1998:220–221)
ὡς δ᾽ ὅτε νεβρὸν **ὄρεσφι** κύων ἐλάφοιο δίηται...
'As when a dog pursues (the) fawn of (a) deer **in the mountains**...'
Il. 22.189

c. *Instrument*
ἑτέρηφι δὲ λάζετο πέτρον...
'**With** (his) **other (hand)** he was grabbing a stone...'
Il. 16.734

(17) a. *Source* (Thompson 1998:221–222)
δέγμενος ὁππότε **ναῦφιν** ἀφορμηθεῖεν Ἀχαιοί...
'Anticipating when the Achaeans broke forth **from their ships**...'
Il. 2.794

b. *Possession* (Thompson 1998:225)
μὴ πρὶν παύειν χεῖρας ὁμοιΐου πολέμοιο
πρὶν κατὰ **Ἰλιόφι** κλυτὰ τείχεα λαὸν ἐέλσαι
Τρωϊκόν.
'Do not rest your hands from grievous? war, until you pen the Trojan people inside the famed walls **of Ilion**.'
Il. 21.295

These examples provide further support for the view that -φι(ν) realizes genitive or dative case. The semantic roles in (16) are associated with the dative;[9] those in example (17) with the genitive. To the best of my knowledge, φι(ν)-forms never exhibit semantic roles associated with other cases.

[8]Nieto Hernández (1987) argues that -φι(ν) is used more often as a dative than a genitive. Although I have not counted the number of times -φι(ν) is used as a genitive and dative case marker, my impression of the data is consistent with Nieto's claim. As with the plural bias presented in Figure 3 below, I interpret the dative bias as a by-product of the diachronic trajectory of -φι(ν). The use of -φι(ν) as a genitive had yet to establish an equal foothold with the dative, since it was a more recent development.

[9]Thompson (1998:225) singles out example (16a) as the sole instance of -φι(ν) "with pure dativa l function" (cf. Monro 1891:§158, Rix [1976] 1992:§173, Schwyzer 1988:172). This is an unhelpful description because it does not distinguish case marking (dative) from semantic role (benefactive). Synchronically, there is no meaningful sense in which a dative that bears the benefactive semantic role is a "pure" dative.

Ἰλιόφι 'Ilion' in example (17a) is presented as a possessor, but this analysis is not accepted by all scholars. Nieto Hernández (1987:297–300), for instance, argues that -φι(ν) does not realize semantic roles associated with the genitive and contends that Ἰλιόφι in the example above is an adverb and not a noun. The evidence does not support her analysis, however. Ἰλιόφι in example (17a) patterns like genitives of toponyms elsewhere in Homer:

(18) οἳ δὲ τότ' ἐστρατόωνθ' ἱερὰ πρὸς τείχεα **Θήβης**.
'They were then campaigning against the sacred walls of **Thebes**.'

Hom. *Il.* 4.378

Since the analysis of Ἰλιόφι as a genitive possessor finds a ready parallel within Homer, I see no reason why this form should be analyzed as an adverb (or with some other semantic role, such as location). As for the broader claim of Nieto Hernández (1987:297–300), that φι(ν)-forms do not serve as genitives, the prepositional data presented above in Table 1 militate against this view. They guarantee that -φι(ν) can realize genitive case because ἀπό, ἐκ/ἐξ, and καθύπερθε only assign genitive case.

3.2.2 Number

It has been observed on numerous occasions that Homeric forms in -φι(ν) can have singular or plural denotation (Chantraine 1942:§105, Morpurgo Davies 1969:47, Hajnal 1995:293–294):

(19) *Singular denotation*
πλάγχθη δ' ἀπὸ **χαλκόφι** χαλκός.
'Bronze was thwarted by **bronze**.'

Il. 11.351

(20) *Plural denotation*
ἀπὸ **νευρῆφι** δ' ὀϊστοὶ
θρῴσκον.
'Arrows were springing from **the bowstrings**.'

Il. 15.313–314

The most straightforward interpretation of these examples is that -φι(ν) forms underdetermine number. In contrast to other case forms that do distinguish number (e.g., the contrasting case markers of the genitive singular and genitive plural), -φι(ν) realizes morphosyntactically singular and plural nouns with the same exponent.

Although forms in -φι(ν) are used with both singular and plural reference, there is a decided bias in usage toward the latter, as Figure 3 reveals. The panel labeled -φι(ν) provides the relative frequency of all nominals ending in -φι(ν) in the *Iliad* and *Odyssey* according to singular, dual, and plural use. The non-φι(ν) panel presents the same information for all nominal forms whose inflectional ending is not -φι(ν). (The absolute token frequencies are presented in Table 9 in section 4.7 below.) I attribute the plural bias of φι(ν)-forms to diachrony. As argued in section 5.2 below, -φι(ν) descends from an erstwhile instrumental plural case marker.

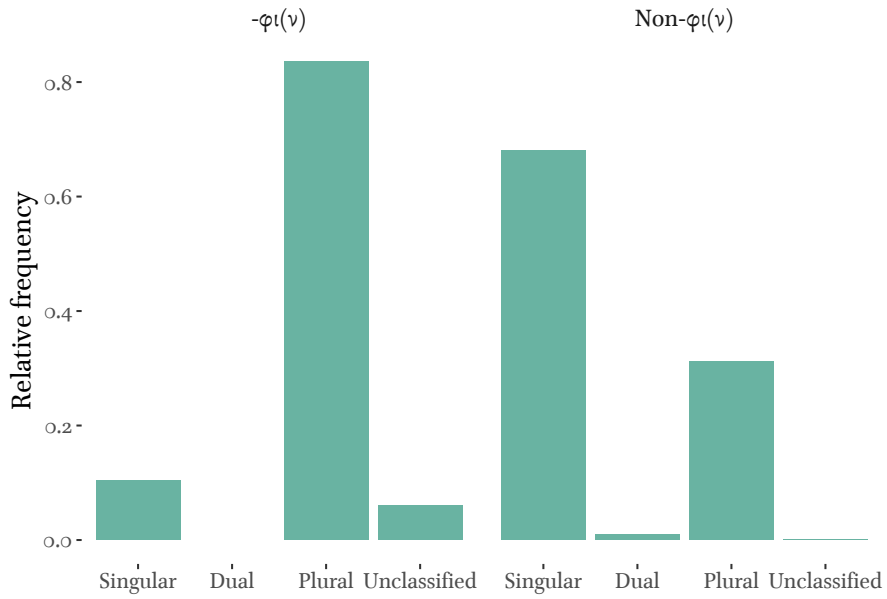

Figure 3: Relative frequency according to grammatical number

3.3 Word order

The following surface word order pattern has yet to be observed in the literature.[10] In strings of an adjective and a noun and phrases paired by conjunction or disjunction that contain a φι(ν)-form, the φι(ν)-form is uniformly rightmost in the phrase:

(21) a. *Adjective-noun*
ὡς δ᾽ ὅτ᾽ ἀπὸ **πλατέος πτυόφιν** μεγάλην κατ᾽ ἀλωὴν...
'As when from a **broad shovel** in a large threshing floor...'
Il. 13.588

b. *Noun-adjective*
οἶνον ἔχους᾽ ἐν **χειρὶ** μελίφρονα **δεξιτερῆφι**...
'(Hekabe came in) holding delicious wine in her **right hand**...'
Il. 24.284–285

c. *Conjoined phrase*
τὸν δ᾽ οὐ βέλος ὠκὺ δάμασσεν,
ἀλλ᾽ ἀναχωρήσας πρόσθ᾽ **ἵπποιιν** καὶ **ὄχεσφιν**
ἔστη.
'Him the swift arrow did not kill. Drawing back he took his stand before his **two horses** and **chariot**.'
Il. 5.106–108

d. *Disjoined phrase*
ἦ μή τίς σ᾽ αὐτὸν κτείνει **δόλωι** ἠὲ **βίηφιν**;

[10] I am grateful to Mark Hale for initially drawing my attention to this pattern.

'Can it be that someone is going to kill you **by cunning** or **force**?'

Od. 9.406

Examples (21a) and (21b) feature adjective-noun and noun-adjective sequences, respectively. In both cases, the φι(ν)-form is the rightmost of the two elements. Likewise, in conjoined and disjoined phrases (examples 21c and 21d, respectively), the φι(ν)-form is uniformly the rightmost of the two elements.

Feature sharing between the φι(ν)-form and preceding nominal is crucial to this pattern. In examples (21a) and (21b), the φι(ν)-form agrees in gender, number, and case with the preceding nominal. In example (21c), the conjoined phrases both share the same case value (dative). In example (21d), both nouns share the same case and number values. When there is no agreement or feature-sharing relationship at play, then the word-order pattern in example (21) does not obtain:

(22) μὴ πρὶν παύειν χεῖρας ὁμοιΐου πολέμοιο
πρὶν κατὰ **Ἰλιόφι** κλυτὰ τείχεα λαὸν ἐέλσαι
Τρωϊκόν.

'Do not rest your hands from grievous[?] war, until you pen the Trojan people inside the famed walls **of Ilion**.'

Il. 21.295

Ἰλιόφι modifies κλυτὰ τείχεα 'famed walls' but neither agrees with nor shares morphosyntactic feature values with it. In contrast to the cases in example (21), the φι(ν)-form precedes other elements in its phrase.

Crucially we do not find examples of conjoined and disjoined phrases or adjective-noun sequences in which a φι(ν)-form precedes a non-φι(ν) form. This absence is due to the underdetermined nature of the case marker. In the phrases above, the φι(ν)-form has the same morphosyntactic properties as the preceding nominal. In contrast to the φι(ν)-form, the preceding nominal is not underdetermined. In example (21a), for instance, the genitive singular πλατέος cues the listener to the morphosyntactic properties of the agreeing noun πτυόφιν. Were the order of the adjective and noun reversed, this cue would be lost.

3.4 Morphology

As noted in section 2 above, Mycenaean <-pi> is restricted to athematic stems, whereas thematic stems are marked with <-Co> /-o:is/. In Homeric Greek, -φι(ν) is suffixed to both athematic- and thematic-stem nominals (Morpurgo Davies 1966:54, Thompson 1998:241):

(23) *Athematic*
  a. *Noun*
  νευρῆ-φι: νευρή 'bowstring'
  ὄρες-φι: ὄρος 'mountain'
  b. *Adjective*
  δεξιτερῆ-φι: δεξιτερή 'right'

(24) *Thematic*

a. *Noun*
δακρυό-φι: δάκρυον ‘tear’
b. *Adjective*
δεξιό-φιν: δεξιός ‘right’

The thematic forms are particularly interesting because the theme vowel is stressed (i.e., δακρυό̲φι, δεξιό̲φιν), irrespective of the stress of the base form.

Surprisingly, athematic nouns are also found with -όφι(ν) (Thompson 1998:241, Hajnal 1995:291):

(25) *Athematic nouns in* -ό-φι(ν)
a. κοτυληδον-ό-φιν: κοτυληδών ‘any cup-shaped hollow or cavity; (pl.) suckers of the cuttle-fish’
b. ἐσχαρ-ό-φιν: ἐσχάρη ‘hearth’

Ventris and Chadwick (*DMG*²:82–83) note that -φι(ν) is not suffixed to stems ending in stops or liquids. Such a phonotactic constraint would then account for κοτυληδονόφιν. Example (25b) seems to show that the appearance of -ό- is not motivated solely by phonotactics (i.e., it is not straightforwardly a linking vowel, *pace* Hajnal 1995:291 n. 369), however, since the stem ends in a vowel, ἐσχάρη- (cf. νευρῆφι in 23a above). In section 4.5, I suggest that the forms in the example above result from overabundance at the stem level (see further see Chantraine 1942:§104, Lejeune 1972).

3.5 Two synchronic exceptions that diachronically are not

There are two synchronic exceptions to the claim that forms in -φι(ν) are nominals.[11] The first is the preposition and adverb (ἀπο)νόσφι(ν) ‘away from’:

(26) νόσφι φίλου πατρὸς καὶ μητέρος
‘**away from** (my) dear father and mother’

Hom. *Il.* 19.422

Although the etymology of νόσφι(ν) is obscure (e.g., *EDG*:1024–1025, Dieu 2010:64–68), it has long been thought that it continues an instrumental plural word form (*DELG*:757). In my view, the best account of the history of νόσφι(ν) compares it with Latin *nates* ‘buttocks’ and Greek νῶτον ‘back’ (Schulze 1888:263 n. 1, Schwyzer 1959:362). Morphosyntactically, a change from a body-part noun to a preposition is typologically common (for an example of ‘waist, middle’ > ‘between’ from Digor Ossetic, see Thordarson 1989:470). Semantically, ‘back’ or ‘buttocks’ to ‘behind’ would find typological parallels (Kuteva et al. 2019:64–65, 83). From here, the step to ‘apart from, away from’ would be short. Augmented ἀπονόσφι(ν) simply intensifies the distance involved, i.e., ‘far away from’ as opposed to ‘away from’.[12]

The second exception is the Homeric adverb ἶφι ‘violently, with force, vigorously’:

[11] My claim about the morphosyntax of word forms ending in -φι(ν) does not include the preposition and adverb ἀμφί, since this form cannot be suffixed with moveable nu. I assume that this -φι is the reflex of the suffix */-b^{h}í/ discussed in section 5.2 below.

[12] The main challenge for this account is the uncertainty of the input form and the motivation for the necessary steps. To begin with the former, νόσφι(ν) could continue the instrumental plural of a root noun */not-p^{h}i/ or an *i*-stem noun */noti-p^{h}i/. The latter preform has the advantage of lining up with Latin *nates*. If we assume this starting point, then we have to posit assibilation and deletion, but the order of these changes is unclear. Assibilation could have preceded deletion (*/notip^{h}i/

(27) πῶς τίς τοι πρόφρων ἔπεσιν πείθηται Ἀχαιῶν
ἢ ὁδὸν ἐλθέμεναι ἢ ἀνδράσιν ἶφι μάχεσθαι;

'How would any of the Achaeans gladly obey your words either to go set off on an expedition or to fight **vigorously**?'

Il. 1.150–151

Ἶφι could in principle be interpreted either as a manner adverb 'vigorously' or as an instrumental noun 'with vigor'. On the analysis of ἶφι as a noun, it would be unique among forms in -φι(ν) in its lack of contrasting paradigmatic forms. One could postulate a defective paradigm, in which the only case form of a stem ἰ- would be ἶφι. This would be an attractive analysis if there were examples in which ἶφι exhibited agreement with an adjective or served as the complement of a preposition. Such patterns are unattested, however: ἶφι never participates in agreement and is never the complement of a preposition. In fact, the distribution of ἶφι is highly restricted. Although it is attested seventeen times in the *Iliad* and *Odyssey*, it co-occurs with only three verbal lexemes (δαμάζω, ἀνάσσω, and μάχεσθαι). Moreover, it is uniformly the penultimate word in the metrical line (and almost always the beginning of the fifth metrical foot). Sychronically, ἶφι is thus an adverb. On this analysis, it does not belong to the paradigm of a lexeme (ϝ)ἰ- and in contrast to the φι(ν)-forms discussed in the preceding sections is not formed via suffixation.

Diachronically, however, ἶφι is the erstwhile instrumental plural of the stem *ϝἰ- 'sinew' (Clackson 1994:69).[13] It thus underwent the common semantic change from instrument to manner (e.g., Kuteva et al. 2019:241–242). The root (but not the stem.}) of ἶφι is cognate with Vedic *váyas* 'strength' and Latin *vis* 'strength'.\footnote{Although Vedic *váyobhir* and Latin *viribus* are both *s*-stem nouns, there is reason to believe that membership in this stem class is an innovation. Indeed, the singular sub-paradigm of *vis* in Latin (e.g., genitive singular *vis*, accusative singular *vim*) bears witness to a stem /wi:-/, which agrees with the shape of the stem in Homer and Mycenaean. Vedic *váyas-* is thought to have undergone a similar innovation, even if the details are less clear (cf. *EDLIL*:683). Greek goes on to reassign the stem ἰ- to a different inflectional class, namely the *n*-stem ἴς, ἰνός 'sinew, strength' These lexical items preserve what must have been the earlier state of affairs with ἶφι (cf. Ruijgh 2011:275, *OLD*:s.v. uīs B):

(28) a. agnír amṛ́to abhavad **váyobhir**
yád enaṃ dyáur janáyat surétāḥ

'Agni became immortal **through his vital powers**, when Heaven of good seed begat him.'

RV 10.45.8cd (tr. Jamison and Brereton 2014:1451)

b. **viribus** haud ullis valuit discludere morsus
roboris Aeneas.

> */nosip^{h}i/ > νόςφι) or the opposite order could have obtained, in which case we would have to postulate additional steps: */notip^{h}i/ > */notp^{h}i/ > */notsp^{h}i/ > */nossp^{h}i/ > νόςφι. Similar changes perhaps resulted in μέςφα 'until'. For my purposes the crucial point is only that νόςφι(ν) continues an instrumental plural word form. So I leave open the question of its phonological history.

[13]Beekes (*EDG*:598–599) reconstructs two homophonous roots **wiH-* 'strength' and **wiH-* 'tensile force'. It is to the former that he assigns Homeric ἶφι 'with force'. He writes that "It is debatable whether ἴς 'sinew' (which seems to have had ϝ-) is a concretization of 'strength', or if it was originally a separate word." Given how close the two meanings are, the reconstruction of two homophonous roots seems unnecessary, since in all likelihood one developed from the other. As far as the semantics go, we simply have to reverse the trajectory that Beekes proposes: 'sinew' > 'strength'. The evidence in example (28) reflects such a development.

'Despite all his **strength**, Aeneas was unable to open the bite of the oak.'

Verg. *Aen.* 12.782–783

The Vedic instrumental plural *váyobhir* encodes the instrument semantic role, whereas in Latin *viribus* encodes this role with the synchronic ablative. In sum, ἶφι is synchronically an adverb but diachronically an instrumental plural noun.[14]

3.6 Interim summary

The essential points of my analysis of the Homeric data are the following:

(29) *Main points*

a. Forms in -φι(ν) are nominals. The only synchronic exceptions to this generalization are (ἀπο)νόσφι(ν) and ἶφι, which are lexicalized case forms.

b. -φι(ν) serves as an alternate way to realize genitive or dative case, in any gender or number.

In the next section, I model these generalizations in Paradigm Function Morphology.

4 Paradigm Function Morphology

One of the major questions in linguistic theory is whether morphological paradigms have a status in the grammar or whether they are mere epiphenomena. Paradigm Function Morphology is a theory of inflectional morphology in which paradigms play a fundamental role: inflectional paradigms are part of the grammar of a language and not mere by-products of principles of morpheme composition (Stump 2001a, Stump 2001b, Spencer 2013:143–172, Stump 2016a, Stump 2016b, Bonami and Stump 2016). Within the typology of morphological theories, PFM is INFERENTIAL and REALIZATIONAL (Stump 2001b:1–3, Stewart and Stump 2007:387). It is realizational because all morphosyntactic information is independently available on the stem; inflection markers realize these features. It is inferential in that inflection markers do not exist as independent entities in the lexicon (i.e., morphemes have no theoretical status). The crucial advantage of this approach is that it provides a framework that distinguishes morphosyntactic properties (i.e., inflectional categories and their values) from the exponents that realize those properties.[15]

Essential to Paradigm Function Morphology (PFM) and the scientific study of morphology generally (Booij 2012:3) is the distinction between a LEXEME and a WORD FORM. The semantic and grammatical content shared by all forms of a word constitute a lexeme. Lexemes bear a meaning (or grammatical function) and a syntactic category, but not a phonological form. I represent lexemes with small caps, e.g., DOG. Lexemes are realized by individual word forms, i.e., by phonological forms (Stump 2016a:58–66). In fact, the purpose of inflectional morphology is to give phonological expression to pairs of lexemes and property sets (Stump 2012:256). The realization of the lexeme DOG, for instance, is the set of its word forms: {*dog, dogs*}.

[14] One can perhaps also compare the Gothic adverbs in *-ba*, which may have arisen from an instrumental case form, although uncertainty abounds (see Heidermanns 1996:265–274 for a review of past proposals and a new attempt at the problem).

[15] A reviewer notes that Paradigm Function Morphology was developed as a model of speaker competence. I want to highlight the fact that this is not the use to which I am putting this framework. I use PFM to offer an explicit and falsifiable account of -φι(ν) in Homer.

Morphosyntactic properties are the properties to which the syntax and morphology of a language are sensitive (Stump 2016a:8) and generally serve three functions (Stump 2012:256):

(30) *Morphosyntactic property sets*
   a. Constrain lexical insertion
   b. Determine semantic interpretation
   c. Induce the introduction of inflectional exponents

Among Greek nominals, gender, number, and case are all relevant to both inflectional morphology and syntax. In canonical paradigms, each well-formed combination of these properties defines a paradigm cell. A cell is pairing of lexical and morphosyntactic content. More formally, a cell is a pairing of a lexeme L and a property set σ. The realization of the cell ⟨DOG, {PL}⟩ is the word form *dogs*. So each word form of a lexeme expresses one (or, in more complex situations, more than one) of its cells (Stump 2016a:10).

4.1 Paradigm Linkage Theory

The most recent version of Paradigm Function Morphology champions two claims about inflectional paradigms (Stump 2016a:1):[16]

(31) a. *The irreducibility hypothesis*
   Some morphological regularities are, irreducibly, regularities in paradigm structure.
   b. *The interface hypothesis*
   Paradigms serve as the interface between the inflectional morphology of a language and its syntax and semantics.

These two hypotheses constitute the PARADIGM-LINKAGE THEORY, the central idea of which is that the definition of the inflectional morphology of a language results from the interaction of three types of paradigms: CONTENT PARADIGMS, FORM PARADIGMS, and REALIZED PARADIGMS.

Content paradigms delimit the range of morphosyntactic property sets with which lexemes associate. These morphosyntactic property sets are the inflectional categories of a language that determine semantic interpretation in accordance with syntactic context. The form paradigm is the result of a mapping from the lexeme to the stem. Realization rules then apply to each form cell of a stem to determine its morphophonological expression. Content paradigms are relevant to syntax and semantics, whereas form paradigms have morphophonological relevance (Stump 2012:257–258). The relationship between the three types of paradigms is presented in Table 2.

CONTENT CELLS	← *Rules of paradigm linkage* →	FORM CELLS	← *Realization rules* →	REALIZA-TIONS

Table 2: The architecture of inflectional morphology (Stump 2012:258)

The following example of the lexeme DOG illustrates each type of paradigm:

[16] Two phases of Paradigm Function Morphology are recognized in the literature, PFM1 and PFM2. Bonami and Stump (2016) outline the differences between PFM1 and PFM2.

(32) a. *Content paradigm*
{⟨DOG, {SG}⟩, ⟨DOG, {PL}⟩}
b. *Form paradigm*
{⟨*dog*-, {SG}⟩, ⟨*dog*-, {PL}⟩}
c. *Realized paradigm*
{⟨*dog*, {SG}⟩, ⟨*dogs*, {PL}⟩}

Canonical linkage among the three paradigms is characterized by the following properties (Stump 2012:259):

(33) *Canonical paradigm linkage*
a. The relation between a lexeme's content cells and their form correspondents is a total function, i.e., every content cell has a form correspondent.
b. All of a lexeme's form correspondents share the same stem, i.e., all are drawn from the same form paradigm.
c. The relation between content cells and their form correspondents is one-to-one rather than many-to-one, i.e., there is no sharing of form correspondents.
d. A content cell's form correspondent is morphosyntactically faithful to it, i.e., it carries the same morphosyntactic property set.

Paradigm-linkage theory is designed to handle an array of deviations from this canonical behavior by means of various functions that are introduced below.

4.2 Rules of exponence

The association of morphosyntactic properties with their exponents is achieved via rules of exponence (Ackerman and Stump 2004:133, Spencer 2013:171, Stump 2016a:48, Stump 2016b:49):

(34) *Rule of exponence*
X, C, $\kappa \rightarrow f(X)$

X is a variable over stems, C a variable over stem class, κ represents a property constraint, and f an operation on stems (such as the addition of a suffix). Property constraints restrict the application of rules of exponence and are satisfied by morphosyntactic property sets. The satisfaction relation between a set P of morphosyntactic properties and members of a set C_P of property constraints for P is defined as follows (Stump 2016a:48):

(35) Where $\sigma \subseteq P$ and $\kappa_1, \kappa_2 \in C_P$
a. σ satisfies $[\kappa_1 \wedge \kappa_2]$ iff σ satisfies both κ_1 and κ_2.
b. σ satisfies $[\kappa_1 \vee \kappa_2]$ iff σ satisfies either κ_1 or κ_2 or both.
c. σ satisfies $\neg\kappa_1$ iff σ does not satisfy κ_1.
d. If $\kappa_1 \subseteq P$, then σ satisfies $\kappa_1 \subseteq \sigma$.

According to this definition, the property set {MASC ACC SG} satisfies both of the following property constraints:

(36) a. {ACC SG} by (35d)
b. [[ACC ∨ GEN] ∧ SG] by (35b)

This definition of the satisfaction relation means that the property constraint of a rule of exponence may underdetermine the morphosyntactic properties associated with the word as a whole (Stump 2001b:7, Stump 2016a:17–18, 29, 36–38). The ability of rules of exponence to underdetermine the morphosyntactic property sets of a word form is essential to the analysis of Homeric -φι(ν) in section 4.4 below.

If rules of exponence provide alternate ways of realizing the same morphosyntactic content, they compete. Consider the following French rules of exponence (Stump 2016a:50):

(37) *Competing rules of exponence*
a. X, V, {1 PL} → Xɔ̃
b. X, V, {1 PL SIMPLE.PST IND} → Xm

The property set {1 PL SIMPLE.PST IND} satisfies both of the property constraints in the rules above, but PĀṆINI'S PRINCIPLE prevents both from applying:

(38) *Pāṇini's principle* (Stump 2001b:22, Stump 2016a:50)
When two rules compete the narrower rule overrides the more general rule. A rule A is narrower than a rule B if and only if the set of stem pairings to which A is applicable is a proper subset of those to which B is applicable.

In the French example above, the rule in example (37b) is narrower than that in example (37a) and therefore overrides it. In section 4.5 below we will see that a fundamental property of the Homeric *Kunstsprache* is the relaxation of Pāṇini's principle.

4.3 Mycenaean

Returning to Greek, in this section I present a PFM analysis of Mycenaean inflectional morphology. At the morphosyntactic level, we need to recognize at least the values for the inflectional categories of gender, number, and case presented in Table 3. If one were to recognize other case values, such as the ablative (Hajnal 1995:289), it would have no impact on my analysis. The only crucial value for my account is the instrumental case. In view of the uncertainty surrounding the formal paradigms of Mycenaean, I focus here only on those aspects of Mycenaean inflectional morphology that are essential for the account of Homeric -φι(ν) presented in the next section.

In section 2.1 above, I argued that the instrumental plural and dual had syncretized by the time of Mycenaean. In Paradigm Function Morphology, syncretism is the realization of two or more content cells through a single form cell (Stump 2016a:170–183). The use of Mycenaean <-pi> to realize the instrumental dual is an example of directional syncretism (Stump 2016a:175–179), because the instrumental dual is parasitic on the instrumental plural. Whereas the content paradigm of Mycenaean nominals has separate cells for the instrumental plural and dual, the form paradigm has only one:

INFLECTIONAL CATEGORY	VALUE
GENDER	MASCULINE, FEMININE, NEUTER
NUMBER	SINGULAR, DUAL, PLURAL
CASE	NOMINATIVE, GENITIVE, DATIVE, ACCUSATIVE, INSTRUMENTAL, VOCATIVE

Table 3: Morphosyntactic properties of Mycenaean Greek nominals

(39) *Mycenaean instrumental mismatch*

a. *Content paradigm cells*
⟨L, {GENDER:α, CASE:INSTRUMENTAL, NUMBER:PLURAL}⟩
⟨L, {GENDER:α, CASE:INSTRUMENTAL, NUMBER:DUAL}⟩

b. *Form paradigm cell*
⟨X, {GENDER:α, CASE:INSTRUMENTAL, NUMBER:PLURAL}⟩

One way to handle this mismatch between content and form paradigms is with the property mapping function $\boldsymbol{pm}_c$:

(40) *Instrumental plural and dual syncretism*
$\boldsymbol{pm}_c$({GENDER:α CASE:INSTRUMENTAL NUMBER:DUAL}) =
{GENDER:α, CASE:INSTRUMENTAL, NUMBER:PLURAL};
otherwise, $\boldsymbol{pm}_c(\sigma) = \sigma \cup c$

The property mapping function $\boldsymbol{pm}_c$ (the subscript $_c$ indexes inflection class) here extends the form of the instrumental plural content cell to the realization of the instrumental dual across all grammatical genders, with the result that there is a many-to-one relationship between the instrumental plural and dual content cells and the instrumental plural form cell.

The following rules of exponence then map instrumental plural form cells to their realizations:

(41) *Rules of exponence*

a. X, [Athematic nominal], {INST PL} → X<-pi>[17]

b. X, [Thematic nominal], {INST PL} → X<-o>

According to these rules of exponence, <-pi> is suffixed to athematic nominals in the context of the instrumental plural and dual and <-o> in the case of thematic instrumental plurals. It is important to note that the ability of <-pi> to realize instrumental dual nominals is not a property of either exponents in example (41). According to my analysis, the parasitic relationship between the instrumental dual and plural is a property of Mycenaean nominal paradigms and not specific exponents.

[17]Were one to recognize <-pi> forms suffixed to thematic stems, then the inflection class for this rule of exponence would simply be [Nominal]. If one did not believe that the instrumental plural and dual were syncretized, one could do away with the syncretism in example (40) and instead formulate the property constraint in the rule of exponence in (41a) as {INST ¬SG}, which would associate <-pi> with non-singular morphosyntactic property sets.

4.4 Homer

The content paradigms of Homeric Greek nominals are well-formed extensions of the morphosyntactic properties properties in Table 4. The instrumental is crucially absent from this table, since it is irrelevant to the syntax and morphology of Homeric Greek. For instance, there are no predicates that assign instrumental case to their arguments. In addition, nominals typically agree for gender, number, and case, but instrumental is not a licit agreement feature. It is therefore impossible for -φι(ν) to realize the instrumental case in Homeric Greek.[18]

INFLECTIONAL CATEGORY	VALUE
GENDER	MASCULINE, FEMININE, NEUTER
NUMBER	SINGULAR, DUAL, PLURAL
CASE	NOMINATIVE, GENITIVE, DATIVE, ACCUSATIVE, VOCATIVE

Table 4: Morphosyntactic properties of Homeric Greek nominals

My analysis of Homeric -φι(ν) requires the addition of a further inflectional category beyond that of gender, number, and case, namely that of oblique. Oblique case is defined with the following property co-occurrence restriction (cf. Stump 2001b:179 on direct case in Sanskrit):

(42) *Oblique property co-occurrence restriction*
A set σ of morphosyntactic properties for a nominal is in conformity with the property cooccurrence restrictions of Homeric Greek only if: σ is an extension of {OBL:YES} iff σ is an extension of either CASE:GEN or CASE:DAT.

Oblique is thus a second-order morphosyntactic property that automatically appears in the presence of genitive or dative case. It is worth noting that this property is relevant not only for the morphosyntax of Homeric Greek, but also for stress distribution (e.g., Probert 2006:116) and syncretism (discussed in section 4.5 below).

The rule of exponence for -φι(ν) is then defined as follows:

(43) *Rule of exponence*
X, [Nominal], {OBL:YES} → ⟨Xφι, σ⟩

According to this rule, -φι(ν) appears in paradigm cells associated with the property sets in Table 5, which form a natural class in as much as they are all extensions of a single property, OBL:YES. This rule captures the syntactic and semantic properties of -φι(ν) detailed in section 3 above. First, it enables -φι(ν) to show up after any preposition that assigns genitive or dative case. In addition, it enables forms in -φι(ν) to encode any semantic role associated with either of the oblique cases. Which semantic role it assumes is determined by the content cell that -φι(ν) realizes. For instance, if -φι(ν) realizes the content cell ⟨L, {MASC DAT SG OBL:YES}⟩, then the form will be able to do what any other dative singular can do.

[18] *Pace* Risch (1974:361), it makes no sense to assert that -φι(ν) is an instrumental, ablative, locative, genitive, and dative suffix, since at least the first two of these are not morphosyntactic properties in Homer.

{GEN SG MASC OBL:YES}	{GEN SG FEM OBL:YES}	{GEN SG NEUT OBL:YES}
{GEN DU MASC OBL:YES}	{GEN DU FEM OBL:YES}	{GEN DU NEUT OBL:YES}
{GEN PL MASC OBL:YES}	{GEN PL FEM OBL:YES}	{GEN PL NEUT OBL:YES}
{DAT SG MASC OBL:YES}	{DAT SG FEM OBL:YES}	{DAT SG NEUT OBL:YES}
{DAT DU MASC OBL:YES}	{DAT DU FEM OBL:YES}	{DAT DU NEUT OBL:YES}
{DAT PL MASC OBL:YES}	{DAT PL FEM OBL:YES}	{DAT PL NEUT OBL:YES}

Table 5: Oblique morphosyntactic property sets

Before situating the rule of exponence in example (43) within Homeric inflectional morphology more broadly, there are two points that I want to highlight. The first is that the ability of -φι(ν) to realize the content cells listed in Table 5 is not due to syncretism. The reason for this is that it is not a general property of Homeric Greek nominal paradigms that there is a many-to-one relationship between oblique content cells and oblique form cells. The distribution of Homeric -φι(ν) is due to the property constraint of this particular exponent. The second point is that the underdetermination in the rule of exponence in example (43) should not be conflated with underspecification. Underspecification in the context of Paradigm Function Morphology would entail the absence of either inflectional categories or their values among content cells, which is decidedly not the case with Homeric -φι(ν). The distribution of Homeric -φι(ν) is due to its ability to realize a multitude of content cells and not to any sort of defective, underspecified, or unspecified quality in the content cells themselves.

4.5 Homeric overabundance

In canonical paradigms, each content cell is realized by exactly one word form (Stump 2016a:147). For instance, the content cell ⟨DOG, {PL}⟩ has one realization, the word form *dogs*. Homeric Greek paradigms deviate from this canonical standard, as illustrated by the declension of the lexeme CTHΘOC 'chest' in Table 6. Forms prefixed with an asterisk are not attested in Homer and are provided only for the sake of illustration. Shaded columns reflect syncretisms (which are discussed in the next paragraph). The multiple realizations of the dative plural reflect a central property of Homeric Greek, its morphological overabundance. My analysis adds an additional word form in -φι(ν) to each of the oblique cells.

	SG	DU	PL
NOM	στῆθος	*στήθεε	στήθεα
VOC	στῆθος	*στήθεε	στήθεα
ACC	στῆθος	*στήθεε	στήθεα
GEN	στήθεος	*στηθέοιιν	στηθέων
DAT	στήθεϊ	*στηθέοιιν	στήθεσσι, στήθεσι

Table 6: The declension of CTHΘOC 'chest' in Homeric Greek

There are number of syncretisms that occur across all inflectional classes in Homeric Greek. Form paradigms are insensitive to the distinction between nominative, accusative, and vocative dual; genitive and dative dual; and nominative and vocative plural. These syncretisms differ from that of Mycenaean in example (40) above in that they are not directional, that is, one form cell does not rely on another for its

realization. Symmetrical syncretism can be captured with the following property mappings (cf. Stump 2016a:181–182):

(44) *Nominative-accusative-vocative dual syncretism*
Where γ is any gender and c is the inflection-class index associated with any declension, $\boldsymbol{pm}_c(\{\gamma$ NOM DU$\}) = \boldsymbol{pm}_c(\{\gamma$ ACC DU$\}) = \boldsymbol{pm}_c(\{\gamma$ VOC DU$\}) = \{\gamma$ NAV DU c$\}$

(45) *Genitive-dative dual syncretism*
$\boldsymbol{pm}_c(\{\gamma$ DAT DU$\}) = \boldsymbol{pm}_c(\{\gamma$ GEN DU$\}) = \{\gamma$ GD DU obl:yes c$\}$

(46) *Nominative-vocative plural syncretism*
$\boldsymbol{pm}_c(\{\gamma$ NOM PL$\}) = \boldsymbol{pm}_c(\{\gamma$ VOC PL$\}) = \{\gamma$ NV PL c$\}$;
otherwise, $\boldsymbol{pm}_c(\sigma) = \sigma \cup$ c

The property mapping function again creates a many-to-one relationship between content cells and form cells by reducing the number of form cells.

For neuter nouns, there is also a directional syncretism among the non-oblique cases (Stump 2016a:181–182):

(47) $\boldsymbol{pm}_c(\{$NUMBER:α GENDER:NEUT CASE:NOM$\}) =$
$\boldsymbol{pm}_c(\{$NUMBER:α GENDER:NEUT CASE:VOC$\}) =$
$\{$NUMBER:α GENDER:NEUT CASE:ACC$\}$;
otherwise, $\boldsymbol{pm}_c(\sigma) = \sigma \cup$ c

The function $\boldsymbol{pm}_c$ here maps neuter nominative and vocative content cells in either the singular or plural to the accusative form cell.

The stem of CTHΘOC is not uniform throughout its declension, as it alternates between στηθος- and στηθε-. This alternation is dictated by the membership of CTHΘOC in the neuter *s*-stem inflection class. Stump (2016a:71, 82) describes such an alternation as CLASS-DETERMINED and labels the stems that participate in this type of alternation KINDRED STEMS. The ***Stem*** function maps lexemes onto kindred stems as follows:

(48) Where L is an *s*-stem noun
$\boldsymbol{Stem}(\langle$L, σ:$\{$NEUT SG OBL:NO$\}\rangle) =$ Χος
otherwise, $\boldsymbol{Stem}(\langle$L, σ$\rangle) =$ Χε

According to this function, the stem alternation among neuter *s*-stem nouns is morphosyntactically conditioned: the stem in -ος- occurs in the nominative, accusative, and vocative neuter singular (in other words, the non-oblique cases), that in -ε- everywhere else. Finally, I assume that the membership of CTHΘOC in the recessive stress-assignment class is established in the mapping from the content paradigm to the form paradigm.

The form paradigm of CTHΘOC is presented in Table 7. I signal the membership of CTHΘOC in the recessive stress-assignment class with the abbreviation *rec.* (To keep this illustrative example simple, I have not formalized the process of stress assignment.) The gaps in the form paradigm are due to the property mappings in examples (44)–(46).

{⟨στηθοc, {NEUT NAV SG OBL:NO S rec}⟩,	⟨στηθε, {NEUT NAV DU OBL:NO S rec}⟩,	⟨στηθε, {NEUT NAV PL OBL:NO S rec}⟩,
⟨στηθε, {NEUT GEN SG OBL:YES S rec}⟩, ⟨στηθε, {NEUT DAT SG OBL:YES S rec}⟩,	⟨στηθε, {NEUT GD DU OBL:YES S rec}⟩,	⟨στηθε, {NEUT GEN PL OBL:YES S rec}⟩, ⟨στηθε, {NEUT DAT PL OBL:YES S rec}⟩}

Table 7: The form paradigm of CTHΘOC 'chest'

The mapping from the form paradigm to the realized paradigm among the oblique paradigm cells is then accomplished by the following rules of exponence:

(49) *Oblique rules of exponence* (cf. Stewart and Stump 2007:392)

a. X, [3rd declension nominal], {GEN SG OBL:YES} → ⟨Xoc, σ⟩
b. X, [3rd declension nominal], {GD DU OBL:YES} → ⟨Xοιιν, σ⟩
c. X, [3rd declension nominal], {GEN PL OBL:YES} → ⟨Xων, σ⟩
d. X, [3rd declension nominal], {DAT SG OBL:YES} → ⟨Xι, σ⟩
e. X, [3rd declension nominal], {DAT PL OBL:YES} → ⟨Xcci, σ⟩
f. X, [3rd declension nominal], {DAT PL OBL:YES} → ⟨Xci, σ⟩
g. X, [Nominal], {OBL:YES} → ⟨Xφι, σ⟩

Crucially, rules (49a)–(49f) are all narrower than rule (49g). In canonical paradigms, Pāṇini's principle would have only have allowed the narrower rules above to apply and nominals in -φι(ν) would have been blocked. A central feature of the Homeric *Kunstsprache* is the relaxation of this assumption, which provides rhapsodes with alternate realizations for a given content cell.[19] The dative plural of CTHΘOC, for instance, has the three following realizations:

(50) *Homeric overabundance*[20]
PF(⟨CTHΘOC, {NEUT DAT PL OBL:YES}⟩) = {⟨στήθεccι, {NEUT DAT PL OBL:YES S rec}⟩, ⟨στήθεcι, {NEUT DAT PL OBL:YES S rec}⟩, ⟨στήθεcφι, {NEUT DAT PL OBL:YES S rec}⟩}

It is worth noting that it is not -φι(ν) specifically that requires the relaxation of Pāṇini's principle.[21] As

[19] On the topic of *Kunstsprache*, I want to clarify a point that is often misapprehended. The Homeric dialect is "artificial" only to the extent that it was used in metrical composition but not non-metrical speech. It is not "artificial" in the sense that it is somehow at odds with or falls beyond the boundaries of natural language. Such a view of the Homeric *Kunstsprache* is to be emphatically rejected. Morphological overabundance exists among non-metrical forms of speech (Thornton 2011, Thornton 2012, Stump 2016a:147–155, Cappellaro 2018, Thornton 2019). The Homeric *Kunstsprache* thus differs from other languages in degree, not kind. Overabundance is simply more prevalent in Homeric Greek on account of its metrical utility, as laid out in section 4.6 below.

[20] The paradigm function in this example is technically not a function but a relation (see further Bonami and Boyé 2007, Bonami and Stump 2016:469), since it defines more than one word form for a given lexeme-morphosyntactic property set pair.

[21] Stump (2016a:151) and Thornton (2019:229–230) distinguish two types of overabundance, one that arises in the mapping from content cells to form cells and another that arises in the mapping from form cells to realizations. Overabundant φι(ν)-forms are predominantly of this second type, but cases of the first also exist. In example (25) above, I noted two lexemes that exhibit both athematic and thematic stems. This appears to be a case of overabundance at the stem level. For instance, the

witnessed by the dative plural forms in Table 7 above, for instance, overabundance is a general property of the Homeric epics and not limited to the distribution of -φι(ν).

An anonymous reviewer poses the important question of how my analysis ensures that Pāṇini's principle is relaxed only in places where we need it to be relaxed. This is a difficult question to answer, because we typically cannot tell whether the absence of a form is a reflection of the grammar or simply an accident of the text. An adequate answer to the question of what role Pāṇini's principle plays in Homeric Greek morphology requires examination of the entire nominal system of Homeric Greek, an endeavor that lies beyond the remit of this study. For the time being, I can at least say that I am aware of no situation in which relaxing Pāṇini's principle opens the door to the overapplication of a rule of exponence.[22]

4.6 Motivating Homeric overabundance

The motivation for Homeric overabundance is widely agreed to be functional. Multiple realizations of a single content cell are useful to the poet (Chantraine 1942:§105). Risch (1974:361) writes in regard to -φι(ν) specifically: "Bei Hom. ist -φι dagegen nur noch ein metrisch bequemes poetisches Suffix für Instr., Abl. und Lok. (vereinzelt Dat. und Gen.), Sing. und Plur." Although I think the formulation of the morphosyntactic portion of this statement is inaccurate, I agree with the prosodic portion. It is not, however, the whole story. The preservation of -φι(ν) in fact serves two purposes: it is metrically expedient and archaizing.

To start with metrics, -φι(ν) offers a useful prosodic alternative to most other oblique case exponents, as Table 8 reveals. For the genitive singular, dual, and plural, and the dative singular and dual, -φι(ν) is prosodically unique. Hajnal (1995:291) calls attention to the metrical advantage of ἐξ Ἐρέβεσφιν at *Il.* 9.572 (Thompson 1998:246 records a number of other cases):

(51) τῆς δ' ἠεροφοῖτις Ἐρινὺς
ἔκλυεν **ἐξ Ἐρέβεσφιν** ἀμείλιχον ἦτορ ἔχουσα.
'(The) air-traversing Erinyes of pityless heart heard her **from Erebos**.'

Il. 9.571–572

With genitive ἐξ Ἐρέβεος, the prepositional phrase would be metrically illicit.

	GEN SG	GEN-DAT DU	GEN PL	DAT SG	DAT PL
Thematic	-οιο, -οο, -ου	-οιιν	-ων	-ωι	-οιϲι, -οιϲ
Athematic -α/-η	-ηϲ, -αο, -εω		-αων, -εων	-ηι	-ηιϲι, -ηιϲ
Athematic	-οϲ			-ι	-εϲϲι, -ϲι

Table 8: Overabundant oblique case exponents in Homer

lexeme ΚΟΤΥΛΗΔΩΝ 'any cup-shaped hollow or cavity' would have both an athematic stem and a thematic stem; κοτυληδονόφιν would be the oblique realization of the latter.

[22] I want to make it clear that my analysis is restricted to the possible word forms that can be deduced from pairs of lexemes and morphosyntactic property sets. I have not attempted to provide an account of Homeric usage. That is, I have not attempted to answer the question of why a word form with a particular case exponent is selected in a particular metrical position, since such a question would require its own investigation.

In the dative plural, -φι(ν) does not offer the same prosodic advantages. Here it appears to be otiose given the availability of -σι(ν). Hajnal (1995:290) notes in particular that metrical expedience cannot account for the existence of ὄχεσφι beside ὄχεσσι;[23] Thompson (1998:247) notes two more such cases.

In addition to metrical utility, -φι(ν) also offers the poet a way to distance epic language from everyday speech (Miller 2014:334), since it is unlikely that -φι(ν) was part of spoken Ionic in the late eighth and early seventh centuries BCE. Hackstein (2002:15) in fact singles out -φι(ν) as one of the central examples of Homeric archaizing (cf. Schadewalt 1965:54–86, Greenhalgh 1973:41–42, Powell 1991:190–191 for other aspects of Homeric archaizing).

4.7 An excursus on dual φι(ν)-forms

The realization rule in example (43) associates -φι(ν) with forms in all oblique cells, including dual cells. This rule of exponence thus extends beyond the observable evidence, since there are no φι(ν)-forms in Homer with dual reference. Is this absence an accident of the corpus or linguistically real? In this section, I use Bayesian inference to argue for the former.[24] To answer this question, I compare the proportion of forms with dual reference among nominals ending in -φι(ν) to the proportion of forms with dual reference among nominals that are not marked with -φι(ν). Table 9 lists the token frequency of singular, dual, and plural adjectives and nouns in Homer that end in -φι(ν) compared to other case markers.

NUMBER	NON-φι(ν)	-φι(ν)
Singular	56,976	17
Dual	752	0
Plural	26,088	137
Unclassified	16	10
Total	83,832	164

Table 9: Token frequency according to grammatical number

The crucial question is whether the frequency of dual forms among non-φι(ν) nominals, i.e., the proportion 752/83,832, differs from the frequency of dual forms among nominals marked with -φι(ν), i.e., the proportion 0/164. According to the null hypothesis, there is no difference between the rate at which dual forms occur among φι(ν)-nominals and non-φι(ν) nominals. The alternative hypothesis posits a difference between the two rates.

I use Bayes' Theorem and Markov Chain Monte Carlo (MCMC) sampling to estimate the difference between the rate of appearance of a dual form among -φι(ν) and non-φι(ν) nominals.[25] Figure 4 presents

[23] The motivation in this particular case could have been segmental, if for some reason the poet wanted to avoid geminate -σσ-.

[24] One could also use a chi-squared test to evaluate this question. I have not done that here because of the way that such frequentist statistical tests work. In short, one can either reject a null hypothesis or fail to reject a null hypothesis. Neither of these options enables one to assess the degree to which the data support a null hypothesis. Bayesian methods do, however, offer this possibility (Lee and Wagenmakers 2013:107).

[25] A Beta(1,1) prior was used. This is mathematically equivalent to a Uniform(0,1) distribution, according to which all values between 0 and 1 have an equal probability of being sampled. It is thus an uninformative prior. For the analysis, three MCMC chains of two million iterations each were run with a burn-in of 200,000.

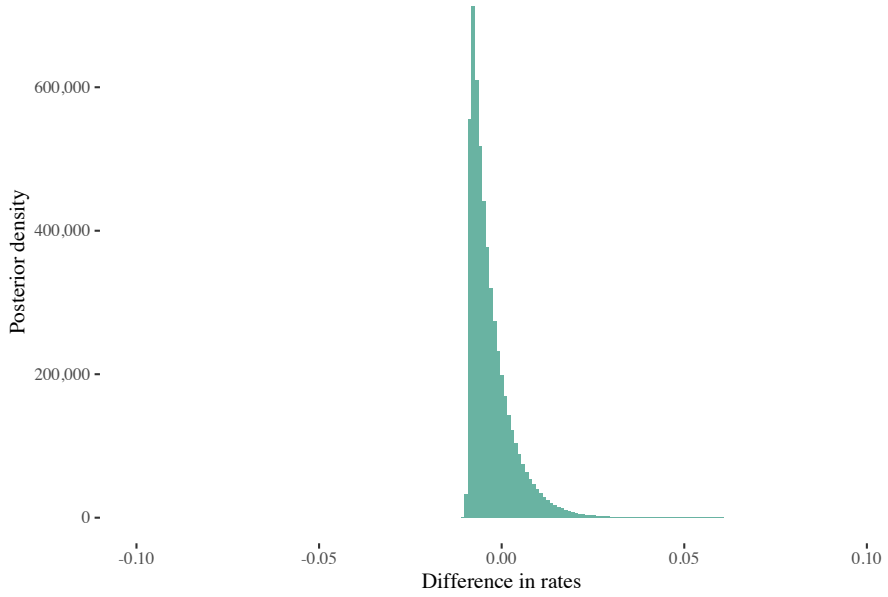

Figure 4: Posterior distribution of the difference in rates

the posterior distribution of the difference in rates. The crucial property of this graph is that most of the samples cluster around zero, which is to say that most of the samples suggest that there is no difference in the proportion of dual forms found among φι(ν)-nominals compared to those with other case-endings. The 95% credibility interval is (-0.0089, 0.013), which means that we can be 95% confident that the true difference in the proportion of dual forms lies somewhere in this interval. Crucially this interval includes zero.

We can also compare the relative performance of models with a Bayes factor. A Bayes factor is the ratio of the marginal likelihoods of two competing hypotheses. In other words, we are comparing the performance of the null model to that of the alternative model. The Bayes factor in favor of the null hypothesis is 38, which constitutes "very strong" evidence (Kass and Raferty 1995). In sum, there is reason to believe that the absence of dual φι(ν)-forms in Homer is an accident of the corpus.

5 Diachrony

The synchronic analysis advanced in the previous section is essential to understanding the diachronic differences between Mycenaean <-pi> and Homeric -φι(ν). In particular, the analysis of Homeric -φι(ν) as an oblique case marker reveals that several previous historical accounts of these exponents are untenable. In this section, I advance three diachronic claims. First, the difference between Mycenaean <-pi> and Homeric -φι(ν) results from a weakening of the constraints in the rule of exponence of the instrumental plural exponent. Second, Homeric -φι(ν) is not—despite claims to the contrary by, e.g., Chantraine (1942:§108)—morphosyntactically archaic (cf. Thompson 1998:248). One can therefore not project aspects of its behavior back to earlier stages of Greek or to Proto-Indo-European. Finally, Mycenaean <-pi> and Homeric -φι(ν) continue the instrumental plural case marker */-bʰis/ and not the adverbial suffix */-bʰi/.

5.1 From Mycenaean to Homer

In this section, I investigate the diachronic relationship between Mycenaean <-pi> and Homeric -φι(ν). Hajnal (1995:294) argues for the following analytic space:

(52) *Analytic possibilities according to Hajnal*

a. */-p^{h}i/ is morphosyntactically plural (and dual?) in Proto-Greek. The singular use of -φι(ν) in Homer is an innovation that is emerging in Mycenaean.

b. */-p^{h}i/ is morphosyntactically singular in Proto-Greek. The use of Mycenaean <-pi> with dual and plural denotation, which is also found in Homer, is an innovation.

c. */-p^{h}i/ is morphosyntactically underspecified for number in Proto-Greek.

Hajnal (1995:297–298) himself subscribes to the view in (52b), that */-p^{h}i/ is morphosyntactically singular in Proto-Greek.[26] On his analysis, the restriction of Mycenaean <-pi> to plural morphosyntax is therefore an innovation. Hajnal asserts further that since Homeric -φι(ν) did not undergo this innovation, Mycenaean and the precursor of Homeric Greek must have belonged to different "Dialektsphären." This claim is not elaborated.

If we start from the common (but by no means universal) assumption that */-b$^{\text{ɦ}}$is/ realized the instrumental plural in Proto-Nuclear-Indo-European (i.e., the ancestor of all Indo-European languages except the Anatolian clade), then Hajnal's account would entail that this */-b$^{\text{ɦ}}$is/ became a marker of the instrumental singular between Proto-Nuclear-Indo-European and Greek, only to then regain an association with the plural at some point on the way to Mycenaean. Such a trajectory strikes me as unlikely.

Hajnal (1995:294–295) rejects analysis (52a) because a morphosyntactic change from plural to singular is, in his view, too difficult to motivate (cf. Miller 2014:294). This objection is based on a misunderstanding of the nature of the change, however. According to Hajnal, the change in (52a) looks something like the following:

(53) a. *Mycenaean Greek*
X, [Nominal], {INST PL} → ⟨X<-pi>, σ⟩

b. *Homeric Greek*
X, [Nominal], {INST SG} → ⟨Xφι, σ⟩
X, [Nominal], {INST PL} → ⟨Xφι, σ⟩

A rule of inflection realizing the instrumental plural (example 53a) gives rise to a rule of inflection that realizes the same case form in the singular (example 53b).[27]

As we have already seen in section 4.4 above, however, the ability of -φι(ν) to realize singular forms is the by-product of a weakened property constraint:[28]

[26] Hajnal ultimately argues (p. 329) that PIE */-b$^{\text{ɦ}}$i/ was characterized by "Numerusindifferenz."

[27] Ruijgh (2011:275) appears to support this view of the diachrony. He accounts for the use of -φι(ν) with singular denotation with reference to the reinterpretation of ἶφι. Once this word became intepreted as 'with force', speakers were able to use -φι(ν) with singular nouns. If true, this analysis would only account for one aspect of -φι(ν), its semantics. It would not account for the range of semantic roles presented in section 3.2.1 above.

[28] Sihler (1995:§257.8) asserts that Homeric -φι(ν) is more conservative than Mycenaean <-pi>, because only the former

(54) a. *Mycenaean Greek*
X, [Athematic Nominal], {INST PL} → ⟨X<-pi>, σ⟩
b. *Homeric Greek*
X, [Nominal], {OBL:YES} → ⟨Xφι, σ⟩

The difference between Mycenaean and Homer thus lies not so much in the development of a rule of exponence that associates -φι(ν) with the singular, but rather in the loss of any specification for grammatical number in its property constraint. Indeed, this sort of weakening is typical of grammaticalization (e.g., Bybee et al. 1994:9, Kuteva et al. 2019:3, Condoravdi and Deo 2014).[29]

It is difficult to piece together how and why this change happened. One possibility is that φι(ν)-forms ended up as alternative realizations of the genitive and dative because the semantic roles that the erstwhile instrumental encoded (judging by the Mycenaean evidence, these would be instrument and location) were reassigned to the dative and genitive (on the ability of the genitive to encode location, see Smyth 1956:§1448). So in the Homeric period -φι(ν) is able to realize both genitive and dative case because they are both associated with semantic roles that were once the remit of the instrumental. As for the underdetermination of number, this is even less clear, but it could have arisen from the prevalence of manner readings with forms in -φι(ν). As observed above in section 3.5 with respect to ἴφι, manner readings of instrumental nouns can obscure grammatical number. A plural instrumental noun 'with forces' vel sim. can be interpreted as an adverb 'forcefully' with no grammatical number. These suggestions are little more than informed speculation, however.

5.2 Diachronic source: **/-bʰis/ or */-bʰi/?

A central question in the diachrony of Homeric -φι(ν) is whether it continues the Proto-Nuclear-Indo-European athematic instrumental plural case marker */-bʰis/ or the adverbial suffix */-bʰi/. Table 10 presents the exponents that are standardly interpreted as reflexes of a Proto-Nuclear-Indo-European athematic instrumental plural exponent */-bʰis/.[30] The Germanic and Balto-Slavic exponents, with the "Northern IE" (Jasanoff 2009:138) substitution of */-m-/ for */-bʰ-/, are considered innovations (see further Hill 2012:178–192). */-bʰis/ is thought to have developed after the departure of Anatolian (Jasanoff 2009:139, Lundquist and Yates 2018:2088), since the instrumental plural markers in Anatolian (e.g., Hittite *-it*, *-d/ta*) are not cognate with the exponents in Table 10.[31]

is indifferent to number. This indifference to number is a property of deep antiquity: "aboriginal indifference to number is guaranteed by the PIE singular personal pronouns **mébhi* 'to me' and **tébhi* 'to you' dat.sg. … which are very ancient" (cf. Hajnal 1995:329). The */-bʰi/ morph found among pronouns is exclusively found in the singular. They therefore cannot be equated with Homeric -φι(ν). The relationship between the morph */-bʰi/ in */mébʰi/ and */tébʰi/ and the case markers in Table 10 above and the adverbs in example (55) remains unclear. One possibility is that the dative pronominals are somehow connected to the allative semantics of */-bʰi/.

[29] A reviewer notes that Homeric Greek does not stand in a relationship of descent with Mycenaean Greek, so it is inaccurate to talk about a diachronic change from the latter to the former. This is of course true, but the change implied in example (54) still stands. As detailed in section 5.2, the Mycenaean situation preserves an earlier state of affairs, so one can attribute the rule of exponence in example (54a) to the most recent common ancestor of both Mycenaean and Homeric Greek.

[30] Luján and López Chala (2020:§3) argue that the Greek evidence shows that the original form of the instrumental plural exponent was in fact */-bʰi/.

[31] Jasanoff (2009:141) and Melchert and Oettinger (2009:63–64) maintain that */-is/ was the original case marker of the instrumental plural in Proto-Indo-European. The later */-bʰis/ results from the fusion of */-bʰi/ and */-is/.

CLADE	LANGUAGE	EXPONENT
Indo-Iranian	Vedic	*-bhiḥ*
Indo-Iranian	Avestan	*-bīš*
Indo-Iranian	Old Persian	*-biš*
Celtic	Old Irish	*-(i)b*
Celtic	Gaulish	-BI
Germanic	Gothic	*-m*
Germanic	Old Norse	*-m(r)*
Germanic	Old High German	*-m*
Baltic	Lithuanian	*-mìs*
Slavic	Old Church Slavic	*-mi*

Table 10: Reflexes of Proto-Nuclear-Indo-European */-b$^{\text{ɦ}}$is/

The following forms continue the adverbial suffix */-b$^{\text{ɦ}}$i/ (for a useful collection of data, see Dunkel 2014:113–116):[32]

(55) *Adverbs in* */-b$^{\text{ɦ}}$i/

a. */h$_1${o,e}-b$^{\text{ɦ}}$í/ 'there, towards, against' > Ved. *abhí* OCS *obъ* Go. *bi* (Dunkel 2014:325, 350–351)

b. */h$_2$nt-b$^{\text{ɦ}}$í/ 'on both sides' > Greek *ἀμφί* Lat. *am(b)-* OIr. *imm* OHG *umbi* (Dunkel 2014:35–40, 307)

c. */k$^{\text{w}}$o-b$^{\text{ɦ}}$í/ > Hitt. *kuwapi* 'when, where' Lat. *(ali)cubi* (Melchert and Oettinger 2009:65, Dunkel 2014:437 n. 9, 463)

From these examples it appears that this suffix encoded spatial semantics, more specifically direction and location. Given the existence of adverbs that continue */-b$^{\text{ɦ}}$i/ both within and outside of Anatolian, this suffix is typically reconstructed to Proto-Indo-European (Lundquist and Yates 2018:2087–2088).

Identifying the ancestral form of -φι(ν) is challenging because morphosyntactically */-b$^{\text{ɦ}}$is/ is more akin to -φι(ν) but segmentally it is closer to */-b$^{\text{ɦ}}$i/. I present here three attempts to overcome these challenges: the contamination analysis of Jasanoff (2009); the substitution analysis of Ringe (2017:53); and the backformation analysis of Melchert and Oettinger (2009:66).

Jasanoff (2009:143) tries to resolve this conundrum by arguing that -φι(ν) resulted from a merger of two Mycenaean suffixes, the instrumental plural exponent /-p$^{\text{h}}$is/ and an adverbial suffix /-p$^{\text{h}}$i/. In support of this view, he notes that "Late PIE *-*b^{h}i*, like Gk. -φι(ν), covered a wide range of case functions—dative, ablative, instrumental, and locative" (Jasanoff 2009:141). This description is at odds with the data, however. Jasanoff overstates the similarity between "Late PIE" */-b$^{\text{ɦ}}$i/ and Homeric -φι(ν). The semantic range of */-b$^{\text{ɦ}}$i/ appears to be more restricted than Jasanoff allows, in as much as the forms in example (55) cluster

[32] Hajnal (1995:329) raises the possibility that Tocharian A *-yāp* and Tocharian B *-epi*, both genitive singular exponents, continue */-b$^{\text{ɦ}}$i/.

around locative and directional semantics (Melchert and Oettinger 2009:63–64).[33] Moreover, Jasanoff's account glosses over the ability of Homeric -φι(ν) to realize genitive case. The suffix */-bʰi/ has nothing to do with the genitive or semantic roles associated with the genitive. Once we recognize that */-bʰi/ and -φι(ν) are actually not that similar, the motivation for the alleged merger of /-pʰis/ and /-pʰi/ vanishes.

Ringe (2017:53) contends that */-bʰi/ has "been pressed into service as a case ending in Greek and Armenian." This analysis circumvents the segmental issue of the final */-s/, but lacks motivation morphosyntactically. For one, it is far from clear why an adverbial suffix that was not specified for number specifically became an instrumental plural case marker. Second, it is mysterious how one gets from the locative and directional semantics exhibited by the forms in example (55) above to the instrumental semantics of Mycenaean <-pi>.

Melchert and Oettinger (2009:66) maintain that "Der Befund Homers spricht jedenfalls für einen regularen vormykenischen Instrumental Singular auf *-$b^h i$ im Griechischen." According to this analysis, */-bʰi/ is a backformation from plural */-bʰis/. In a similar vein, Martirosyan (2013:91) claims that "Greek and Armenian share the use of *-$b^h i$- as an instrumental singular marker." As explicated in section 5.1 above, however, there is no reason to believe that -φι(ν) or its precursor was ever morphosyntactically an instrumental singular.[34]

In my view, */-bʰis/ is a far more plausible source of Mycenaean <-pi> and Homeric -φι(ν) than */-bʰi/. */-bʰis/ and <-pi> are both instrumental plural exponents and the behavior of Homeric -φι(ν) results from a weakening of inflection class and property constraints, as detailed in section 5.1 above. As for the final sibilant, there is currently no way to know whether it was lost before or after Mycenaean. There is at any rate no regular sound change that would delete word-final /-s/. Whenever this change took place, I attribute it to analogy with the athematic dative plural <-si>/-σι(ν). Given their morphosyntactic overlap, it is plausible that they would pattern together segmentally.

6 Envoi

I have argued that Homeric -φι(ν) is an oblique case marker that ultimately descends from the Proto-Nuclear-Indo-European instrumental plural exponent */-bʰis/. My analysis also makes a broader methodological point. Form-meaning associations are fundamental to the investigation of diachronic mor-

[33] Jasanoff's broader view of the semantics of */-bʰi/ appears to be based not just on the reflexes of this adverbial suffix (such as those in example 55), but also on the dative-ablative case exponent */-bʰ(j)os/ and the instrumental plural */-bʰis/, which can be analyzed as */-bʰi-os/ and */-bʰi-(i)s/, respectively. However, one cannot simply assume, as Jasanoff (2009:140) appears to do, that the morphosyntactic properties of */-bʰi-os/ and */-bʰi/ were identical. For example, a dative-ablative */-bʰi-os/ does not necessarily entail a dative-ablative */-bʰi/.

[34] The comparison between Greek and Armenian is in fact spurious (*pace* Godel 1975:103, Matzinger 2005:117, Olsen 1999:10) because the presumed reflex of */-bʰi/, *-b/-w/-v*, is an instrumental singular marker, as opposed to being an oblique case marker (Schwyzer 1959:551). It is of course possible that */-bʰi/ in Armenian once underdetermined number and that a contrast with the plural was subsequently recreated with the addition of *-k^c to yield *-bk^c/-wk^c/-vk^c (so Kortlandt 2003:48). If that is the true history, the reflex of */-bʰi/ does not become an instrumental singular marker until after the contrast with the plural is renewed. Alternatively, one could argue that *-bk^c/-vk^c continue instrumental */-bʰis/ directly, from which singular *-b/-v* was backformed (**klingenschmitt1994**, Matzinger 2005:117, 136). Matzinger (2005:136) presents a slightly more complicated chain of events. He assumes an initial "Adverbialsuffix" */-bʰi/, which is underdetermined for number. A plural */-s/ is then suffixed to the original marker to yield */-bʰis/, from which Armenian *-b/-w/-v* is backformed. My goal here is not to advocate for a particular analysis of the diachrony of instrumental case marking in Armenian. It is merely to point out that the Armenian instrumental singular *-b/-v* is not morphosyntactically comparable to Homeric -φι(ν).

phosyntax. Homeric -φι(ν) reveals that we cannot rely on the morphosyntactic properties of word forms alone when studying morphological history. We have to look at the role that a particular exponent plays in the inflectional morphology as a whole. As I have demonstrated, the fact that some φι(ν)-forms are morphosyntactically singular does not mean that this case marker specifically realizes singular number or that it descended from such an exponent. Finally, this analysis is part of a recent trend in Indo-European linguistics to reassess the linguistic properties attributed to Proto-Indo-European (cf. Kiparsky 2010, Lundquist 2015, Yates 2015, Lundquist and Yates 2018). Previous scholars interpreted the peculiarities of Homeric -φι(ν) as evidence for an uralt exponent of either Proto-Indo-European or even Pre-Proto-Indo-European antiquity. Such a view appears to be rooted in the conviction that the pecularities of -φι(ν) must be due to retained archaism. When we analyze the peculiarities more closely, however, it becomes clear that they are innovations and not archaisms.

The data and code used for this paper are archived at `10.5281/zenodo.3592064`.

Abbreviations

DELG Pierre Chantraine (2009). *Dictionnaire étymologique de la langue grecque. Histoire des mots*. 2nd ed. Paris: Klincksieck.

DM Francisco Aura Jorro, ed. (1985–1993). *Diccionario micénico*. Salamanca: Consejo Superior de Investigaciones Científicas.

DMG² Michael Ventris and John Chadwick (1973). *Documents in Mycenaean Greek*. 2nd ed. Cambridge: Cambridge University Press.

EDG Robert S. P. Beekes (2010). *Etymological dictionary of Greek*. 2 vols. Leiden Indo-European Etymological Dictionary Series 10. Leiden: Brill.

EDLIL Michiel de Vaan (2008). *Etymological dictionary of Latin and other Italic languages*. Leiden Indo-European Etymological Dictionary Series 7. Leiden: Leiden.

OLD Peter G. W. Glare, ed. (2012). *Oxford Latin dictionary*. 2nd ed. Oxford: Oxford University Press.

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