

Lexical Ambiguity and Lexicalizations of Punctual *Until* in the Diachrony of Ancient Greek*

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ABSTRACT The preposition *until* has received extensive attention in recent decades. As an explanation of its distribution and semantics, Karttunen (1974) proposed the Lexical Ambiguity Analysis (LAA), suggesting that there are *two* *untils*: a durative (*until-d*) and a punctual *until* (*until-p*). Giannakidou (2002) and Condoravdi (2008) have attempted to support the LAA with evidence from languages like Greek, which appear to have distinct lexicalizations of *until-d* and *until-p*. Yet recently, Staniszewski (2020) and Iatridou & Zeijlstra (2021) have argued the LAA lacks empirical coverage of the crosslinguistic facts and that a unified analysis should be preferred. In this paper I examine whether a LAA also lacks diachronic coverage in Greek. I find that in Greek prior to the 6th CE there was not a distinct yet simultaneous lexicalization of *until-d* and *until-p*. These data provide diachronic support from the history of Greek for the analysis in Iatridou & Zeijlstra (2021).

1 HISTORY OF ANALYSIS OF *UNTIL*

The preposition *until* (=UP) is a boundary adverbial that ‘relates two propositions within a scalar model’ called the Until Time Span (UTS) (Kay 1990, Iatridou & Zeijlstra 2021). The UTS sets the right-boundary (RB) of a state of affairs, which forms the topic time of the utterance. Boundary adverbials like the UP behave like definite descriptions, which select a maximally informative interval of an event for comment. In the case of the UTS, the event that sets the RB is selected for comment precisely because it is the moment at which the truth conditions of the utterance change (the final boundary of one event is the initial boundary of another), and is therefore the most informative interval (von Stechow & Iatridou 2019, Iatridou & Zeijlstra 2021).

One reason the UP has received extensive attention in the literature is its puzzling behaviour under negation (e.g. Karttunen 1974, Mittwoch 1977, Dowty 1979, Hitzeman 1991, Declerck 1995, de Swart 1996, Giannakidou 2002, Condoravdi 2008, Iatridou & Zeijlstra 2021, Staniszewski 2020: aspects of this discussion summarise Staniszewski 2020.). Notice that (1a) is acceptable but (1b) is not:

- (1) a. He didn’t arrive until yesterday.
b. #He arrived until yesterday.

* I wish to thank Antonio Revuelta and Ezra la Roi for their insightful comments on earlier drafts of this material. Any remaining errors are of course entirely my own.

The presence of negation makes (1a) licit but not (1b). We might be tempted on this basis to conclude that the UP is a Negative Polarity Item (NPI) because it requires a downward-entailing environment.¹ Yet notice the absence of negation does not affect the acceptability of (2a):

- (2) a. He slept until 9AM.
b. He didn't sleep until 9AM.

One obvious difference between (1b) and (2a) is the type of predicate: (1b) is telic but not durative, while (2a) is durative but not telic. Yet a richer explanation is still required to account for the puzzling behaviour of the UP *under negation*. One early explanation in Mittwoch (1977) was based on scope assignment. She attempted to give a unified analysis of the UP that avoided positing two homophonous lexical items. Her argument was that the distribution in (1) corresponds to a wide-scope *not-throughout* reading and a narrow-scope *throughout-not* reading. On the scopal account, when the UP in (3) is given a reading in which negation scopes over the UP, it receives a *not-throughout* interpretation:

- (3) He wasn't asleep until five.
[NOT [until five [he was asleep]]]

This can be read to mean that during all intervals that held prior to five, he was not asleep, *period*. The *throughout-not* reading arises when the UP scopes over negation:

- (4) [Until five [NOT [he was asleep]]]

This is consistent with a state of affairs in which he was asleep before five, say at three, but woke up at four, and then went back to sleep just after five. While the scopal analysis is elegant, it ultimately failed because it could not account for the relationship between negation and the different inferences triggered by the UP (e.g. a wide-scope or *not-throughout* reading does not behave as expected).

As others had already recognized, a pragmatic distinction exists when the UP is under the scope of negation. Notice that until-p in (5) must receive an enriched interpretation that includes an obligatory (that is, non-cancellable) scalar inference:

- (5) He didn't arrive until yesterday. #And I don't know if he arrived at all.

The UP in (5) generates an inference that widens the domain beyond the right boundary (RB) of the UTS, inferring that the event transpired. Yet unlike (5), the corresponding enrichment in (6) is subject to Gricean reasoning:

¹ Consider Ladusaw's (1980) condition: ' α is a trigger for negative polarity items in its scope iff α is downward entailing.' However NPIs like *punctual* until are *Strong* NPIs (e.g. additive *either*, *in weeks*, etc.) because they require an anti-additive environment: F is anti-additive if and only if $F(A \vee B) \neq F(A) \wedge F(B)$. Anti-additivity is (strictly speaking) weaker than explicit negation (Zwarts 1995: see also Gajewski 2011 and Chierchia 2013).

- (6) He didn't sleep until 12PM. And I don't know if he slept after either.

Both of these inferences are conventionalized scalar implicatures, but notice the distinction: there is a termination inference for until-d (6) but an *actualization* inference for until-p in (5). This puzzling behaviour has generated two major schools of thought: (1) *The Lexical Ambiguity Analysis* (LAA), which states the UP is ambiguous between a strong NPI reading called punctual *until* (until-p) and a Free Choice Item (FCI) reading called durative *until* (until-d), and (2) *The Unified Analysis*, which states the UP is a single lexical item whose various properties arise from the relation between logical entailments (subdomain alternatives), grammatical aspect (the relation between event time and topic time), and a focus sensitive operator called exhaust (EXH).² I review these two schools of thought in more detail below.

1.1 Lexical Ambiguity

The LAA began with [Karttunen \(1974\)](#) who argued that because the UP can be both a NPI with an obligatory inference in certain environments and a seeming FCI with a non-obligatory inference in others, it is lexically ambiguous (that is, there are *two untils*). On the LAA, the pragmatic distinction between until-d and until-p points toward two distinct yet homophonous lexical items. Recently, [Giannakidou \(2002\)](#) and [Condoravdi \(2008\)](#) have defended the LAA using a crosslinguistic argument. They point to languages like Greek, which appear to have distinct lexicalizations of until-d (5a) and until-p (5b):

(7) Until-D: μέχρι (méchri)

- a. Δεν ήξερε ποιο μέρος να πάει **μέχρι** τώρα
not knew.PERF which place to go **until** [méchri] now

He did not know which place to go until just now.

- b. ήξερε ποιο μέρος να πάει **μέχρι** τώρα
knew.PERF which place to go **until** [méchri] now

He knew which place to go until just now.

(8) Until-D: πάρα μόνο (pára móno)

- a. η βόμβα δεν εξερράγη **πάρα μόνο** χθες
the bomb not exploded.PERF **except only** [pára móno] yesterday

The bomb did not explode until yesterday. ([Condoravdi 2008](#))

² If [Iatridou & Zeijlstra \(2021\)](#) are correct, until-d and until-p are not actually a parse of the preposition itself. Instead which parse we assign will depend on the cluster of properties (structural, semantic, logical) that create the obligatory actualization inference. However for the sake of argument, I assume throughout this paper the convention of referring to an until-d and until-p parse.

- b. #η βόμβα εξερράγη **πώρα μόνο** χθες
the bomb exploded.PERF **except only** [pára móno] yesterday
#The bomb exploded until yesterday.

Condoravdi argues that distinct lexicalizations of the UP in Greek provide support for the LAA of the UP in English. Where other accounts provide empirical coverage for the distribution of the UP with certain predicate types, advocates of the LAA maintain their analysis also provides empirical coverage for crosslinguistic data from languages like Greek, which have multiple lexicalizations of the UP. As they reason, if languages like Greek lexicalize a distinction between until-d and until-p, there is good reason to think that the puzzling behavior of the UP in English arises from two homophonous lexical items.

1.2 Unified Analysis

Although it was first proposed by Mittwoch (1977), Staniszewski (2020) and most recently Iatridou & Zeijlstra (2021) have reinvigorated interest in the unified analysis. They argue that the UP always introduces subdomain alternatives and must select for a predicate that either possesses the subinterval property or yields it under negation. That is, where some state holds for one interval t , it must hold for all subintervals of t as well (t_1, t_2, t_3 , etc). This explains why telic predicates like (9b) are ill-formed:

- (9) a. He slept until 9AM.
b. #He arrived until yesterday.

For a predicate in a positive sentence to be compatible with the UP, it must yield the subinterval property - and the predicate *arrive* in (9b) does not yield this property *except under negation*. Without negation, the sentence is illogical: it states that the single event of *arriving* was continually completed until 9PM. The subinterval property also allows us to unify the semantics of until-d and until-p and account for certain grammaticality judgements. Adapting the simplified semantics from Iatridou & Zeijlstra (2021), we can read until-p in (10) as follows:

- (10) He didn't leave until yesterday.
Where e is an event, $\text{Run}(e)$ the runtime of that event, and the UTS is τ , such that $\tau = [t_0, \text{yesterday}]$
 $\neg \exists e [\text{leave}(e, \text{he}) \wedge \text{Run}(e) \subseteq \tau]$

These semantics state that an utterance that contains until-p merely asserts that some event did not transpire prior to the RB of the UTS: for every subinterval at which it was false that the event occurred, it remained false up to the RB (just as at every subinterval at which until-d was true, it remained true up to the RB). Because telic predicates only yield the subinterval property under negation, they cannot combine with the UP except in (at least) anti-additive environments. So

far so good: we can use these semantics to give a unified account of until-d and until-p. Yet this still leaves us with the problem identified by [Karttunen \(1974\)](#): Why does until-d trigger an optional termination inference while until-p triggers an obligatory actualization inference?

[Iatridou & Zeijlstra](#) argue the UP is a scalar item whose different inferences are created by the relation between logical entailments, grammatical aspect, and an operator called EXH.³ EXH is a focus operator that selects for negation all stronger alternatives from the subdomain:

$$(11) \quad [[\text{EXH}]]^{i,g} = \lambda A \langle_{st,t} \rangle . \lambda p \langle_{s,t} \rangle . \forall q \in \text{IE}(p,A) [\neg q \langle_{w_i, t_i} \rangle] \wedge \forall r \in \text{II}(p,A) [r \langle_{w_i, t_i} \rangle]]^4$$

On a grammatical theory of scalar implicatures, EXH is analogous to covert ONLY in that it quantifies over the subdomain in order to negate all *stronger* alternatives ([Fox 2007](#): see also [Spector & Sudo 2017](#)). This is why the UP is incompatible with telic predicates in positive sentences: EXH creates a contradiction. To understand why, we must examine the interaction of EXH with grammatical aspect. When the predicate is perfective, the event time is contained in the topic time. Because this is a stronger alternative, it creates a contradiction: the assertion says the events happened but EXH says it did not. This is why (12) is ungrammatical: it states that between some time τ_0 and 7PM, the event of arriving *transpired*.

$$(12) \quad \# \text{Sue arrived until 7PM} \\ \text{For an UTS } \tau, \text{ such that } \tau = [\tau_0, 7]: \\ \exists e [\text{arrive}(e, \text{Sue}) \wedge \text{Run}(e) \subseteq \tau] \quad (\text{Iatridou \& Zeijlstra 2021: 122})$$

Yet EXH negates all stronger alternatives from the subdomain, such as (13):

$$(13) \quad \{ \exists e [\text{arrive}(e, \text{Sue}) \wedge \text{Run}(e) \subseteq \tau] \mid \tau \subset \tau' \} \\ \exists e [\text{leave}(e, \text{Sue}) \wedge \text{Run}(e) \subseteq [\tau_0, 6]] \\ \exists e [\text{leave}(e, \text{Sue}) \wedge \text{Run}(e) \subseteq [6, 7]]$$

Presumably, if the event took place between 6 and 7, it took place between τ_0 and 6, which took place between τ_0 and 7, and so on. These entailments are the stronger alternatives negated by EXH. Yet such negation leads to a contradiction:

$$(14) \quad \exists e [\text{arrive}(e, \text{Sue}) \wedge \text{Run}(e) \subseteq \tau] \wedge \neg \exists e [\text{arrive}(e, \text{Sue}) \wedge \text{Run}(e) \subseteq \tau]$$

³ ([Fox 2007](#): 80): ‘we might think of exh as a syntactic device designed (‘by a super-engineer’) to facilitate communication in a pragmatic universe governed by [the Gricean maxim of quantity].’

⁴ [Staniszewski \(2020: 277\)](#): ‘EXH takes as arguments a prejacent (p) and set of alternatives (A) and returns the negation of all IE [Innocently Excludable] alternatives, as well as the assertion of all the II [Innocently Includable] alternatives. The IE alternatives are those that can be negated consistently without contradicting the prejacent, and without making arbitrary choices (thus each IE alternative must be in all the maximal sets). The II alternatives are those that can be asserted without contradicting the prejacent and without contradicting the negated IE alternatives (and also each must be in all the maximal sets).’ See also [Bar-Lev & Fox 2017](#).

In other words, by negating all stronger alternatives, EXH negates (12) itself, creating a contradiction. But notice that negation renders the same predicate grammatical:

(15) Sue didn't arrive until 7.

The reason is that telic predicates yield the subinterval property *under negation*, thereby avoiding a contradiction since they do not assert the event transpired prior to the RB. EXH can negate these alternatives without contradiction.

What about the different inferences? There are two answers: contrastive focus and scopal ordering. Although until-d and until-p possess unified semantics, until-p arises only in anti-additive environments. In these environments, it is contrastively focused with the subdomain alternatives negated by EXH (as in Chierchia 2013). Because the RB selects the most informative interval for comment, and because the negated predicate is perfective (the event time is contained in the topic time), focus has a domain-widening effect such that the actualization inference always goes through. In other words, the interval selected by until-p to set the RB is selected because it is the first interval at which the event *began* to transpire. Such domain-widening is limited to NPIs, and is therefore unavailable for until-d. This is why any such inference attached by until-d is subject to Gricean reasoning: the UTS sets the RB at the furthest logically possible interval. In positive sentences, this is the interval at which an event *presumably* last held true. Whether it held true after the RB must be recovered from context. Furthermore, Iatridou & Zeijlstra give a plausible explanation for this distinction based on scopal ordering. They argue until-d is the result of EXH scoping directly *over* the UP (EXH >UP), while until-p is the result of EXH scoping over both negation and the UP (EXH >NEG >UP) (Iatridou & Zeijlstra 2021: 127). When EXH intervenes, such that negation no longer scopes directly over the UP, it prevents contrastive focus from occurring. Without such focus, there is no domain-widening, hence the difference in the kind and necessity of inference between until-d and until-p.

As for the crosslinguistic evidence, Iatridou & Zeijlstra demonstrate that *πάρα μόνο* (*pára móno*) is *not* until-p (16), but rather a general exceptive that selects temporal arguments:

(16) *Δεν θύμωσε παρά μόνο προχθές,*
Not get angry.PERF **except only** [pára móno] the day before yesterday,
χθες το βράδυ και σήμερα το πρωί
 yesterday the evening, and today the morning.

She did not get angry except the day before yesterday, yesterday evening, and this morning. (Iatridou & Zeijlstra 2021: 110)

Likewise, the compatibility of *μέχρι* (*méchri*) with perfectives (17) proves that *μέχρι* (*méchri*) is also *not* until-d:

- (17) **Μέχρι** τις 5 το απόγευμα, ο Γιάννης είχε ήδη
until [méchri] the 5 the afternoon, the John had already
 πει 3 μπύρες
 drink.PLUPERF 3 beers

By 5 in the afternoon, John had already drunk 3 beers.

If μέχρι (méchri) were until-d, perfective predicates in which the event time is contained in the topic time, such as είχε πει (éiche piei), would be impossible. And yet (17) is well-formed. Therefore, in at least Greek, there is not a distinct lexicalization of until-d and until-p. Both πάρα μόνο (pára móno) and μέχρι (méchri) fail the standard tests.

In sum, the Unified Analysis provides a plausible model for the semantics and distribution of the UP, including its obligatory implicature in certain configurations. Yet if the Unified Analysis can provide empirical coverage for synchronic facts in both English and Modern Greek, can it also provide coverage for the *diachronic* facts? After all, several (different) lexicalizations of the UP have always existed in Greek, and it may be that the synchronic state analysed in Iatridou & Zeijlstra (2021) is itself the result of diachronic change (e.g. at an earlier period until-d and until-p were distinctly lexicalized). Below I sketch an answer to this question by examining the diachrony of the UP in Ancient Greek.

2 GREEK DIACHRONY: PROTO-INDO-EUROPEAN (PIE)

There are at least three lexicalizations of the UP in Greek.⁵ The primary lexicalizations in Ancient Greek were ἕως (éios, Archaic ἦος / εἶος), μέχρις (méchris), and ἄχρις (áchris).⁶ Before examining their semantics and distribution, it is important to distinguish their prehistoric origins: μέχρις derives from *me- (with) and *ǵ^hsr- (hand) with a locative suffix (*i*) forming *me-ǵ^hsr-i (Greek: με + χερ + ι), while ἄχρις most likely ‘continues a petrified prepositional phrase *h₂ed-ǵ^h(s)r-i, formed exactly like *me-ǵ^hsr-i, but with a different local particle.’⁷ While it is possible to argue that ἄχρις is an allomorph that arises *via* zero-grade ablaut of μέχρις (ablaut of the syllabic liquid *-m̥, Greek ε → α), this reconstruction is less likely. As van Beek (2018) notes, (1) there is no independent evidence of *me undergoing ablaut, (2) there is no morphological motivation for the variants *meǵ^h(s)ri and *m̥ ǵ^h(s)ri, and (3) the variant me-ǵ^h(s)r-i with only zero grades would be unusual (p. 54). As to their geographical distribution, ἄχρις (áchris) may have arisen independently from PIE in Ionian, while μέχρις (méchris) was originally Attic (Chantraine 1999). The origin of ἕως (éios) can be reconstructed from PIE *ieh₂uot (‘until, as far as’), where it was presumably as productive as it is in Ancient Greek (Beekes & van Beek 2009).

⁵ That is, there is overdifferentiation. See de Swart, Tellings & Wälchli (2022: 24).

⁶ For the purposes of this paper, I do not treat μέσφα, ὄφρα, and τόφρα since these lexicalizations do not persist into later periods of Greek and are not the subject of the LAA.

⁷ van Beek (2018: 54): ‘... enthält den Lokativ des Wortes für ‚Hand‘ (‘contains the locative of the word for hand’). See also Pokorny 1959, Joseph 2017, Frisk 1973, Sihler 1995: 441. I wish to thank Kaspars Ozolins for his advice on this section.

2.1 Diachronic Semantics and Periodization

Two preliminary notes are required before examining the diachronic semantics of the UP in Ancient Greek: (1) It is not possible to provide an extensive analysis of all variations on until-d and until-p, or their distribution in particular authors, and (2) While the periodization of Ancient Greek is controversial, testing a hypothesis like the LAA requires generalizations that span nearly 1200 years.⁸ The immensity of such a task will naturally fail to please everyone, and there may be some exceptions to the generalizations made below.⁹ For the purposes of the present argument, it is only necessary to examine the evidence *as it relates to the LAA*: Does any period of Ancient Greek support the LAA by containing a distinct yet simultaneous lexicalization of until-d and until-p?

2.2 Archaic Greek

As noted above, ἕως (eíos, also spelled as ἤως, εἶως, et al.), μέχρι (méchri), and ἄχρι (áchri) were boundary adverbials that established the RB of an UTS, which was the topic time of the utterance. Among these lexicalizations, ἕως (eíos) was the most productive while ἄχρι (áchri) was the least.¹⁰ Assuming that μέχρι (méchri), and ἄχρι (áchri) arose as dialectical variations on a PIE ancestor, and retain a phonetic distinction in Archaic Greek, it is necessary only to review their distribution and semantics relative to ἕως (eíos). In Archaic Greek, μέχρι (méchri) and ἄχρι (áchri) appear to be in complementary distribution with one another, while ἕως (eíos) appears to be in contrastive distribution with at least μέχρι (méchri) (García Novo 2019: 54).

- (18) ὧς Ἐκτωρ εἶως μέν ἀπειλεῖ μέχρι θαλάσσης
 so Hector **until** [eíos] threatening.IMP **until** [méchri] sea

So Hector for a time was threatening *to make his way* up to the sea.¹¹
 Homer, *Iliad*: 13.143

Since both tokens lexicalize until-d, there are two instantiations of the UTS in (18). The second is uncontroversial: μέχρι (méchri) selects an argument that sets the RB of a null completive predicate ('to make his way'). However, the first UTS is more unusual and requires an explanation. Notice that ἕως (eíos) establishes the RB of the UTS without selecting an argument. In such cases it denotes a vague

⁸ All data in this paper comes from *Thesaurus linguae Graecae* (<http://stephanus.tlg.uci.edu/>). Periodization is as follows: Archaic Greek (8th BCE – 5th BCE), Classical (5th BCE – 4th BCE), Early Postclassical (3rd BCE – 1st BCE), Middle Postclassical (1st CE – 3rd CE), Late Postclassical (4th CE – 6th CE).

⁹ La Roi (2020: 219): 'Analyses based on imprecise periodisation such as Hellenistic-Roman for 4th BC–6th AD or 500–1100 AD as Early Medieval Greek contribute to fallible generalizations which could have been prevented if smaller and more precisely periodised data were used.' Although I have tried to adopt la Roi's insights here, space constraints prevent a more fine-grained analysis.

¹⁰ On the use of Homer as evidence for 'oral' Archaic Greek, see Probert 2015.

¹¹ Phrases are italicized when they do not directly translate a referent in the source text. All translations of Homer are adapted from Murray 1924.

period of time at which the predicate held true. This is not attested for μέχρι (méchri) and ἄχρι (áchri), which provides at least a partial explanation for their apparent contrastive distribution with ἕως (eíos) in Archaic Greek. Likewise, it appears that when two durative events were related such that one event was a necessary condition for the truth value of the other, ἕως (eíos) was selected over μέχρι (méchri) and ἄχρι (áchri) to lexicalize until-d:

- (19) ἦσθιε δ' εἶος ἀοιδὸς ἐνὶ μεγάροισιν ἄειδεν
 was eating.IMPF and **until** [eíos] minstrel in halls sang.IMPF

Now he was eating while a minstrel sang in the halls.

[Homer, *Odyssey*: 17.358](#)

In such cases, the truth value of the predicate that sets the LB is coextensive with the predicate that sets the RB. While much more can be said about contrastive distribution between ἕως (eíos) and at least μέχρι (méchri), the analysis above suffices to show that at least some variation existed in lexicalizations of until-d, although this variation does not point yet to a distinct lexicalization of until-d and until-p.

Above I noted that μέχρι (méchri) and ἄχρι (áchri) probably arose as dialectal variations on a common PIE ancestor. It is clear in the earliest written evidence that one could substitute μέχρι (méchri) for ἄχρι (áchri) without changing the semantics of the UP:

- (20) πειρησαίμεθα ἔργου νήστιες ἄχρι μάλα κνέφαος
 might test.PERF work.GEN fasting.NOM.PL **until** [áchri] deep darkness

We might test our work, fasting until late evening.

[Homer, *Odyssey*: 18.370](#)

Notice in (20) that ἄχρι (áchri) selects a deverbal noun as a temporal argument that sets the RB of the UTS. The noun νήστιες (nísties, fasting) is coreferential with the subject of the matrix clause, but it is not marked for grammatical aspect. Nevertheless, as a lexicalization of until-d, ἄχρι (áchri) must select a predicate that possesses the subinterval property. In this case, the deverbal noun inherits the lexical aspect of its verbal counterpart, which is inherently durative, satisfying the subinterval criteria. This is why any difference between (21a) and (21b) depends not on the semantics of the preposition itself but the argument that preposition selects:

- (21) a. **μέχρι** (méchri)
 So Hector for a time threatened *to make his way up to* the sea.
 Given an UTS τ , such that $\tau = [t^0, \text{the sea}]$
 $\exists e [\text{make his way}(e, \text{Hector}) \wedge \text{Run}(e) \subseteq \tau]$
- b. **ἄχρι** (áchri)
 We might test our work, fasting **until** late evening
 Given an UTS τ , such that $\tau = [t^0, \text{late evening}]$
 $\exists e [\text{fasting}(e, \text{we}) \wedge \text{Run}(e) \subseteq \tau]$

So then we have a picture in Archaic Greek that must be at least as true as this: ἕως (éios) was in contrastive distribution with at least μέχρι (méchri), while μέχρι (méchri) and ἄχρι (áchri) were in complementary distribution with one another (presumably for phonetic rather than semantic reasons).

So much for until-d. Do they lexicalize until-p anywhere in Archaic Greek? Unfortunately, the answer is also negative. Neither ἕως (éios), μέχρι (méchri), nor ἄχρι (áchri) lexicalize until-p, since examples like (22) where the UP is in the scope of negation are impossible tokens of until-p:

- (22) *αὐτὰρ ἐγὼ γε οὐκ ἀλέγω εἰός μοι ἐχέφρων Πηνελόπεια*
 But I indeed **not** care.IMPF, **until** [éios] my prudent Penelope
ζῶει ἐνὶ μεγάροισι
 lives in halls

Besides, I don't care, as long as my lady, prudent Penelope, is alive in the palace. Homer, *Odyssey*: 17.390

Recall that a parse as until-p does not depend on a particular grammatical aspect, or the bare presence of negation, but whether the environment is anti-additive and there is an obligatory actualization inference. Examples like (22) are scopally ambiguous and can yield two different readings, corresponding to the not-throughout (23a) and throughout-not (23b) readings from Mittwoch (1977). Such ambiguity is a sign of until-d:

- (23) a. [NOT [as long as Penelope is alive [I care]]]
 b. [as long as Penelope is alive [NOT [I care]]]

It is clear the UP must scope over the negation because (22) is identical to (19): two durative events are related such that one event is a necessary condition for the truth value of the other. So (22) should be assigned a *throughout-not* reading: he did not care as long as it was true that Penelope was alive in the palace. Whether he cared after is subject to Gricean reasoning. Scopal ambiguity and the optional inference in (22) point to until-d, not until-p.

However one might object that until-p (*not...until*) is frequent in English translations of Homer:

- (24) **Nor** did anyone drink **until** he made a drink-offering to the son of Cronos.
 # And whether they drank after, I don't know.

These tokens of until-p are a product of the English translators and not the Greek source (the collocation *not...until* in English versions never translates a lexicalization of the UP under the scope of negation). Notice the equivalent πρὶν (prín) in the Greek source, which is not a lexicalization of the UP:

- (25) *οὐδέ τις ἔτλη πρὶν πίνειν, πρὶν λείψαι*
Nor someone dare.PERF before to drink, **before** [prín] to make a drink-offering
ὑπερμενεί Κρονίῳνι
 to mighty Chronos.

Nor did anyone dare to drink until he made an offering to the mighty son of Cronos. [Homer, Iliad: 5.898](#)

These tokens represent a truth-conditional equivalent of the semantics of until-p (e.g. truth-conditional *before*).¹² While the semantics pattern after until-p, they cannot be parsed as until-p: πρὶν (prín) is not a NPI, does not require a predicate with the subinterval property, and does not introduce subdomain alternatives.

- (26) *οὐ γὰρ πρὶν πολέμου ἀποπαύσεται ὄβριμος Ἑκτωρ πρὶν ὄρθαι παρὰ ναῦφι ποδώκεα Πηλεΐωνα*
Not for before battle he refrained.PERF dread Hector **before** [prín]
 straight beside ships swift-footed, son of Peleus

For dread Hector shall not refrain from battle until the swift-footed son of Peleus rises up beside his ships. [Homer, Iliad: 15.738](#)

Tokens like this state only that some event *e* was not true prior to the RB of the UTS. Whether Hector continued to refrain after Peleus was uprisen is subject to Gricean reasoning. The reason for the confusion among translators is that overlapping logical relations between truth-conditional *before* and until-p yield similar semantics. But this does not mean they are identical. When the context is altered, a reading with the before-phrase can go through that lacks any scalar inference at all, which is impossible for until-p:

- (27) a. *When did everyone start drinking?*
 No one drank before he made a drink-offering to the son of Cronos.
 = They started drinking, but not before making a drink-offering.
- b. *When did everyone start drinking?*
 No one drank before he made a drink-offering to the son of Cronos.
 = And no one drank after either, for it was a day of great battle.

The question in (27a) embeds a presupposition that the event did in fact occur. The before-phrase does not introduce a contradiction because its logical properties are consistent with the actualization of the event. Notice also in (27b) how the inference that the event occurred can be blocked without contradiction. In both cases, we find overlapping logical relations cause the semantics of truth-conditional *before* to pattern like until-p, but the fact that truth-conditional *before* lacks the corresponding obligatory inference demonstrates that it cannot be given a parse as until-p, making the English translation *not... until* for these tokens misleading.¹³

¹² On the semantic overlap between *Before* and *Until*, see [de Swart et al. 2022](#).

¹³ That is, English translations of Homer use explicitation to interpretively resemble a corresponding inference from the Greek source.

Strictly speaking, despite their distinct origins in Proto-Indo-European, lexicalizations of the until-phrase in Archaic Greek do not codify a distinction between until-d and until-p.¹⁴ For the purposes of the present argument, these data disconfirm the LAA for this period since until-p is not present, and there cannot be lexical ambiguity as a result. However, the analysis above now allows us to examine the diachrony of these three prepositions to see if at some stage they *do* enter into a relation that codifies a lexical distinction between until-d and until-p.

2.3 Classical Greek

One area of obvious continuity between Archaic and Classical Greek is that the semantics of until-d in Classical Greek continue to pattern after Archaic Greek in predictable ways, where the levels of productivity and distribution for particular lexicalizations of until-d remain stable. It is not necessary here to provide more examples. Let us begin with diachronic change in the form of host class and semantic-pragmatic expansion. In Classical Greek, chunks begin to emerge in the form of idiom clusters like μέχρι τούτου (méchri toutou) . . . ἕως ἄν (éos án) in (28), which are (at this stage) not substitutable for different lexicalizations of until-d:

- (28) ἀλλ' ἴθι, ὦ ἄριστε, ὀλίγον ἐπίσπου, **μέχρι** **τούτου**
 But come, o friend, a little while follow.IMPF **until** [méchri] **this**
 αὐτοῦ ἕως ἄν εἰδῶμεν εἴτε ἄρα σὲ δεῖ
 same **until** [éos] **might** see whether, after all, you it is necessary
 διαγραμμάτων περὶ μέτρον εἶναι
 of diagrams concerning a measure to be

But come, my noble friend, follow a little while until such a time as we might see whether you should claim to be a measure of diagrams.

Plato, *Theaetetus*: 169a

In Classical Greek, although it was logically possible for μέχρι (méchri) to be substituted for ἄχρι (áchri), such a substitution is unattested for this particular cluster, where the initial and final slots are always μέχρι (méchri) and ἕως (éos):

¹⁴ So de Swart et al. (2022: 25): ‘different semantic encodings of the ‘not . . . until’-meaning [cross-linguistically] are semantically/pragmatically equivalent, but originate in different lexicalizations of the construction.’

(29) **Token Distribution in TLG (5th BCE – 4th BCE):**

Attested:	[méchri]–[ARG]–[éos án]
Unattested:	[méchri]–[ARG]–[méchri án]
Unattested:	[méchri]–[ARG]–[áchri án]
Unattested:	[áchri]–[ARG]–[éos án]
Unattested:	[áchri]–[ARG]–[méchri án]
Unattested:	[áchri]–[ARG]–[áchri án]
Unattested:	[éos]–[ARG]–[méchri án]
Unattested:	[éos]–[ARG]–[áchri án]
Unattested:	[éos]–[ARG]–[éos án]

What explanation can we give for this? Recall the example from Archaic Greek in (30):

- (30) ὥς Ἐκτωρ εἶος μὲν ἀπειλεῖ μέχρι θαλάσσης
 so Hector **until** [éios] threatening.IMP **until** [méchri] sea

So Hector for a time was threatening *to make his way* up to the sea.

In Archaic Greek (and after), ἕως (éios) established the RB of the UTS but could lack an argument when the RB was vague (e.g. when two durative events were co-referential). This appears to be the background to tokens like (28), where the RB is an *irrealis* predicate without an exact location in time (note the modal particle ἄν / án).¹⁵ Lack of substitutability in such cases suggests not only the emergence of a chunk, but that the semantics of ἕως (éios) continue (in certain cases) to constitute a distinct lexicalization of until-d (‘while’) in Classical Greek. We can safely assume the same is the case with μέχρι (méchri) and ἄχρι (áchri) as well.

However, in Classical Greek, we also witness forms of host class expansion that suggest these prepositions are beginning to enter into free variation with one another, which suggests at least partial synonymy. Recall in Archaic Greek that ἕως (éios) was in contrastive distribution with at least μέχρι (méchri), while μέχρι (méchri) and ἄχρι (áchri) were in complementary distribution with one another. While tokens like (28) may witness to the chunking of older distinctions, in Classical Greek these relations have been expanded such that the particular lexicalization now appears arbitrary:

¹⁵ The presence of explicit modality confirms [Iatridou & Zeijlstra \(2021: 277\)](#): ‘with *until*, one can detect elements of modality, possibly because it stretches toward the future.’

- (31) a. οἱ Κορίνθιοι **μέχρι** **τούτου** προθύμως
 The Corinthians **until** [méchri] **this** zealous
 The Corinthians, zealous up to this point...
 Thucydides, *The Peloponnesian War*: 5.32.4
- b. καὶ ταῦτα μὲν ἄχρι **τούτου** φησίν.
 And these things **until** [áchri] **this** he says.IMPF
 And these things he says up to this point. . .
 Hippo, *Testimonia*: D8 (A11) Anon. Lond. 11.23–43
- c. φησὶν γὰρ ἕως **τούτου**
 He says.IMPF for **until** [éos] **this**
 For he says up to this point. . .
 Theopompus, *Fragments*: 2b.115f .267a

As Murphy (2003: 86) notes: ‘synonymy occurs when two words have senses with identical feature specification.’ Such identical feature specifications are well attested in the evidence, where one can find different lexicalizations in minimal pairs written by the same author:

- (32) a. Ἰσχναίνειν δὲ χρὴ τὸ σῶμα ἄχρι ἡμερέων
 to whither.IMPF and it is necessary the body **until** [áchri] days
 δέκα.
 ten.
 Now it is necessary to whither the body for ten days.
 Hippocrates, *On Joints*: 14
 Given a UTS τ , such that $\tau = [\tau_0, 10 \text{ days}]$
 $\exists e [\text{whither}(e, \text{NULL}) \wedge \text{Run}(e) \subseteq \tau]$
- b. καὶ πυρετὸς εἶχε **μέχρις** ἡμερέων δέκα τῶν πρώτων.
 And a fever held.IMPF **until** [méchris] days ten of the first.
 And a fever held for the first ten days. Hippocrates, *Epidemics*: 5.11
 Given a UTS τ , such that $\tau = [\tau_0, 10 \text{ days}]$
 $\exists e [\text{held}(e, \text{fever}) \wedge \text{Run}(e) \subseteq \tau]$

Tokens like (31) are an example of host class expansion: two units, A and B, begin to form a common unit C as the result of A frequently co-occurring with B (Chen 2018: 215). In this case, A is μέχρι (méchri) and B is τούτου (tóutou), which form C, μέχρι τούτου (méchri tóutou). It is clear from tokens like (31a-c) that, at least in certain cases, a choice between particular lexicalizations of until-d was not driven by their semantics. By the time we reach Classical Greek, with exception to repair strategies like epenthesis, it is sometimes not clear at all why an author might have chosen a particular lexicalization of the UP:

Les deux mots sont présents dans Homère. . . μέχρι(ς) est bien plus répandu que ἄχρι(ς). Hérodote, Thucydide, Xénophon, Platon et Théophraste préfèrent μέχρι, tandis que le Corpus Hippocratique et Aristote favorisent les deux, et Démosthène n'utilise que ἄχρι. Il faut remarquer aussi que Thucydide et Platon écrivent seulement μέχρι (pas de -ς, pas d'ἄχρι).

Both [μέχρι and ἄχρι] are present in Homer . . . μέχρι(ς) is much more common than ἄχρι(ς). Herodotus, Thucydides, Xenophon, Plato and Theophrastus prefer μέχρι, while the Hippocratic Corpus and Aristotle favor both, and Demosthenes only uses ἄχρι. It should also be noted that Thucydides and Plato only write μέχρι (no -ς, no ἄχρι)

(García Novo 2019: 54)

Even in cases where multiple lexicalizations are used in the same sentence, it is clear the author has used this for stylistic effects:

- (33) a. ὅμως δὲ περίεστί μοι καὶ ἐσθίοντι ἄχρι
 Nevertheless and there is enough for me and eating **until** [áchri]
 τοῦ μὴ πεινῆν ἀφικέσθαι καὶ πίνοντι **μέχρι** τοῦ μὴ
 the not hungry to come and drinking **until** [méchri] the not
 διψῆν
 drink

Nevertheless, I have enough as to eat until I no longer feel hungry and drink until I do not feel thirsty. [Xenophon, Symposium: 4.37](#)

- b. Διὰ τί μετὰ τὰς τροπὰς ἀμφοτέρως **μέχρι** ἑκατὸν ἡμερῶν
 Why after the solstices each, **until** [méchri] hundred days
 ἀποθνήσκουσι μάλιστα; ἢ ὅτι **ἄχρι** τοσούτου ἑκατέρω
 die especially? or that **until** [áchri] these both
 ἡ ὑπερβολὴ διέχει, ἢ τε τοῦ θερμοῦ καὶ τοῦ ψυχροῦ;
 the excess extends both of the heat and of the cold?

Why, after either solstice, do people die especially leading up to the hundred days that follow? Is it not that up to that distance the influence of both excess heat and cold is felt? [Aristotle, Meteorology: 1.14](#)

The difference in lexicalization does not appear to be driven by either phonetic or semantic processes. Xenophon, for example, contrasts eating with drinking and uses both μέχρι (méchri) and ἄχρι (áchri) in the same utterance, yet without any discernible linguistic reason for the alternation. The difference is primarily stylistic and literary.

What does this have to do with until-p? Recall that until-p was unattested in Archaic Greek. As the Greek language evolved in the classical period, host-class and eventually semantic-pragmatic expansion occur such that the first tokens of until-p

are attested.¹⁶ These tokens are strong NPIs limited to anti-additive environments. To receive an until-p parse, they must possess an obligatory actualization inference. Both μέχρι (méchri) and ἕως (éos) have equal time-depths as lexicalizations of until-p (here 5th BCE):

- (34) a. οὐκ ἠπιστέατο **μέχρι** οὐδ' *πρώην τε καὶ χθὲς*
 Not known.IMPF **until** [méchri] which a very little while ago

It was not known until just recently.

Herodotus, The Persian Wars: 2.53

- b. καὶ οὐ πρότερον ἀφῆκέ με ἕως αὐτῷ κατέστησ' *ἕξ τάλαντων ἐγγυητάς*
 And **not** at first released.PERF me **until** [éos] to him restored
 six talents security

And he did not release me at first until I restored six talents security.

Isocrates, Trapeziticus 17.12.

As an assertion, the semantics of (34a) states only that some event *e* did not trespass the boundary of the argument selected by the UTS:

- (35) They did not know until a very little while ago.
 Given an UTS τ , such that $\tau = [t_0, \text{a very little while ago}]$
 $\neg \exists e [\text{know}(e, \text{they}) \wedge \text{Run}(e) \subseteq \tau]$

However, the environment is anti-additive and there is an obligatory actualization inference that indicates the presence of an EXH operator negating all stronger subdomain alternatives. This operator scopes over both negation and the UP (EXH > NEG > UP) creating contrastive focus that widens the domain beyond the RB. Notice too that the inference cannot be cancelled:

- (36) It was not known until just recently. #And it is still not known.

- (37) And he did not release me at first until I restored six talents security. #And he didn't release me after either.

These facts also provide a reason why tokens such as (38a) and (38b) cannot be parsed as until-p:

¹⁶ As in Archaic Greek, the truth-conditional equivalent of until-p (*not... before*) continues to be used widely.

- (38) a. **οὐδείς ἕως** ἤμαξε τὸ ναυτικὸν ἡμῖν ἤξίωσεν
No one, until [éos] at its peak.IMP.F the navy to us stood up

No one, when the navy was in its prime, stood up to us.

[Thucydides, *The Peloponnesian War*: 7.63.4.](#)

- b. τοῦ δὲ σοῦ ψόφου **οὐκ** ἄν στραφείην, **ἕως** ἄν ἦς
 the and your account **not** would swerve **until** [éos] which
 οἷός περ εἶ.
 such as you are

I would never swerve on account of your applause, so long as you are
 such as you are. [Sophocles, *Ajax*: 1115](#)

Until-d is the result of EXH scoping directly over the UP (EXH >UP), while until-p is the result of EXH scoping over negation and the UP (EXH > NEG > UP). For tokens like (23a), EXH intervenes, such that negation no longer directly scopes over the UP, which prevents contrastive focus, domain-widening, and an until-p parse. It is clear (38a) and (38b) should receive a *throughout-not* reading in which the UP scopes over negation:

- (39) a. [up to the point x [NOT [someone stood up to us]]]
 b. [so long as x [NOT [I would change course]]]

While it is not possible to determine which lexicalization of until-p preceded the others, a reasonable hypothesis is that patterns of productivity in Ancient Greek spread under the influence of semantic–pragmatic expansion: as ἕως (éos) lost contrastive distribution with μέχρι (méchri), which was already synonymous with ἄχρι (áchri), the three entered into free variation with each other for until-d, which spread by analogy to until-p, first with ἕως (éos), and then presumably to μέχρι (méchri). In sum, while a distinction between until-d and until-p emerges in Classical Greek, it is not lexical. It is also not very productive. Yet in Classical Greek we do see the first signs of a semantic–pragmatic expansion that anticipates later changes in Postclassical Greek. These lexicalizations however do not codify a distinction between until-d and until-p.

2.4 Postclassical Greek

Assuming the analysis of until-d in Archaic and Classical Greek above, it is only necessary at this point to review data for until-p.¹⁷ The essential shift is that while free variation was possible for lexicalizations of until-d in Classical Greek, it is now also possible for lexicalizations of until-p in Postclassical Greek ([Bortone 2010: 188](#)). This process begins with μέχρι (méchri) and ἕως (éos), which appear to be more productive for until-p in early Postclassical Greek (3rd BCE – 1st BCE) than

¹⁷ By this point, the only apparent reason for a choice between μέχρι (méchri) and ἄχρι (áchri) is phonetic rather than semantic: Galen for example writes ἄχρισ [áchris] after a consonant but μέχρισ [méchris] after a vowel. [García Novo 2019: 54](#).

ἄχρι (áchri). This is likely inherited from their productivity in the language more generally: a search of documentary sources from Ptolemaic Egypt at papyri.info returns approximately a dozen tokens for ἄχρι (áchri) but several hundred for μέχρι (méchri) and nearly a thousand for ἕως (éos). Unlike Classical Greek, until-p is widespread in early Postclassical Greek, attesting to the completion of the semantic–pragmatic expansion that began earlier:

- (40) a. ἔλαιον **οὐκ** ἠλειψάμην **ἕως** τοῦ συντελέσαι με τὰς τρεῖς
oil **not** anointed.PERF **until** [éos] the to complete me the three
ἑβδομάδας τῶν ἡμερῶν
weeks of days

I did not anoint myself with oil until I completed three weeks of days.
[Septuagint, Daniel \(Th\): 10.3](#)

- b. **οὐκ** ἐξεώσθη **μέχρι** νυκτὸς ἐνοχλούμενο ὑπὸ τῶν
not thrust out.PERF **until** [méchri] night being harassed by the
πολεμίων
enemies

He was not thrust out until night, though he was harassed by his enemies.
[Plutarch, Lives, Aratus: 27.2](#)

Both utterances contain a strong NPI with an obligatory actualization inference and must therefore receive an until-p parse. Notice that when posed as an answer to the question, ‘When was he thrust out?’ the presupposition cannot be blocked and the inference must go through:

- (41) When was he thrust out?
He **wasn’t** thrust out **until** night.
And he wasn’t thrust out after, either.

The semantics state only that some event did not occur prior to the RB of the UTS:

- (42) Given an UTS τ , such that $\tau = [\tau_0, \text{night}]$
 $\neg \exists e [\text{thrust out}(e, \text{he}) \wedge \text{Run}(e) \subseteq \tau]$

As we saw above, the scalar inference is obligatory because the EXH operator negates all stronger subdomain alternatives, contrastively focusing the UP and widening the domain beyond the RB. This is why the interval selected by until-p in (40a) is a maximally informative interval: it is the first interval at which the event began to transpire. Tokens like (40a) and (40b) must receive an until-p parse.

Yet what about intersecting environments like (43) that appear to meet the same conditions but do not trigger the corresponding implicature?

- (43) **οὐκ** ἐνέμεινε **μέχρι** τέλους
Not remained.PERF **until** [méchri] end

He did not remain until the end. [Plutarch](#), *Vitae decem oratorum*: 848f.

When the UP selects an argument like τέλους (téλους, end), it creates a logical environment that coerces an until-d parse. Recall that the focus operator EXH negates all stronger alternatives from the subdomain, which contrastively focuses until-p. In (43) this is logically impossible since there is no period of time after the RB. As [Iatridou & Zeijlstra \(2021: 119\)](#) explain, ‘until-p does not merely yield a [scalar inference]. There is a comparison to a contextual alternative, and the argument of until-p is later than that.’ Yet there is nothing logically later than *the end*, hence no expansion of the RB and no inference. In such cases, the semantics are equivalent to truth-conditional *before*: they simply deny some state of affairs was the case prior to the RB. Such tokens require a *throughout-not* reading:

- (44) [until the end [NOT [he remained]]

All of this is expected from our analysis above and explains why tokens like (45) should receive an until-p parse while (43) should not:

- (45) καὶ **οὐκ** ἐμέμφεσθε **μέχρι** τῆς Εὐμένους διαβολῆς
 and **not** objected.IMPF **until** [méchri] the Eumenes’ slander

And you did not *begin to* object until Eumenes’ slander.

[Appian](#), *Macedonian Affairs* 1 (Suid. v. τετρῦσθαι), 7

In such cases, an inchoative interpretation of the predicate is required as explicitation of the scalar inference that until-p necessarily triggers.

As I note above, the essential shift in Postclassical Greek is that what was lexically possible for until-d is now also possible for until-p, even in the same phrase (and the same sentence). This phenomenon can be found, for example, in the New Testament, where two authors make use of each other’s material but one changes the lexicalization of *until*:

- (46) a. **οὐ μὴ** παρέλθῃ ἡ γενεὰ αὕτη
Certainly not would pass away.PERF the generation this
μέχρις οὗ ταῦτα πάντα γένηται.
until [méchri] which these things all happen

This generation will certainly not pass away until all these things transpire. [Mark](#) 13.30.

- b. **οὐ μὴ** παρέλθῃ ἡ γενεὰ αὕτη **ἕως**
Certainly not would pass away.PERF the generation this **until** [éos]
 ἂν πάντα ταῦτα γένηται
 all these things should happen

This generation will certainly not pass away until all these things transpire. [Matthew](#) 24.34.

There is no difference in the semantics of (46a) and (46b): both predicates are identical, under the scope of the same negator, and select an almost identical clausal argument. It is possible that ἕως (éōs) was selected for syntactic reasons (notice the modal particle ἄν / ἄν in 46b), but even this is unpersuasive: both UPs select a deranked clausal argument, in which case (46b) is presumably just extra coding for the same irrealis semantics present in (46a).

Finally, although it was rare in late Classical and early Postclassical Greek, it is much more common in middle Postclassical Greek (1st CE – 3rd CE) for μέχρι (méchri) and ἕως (éōs) to be substituted for ἄχρι (áchri). Recall earlier that the slots of the idiom cluster [μέχρι, méchri] - [ARG] - [ἕως ἄν, éōs ἄν] were not substitutable. In middle Postclassical Greek, however, the slot once reserved for μέχρι (méchri) is now substitutable for ἄχρι (áchri):

- (47) ἄχρι τούτου δεῖν ἐλέγχειν, ἕως ἄν
 until [áchri] this it is necessary to investigate.IMPF until [éōs]
 τις τὰ φώρια ἐν τοῖν χεροῖν ἔχοντα ἀποδείξει
 someone the goods in the hands having shown

One must continue to investigate until someone shows the stolen goods in their hands. *Aristides, Orationes: 48, 349.8*

This is evidence of synonymy and free variation. As with the broader changes taking place between until-d and until-p, a plausible mechanism for spread was analogy with μέχρι (méchri) and ἕως (éōs). This process is completed by the time we reach middle Postclassical Greek, where all three lexicalizations are possible for both until-d and until-p:

- (48) οἱ λοιποὶ τῶν νεκρῶν οὐκ ἔζησαν ἄχρι τελεσθῆ τὰ χίλια ἔτη.
 The rest of the dead **not** alive **until** [áchri] finished the 1000 years
 The rest of the dead did not come to life until the thousand years finished.

As we have seen, despite the new lexicalization of until-p, the semantics are once again identical:

- (49) The rest of the dead did **not** come to life **until** the thousand years finished.
 Given an UTS τ , such that $\tau = [t_0, \text{the thousand years finished}]$
 $\neg \exists e [\text{come to life}(e, \text{the rest of the dead}) \wedge \text{Run}(e) \subseteq \tau]$

The assertion must also be enriched with an obligatory scalar inference for all the reasons that we have reviewed above:

- (50) The rest of the dead did not come to life until the thousand years finished.
 #And the rest of the dead did not come to life after either.

Given all the facts above, a plausible story is this: each preposition was (for whatever reason) a distinct lexicalization of the UP, first for until-d and then until-p.

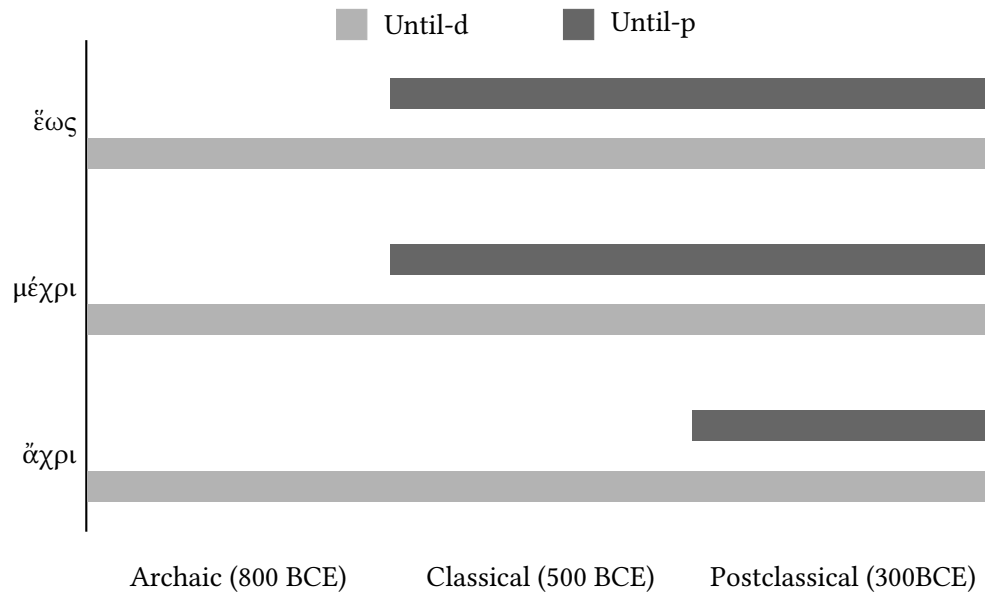


Figure 1 Lexicalizations of until in the diachrony of Ancient Greek.

Complementary distribution in Archaic Greek led to eventual partial synonymy in Classical Greek, and free variation in Postclassical Greek, where by analogy until-p was lexicalized first for ἕως (éos) and μέχρι (méchri), and then later for ἄχρι (áchri). The diachrony of the UP in Ancient Greek then could be given roughly as shown in Figure 1.

As Horrocks (1997: 82) notes, generalization processes like this in Postclassical Greek ‘represent simplifications or regularizations of their traditional Attic counterparts’ that correspond to a widening gap between Classical Greek and the emerging Postclassical varieties that overtook it.¹⁸ This is why, for example, it is not always clear what explanation can be given for a particular lexicalization of the UP in Postclassical Greek. Semantic–pragmatic expansion and simplification have created free variation not only for until-d but also until-p.

3 CONCLUSIONS

What do these data mean for the LAA? We can sum up these findings in two ways:

- Although multiple lexicalizations of the UP have always existed in the diachrony of Ancient Greek, they do not represent a distinct yet simultaneous lexicalization of until-d and until-p at any period. This means one cannot argue the LAA held true only at an earlier time-depth in Ancient Greek. It also means any diachronic support for LAA must begin after 6th CE.

¹⁸ He goes on, ‘the beginnings of a real gap between (classical) Attic and the official Koine in terms of grammar and lexicon can still be discerned from as early as the end of the 3rd century bc, and this gap widens steadily as we pass into the later Hellenistic and Roman periods.’ On the diachrony of Postclassical Greek, see most recently La Roi 2020.

- The analysis in Iatridou & Zeijlstra (2021) not only has empirical coverage of the semantics of the UP in Modern Greek, it also has diachronic coverage of corresponding lexicalizations of the UP in Ancient Greek.

Although much more needs to be said about lexicalizations of the UP in the diachrony of Greek, including fine-grained periodisation leading up to Medieval and Standard Modern Greek, and under-differentiation between *until* and *as long as*, this study suffices to show that at no point in the diachrony of Ancient Greek was there a distinct yet simultaneous lexicalization of until-d and until-p. This fact not only undermines the LAA, it also provides further support for a unified analysis of the semantics of the UP more generally, since the analysis in Iatridou & Zeijlstra (2021) has explanatory fit with the data from Ancient Greek. One might hypothesize that a shift occurred in Medieval Greek or *Katharevousa* such that distinct lexicalizations of until-d and until-p were created *ad hoc*, which would undermine the unified analysis. I leave that question to future research, along with the historical origins of the UP in PIE and the semantics and distribution of until-d in various periods and authors. At the very least we can say that the Greek language does not support the LAA at time-depths exceeding several millennia.

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