Swimming against the typological tide or paddling along with language change?
Dispreferred structures and diachronic biases in affix ordering

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It has repeatedly been observed that there is a worldwide preference for suffixes as opposed to prefixes. In this paper, we argue that universally dispreferred – or rare – structures can and do arise as the result of regular processes of language change, given the right background structures. Specifically, we show that Ancient Egyptian-Coptic shows a long-term diachronic macro-change from mixed suffixing-prefixing to an overwhelming preference for prefixing. The empirical basis for this study is a comparison of ten typologically significant parameters in which prefixing or affixing is potentially at stake, based on Dryer's (2013a) 969-language sample. With its extremely high prefixing preference, Coptic belongs to the rare 6% or so of languages that are predominantly prefixing. We argue that each of the micro-changes implicated in this macro-change are better understood in terms of changes at the level of individual constructions, rather than in terms of a broad structural 'drift.' Crucially, there is nothing unusual about the actual processes of change themselves.

Keywords: universals, typological rara, Ancient Egyptian-Coptic, diachronic typology, affixation, linear order

1. Introduction

It has repeatedly been observed that there is a worldwide preference for suffixes as opposed to prefixes in a proportion of about three to one in the languages of the world (Bybee et al. 1990, Cysouw 2009, Greenberg 1957, Hall 1988, Hawkins & Cutler 1988, Himmelmann 2014, Sapir 1921, and more). As Himmelmann (2014) has noted, this observation in fact comprises two distinct universal preferences: the first holds that grammatical morphemes have a significant tendency to follow their hosts (the POSTPOSING PREFERENCE), and the second is that postposed grammatical morphemes tend to be affixed (the SUFFIXING PREFERENCE in the narrow sense).

The suffixing preference might be explained in several ways. One possible explanation is that this feature is a world-wide retention from Proto-World. Such an argument, to the best of our knowledge, has not been made, but it has been made for the worldwide preference for OV order (Gell-Mann & Ruhlen 2011). This is unlikely, however, since many suffixes have identifiable diachronic sources. One might propose that suffixes are especially prone to diffusion through language contact, but affix borrowing – especially in the domain of inflectional morphology – is probably not frequent enough to explain impressive extent of the suffixing preference (Matras 2014; Seifart 2013, 2015); this, however, does not rule out extensive pattern-replication (Matras

& Sakel 2007). Another possible explanation is that suffixes are preferred for some reason in some form of Universal Grammar or for reasons related to processing or some other cognitive mechanism (Cutler, Hawkins & Gillingan 1985, Caballero et al. 2008). Yet another explanation is that suffixes are more prone to be created through regular processes of language change, e.g., grammaticalization (Givón 1971, Bybee 1985, Bybee et. al 1990), perhaps due to usage factors (Hall 1988, Himmelmann 2014).

The explanation of the suffixing preference is directly relevant to a question highlighted in Good (2008) and elsewhere, namely, the relationship between language universals and language change: do synchronic structural universals constrain change, or do diachronic universals, ultimately motivated by online *usage* factors, give rise to synchronic universals? Kiparsky (2008) argues that the form of synchronic grammars constrains change, i.e., languages should not be able to change in such a way that they flout Universal Grammar. Greenberg (1966) makes a similar proposal, i.e., "no diachronic change gives rise to a synchronically nonexistent type." On the other hand, for Bybee (2008), the most robust universals are in fact universals of language change, and synchronic states are in a sense epiphenomenal. This line of thought has been advocated for forcefully in recent times by Cristofaro (2013, 2014, 2017, forthcoming).

For understanding this question, apparently 'counter-directional' changes are crucial: if synchronic universals rule out possible changes, how can language change lead to universally dispreferred distributions of linguistic structures? We stress that we use 'counter-directional' in this particular sense, i.e., to refer to changes that lead to rare or dispreferred structures, rather than in the senses used by Haspelmath (1999) or Norde (2009).

In this paper, we argue that rare or universally dispreferred structures can and do arise as the result of regular language change, given the right background structures as the particular 'ecology' in which change takes place. In this respect, this paper partially corroborates the claim of Harris (2008), which we quote in full:

> "... unusual or rare features are unusual or rare because they are the accidental result of many different circumstances or conditions being lined up in just the right way. […] If a construction can only develop by passing through a relatively large number of changes, or can only develop if certain conditions exist, or some combination of these, simple probability tells us that it will be less common than a construction that develops through fewer steps or requiring fewer conditions. This explanation does not depend on one change being less common than another, or on some conditions being infrequent; on the contrary, it assumes as a starting point that all changes and all conditions are equally common. It is the combination that is uncommon, not any of the specific elements." (Harris 2008: 55-57).[1]

However, we add that cross-linguistic rarity can be the result of additional factors, beyond the multi-stage scenario proposed by Harris. For example, Nichols (2003) identifies the probabilities of INHERITANCE, BORROWING, SUBSTRATE INFLUENCE, and SELECTION [2] as diachronic propensities that can end up shaping the cross-linguistic frequency of language structures.

Following Grossman (2016) and Grossman et al. (2018), we identify six main diachronic factors that probabilistically determine the relative (in)frequency of language structures. These

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[1] However, Greenberg (1978: 75) and Blevins (2004) consider certain changes to be more frequent than others, and Greenberg proposes that certain structures are unstable, i.e., prone to change.

[2] "the process whereby elements that embody language universals, cross-categorial harmony, unmarked terms, and other typological desiderata are incorporated into a language" (Nichols 2003: 286-287).

factors are summarized in Table 1, which presents the type of diachronic factor, a cross-linguistically rare feature, and where the rare feature is documented. The first factor, identical to that identified by Harris, is (i) the STAGE factor, i.e., rare structures can be rare because they require multiple stages in a particular sequence, in order to come about. Rare structures can be rare because (ii) they require rare input or source structures (the SOURCE factor). For example, a structure facilitated by VSO order and inhibited by subject-initial orders is likely to be rare, since VSO is much rarer than SOV or SVO in the world's languages. Another factor (iii) leading to the rarity of a structure is if it results from a relatively rare type of change, as seems to be the case for dissimilation, which is rarer than assimilation, or degrammaticalization, which is rarer than grammaticalization (TYPE). Yet another possibility (iv) is that there are few pathways that lead to a given structure, e.g., affixes that denote fear or apprehension, attested in Ese Ejja (Takanan; Vuillermet 2018), as opposed to structures that many developmental paths converge on, such as agent nominalizations, which develop from a wide range of construction types (PATH). Furthermore, (v) some structures might be rare because they are inherently unstable and tend to be reanalyzed away (STABILITY), as Blevins (2008) has proposed for three-way length distinctions, which are attested in very few languages. In this sense, stability differs from Nichols' probability of inheritance, which is relevant at a macro-scale of languages, while stability in the sense here begins from online events of production and perception. Finally, (vi) features that are unlikely to diffuse through language contact are likely to be rarer than those that spread easily (DIFFUSABILITY). Possibly orthogonal to all of these diachronic factors is Nichols' (2003) SELECTION. Interestingly, if a global preference for suffixed inflectional morphology is understood in terms of selection, then cases in which dispreferred structures emerge through language change show that other synchronic and diachronic factors can easily override universal preferences in shaping language structures.[3]

Table 1. Diachronic factors that shape cross-linguistic frequencies

Type	Factor	Rare feature	Documentation
STAGE	Many (vs. few) stages necessary	endoclitics	Udi (Harris 2008)
PATH	Few (vs. many) pathways	apprehensive affix	Ese Ejja (Vuillermet 2018)
SOURCE	Rare (vs. common) source construction	adverbial subordinator prefixes	Amharic (Hudson & Teferra 2007)
TYPE	Rare type of change	coronal annihilation	Northwest Mekeo (Blevins 2009)
STABILITY	Inherent instability	three-way contrast between oral, weakly nasalized, and strongly	Palantla Chinantec (Blevins 2008)

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[3]   A similar argument has been made by Bickel (2015: 117-118), who claims that universal effects may be quite weak, and as such may be overridden by a host of historically contingent factors.

		nasalized segments	
DIFFUSABILITY	Resistant to borrowing	demonstrative pronouns	Chamorro (Topping 1973)

Of course, these factors are not mutually exclusive, and all things being equal, it is likely that a structure whose development involves more than one of these factors will be even rarer. As Blevins (2009) points out that the absence of all coronal segments in Northwest Mekeo, which is the sole attestation of a language without distinctive coronal segments, is the result of three different processes of change, some of which are very rare. Moreover, she adds that Northwest Mekeo has developed surface coronals, and as such, is likely to develop phonemic coronals; in other words, the property of lacking coronals is inherently unstable. Finally, it may be that some factors outrank others; for example, it may be that some properties develop from common sources and along multiple pathways, but if they are inherently unstable, they will likely show skewed distributions. For example, Jacques (2011) argues that aspirated fricatives can develop from multiple sources, but due to perception biases, they are often merged with similar sounds. In a similar vein, Nikolaev & Grossman (2018) show that affricate-dense sound systems are unstable when isolated areally; they tend to be stable only in areas where they are supported by affricate-dense neighbor languages.

In this article, we show that Ancient Egyptian-Coptic (Afroasiatic) shows a long-term diachronic macro-change from mixed suffixing-prefixing to an overwhelming preference for prefixing, which is a rare language type. Furthermore, we argue that each of the micro-changes implicated in this macro-change are better understood in terms of changes at the level of individual constructions rather than in terms of a broad Sapirian drift. Crucially, it is the particular constellation of structural features of the language at a particular moment in time, together with regular mechanisms of language change, that give rise to the cross-linguistically unusual 'macro-preference' of the language.

By making these claims – i.e., that cross-linguistically dispreferred structures can and do arise through normal processes of language change – we corroborate the arguments made by Mithun (2003: 178) and Creissels (2008: 2), who point out that harmonic word orders may not *directly* reflect cognitive principles, but are rather the product of processes of language change. In a sense, this is a 'source-oriented' account (Cristofaro 2017). We do so by demonstrating that changes in affix order in Ancient Egyptian-Coptic occur at different times, at different rates, and to different degrees, in different domains. Moreover, our claims are in line with the distributional typology program laid out in Bickel (2011, 2015), which argues against the Pāṇinian approach to linguistics, in which linguists propose complex rules in order to account for generalizations and exceptions; in the context of distributional typology, statistical universals are probabilistic, and individual cases in which a language seems to go against an otherwise robust cross-linguistic generalization may nonetheless develop and remain stable in particular historical situations. In this article, our aim is to provide a detailed account of one such historical situation.

We focus on diachronic change in the domain of affix ordering here. However, since these affixes did not simply change their order vis-à-vis their bases,[4] we make reference to other processes in order to explain the changes in affix ordering. Our basic claim is that prefixes develop at different times and different rates in different domains, and it is only if we consider the changes from their endpoint that the whole macro-change has a conspiratorial look to it. Crucially, there is nothing unusual about the actual processes of change themselves; what may be unusual, from a cross-linguistic point of view, is the length of uninterrupted documentation of a single language, which allows us to observe long-term changes with abundant evidence. In short, we argue that Ancient Egyptian-Coptic looks as though it is swimming against the typological tide, although it is constantly paddling along with the usual tides of language change.[5]

The structure of this paper is as follows. Section 2 describes our methodology, which is based on Dryer's (2013a) typology of affixing preferences. Section 3 provides some background about Ancient Egyptian-Coptic and gives a general synchronic description of affixing in Coptic, showing that the language is predominantly prefixing. Section 4 adapts Dryer's (2013) typology for diachronic purposes, and shows how each of the prefixes developed. Section 5 summarizes and concludes.

2. Methodology

As noted in Section 1, it has often been observed that there is a worldwide preference for suffixes. Grammatical morphemes have an impressive tendency (a) to follow the verb and (b) to be bound, i.e., suffixes.[6] Table 2 illustrates these two tendencies for verbal elements in 71 different languages.

Table 2. The suffixing preference in verbal grammatical elements from 71 languages
(Himmelmann 2014, from the database of Bybee et al. 1990: 5)

	PREPOSED	POSTPOSED	TOTAL
AFFIXES	426	1236	1662
FUNCTION WORDS	386	316	702
TOTAL	812	1552	2364

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[4] For one type of scenario in which affixes do, in a sense, move, see Haspelmath (1993) on the externalization of inflection.

[5] A similar point is made in Shisha-Halevy (2000: 79) with respect to the evolution of constituent ordering in general.

[6] Note that (unbound) function words actually show a preference for being preposed, which may indicate that postposed function words become affixes more often than preposed function words. Himmelmann (2014) proposes a prosodic explanation for the SUFFIXING PREFERENCE in the narrow sense. In Ancient Egyptian-Coptic, interestingly, preposed items rarely become postposed before becoming bound. On the contrary, in Ancient Egyptian-Coptic prefixes often correspond to earlier *postposed* grammatical items. For example, the typical position for demonstratives within a noun phrase in Earlier Egyptian is after the head noun, while bound demonstratives in Later Egyptian are preposed and ultimately prefixed.

This finding has been replicated many times, and we are unaware of any strong findings to the contrary, although there is a growing consensus that different construction types show different preferences. For example, in contrast to previous research, Siewierska & Bakker (1996) found no particular suffixing preference for subject and object agreement markers. Cysouw (2003) reports that there is even a slight prefixing preference for person markers; on the other hand, he found that there is a very strong suffixing preference for case markers, plural markers, and tense/aspect markers. Typologists have generally sought to explain the suffixing preference, at least partially, in terms of linear order of major constituents, taking the latter as a predictor of the former. Jacques (2013), on the basis of the WALS database (Dryer & Haspelmath 2013), observes that a preference for suffixes tends to correlate with OV order, while a preference for prefixes tends to correlate with VO order (see also Hawkins & Gilligan 1988). However, it has also been argued that the order of verbs and objects is not enough to explain the suffixing preference (Jacques 2013, Himmelmann 2014). Interestingly, Cysouw (2003) also showed that smaller paradigms show a preference for prefixing, while a suffixing preference is typical of larger person marking paradigms. As a result, he concludes that "it does not seem to be a fruitful approach to consider the suffixation preference as a monolithic observation to be explained by one overarching theory of linguistic affixation" (2009: 13).

Nevertheless, in line with, e.g., Nichols' (1986) 'whole-language types'[7] and Haspelmath et al.'s (2014) 'causative/causal prominence,' we can identify macro-characteristics of individual languages, which result from generalizations made over individual constructions. This is captured by Dryer's (2013a) method for comparing the degree to which languages are characterized by a preference for prefixing, suffixing, or neither. Dryer proposes ten parameters, given in Table 3.[8]

Table 3. Types of inflexional affixes (Dryer 2013a)

PARAMETERS	
1	case affixes on nouns
2	pronominal subject affixes on verbs
3	tense-aspect affixes on verbs
4	plural affixes on nouns
5	pronominal possessive affixes on nouns
6	definite or indefinite affixes on nouns
7	pronominal object affixes on verbs
8	negative affixes on verb
9	interrogative affixes on verbs
10	adverbial subordinator affixes on verbs

The calculation of the prefixing and suffixing indexes for a single language is done as follows. A language receives a single point for prefixing or suffixing if it is *predominantly* prefixing or suffixing for a given parameter, and half a point for each if it has both prefixing and suffixing,

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[7] See further Nichols & Bickel (2013).

[8] A reviewer points out that features like 'subject' and 'object' may be biased towards languages with nominative-accusative alignment. As such, we have generally preferred to use SAP terminology.

with *neither deemed dominant*. The first three affix types are considered to be especially important, so Dryer gives them double weight. As such, the highest score that a language could have for either prefixing or suffixing would be 13 (= 3*2 + 7), and the lowest would be zero, for a language with no affixing in the relevant domains. Table 4 summarizes Dryer's findings as regards suffixing vs. prefixing in inflectional morphology.

Table 4. Suffixing vs Prefixing in Inflectional Morphology (Dryer 2013a)

VALUE	DESCRIPTION	REPRESENTATION	PERCENTAGE
Little or no inflectional morphology	affixing index is 2 or less	141	14.55%
Predominantly suffixing	suffixing index which is more than 80% of its affixing index	406	41.90%
Moderate preference for suffixing	suffixing index is more than 60% of the affixing index but not more than 80%	123	12.69%
Approximately equal amounts of suffixing and prefixing	suffixing index that is greater than or equal to 40% of the affixing index and less than or equal to 60% of the affixing index	147	15.17%
Moderate preference for prefixing	prefixing index is more than 60% of the affixing index but not more than 80%	94	9.70%
Predominantly prefixing	prefixing index that is more than 80% of its affixing index	58	5.99%
TOTAL		969	100%

We propose that, for diachronic purposes, a modified form of Dryer's typology is useful. Rather than limiting the score to 0 for no affix, 1 for either suffixing or prefixing, and 0.5 for both prefixing and affixing, we suggest using a more fine-grained scale, as presented in Table 5, which can be interpreted both synchronically and diachronically.[9]

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[9] We use the term 'productive' as in Barðdal (2006) as a complex notion involving generality, regularity, and extensability, and which is closely related to type frequency and coherence. For a more detailed discussion of the many factors that contribute to productivity, see Baayen (1992, 1993, 2009). In general, we are dealing in this article with productive inflectional morphology, noting when a given

Table 5. A finer-grained index for affixing

INDEX	SYNCHRONIC	DIACHRONIC
0	No affix	No affix
.25	Construction is prefixing or suffixing, but is of limited distribution in some way	(a) An older construction, which is recessive in some way (of limited frequency or productivity), or (b) An innovative construction, which is emerging and conventionalized to some extent, but is still limited in frequency or distribution in some way
.5	More or less equally prefixing and suffixing	Both types of affix are more or less equally productive
.75	Construction is predominantly prefixing or suffixing, but another, more restricted construction-type in the same domain is attested with the other type	(a) A newer construction that has come to dominate a particular domain in terms of frequency or productivity, or: (b) An older construction, which still dominates a particular domain, while another, newer construction is emerging and conventionalized to some extent
1.0	Exclusively prefixing or suffixing	Exclusively prefixing or suffixing

These scores can be doubled for the first three parameters, if one would like to be consistent with Dryer (2013a). This is a very rough typology, but it nonetheless allows one to take into account situations in which different construction types co-exist in a particular synchronic stage of the language.

3. A predominantly prefixing language: Coptic

3.1. Ancient Egyptian-Coptic: Background information

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inflectional pattern is no longer productive because it has been replaced by another pattern. In some cases, older inflectional patterns remain as relics with low type-frequency.

Ancient Egyptian-Coptic is an independent branch of the Afroasiatic phylum. It is first attested at the end of the fourth millenium BCE, and is documented continually until its obsolescence some time after the 10th century CE; eventually, all of its speakers shifted to Arabic.[10] Its latest stage, Coptic, is still in use as the liturgical language of the Christians of Egypt. Ancient Egyptian-Coptic is standardly divided into five major stages: Old Egyptian (3000-2000 BCE), Middle Egyptian (2000-1350 BCE), Late Egyptian (1350-700 BCE), Demotic (700 BCE-450 CE), and Coptic (ca. 300-1400 CE). Coptic is the only stage of the language in which multiple dialects are clearly visible.

In most typologically-oriented descriptions of Egyptian-Coptic, it is observed that a major typological shift took place in the language, a change so radical that it justifies distinguishing two 'macro-stages' in the history of the language.[11] Such descriptions distinguish *Earlier Egyptian*, which comprises Old and Middle Egyptian, and *Later Egyptian*, which comprises Late Egyptian, Demotic, and Coptic. These stages and their approximate dates are given in Table 6.

Table 6. Stages of Egyptian-Coptic as discussed here

	STAGE	DATES (roughly)
Earlier Egyptian	Old Egyptian	3000-2700 BCE
	Middle Egyptian	2700-1350 BCE
Later Egyptian	Late Egyptian	1350-700 BCE
	Demotic	700 BCE-450 CE
	Coptic	300 CE-1450 CE

Earlier Egyptian is characterized by synthetic verb forms with a rather small number (1-3) of written inflectional morphemes per verb, a preference for postposed or suffixed grammatical elements, and VSO linear order. On the other hand, Later Egyptian shows a gradual rise in periphrastic constructions, eventual agglutination[12] and polysynthesis, a growing preference for preposed and eventually prefixed grammatical items, and a tendency towards SVO order. Haspelmath (to appear: §6) has observed that Ancient Egyptian-Coptic is an exemplary case of what he calls *anasynthesis*, "a change in which an earlier synthetic pattern (such as the Latin future tense, e.g. *canta-bi-t* 'will sing') is replaced by an analytic pattern (such as the Late Latin modal construction with *habere* 'have', e.g. *cantare habet* 'has to sing') which then undergoes various coalescence changes (Haspelmath 2011) and in this way becomes "synthetic again." "

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[10]   See Richter (2009) on the difficulties of reconstructing the sociolinguistic realities and proper dating of Coptic's obsolescence in medieval Egypt. For a general overview of the history of Ancient Egyptian-Coptic, see Loprieno (1995) and Vernus (1988).

[11]   See the discussion in Hintze (1948), Hodge (1970: 3-5), Loprieno (1988; 2000), Reintges (2013), and Shisha-Halevy (2000).

[12]   On issues linked to the cover-term 'agglutination,' see Haspelmath (2009).

One note about the presentation of pre-Coptic Ancient Egyptian examples below is in order. First, pre-Coptic Egyptian was written in a variety of scripts, such as hieroglyphs, used mostly for monumental writing, and hieratic, a cursive form of writing used mostly on other types of support, such as papyrus or ostraca; later on, the hieratic script developed into more abstract scripts. In order to circumvent the difficulty of reproducing these complex scripts in print and to make their reading explicit, Egyptologists use a conventional transliteration system (see Di Biase-Dyson et al., 2009). This transliteration does not accurately represent the sounds of Ancient Egyptian, but allows rendering the variety of scripts in a coherent and homogeneous way. Since the data presented here have to do with morphosyntax, this coherence has been favored over graphemic or (mostly reconstructed) phonological accuracy. Nonetheless, where some attention to phonology is in order, we have made reference to phonological representations.

3.2. The prefixing score of Coptic

First, we set out the criteria used in this paper to determine whether a given bound element is an affix or not, following Bickel & Nichols (2007), Haspelmath & Sims (2010), and Himmelmann (2014). We stress that this does not mean that such bound elements 'are' affixes in any ontological sense; we simply want to make clear why we considered a given element to be an affix for the purposes of this paper. These criteria need not align completely in individual cases.

1) The first criterion is **adjacency**, i.e., if an element is invariably adjacent to a host.
2) The second criterion is **non-interruptability**, i.e., if no other element can occur between the element and a host.
3) The third is **structural**, i.e., if a host structurally requires the presence of an element in order to function as a grammatical unit.
4) The fourth criterion is the **interaction** of the formative and the host, including allomorphy, suppletion, and word-internal phonological processes.
5) A fifth criterion is **host-selectivity**, i.e., that a formative not attach promiscuously to hosts of various types. This is Dryer's (2013c) main criterion for affix status.

We consider criterion (4) to be the strongest evidence of affixal status, since in Coptic it always entails criteria (1)-(3). As for (5) host-selectivity, it can be interpreted (i) categorially, i.e., if a formant can occur with two types of host, it is non-selective and therefore cannot be an affix, or (ii) in a gradient fashion, i.e., affixes are more host-selective than clitics. The second is the interpretation of Bickel & Nichols (2007) and Himmelmann (2014), and it is the approach we adopt here.[13] We discuss systematically theses five criteria for each parameter in Coptic after the presentation of the diachronic evidence in Section 4.

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[13] We note Haspelmath's recent (2018) definition of affix as a 'non-promiscuous bound form which is not a root,' which is close to Dryer's criterion, and which was published after this article has been revised for resubmission. It is more restrictive than the criteria we employ here, and we note in the following discussion which bound morphemes would not fall under Haspelmath's definition.

Table 7 provides an overview of the affixing preference of Coptic in synchrony, following Dryer's (2013a) method.[14] Section 4 discusses the historical scenarios that lead to this situation.

Table 7. Calculation of the affixing index for Coptic and of the suffixing vs. prefixing strategies

	PARAMETER	PREFIXING OR SUFFIXING	SUFFIXING SCORE	PREFIXING SCORE
1	case affixes on nouns	exclusively prefixing	0	2
2	pronominal subject affixes on verbs	exclusively prefixing	0	2
3	tense-aspect affixes on verbs	exclusively prefixing	0	2
4	plural affixes on nouns	predominantly prefixing	0	1
5	pronominal possessive affixes on nouns	predominantly prefixing	0	1
6	definite or indefinite affixes on nouns	exclusively prefixing	0	1
7	pronominal object affixes on verbs	exclusively suffixing	1	0
8	negative affixes on verb	exclusively prefixing	0	1
9	interrogative affixes on verbs	exclusively prefixing	0	1
10	adverbial subordinator affixes on verbs	exclusively prefixing	0	1
	TOTAL		1	12
	AFFIXING INDEX		100%	
	Suffixing vs. prefixing strategies		7.7%	92.3%

In terms of Dryer's (2013a) typology, Coptic has an unusually high prefixing preference: with its extremely high prefixing preference (12/13), Coptic belongs to the rare 6% or so of languages that are predominantly prefixing. Moreover, it has a higher prefixing index than any other

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[14] These sections cover ground similar to that found in Grossman (2018); the main goal of which is to argue that Greek did not influence the Coptic prefixing preference, but which includes a detailed presentation of Coptic prefixes.

language in Dryer's 969-language sample. The closest competitor is Hunde (Bantu; Democratic Republic of Congo; Kahombo 1992), with a prefixing index of 9.5/13. Interestingly, Coptic was deemed to be 'weakly prefixing' in Dryer's study,[15] but the present discussion shows that this description needs to be revised.

Coptic is also an areal outlier. While predominantly prefixing languages are relatively common in Mesoamerica and in Africa, within Africa it is only in western and southern sub-Saharan Africa that predominant prefixing is common. In northern Africa, Coptic is the only language that is predominantly prefixing, although some Berber languages are considered to be 'weakly prefixing' by Dryer.[16] Coptic is also possibly a genetic outlier, although we have not checked other Afroasiatic languages in this respect. Since Coptic presents a cross-linguistically, areally, and (possibly) genetically atypical distribution of structures, we turn to the question: how did it get to be that way?

3.3. Coptic morphology: some basic facts

Before moving on to the next section, it may be helpful to have in mind some basic notions of the templatic structure of Coptic nouns and verbs.[17] We begin with the notion of bound group, defined by Layton (2011: 22) as strings of morphemes "united by relationships of adjacency or "boundness."" In other words, bound groups in Coptic are defined by adjacency, dependency, and are characterized by a single stress accent. In a bound group, no more than one morpheme may be a 'free' morpheme – the rest have to be bound. In fact, it is common for all morphemes in a bound group to be bound, i.e., they cannot occur independently, as in the verb *aktrensouong* 'you caused us to know you'; the analysis of this verb is detailed below.

Importantly, bound groups do not necessarily coincide with morphosyntactic units, and some bound groups are smaller than a morphosyntactic word. In the context of this article, this is the case primarily when verbs have incorporated S/A arguments. In such verbs, the lexical S/A

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[15] Dryer's information about Coptic comes from Plumley (1948) and Lambdin (1983), both of which are teaching grammars that do not reflect contemporary linguistic analyses of the language. There are many errors and inconsistencies in the WALS data for Coptic. For example, for Feature 33a 'Coding of Nominal Plurality' (Dryer 2013b), Coptic has the value 'no plural,' while for 34a, 'Occurrence of Nominal Plurality' (Haspelmath 2013), Coptic has the value 'Obligatory marking in all nouns.' As shown here, the correct value for Feature 33a is 'plural affix.' Similarly, for Features 37a 'Definite Articles' (Dryer 2013g) and 38a 'Indefinite Articles' (Dryer 2013h) Coptic is said to have definite and indefinite words distinct from the demonstrative article and the numeral 'one,' respectively, when in fact, both definiteness and indefiniteness are marked by prefixes on nouns; both resemble the demonstrative, on the one hand, and the numeral 'one,' on the other, because the (in)definiteness affixes were grammaticalized from these items. In Feature 69a 'Position of Tense-Aspect Affixes' (Dryer 2013e) Coptic is said to have no tense-aspect affixes, whereas Coptic has a system of tense-aspect prefixes on verbs. It is likely due to coding decisions such as these that Dryer (2013a) has Coptic as 'weakly prefixing.'

[16] It is beyond the scope of the present article to revisit Dryer's (2013a) sample and to determine whether the characterization of languages in terms of affixing preferences is due to the data sources used or to the application of the host-selectivity criteria.

[17] While there is much to say about the templatic structure of Coptic nouns and verbs – and in fact, they may show more properties of layered morphology than templatic morphology in the strict sense – we have preferred here the simplest possible presentation that will allow the reader to get a grasp of what Coptic morphosyntax is like.

argument and everything that precedes it is one bound group, while everything after the S/A argument may be another. This is the main reason that there has been some doubt about whether many Coptic prefixes are in fact prefixes, since they attach either to 'verbs' (in which case the S/A slot is filled by a person index) or to 'nouns' (in which case the S/A slot is filled by a noun phrase). However, as Bickel & Zúñiga (2017) have argued, there may be multiple phonological and morphosyntactic domains, and they need not be isomorphic. It is well known that this is the case for multiple domains. For example, the domain of Turkish vowel harmony is not isomorphic to the domain of stress assignment. In the present context, we simply point out the fact that prosodic and morphosyntactic domains need not be isomorphic, and an item can be bound in a smaller domain than that of the 'word.'

A Coptic noun, defined as a morphological unit composed of a single lexical root, which bears stress, and a number of unstressed affixes, has the following structure, simplified somewhat. Not all slots have to be filled, and some of them can be filled by multiple affixes, especially the slot for pre-root derivational affixes.

Table 8. Templatic structure of the Coptic noun

1	2	3	4	5	6
CASE	PERTINATIVE	DETERMINER	ALTERATIVE	DERIVATION	ROOT

Working our way backwards, the root (6) is the lexical item that remains if all affixes are stripped away. Multiple derivational prefixes (5) can be added to roots in order to derive new lexemes, e.g., *sooun* 'know,' *at-sooun* [PRIV-know] 'ignorant,' *mnt-at-sooun* [ABSTR-PRIV-know] 'ignorance' (Table 9a). Immediately preceding the left-most derivational morpheme can occur what we call (4) an ALTERATIVE prefix, which typically means 'other,' but it can also mark focus of various sorts (Table 9b). To the left of the alterative is (3) a rich paradigm of prefixes that mark (in)definiteness, possessors, or deixis; some of them also mark gender and number distinctions. It is possible to make finer articulations within this slot, but for ease of exposition, we have simplified it somewhat. To the left of this paradigm can occur what we term (2) a PERTINATIVE prefix, which means 'the entity that belongs or pertains to the entity denoted by everything to the right of the prefix,' e.g., *pa-pef-eoou* [PERT:M.SG-POSS.M.SG:3SG.M-glory] 'that[M.SG] which belongs to his father.' Finally, to the leftmost edge attach (1) a set of prefixes, some of which are called prepositions and other case prefixes, but all show affixal properties, i.e., they occur in a fixed slot, they are inseparable from their host, they are often structurally required by the construction, and they often show allomorphy and word-internal assimilatory phonological processes, e.g., *n-p-sôma* [ACC-DEF:M.SG-body] > *mpsôma* 'the body.'

For another example, *nci-na-t-ke-palaia* 'those who belong to the other old one (i.e., the Old Testament)' (Table 9b) comprises (1) the nominative case prefix, (2) the plural form of the pertinative (*na-*, 'those who belong to'), (3) the definite prefix (*t-*), which also marks number and gender (DEF:F.SG), (4) the alterative prefix *ke-* ('other') and (6) the root *palaia* ('old one').

Table 9. Two examples of roots with nominal affixes

	1	2	3	4	5	6
	CASE	PERTINATIVE	DETERMINER	ALTERATIVE	DERIVATION	ROOT
(a)	*n-*		*te-u-*		*mnt-at-*	*sooun*
	ACC		POSS:F.SG-3PL		ABSTR-PRIV-	know
	'Their ignorance (ACC)'					
(b)	*nci-*	*na-*	*t-*	*ke-*		*palaia*
	NOM	the_ones_belonging_to	DEF:F.SG	other		old_one
	'Those who belong to the other old one (NOM)'					

Verbs, defined as morphosyntactic units with a single stressed syllable, which include a verbal root and which may include numerous affixes, also have a relatively complex structure. In fact, several templates are needed to fully account for Coptic verb morphology.

For verbs that occur in main clauses, the main template is roughly as follow, again with some simplification. This time working from the verb stem in (8), the only formants that occur to the right are incorporated objects or P indexes, which are in complementary distribution (9). Verbs can have up to four stems. Three are allomorphs conditioned by what follows. For example, the verb 'to build' has the free form *kôt* (known as *status absolutus*), which is the citation form and which occurs when there is no object or a case-marked object after the verb. If the verb has an incorporated object, the stem allomorph is *ket-* (known as *status constructus*), and if it has a P index the stem allomorph is *kot-* (known as *status pronominalis*). The fourth stem is a stative stem (*kêt*), which is limited in its distribution to the present tense and morphosyntactically related forms; the details of this alternation are unimportant for the present discussion.

To the left of the verb stem there are slots for the causative affix (6) and for the causee (7). To the left can occur slots (4) and (5), for a number of modal, aspectual, adverbial and other derivational prefixes. To the left of this is (3) a slot for S/A person indexes. Immediately preceding the person indexes is (2) a slot for TAM prefixes, which also mark polarity (and some of which require an additional prefix). To the left of this slot can occur (1) a set of prefixes that mark additional aspectual categories, some subordinating prefixes, and information-structural prefixes. Not all slots need be filled, other than (2), (3), and (8)[18]. For example, the verb *aktrensouong* 'You have caused us to know you' (Table 10a) can be analyzed into the following bound morphemes: (2) *a-* [PST], (3) *k-* [2SG.M], (6) *tre-* [CAUS], (7) *n-* [1PL], (8) *souon-* [know], (9) *-g* [2SG.M].

Table 10. Examples of Coptic verbs

1	2	3	4	5	6	7	8	9
PRE-TAM	TAM/POL1	S/A	TAM/POL2	MODAL	CAUS	CAUSEE	ROOT	P

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[18] Verbs that have adverbial subordinator prefixes and as such are inherently subordinate have a slightly different structure, as they do not occur with other subordinators or information-structural prefixes found in (1) of the structure presented here. Moreover, the adverbial subordinator prefixes, unlike the TAM prefixes of the main clause verbs, do not mark polarity; there is a distinct slot for the dedicated negator (*tm-*). There are several other templates for Coptic verbs, and at the present, it does not seem that they can easily be collapsed into a single template.

(a)	a- PST.AFF	k- 2SG.M			tre- CAUS	n- 1PL	souon- know	-g 2SG.M
	'you have caused us to know you'							
(b)	mp- PST.NEG	f- 3SG.M-		oueš- DESID			fi- lift-	nefbal his.eyes
	'he did not want to lift his eyes'							

While these templates are highly schematic, and elide many structural details, they should provide a feel for the type of morphology that will be dealt with in this article.

4. The diachrony of affixing and affix ordering in Ancient Egyptian-Coptic

In this section, we provide examples for each parameter from four distinct stages of the language:[19] Earlier Egyptian (Old and Middle Egyptian), Late Egyptian, Demotic and Coptic, sometimes lumping Late Egyptian and Demotic together as 'Later Egyptian.'[20] We also give the suffixing vs prefixing score for these stages, and we briefly explain the mechanisms of language change that account for the diachronic evolution towards such a high prefixing preference in Coptic.

4.1. Case-marking

In Earlier Egyptian, there is no case marking on lexical noun phrases in S, A, or P roles. In (1), the noun phrase in S role, in (2) in A role, and in (3) in P role bear no overt case markers.

(1)   rs   ꜣs.t bkꜣ-t(ı̓)   ẖr   mtw-t   sn-s   Wsı̓r
      wake_up:PRF **Isis** impregnate-STAT.F   under semen-F brother-3SG.F Osiris
      'Isis woke up pregnant with the seed of her brother Osiris' (*CT* II, 210a-b)

(2)   n   mꜣ-n   s(j)   **ı̓r-t**   **nb**
      NEG   see-IPFV   3SG.F   **eye-F**   **any**
      'No eye can see it' (*Hammamat* 191,6)

(3)   ı̓w   wḏꜣ-n-ı̓   **sbꜣ-w**   **ı̓s-w**
      AUX   unlock-ANT-1SG   **door-PL** **tomb-PL**
      'Now, I have unlocked the gates of the tombs' (*CT* II, 113b-c)

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[19]   The linguistic material presented below is in line with the grammatical descriptions available for Ancient Egyptian-Coptic. For Earlier Egyptian, we refer the interested reader to Allen (2010), Borghouts (2010) or Gardiner (1957). For Late Egyptian, see Černý & Groll (1984), Erman (1933), Junge (2001), or Winand (1992). For Demotic, see Simpson (1996) or Spiegelberg (1925). As for (Sahidic) Coptic, see Layton (2004) and Reintges (2004). Studies about specific aspects of affixation in Ancient Egyptian-Coptic are mentioned in the relevant sections below.

[20]   While we give approximate dates for the examples in Late Egyptian and Demotic, we refrain from doing for the Earlier Egyptian examples since it is often difficult to securely establish the date of composition of texts. The Coptic examples are from the New Testament in the Sahidic dialect.

In Late Egyptian and Demotic, there is no obligatory case marking on lexical noun phrases. The noun phrases in S role (4, 5), in A role (6, 7), or in P role (6, 7) do not bear case marking.

(4) bn   mdw   **srỉ srỉ-t**   ỉm-f (Late Egyptian)
     NEG   talk:SBJV **child child-F**   in-3SG.M
     'No son or daughter shall talk about it (i.e., contest its ownership)' (pAsh.Mus. 1945.95, 4-5; c. 1150 BCE)

(5) ꜥl   **Stne** r   mr-t   r   tꜣ   shr-t   pr-ꜥ (Demotic)
     climb:PST **Setne** ALL board-F ALL DEF:F.SG pleasure_boat-F   Pharaoh
     'Setne climbed on board of the pleasure boat of Pharaoh' (*Setne* I, 6/18; c. 250 BCE)

(6) ḏd   **pꜣy ḥꜣty_ꜥ**   n   **nỉw-t**   **nhꜣy-n**   **md-w-t** (Late Egyptian)
     say:PST **DEM mayor**   of   **Thebes-F** **some-of** **charge-PL-F**
     'This mayor of Thebes made certain charges' (K*RI* VI, 480, 11; c. 1050 BCE)

(7) ỉr   **rmṯ** mr   **pꜣy-f**   **ỉry**   **nỉm-n** (Demotic)
     AUX.PST   **man** love:INF POSS:M.SG-3SG.M   fellow   among-1PL
     'We made love to each other' (*Setne* I, 3/7; c. 250 BCE)

However, both nominative and accusative case markers begin to emerge some time before Coptic, at different times, and grammaticalize at different rates, leading eventually to a system in which there is both Differential Object Marking (Engsheden 2006, 2008) and Differential Subject Marking (Grossman 2015).

The accusative marker (8) begins to grammaticalize in Late Egyptian from a highly polysemic locative preposition (Werning 2012: 300, 321, 325-332, Winand 2015).[21]

(8) sw   ỉr   **m**   pꜣy-f   shn
     3SG.M   do:INF   LOC (**in** > ACC) POSS:M.SG-3SG.M   assignment
     'He does his job' (*LRL* 32,13; c. 1050 BCE)

In Demotic, a system of Differential Object Marking develops, such that the accusative marker occurs in some contexts, and not in others. Specifically, P arguments are flagged with *m/nỉm* (9) in progressive contexts, but are generally not case-marked in other constructions, including imperfective gnomic or habitual statements (Simpson 1996: 151-156). However, in Late Demotic, one observes the extension of the accusative marker to new contexts of use, such as the imperative (10) or the optative (Quack 2006: 212).

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[21] Interestingly, while the accusative marker developed from a single preposition, Winand (2015) shows that multiple constructions in which P arguments were marked as oblique converged in this grammaticalization process. Specifically, prepositionally marked objects occurred in antiapplicative contexts, where the transitive P is 'demoted' to oblique status (i) in partitive contexts, (ii) in detelicizing contexts, and (iii) to make the P argument available for a particular type of focalization. For a detailed discussion of multiple source constructions in language change, see Van de Velde et al. (2013).

(9) nꝫy-k   ḫrd-w   st   wḥꝫ   **nı̓m-k**
     POSS:PL-2SG.M   child-PL   3PL   search:INF   **ACC-2SG.M**
     'Your children, they are looking for you' (*Setne* I, 5/33; c. 250 BCE)

(10) nhs   **nı̓m-w**   nꝫ-ı̓
      wake_up:IMP   **ACC-3PL**   for-1SG
      'Wake them up for me!' (pMagLL 10,7; c. 250 CE)

In the Coptic variety described here, all postverbal P arguments, if they are not incorporated, must be case-marked (11).

(11) a-s-ô   **n**-ou-šêre
      PST-3SG.F-conceive   **ACC**-INDEF-son
      'She conceived a son' (Luke 1:36)

On the other hand, the nominative marker (12) develops much later from an 'afterthought' or antitopic marker, attested sporadically in Demotic (see Mattha 1947).

(12) hbq   nı̓m-s   **nge**-ı̓jḫ
      waste_away:IMP   ACC-3SG.F   **NOM**-demon
      'Waste her away, you demon' (pMagLL 13,2; c. 250 CE)

In Coptic, the nominative case prefix occurs obligatorily on postverbal noun phrases in S or A role (13).

(13) a-s-ô   **nci**-elisabet
      PST-3SG.F-conceive   **NOM**-Elizabeth
      'Elizabeth became pregnant' (Luke 1:24)

These two case markers are fully grammaticalized as prefixes in Coptic. The affixal status of the nominative marker is shown primarily by (1) its immediate adjacency and (2) non-interruptability with the following host, by (3) its structural obligatoriness. Furthermore, both occur only on nouns, and as such, are (5) host-selective or non-promiscuous. The accusative marker shares the same properties, but (4) word-internal phonological processes further indicate its affixal status. For example, the accusative marker assimilates to subsequent labial consonants, e.g., *n-p-baptisma* [ACC-DEF:M.SG-baptism] 'the baptism' is realized as *m-p-baptisma*. The evolution of case marking from Earlier Egyptian to Coptic is summarized in Table 11.

Table 11. Case marking on lexical NPs

	SUFFIXING	PREFIXING

Earlier Egyptian	0	0
Late Egyptian	0	0.25 (ACC) 0 (NOM)
Demotic	0	1 (ACC) 0.25 (NOM)
Coptic	0	1 (ACC+NOM)

The type change involved for case-marking prefixes is secondary grammaticalization (Breban 2014, Bisang 2015), from preposition to accusative case marker, on the one hand, and from antitopic marker to nominative marker, on the other hand.

4.2. Subject person markers on verbs

In Earlier Egyptian, subject person markers were suffixed either to lexical verb stems, as in (14), to post-stem TAM markers, such as the anterior suffix *-n* in (15), to valency-changing suffixes, such as the passive marker *-tw* in (16), or to auxiliaries and particles that precede the lexical verb, such as *i̯w* in (17).

(14) n-zp   mꜣ-**k**   i̯w   pn
      NEG-ever   see:SBJV-**2SG.M**   island   DEM:M.SG
      'You will never see this island (again)' (*Sh.S.* 153-154)

(15) mdw-k   rḫ-n-**k**   wḥꜥ-k
      speak:SBJV-2SG.M   know-ANT-**2SG.M**   solve:NMLZ-2SG.M
      'May you speak after you know how to solve (the problem)' (*Ptahh.* 366)

(16) (a crocodile) n   tkn-n-tw-**f**
                     NEG   approach-IPFV-PASS-**3SG.M**
      'A crocodile that cannot be approached' (*Urk.* IV, 616,10)

(17) i̯w-**i̯**   wn-n-i̯   wn-w-t   hrw
      AUX-**1SG**   open-ANT-1SG   hour-PL-F   day
      'Now I have opened the hours of the day' (*CT* II, 113b)

In Later Egyptian, subject affixes are suffixed to the same categories (18), although most post-stem TAM and valency-changing affixes are gradually lost during this period. During the transitional period between Earlier and Later Egyptian, periphrastic constructions emerge and later begin to dominate the verbal system, such that morphologically simple forms are replaced by periphrastic constructions, mostly comprising an inflected form of the verb *i̯ri̯* 'to do,'

followed by a lexical verb (Kruchten 1999, 2000, 2010). As a result, subject affixes increasingly occur between auxiliary verbs and lexical verbs (19).

(18) bw   sḏm-**f**   pꜣy-k   sḫr   i̯-ḏd(-i̯)   n-k
     NEG   hear:IPFV-**3SG.M** POSS:M.SG-2SG.M advice REL.PST-say-1SG   to-2SG.M
     'He does not listen to your advice, which I talked to you about' (K*RI* III, 535,13; c. 1200 BCE)

(19) bw   **i̯rw-k**   **hꜣb**   n-i̯   ꜥ-k
     NEG   **AUX.IPFV-2SG.M**   **send:INF**   to-1SG   state-2SG.M
     '(… while) you do not write to me how you are doing!' (*LRL* 66,14; c. 1050 BCE)

When these periphrastic constructions later coalesced, bound S/A person markers became entrapped (Yu 2007: Ch. 5) within the verb. This process of periphrasis and coalescence leads to the situation in Coptic, in which bound S/A person markers are prefixed to verbs (20).

(20) a-**f**-či   n-ou-oik
     PST-**3SG.M**-take   ACC-INDEF-bread
     'He took some bread' (Mark 6:5)

A second change that leads to the emergence of S/A prefixes in Coptic is the development and generalization in Late Egyptian (21) of a new paradigm of preverbal subject pronouns (Stauder 2017).

(21) **tw-i̯**≈ḥms-kw   ḥr-i̯r-t   pꜣ   ḥꜥtj
     PRON-1SG=sit-STAT.1SG   on-do-INF   the   bed
     'I am busy (lit. sitting) doing the bed' (pDeM 3, 6; c. 1100 BCE)

However, these are not yet completely bound person indexes, since adverbs can occur between the person marker and the lexical verb (22).

(22) **tw-i̯**≈dy≈ḥms   ḥr-ḏd   n nꜣ   nt̠r-w
     PRON-1SG=here=sit:STAT   on-say:INF   to DEF:PL god-PL
     'I am presently busy (lit. 'here sitting') saying to the gods ('direct speech')'
     (oAsh.M. 269, 4-5; c. 1150 BCE)

In Demotic, this paradigm undergoes significant morphological changes, with progressive and partial levelling such that the original pronominal base *tw-* for instance remains in some persons and is lost in others (Spiegelberg 1925: 67-68). For example, in (23), the pronominal base *tw-* has been lost and the pronoun is written *i̯w-k*, which likely reflects a phonological realization *ek-* or even *k-*.

(23) nꜣ   md-w-t   nty_i̯w   **i̯w-k**   ḏd   ni̯m-w

DET:PL   word-PL-F   REL   **PRON-2SG.M** say:INF   ACC-PL

'The words that you are saying' (*Onchsh*. 2/14; c. 300 BCE)

In Coptic, these relatively recent person markers are prefixes and occur before lexical verbs (24), although they can be prefixed directly to auxiliary verbs-cum-TAM markers, such as the future prefix *na-* (25), which developed from a verb of motion followed by an allative marker.

(24)   etbe-ou   **tetn**-šine   nsô-i
        because-what **2PL**-search   after-1SG
        'Why are you looking for me?' (Luke 2:49)

(25)   **k**-na-mooše
        2SG.M-FUT-walk
        'You will walk' (Luke 1:76)

These two changes – the entrapment of subject expressions between auxiliaries and lexical verbs, on the one hand, and the emergence of a new preverbal subject pronouns – leads to the situation in Coptic, in which subject expressions are always prefixed to verbs. Their affixal status is shown primarily by (1) their immediate adjacency and their (2) non-interruptability with the following host. Furthermore, part of the paradigm of the S/A markers occur only on verbs, and as such, are (5) host-selective or non-promiscuous.[22] Word-internal phonological processes (4) further indicate their affixal status. For example, the string *te-na-* [2SG.F-FUT] is often realized as *terna-* or *tera-*; similarly, the string *tetn-na-* [2PL-FUT] is often realized *tetna-*. Finally, S/A markers in Coptic show much allomorphy (4), depending on the particular TAM form. As illustration, Table 12 represents the past and the present paradigms of the verb *me* 'love'; note the differences between 1SG (*i-* vs. *ti-*), 2SG.F (zero vs. *te-*), 1PL (*n-* vs. *tn-*) and 3PL (*u-* vs. *se-*).

Table 12. Two verb paradigms (Layton 2011: 244, 259)

	PAST	PRESENT
1SG	*a-i-me*	*ti-me*
2SG.M	*a-k-me*	*k-me*
2SG.F	*a-ø-me*	*te-me*
3SG.M	*a-f-me*	*f-me*
3SG.F	*a-s-me*	*s-me*
1PL	*a-n-me*	*tn-me*
2PL	*a-tetn-me*	*tetn-me*
3PL	*a-u-me*	*se-me*

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[22]   The present-tense prefixes also attach to locative predicates, while the non-present paradigm never does.

As discussed above, these two paradigms are the outcome of the two processes exemplified above, namely, (1) the shift of a minor usage pattern, periphrastic constructions with auxiliary verbs, to a major usage pattern, as well as the coalescence or univerbation of periphrastic constructions, an excellent example of *anasynthesis* (Halspemath to appear) and (2) the new pre-verbal person indexes that first appear in Late Egyptian and ultimately coalesce with the verb. This evolution is captured in Table 13.

Table 13. Pronominal subject markers on verbs

	SUFFIXING	PREPOSED	PREFIXING
Earlier Egyptian	0.5	0.5	0
Late Egyptian-Demotic	0.25	0.75	0
Coptic	0	0	1

4.3. Tense-aspect affixes on verbs

In Earlier Egyptian, tense-aspect distinctions are marked by stem alternations to a certain extent. There are also tense-aspect markers that are suffixed to the verb. For example, the anterior marker -*n* is suffixed to the verb stem (26), as are the consecutive future markers -*kꜣ* (27) and the consecutive modal marker -*ḥr* (28).

(26) ỉr-**n**-ỉ   ꜣw-t-ỉ   ỉw-ỉ   m   nḫ<n>-t-ỉ
      do-**ANT**-1SG   office-F-1SG   SBRD-1SG   in   youth-F-1SG
      'I exercised my office while I was in my youth' (stLeiden V.4, 4-5)

(27) ḏd-**kꜣ**-ṯn   m   tp_r(ꜣ)
      say-**FUT.CNSV**-2PL   with   formula
      '(If you have no offerings with you), then you shall recite the formula ('direct speech')'
      (*Denk. der Oase Dachla* 58,5)

(28) ḫr-**ḫr**   sšf-t   ỉm-sn
      fall-**NEC.CNSV**   respect-F   in-3PL
      '(When she says to people 'listen!'), then respect inevitably falls upon them'
      (*Urk.* IV, 245,15)

In Later Egyptian, these TAM suffixes disappear or develop following in three main pathways of development.

(a) In some cases the affixes still exist but occur as prefixes. In (29), the older modal suffix -*ḥr*, in a process that is still poorly understood, 'hops' to preverbal position (Vernus 1990: 61-84;

Depuydt 1993: Part 3; Polis 2005). Its meaning progressively evolves from modal necessity (29) towards habituality (30).

(29) **ẖr-šsp-f** mw m Wꜣs-t (Late Egyptian)
NEC.CNSV-receive-3SG.M water from Thebes
'(As for the one who is buried in the Necropolis), he (inevitably) receives water from Thebes' (K*RI* III, 592,10-11; c. 1200 BCE)

(30) m-ỉr sš pẖr ỉw **ẖr-ỉr-k≠s** (Demotic)
VET disdain:INF remedy SBRD IPFV-do-2SG.M=3SG
'Do not disdain a remedy when you're accustomed to using it (lit. do it)' (*Onchsh*. 9/6; c. 300 BCE)

It is this construction that eventually develops into the Coptic Aorist (31) built with the prefix *ša-* (Green 1987) that derives from -*ẖr*.[23]

(31) **ša-i-štortr** hrai nhêt
IPFV-1SG-distrub LOC in:1SG
'I am (habitually) disturbed' (ShIII 150:14-17)

(b) Another source of TAM prefixes is the anasynthetic rise and eventual coalescence of periphrastic constructions (Kruchten 1999; 2000), in which an auxiliary, such as *ỉrỉ* 'to do,' bears inflection and governs the lexical verb ('infinitive'). This can be represented schematically as in Table 14. See also (19) above.

Table 14. Replacement by periphrasis and new verb forms

STAGE 1	STAGE 2	STAGE 3
(a) heard-3SG.M	(a) heard-3SG.M	
	(b) did-3SG.M hearing	(b) PST-3SG.M-hear
old past	*variation*	*new past*

(c) Finally, some constructions are replaced by other ones in the same functional domain. The negative perfective is a case in point. In (32) we have the Earlier Egyptian construction, with a preverbal negation followed by a perfective verb form.

(32) n mꜣ-ỉ mỉty srw pn
NEG.PFV see:PFV-1SG similar_to goose DEM:M.SG

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23 The transliteration symbol *ẖ* is commonly understood to represent a historical velar fricative, which merges in the first millenium BCE with ʃ in some dialects. See Peust (1999: 115-118) for the details.

'I did not see anything like this goose!' (*Meir* III,23)

In Late Egyptian (33) and Demotic (34), however, we find another auxiliary verb form.

(33) ẖr   ptr   bwpw-f   ỉy-t (Late Egyptian)
      CORD   ATT   NEG.PST-3SG.M   come-INF
      'But look, he did not come' (oDeM 10061, 20-21; c. 1250 BCE)

(34) ỉw   bnp-k   sḏe   wbe   rmṯ   nb   n   pꜣ   tꜣ (Demotic)
      SBRD   NEG.PST-2SG.M   talk:INF   with   man   any   of   DEF:M.SG   earth
      '(and you should go to sleep on a reed mat) without having spoken to anyone on earth'
      (pMagLL 5/7-8; c. 250 CE)

The negation of the past in Later Egyptian is not etymologically related to the negation of the perfective in Earlier Egyptian, but rather was grammaticalized from the negation of an auxiliary verb *pꜣỉ* 'to have done in the past' + infinitive: **n pꜣ-f sḏm* 'he did not do the act of hearing in the past' > *bwpw-f sḏm* > *bnp-f sḏm* 'he did not hear' (Loprieno 1995: 221, 225).

These pathways of development lead to a situation in which Coptic has prefixed tense-aspect affixes on verbs, which either precede (35) or follow (36) the subject prefixes (and also mark polarity; see Section 4.8 below). In (35), the past prefix is the result of the grammaticalization of two constructions that merged, one the periphrastic construction with the verb *ỉrỉ* 'to do' and the other a periphrastic anterior headed by a verb meaning 'finish' (Grossman 2009). In (36), the future prefix is the result of the grammaticalization of construction involving a verb of motion (Grossman et al. 2014).

(35)   **a**-f-sôtm
         PST-3SG.M-hear
         'He heard' (Mt 2:3)

(36)   tetn-**na**-sôtm
         2PL-FUT-hear
         'You will hear.' (Mt 24:6)

The affixal status of the TAM prefixes is shown by their (1) immediate adjacency to a subject expression or to a lexical verb, (2) their non-interruptability with respect to the base to which they attach, (3) their structural obligatoriness. They also show allomorphy (4), often having distinct realizations when they attach to a person-indexed verb form, on the one hand, or a construction with a lexical noun phrase in S/A role, on the other (Table 15). They also sometimes condition word-internal phonological processes, such as the Conjunctive prefix *n-*, which causes voicing on the 2SG.M person prefix *k-* (> *ng-*). As for (5), host-selectivity, they only attach to S/A expressions, whether bound person markers or incorporated lexical noun phrases in S/A role. This might be taken as evidence against their host-selectivity, and therefore as evidence against their affixal status. However, there is a subtle piece of evidence in support of their affixal status.

Affixes, rather than clitics, are liable to have arbitrary gaps (Haspelmath & Sims 2010: 200). In Coptic, bound TAM markers are themselves highly selective about the verbal stem to which they can attach: while Coptic verbs show an alternation between stative and non-stative stems (e.g., *sôtp* 'choose' vs. *sotp* 'chosen', cf. §3.3), TAM markers can only attach to a verb containing the non-stative stem – and this is completely orthogonal to whether the S/A expression is an S/A prefix or a lexical noun phrase. However, for at least some of these bound forms, i.e., those that attach to lexical noun phrases in S/A role without showing allomorphy, their affixal status may be disputed under stricter definitions, such as Haspelmath (2018).

Table 15. TAM/Polarity prefixes in Coptic

	AFFIRMATIVE		NEGATIVE	
	BEFORE PERSON PREFIX	BEFORE LEXICAL NP	BEFORE PERSON PREFIX	BEFORE LEXICAL NP
PAST	*a-*	*a-*	*mp(e)-*	*mpe-*
AORIST	*ša-*	*šare-*	*me-*	*mere-*
FUTURE	*e- ... e-*	*ere-*	*nne-*	*nne-*

In summary, the shift from tense-aspect suffixes to tense-aspect prefixes captured by Table 16 is the result of several processes of change, none of which are inherently unusual. Old tense-aspect suffixes are gradually lost or hop to pre-verbal position, while new TAM affixes are grammaticalized from auxiliary verbs in periphrastic constructions. Since the linear order of these grammaticalizing constructions follows that of basic verbal clauses, i.e., VSO/AuxSVO, it is unsurprising that tense-aspect prefixes are the result.

Table 16. Tense-aspect affixes on verbs

	SUFFIXING	PREFIXING
Earlier Egyptian	1	0
Late Egyptian-Demotic	.25	.75
Coptic	0	1

4.4. Plural affixes on nouns

From Earlier Egyptian through to Late Egyptian, a plural affix (*-w*) is suffixed to noun stems, as in (37-38).

(37) rn   rn-w
      name   name-PL
      'name'   'names'

(38) nh-t   nh-w-t
      sycamore-F   sycamore-PL-F
      'sycamore'   'sycamores'

However, two changes occur in Late Egyptian. In the first, as a side-effect of the grammaticalization of a determiner category, plural marking becomes unambiguously marked by preposed definite and possessive determiners (see Section 4.6). Compare the following examples with the lexeme *pr* 'house.' In (39-41), number is marked by the presence or absence of the plural suffix, as well as by pre-nominal determiners.

(39) ỉw   bn   pȝy-f   dỉw   m   **pȝ**   **pr**
      SBRD   NEG.EXIST POSS:M.SG-3SG.M   ration   in   **DEF:M.SG house**
      'while his ration is not in the house' (K*RI* IV, 232,4; c. 1200 BCE)

(40) ỉw-w   wȝḥ-w   m   pȝ   r(ȝ)   (n) **nȝ**   **pr-w**
      CORD.PST-3PL   leave:INF-3PL   in   DEF:M.SG entrance of   **DEF:PL house-PL**
      'And they left them at the entrance of the houses' (K*RI* VI, 830,7-8; c. 1050 BCE)

(41) šd-tw   nȝ   ḫl-w   m   **nȝy-sn**   **pr-w**
      take_away:SBJV-PASS   DEF:PL chisel-PL from **POSS:PL-3PL house-PL**
      '(…) and the chisels will be taken away from their houses (so as to be given back to Pharaoh)' (K*RI* IV, 318,12-13; c. 1200 BCE)

Plausibly as a result of these developments, the earlier plural suffix is gradually lost in Late Egyptian and Demotic. This process is however difficult to assess properly because of the peculiarities of the Ancient Egyptian scripts.[24]

In Coptic, the erstwhile preposed determiners are affixed to nouns, which means that plurality is now marked by prefixes (42-43).

(42) **p**-rôme   **DEF:M.SG**-man 'the man'   (Mt 4:4)
      n-rôme   **DEF:PL**-man   'the men'   (Mt 5:13)

(43) **ou**-rôme   **INDEF:SG**-man 'a man'   (Mt. 7:26)
      hen-rôme   **INDEF:PL**-man '(some) men'   (Acts 4:13)

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[24] Morphographic plural strokes are systematized over the phonographic plural grapheme -*w* in Later Egyptian. As a result, one can hardly determine whether the plural strokes reflect a segmental unit -*w* or simply stand for a semantically marked plural expression.

Their affixal status is shown by their (1) adjacency and (2) uninterruptability, as well as (3) their structural obligatoriness; a noun that has no (in)definiteness prefix or another prefix from the same paradigm has a particular set of interpretations, see Shisha-Halevy (1986) and Layton (2011) on the 'zero article.' These formants are (5) host-selective, in that they occur only on nouns – or more precisely, they typically occur on nouns, and when they (sporadically) occur on other lexical classes, the entire unit has the distributional properties of a noun. They also show (4) allomorphy and word-internal phonological processes. For example, the definiteness markers are *p-* (MSG), *t-* (FSG), and *n-* (PL, no gender distinction), unless they attach to a cluster-initial base, in which case they are *pe-*, *te-*, and *ne-* respectively. As for word-internal phonological processes The plural definiteness marker occasionally assimilates to the first consonant of the base, e.g., *n-rôme* [DEF.PL-man 'the men'] is sporadically realized as *r-rôme* 'the men.'

There are also remnants of the earlier plural-suffixing constructions, which often involve stem-internal alternations as well (44-45). The latter constructions have low type-frequency (about 100 nouns, according to Layton 2011: 87), and within this group there is no consistent plural marker; rather, there are a number of different allomorphs, which are lexically determined.

(44)   ebot   'month' (Luke 1:24)   ebate   'months' (Gal. 4:10)
(45)   tbnê   'beast' (Luke 10:34)   tbnooue   'beasts' (John 4:12)

As such, Coptic has both prefixing and suffixing for this parameter. However, the suffixed plural markers are restricted to a small, closed list of nouns. All other nouns have plurality marked by prefixes (see 42-43 above).

Table 17. Plural affixes on nouns

	SUFFIXING	PREFIXING
Earlier Egyptian	1	0
Late Egyptian-Demotic	.25	.75
Coptic	.25	.75

The type of change observed here (Table 17) is the loss of plural suffixes, and the emergence and eventual coalescence of innovative preposed determiners that unambiguously mark number. The older construction remains as a non-productive relic.

4.5. Pronominal possessive affixes on nouns

In Earlier Egyptian, possessive affixes are suffixed to nouns (62).

(46)   pr   pr-**k**   pr-**t̠n**   pr-w-**t̠n**
       house   house-**2SG.M**   house-**2PL**   house-PL-**2PL**

'house'   'your (SG.M) house' 'your (PL) house'   'your (PL) houses'

In Later Egyptian, the older suffixing construction is retained (47), but is recessive in the face of a newer construction, which involves preposed possessive determiners (48). These are grammaticalized from preposed demonstrative pronouns (*pꜣ/tꜣ/nꜣ*) with suffixed person markers (Egedi 2010; Gardiner in press; Sojic in press; Winand in press).

(47)   ꜣb-k   ỉn-tw-ỉ   r   pr-**k**
       wish:PST-2SG.M   bring-SBJV.PASS-1SG   ALL   house-**2SG.M**
       'You wished that I be brought to your house' (K*RI* VI, 74,14; c. 1150 BCE)

(48)   pꜣy-**k**   pr   m-sšr
       POSS:M.SG-**2SG.M**   house   excellent
       'Your house is in excellent state!' (*LEM* 8,1; c. 1200 BCE)

Similarly to Late Egyptian and Demotic, Coptic has both the older suffixing construction and the newer construction. However, in Coptic, the earlier preposed possessive determiners have coalesced with nouns, and are now prefixes (49). Their affixal status is shown by their (1) adjacency and (2) uninterruptability, as well as (3) their structural obligatoriness; in fact, they are paradigmatic with the (in)definiteness prefixes described in the next section. These formants are (5) host-selective, in that they occur only on nouns.

(49)   pe-f-ran
       POSS:M.SG-3SG.M-name
       'his name'

Coptic also retains remnants of the older construction in which possessors are suffixed to the possessed noun; these are almost entirely nouns that denote body parts, and occur usually in non-referential uses (e.g., in complex prepositional phrases or in incorporation). In (50), *toot-f* [hand-3SG.M] is incorporated into the verb. Note that the free form lexical item that typically denotes 'hand' is *cič*; the older form from which *toot-f* is derived is rare as a free form.

(50)   a-f-ka-toot-**f**
       PST-3SG.M-lay-hand-3SG.M
       'He laid his hands' (Mark 8:25)

A corpus study (Grossman 2018) shows that the suffixed possessor construction is extremely rare, and is also limited in distribution. For example, for the noun *ran* 'name,' 87% of all occurrences in the New Testament (n=210) are possessed, 71% of these have pronominal possessors, and of these, 97% have possessive prefixes. Of the rare occurrences of the older construction with possessor suffixes, 4 out of 5 occur in the compound verb *ti-ran* ('give-name') 'to name someone or something.'

Table 18. Pronominal possessive affixes on nouns

	SUFFIXING	PREFIXING
Earlier Egyptian	1	0
Late Egyptian-Demotic	.25	.75
Coptic	.25	.75

The type of change visualized in Table 18 is the anasynthetic replacement (Haspelmath 2015) of an older suffixing construction with a new one, in which a possessor affix is preposed to the possessum, and due to the eventual coalescence of the construction, the erstwhile suffix is replaced by a prefix indicating both definiteness and pronominal possession. The older construction remains as a non-productive relic.

4.6. Definite or indefinite affixes on nouns

Earlier Egyptian has no obligatory marking of definiteness or indefiniteness on nouns (51, see Shisha-Halevy 2007). By the end of the Earlier Egyptian period, however, in the so-called Middle Egyptian documentary texts, the preposed demonstrative determiners *pꜣ* (DEM:SG.M), *tꜣ* (DEM:SG.F), *nꜣ* (DEM:PL) raise significantly in frequency (especially when used as pronouns, 52) and progressively losr their demonstrative force, behaving more and more like a definite article when heading nouns phrases (53; cf. Brose 2014: 66-73).

(51) z   nty   n   fgn-n-f
      man   REL   NEG   defecate-IPFV-3SG.M
      'A/The man who cannot defecate (is constipated)' (pEbers 12/16)

(52) nꜣ   nty   ḥnꜥ-f
      DEF:PL   REL   with-3SG-M
      'The ones that are with him' (pBerlin P 10038A, rᵒ 14)

(53) ḥr rdỉ-t   ỉn-t(w)   pꜣ   kꜣ   1   n   nfrw   n   wꜣgỉ
      on CAUS-F   bring-SBJV.PASS DEF:M.SG bull 1   of   lacking for Wag-feast
      '(and this is a message) about having this/the one missing bull brought to the Wag-festival' (pBerlin P 10018, rᵒ 4)

In Later Egyptian, constructions unambiguously marking definiteness and indefiniteness are fully grammaticalized. Each construction has its own pathway. The first to grammaticalize is the definite marker (54), which derives from the aforementioned preposed demonstrative pronoun (see also Section 4.4).

(54) ỉw   pꜣ   kꜣwtj   ḥr   tꜣ   kꜣ-t
     SBRD   DEF:M.SG worker on   DEF:F.SG work-F
     '(…) while the worker is at work' (oCairo 25667, 5-6; c. 1400 BCE)

Somewhat later, during the Late Egyptian period, is the indefinite singular, which derives from the numeral one (wꜥ).

(55) ꜥḥꜥn   rd-n   pꜣ   wr   n Ḳdš   pr   wꜥ   ssm.t
     SEQ.PST CAUS-PST DEF:M.SG great of Qadesh go_out:SBJV INDEF team_of_horses
     'Then the chief of Qadesh made a (single) team of horses go out' (*Urk.* IV, 894,5;
     c. 1450 BCE)

(56) dỉ   n-ỉ   Iꜥḥ-ms   wꜥ-t   šꜥd   n   ḏmꜥ
     give:PST DAT-1SG Ahmose   INDEF-F piece of   papyrus
     'Ahmose gave me a piece of papyrus' (pRylands 9, 2/1; c. 500 BCE)

The last to grammaticalize is the indefinite plural marker (*hyn* > *hen*), which derives from a noun denoting an indefinite quantity (*nhꜣ*, compare 57 and 58).

(57) rmṯ   ỉ-šsp   nhꜣ   ḥḏ
     men   PTCP.PST-receive some.PL silver
     'Men who received some silver' (K*RI* VI, 825,7; c. 1050 BCE)

(58) sḏm-n   hyn   md-w-t   ḏbꜣ   Nꜣ-nfr-ỉb-rꜥ
     hear:PST-1PL INDEF:PL thing-PL-F   about Naneferibra
     'We heard stories about Naneferibra' (pBerlin P 13562, 7-9; c. 350 BCE)

In Coptic, these preposed markers have coalesced with nouns, leading to the situation in which Coptic has definite (59) and indefinite prefixes (60) on nouns, as discussed above in §4.4.

(59) **p**-ran   **n**-ran
     DEF:MSG-name   DEF:PL-name
     'the name' (Mt 28:19) 'the names' (Apoc 21:14)

(60) **ou**-ran   **hen**-ran
     INDEF:SG-name   INDEF:PL-name
     'a name' (Apoc 3:1)   '(some) names' (Apoc 21:12)

Demonstratives often grammaticalize into definite articles, and thereafter to definite affixes. Similarly, the number 'one' often grammaticalizes into indefinite articles, and thereafter to indefinite prefixes (Givón 1981, Heine 1997). Table 19 synthesizes this evolution from Earlier Egyptian to Coptic.

Table 19. Definite/indefinite affixes on nouns

	SUFFIXING	PREPOSED	PREFIXING
Earlier Egyptian	0	.25	0
Late Egyptian-Demotic	0	1	0
Coptic	0	0	1

4.7. Pronominal object affixes on verbs

In Earlier Egyptian, there are two series of bound person markers or pronouns that can mark the P argument of transitive verbs (Table 20). The first series are suffixes, the second are enclitics (Uljas 2016). They are distinguished by a number of properties, which need not concern us here.[25]

Table 20. Two series of bound person markers

	Series I (suffixes)	Series II (clitics)
1SG	*-ỉ*	*=wỉ*
2SG.M	*-k*	*=ṯw*
2SG.F	*-ṯ*	*=ṯn*
3SG.M	*-f*	*=sw*
3SG.F	*-s*	*=sy*
1PL	*-n*	*=n*
2PL	*-ṯn*	*=ṯn*
3PL	*-sn/-w*	*=sn*

In Earlier Egyptian, Late Egyptian, and Demotic, finite verbs, as well as participles, occur with Series II person markers in P role, as in (61-63).

(61) rdỉ-ḫr-k   wrḥ-f≈**sw**   (Earlier Egyptian)
      CAUS-NEC.CNSV-2SG.M[series I]   anoint:SBJV-3SG.M[series I]=**3SG.M[series II]**
      'And you shall make him anoint himself' (pEbers 52,1)

(62) ỉn≈**wỉ**   r   nỉw-t   ỉw-ỉ   ꜥnḫ-kw (Late Egyptian)
      bring:IMP=**1SG[series II]** ALL   Thebes-F   SBRD-1SG[series I]   live-STAT.1SG
      'Bring me back to Thebes alive (lit. while I am alive)' (*LRL* 38,5-6; c. 1050 BCE)

(63) pš-w≈st   r   nꜣ   sꜣ-w   (Demotic)

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25   Some have argued that the two series of pronouns actually differ only for the singular, with a single paradigm for the plural forms, see Uljas (2016).

divide:PST-3PL[series I]=3PL[series II]   ALL   DEF:PL Phyle-PL
'They divide them up between the Phyles' (pRylands 9, 4/1; c. 500 BCE)

Only for infinitives is the P role marked by Series I person markers (64-66).

(64) m   pr-t-**f**   tp-t   (Earlier Egyptian)
      in   go_out-INF-**3SG.M**   first-F
      'during his first outing' (stCairo GC 20057, d1-2)

(65) ἰmj-k   ἰr-**f**   (Late Egyptian)
      VET.SBJV-2SG.M do:INF-**3SG.M**
      'Please don't do it' (pBoulaq IV, 14.15; c. 1400 BCE)

(66) pꜣ   nty   bꜣk-s   (Demotic)
      DET:M.SG   REL   work:INF-3SG.F
      'The one who works her' (*Onchsh*. 24/20; c. 300 BCE)

As noted in Section 4.2, in Late Egyptian, periphrastic constructions, in which the lexical verb is realized by an infinitive, come to dominate the verbal system. As such, the Series I pronouns occur as P markers in simple periphrastic clauses,[26] as in (67).

(67)   bw   ἰr-ἰ   ptr-**f**   m-ḫnw   nꜣy-k   ἰḥ-w
       NEG   AUX.IPFV-1SG   see:INF-**3SG.M** in-inside   DEM:PL-2SG.M ox-PL
       'I do not see it [i.e., my ox] in the middle of your cattle' (*LES* 34,15-16 ; c. 1250 BCE)

In Coptic, the periphrastic constructions have been almost totally generalized and grammaticalized as non-periphrastic constructions. As a result, Series I suffixes have come to dominate P-marking.

(68)   a-f-sepsôp-**t**
       PST-3SG.M-comfort-**1SG**
       'He comforted me' (Acts 23:18)

(69)   a-s-sepsôp-**n**
       PST-3SG.F-comfort-**1PL**
       'She comforted us' (Acts 16:15)

(70)   a-f-sepsôp-**ou**
       PST-3SG.M-comfort-**3PL**
       'He comforted them' (Acts 3:3)

---

[26]   In this paper, we do not discuss the emergence of a paradigm of innovative direct object pronouns in Late Egyptian (see, e.g., Borghouts 1980; Černý & Groll 1984: 32; Junge 2001: 77; Winand 1992: 182-186), which is indirectly related to this process.

The affixal status of the P indexes is demonstrated by (1) their adjacency and (2) non-interruptability with respect to the verb. They are not (3) structurally obligatory, since verbs can occur without P indexes. Nor are they entirely host-selective (5), as they can occur on other lexical classes, such as prepositions; under Haspelmath's (2018) strict definition of affix, which depends on non-promiscuity, these would not be considered affixes. On the other hand, (4) they show phonologically-conditioned allomorphy, which is determined by the final segment of the verb stem. For example, the 1SG P index is -*i* after a single vowel, -*t* after a long vowel, and -*t* or zero after a stem ending in -*t* (for full details, see Layton 2011: 69). They also show lexically-conditioned allomorphy, e.g., a list of several verbs conditions a paradigm of P indexes that is distinct from those that occur with the majority of verbs. For example, according to the phonologically-conditioned allomorphy described above, one would expect the 3PL P index occurring on the imperative *ani-* 'bring' to be -*u*. However, it is –*su* (*ani-su* 'bring them'). Finally, P indexes condition an alternation in the verb stem itself, e.g., *hôtb* 'kill' vs. *hotbe-f* (kill-3SG.M) 'kill him.'

From a theoretical point of view, the change described above is interesting, since it is normally assumed that clitics, over the course of grammaticalization, become affixes. This is of course the well-known cline of increasing coalescence in grammaticalization processes (Hopper & Traugott 2003; Himmelmann 2014):

lexeme > 'heavy' function word > clitic function word > affix > inflectional formative (> zero)

Ancient Egyptian-Coptic thus shows an alternative pathway through which affixes can come to replace clitics in a language: by constructions that occur with affixes in a particular domain becoming more frequent than constructions that occur with clitics within the same domain, without clitics 'becoming' affixes, i.e., without any 'clitic-to-affix' grammaticalization.

Table 21. Pronominal object affixes on verbs

	SUFFIXING	POSTPOSED	PREFIXING
Earlier Egyptian	.25	.75	0
Later Egyptian	.5	.5	0
Coptic	1	0	0

Here the type of change is the shift from a minor usage pattern to a major one. The 'suffix takeover' is the result of grammaticalization of verb forms with suffixed P markers, and the loss of verb forms with clitic P markers, with no 'clitic-to-affix' grammaticalization involved.

4.8. Negative affixes on verbs

Throughout the history of Ancient Egyptian-Coptic, negative elements were almost always preposed to verbs, but have probably not been prefixed to verbs from a very early date, as shown by Earlier Egyptian examples such as (71), where a discourse particle separates the negation from the verb (Oréal 2011: 356-357).

(71) nj   ḥm   wnm-i̯   ḥsw   nj   swr-i̯   wsš-t
      NEG PTCL eat:FUT-1SG faeces NEG drink:FUT-1SG urine-F
      'I will indeed not eat faeces, I will not drink urine' (*CT* III, 75k)

We discuss below the evolution of negation in (i) main verbal clauses, (ii) subordinate clauses, and (iii) non-verbal clauses.

(i) From Late Egyptian onwards, negations in main verbal clauses began to coalesce with TAM auxiliaries (see already the discussion of examples 33-34). As a case in point, we sketch here the evolution of the negative perfect construction (e.g., Loprieno 1995: 93; see Table 22). The synthetic form *sḏm-t-f* was already limited to few perfective constructions in Earlier Egyptian (see the discussion in Section 4.10), one of which is the perfective negation *n sḏm-t-f* NEG hear-PRF-3SG.M 'he has/had not heard yet' (a). This negative pattern is still used in Late Egyptian, with the negative element written *bw*[27] (b). However the periphrastic construction with the auxiliary *i̯ri̯* 'to do' progressively comes to dominate during this period (Winand 1992: 289-292), leading to the construction *bw i̯r-t-f sḏm*. The negative morpheme becomes increasingly bound to the auxiliary in Demotic (c) and ultimately coalesces in Coptic (d), and becomes an unanalyzable morpheme with an epenthetic *p*.

Table 22. Diachronic evolution of the negative perfect

	EARLIER EGYPTIAN	LATE EGYPTIAN	DEMOTIC	COPTIC
(a)	*n sḏm-t-f*	*bw sḏm-t-f*		
(b)		*bw i̯r-t-f sḏm*		
(c)			*bw-i̯r-t-f sḏm*	
(d)				*mpat-f-sôtm*

As a result of these processes of coalescence of the negative marker with auxiliaries, which in turn coalesced with subsequent lexical verbs, in main clauses Coptic has portmanteau prefixes that code both TAM values and polarity. For example, the negative optative marker is *nne-* (65), the prohibitive marker is *mpr-* (73), the negative past is *mp-* (74), the negative imperfective is *me-* (75), and the negative perfective is *mpat-* (76).

(72) **nne**-k-hôtb
      NEG.OPT-2SG.M-kill
      'Thou shalt not kill' (Mt 5:21)

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[27] No convincing explanation has been advanced so far for the graphemic change from *n* to *bw* or for its phonological significance (e.g., Junge 2001: 100, especially n. 10).

(73) **mpr**-hôtb
      PROH-kill
      'Don't kill' (Mk 10:19)

(74) **mp**-f-ti-eoou   m-pnoute
      NEG.PST-3SG.M-give-honor   ACC-God
      'He did not honor God' (Acts 12:23)

(75) **me**-f-ei
      NEG.IPFV-3SG.M-come
      'He cannot come' (John 3:20)

(76) **mpat**-f-ei
      NEG.PRF-3SG.M-come
      'He hasn't come yet' (John 7:6)

While all share an initial nasal, these prefixes are synchronically unsegmentable. The main reason is that these prefixes are asymmetrical with respect to the affirmative forms. For example, the affirmative past tense marker is *a-*, the affirmative aorist marker is *ša-*, and the affirmative imperative typically has no prefix at all. As such, the initial nasal, which goes back to the Earlier Egyptian negation *n*, cannot easily be analysed as a separate morpheme, with the residue marking the TAM category. These negations are highly host-specific, as they occur only on verbs and as noted above, they are highly specific with respect to TAM. They no longer show word-internal phonological processes, as they have already completely coalesced with what were once auxiliaries.

(ii) In verbal subordinate clauses, Coptic has a dedicated negative prefix (*tm-*).

(77)   [And he smote him and his sons and all his people]
       šant-f-tm-šečp-seepe   nta-f
       LIMIT-3SG.M-NEG-leave-remainder   of-3SG.M
       'until he did not leave any remainder of his' (Numbers 21:35)

This prefix was originally a negative verb,[28] which was used in Earlier Egyptian to negate a range of morphosyntactically dependent verb forms, including – but not limited to – participles and infinitives. In Later Egyptian, its distribution is gradually reduced to the negation of infinitives on the one hand (78) and dependent subjunctives on the other (79). This latter use is no longer attested in Coptic.

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[28] The negative verb, in turn, was grammaticalized from a lexical verb meaning 'to be complete, to come to an end' (Junge 2001: 85-86).

(78)　　ỉw-ỉ　　　　　ḥr　tm　sḏm　　n-f　　(Late Egyptian)
　　　　SEQ.PST-1SG　　on　NEG　hear:INF　DAT-3SG.M
　　　　'But I did not listen to him' (*LES* 14,5-6; c. 1200 BCE)

(79)　　m_ỉr　pr　　　　r_bnr　　　tm　　　　　pꜣ　　　　　ym　　iṯꜣ-ṱ　　(Late Egyptian)
　　　　PROH　go_out:INF　outside　　NEG:SBJV　　DEF:M.SG　　sea　take:INF-2SG.F
　　　　'Don't go outside lest the sea carry you away' (*LES* 19,13-14; c. 1200 BCE)

(iii) Finally, in some clause-types, Coptic also has a discontinuous negation, which comprises a negative prefix (*n-*) and an enclitic (=*an*) (80a). The prefix is not highly host-specific, as it occurs in non-verbal clauses and can attach to a lexical NP subject. On the other hand, when it attaches to verbs, one can observe word-internal phonological processes. For example, it voices the adjacent 2SG.M person index, e.g., *n-k-sôtm* [NEG-2SG.M-hear] > *ngsôtm* 'you do not hear' (Layton 2011: 244), see (80a).

　　　　The initial segment of the discontinuous negation is moribund in some dialects, leaving the enclitic =*an* as the sole clausal negation (80b).

(80a)　**n**-g-na-šače=**an**　　　　laau　　(80b)　tⁱ-onh=an
　　　　NEG¹-2SG.M-FUT-say=**NEG²**　thing　　　　　1SG-live=NEG
　　　　'You won't say anything' (Mk 15:4).　　　　'I do not live' (Gal. 2:20).

This discontinuous negation is the result of a Jespersen Cycle (van der Auwera 2009), in which an earlier preverbal negation was reinforced by an emphatic particle (Winand 1997). In Coptic, it is the standard negation of non-verbal clauses (Loprieno et al. 2017). However, the present tense (and morphosyntactically related constructions, like the past imperfective) in Coptic developed from a non-verbal clause construction, and as such, inherits the same negative strategy. All in all, the main strategy in Coptic for verbal main clauses is clearly prefixed negative markers.

Table 23. Negative affixes on verbs

	SUFFIXING	PREPOSED	PREFIXING
Earlier Egyptian	0	1	0
Later Egyptian	0	.5	.5
Coptic	0	0	1

The type of change observed from Late Egyptian onwards is the progressive grammaticalization of portmanteau TAM/Polarity prefixes, due to the coalescence of negative markers and TAM auxiliaries (see Section 4.3).

4.9. Interrogative affixes on verbs

In Ancient Egyptian-Coptic, yes/no interrogative clauses are rarely unmarked (Gardiner 1957: 402, §491). Usually, they are flagged by sentence-initial particles, such as *ỉn/ỉn-ỉw* for neutral questions (81, Silverman 1980), or *ỉs(t)* for modal ones (82, Collier 2014).

(81) ỉn_ỉw   ntt   ḥm.t   (Earlier Egyptian)
      INT   2SG.F   slave_woman
      'Are you a slave woman' (*M. u. K.* D, 2,8)

(82) ỉst   bw   ỉr-k   sḫꜣ   wꜥ   n   nfr   (Late Egyptian)
      INT.MOD   NEG   AUX.IPFV-2SG.M   remember:INF   one of good
      'Can't you remember one good deed?' (*LES* 17,8; c. 1200 BCE)

However, content questions ("wh-questions", see Vernus 2006) often involve special morpho-syntactic marking on the verb (Polotsky 1940, 1944; Uljas 2009, 2012). In Earlier Egyptian, these forms have been traditionally analyzed as nominalizations, and the interrogative construction as the functional equivalent of a cleft sentence (83).

(83) mrr-k   wš-t(w)   ꜥry-t-k   ḥr-ỉḫ   (Earlier Egyptian)
      wish:NMLZ-2SG.M   destroy:SBJV-PASS   gate-F-2SG.M   because-what
      'Why do you wish that your household be laid waste?' (Cairo Bowl, inside 4-5)

In Late Egyptian, these nominalizations receded and were replaced with a functionally similar paradigm (Cassonnet 2000), marked by an overt prefix (84).

(84) ỉ-ỉr-k   qnd   ḥr-ỉḫ   (Late Egyptian)
      FOC-AUX-2SG.M   be_angry:INF   on-what
      'For what reason are you angry?' (*LES* 47,14; c. 1150 BCE)

In Coptic, the descendants of these constructions code the utterance as being characterized by a marked information structure. The affixal status of this formant is indicated by the fact that it is immediately adjacent to the leftmost prefix on the verb (1), and it cannot be interrupted by anything else (2). It is not structurally obligatory (3), as Coptic also has unmarked questions. It is highly host-selective (5), as it occurs only on verbal constructions, with some minor exceptions; whether it falls under Haspelmath's strict definition of affix is unclear. Conclusive evidence for its affixal status is found in its allomorphy, which is, somewhat unusually from a cross-linguistic perspective, conditioned by TAM construction: *nt-* for the past tense, *ete-* in some negative constructions, and *e-* elsewhere.

(85) e-k-čô   na-n   n-tei-parabolê
      FOC-2SG.M-say   DAT-1PL   ACC-DEM:F.SG-parable
      'Are you telling this parable *for us*?' (Luke 12:41)

As in Earlier Egyptian, this information-structural morphology is strongly associated with interrogative constructions (Polotsky 1944; Shisha-Halevy 1986; Reintges 2003), and it can occur even where no focal element is clearly present.

(86) e-k-nkotk
      FOC-2SG.M-sleep
      'Are you asleep?' (Mark 14:37)

While focus morphology is associated with interrogatives since Earlier Egyptian, it is only in Coptic that it is used for direct yes/no questions.

Table 24. Interrogative affixes on verbs

	SUFFIXING	PREFIXING
Earlier Egyptian	0	0
Later Egyptian	0	0
Coptic	0	.25

The type of change involved here is secondary grammaticalization, from an information-structuring prefix to a prefix that occurs in interrogative contexts.

4.10. Adverbial subordinator affixes on verbs
Earlier Egyptian adverbial subordinate clauses are either unmarked (so-called 'virtual adverbial clauses') or are nominalized verb forms introduced by a preposition of some sort (Gardiner 1957: 166, §222), as in (87).

(87) [A torch will be lighted for you,]
      r   wbn-t   šw   ḥr   šnb-t-k
      ALL   rise-LIM   sun   on   breast-F-2SG.M
      '(…) until the sun has risen over your breast' (*Urk.* IV, 117,4; c. 1450 BCE)

With such constructions, yet another anasynthetic change begins in Late Egyptian. Erstwhile clause-initial prepositions begin to coalesce with the following verb form, usually an auxiliary verb (see Section 4.2-3) as in (88), where the initial ỉ- developed from the Allative preposition *r* (Grossman & Polis 2012) of (87), creating, in effect, adverbial subordinator prefixes on verbs.

(88) [Seize this woman, and make her a prisoner]
      ỉ-ir-t-tw-gm   ỉt3w   rmṯ   r   sꜥḥꜥ-s
      LIM¹-do-LIM²-IMPRS-find   thief   man   ALL   accuse:INF-3SG.F
      'until a thief or someone is found to accuse her' (K*RI* VI, 800,13-14; c. 1050 BCE)

These verb forms are then reinforced by the addition of a new 'until' prefix (Winand 1992: 292-297), as in (89).

(89) [Have it brought]

     šꜢꜥ-i̓i̓rt-i̓-šm   r-rsy

     until-LIM-1SG-go   ALL-south

     'before I go south' (*LES* 70,12; c. 1000 BCE)

Ultimately, the combination of preposition plus auxiliary verb ends up in Coptic as an unanalyzable adverbial subordinator prefix *šant-* (89).

(90)   šant-n-hôtb   m-paulos

     LIMIT-1PL-kill   ACC-Paul

     'until we kill Paul' (Acts 23:12)

Other adverbial subordinator prefixes mark temporal, conditional, and sequential clauses. These prefixes occur only on verbs. In fact, they are paradigmatic with TAM prefixes described above, and share the same properties in terms of boundness. Since they can also occur on lexical noun phrases in S/A role, they may not fall under a more restrictive definition of affix that relies solely on non-promiscuity.

Table 25. Adverbial subordinator affixes on verbs

	SUFFIXING	PREFIXING
Earlier Egyptian	1	0
Later Egyptian	0	.75
Coptic	0	1

Here too we observe the process of grammaticalization and ultimate coalescence of periphrastic constructions. Incidentally, as Grossman et al. (2018) point out, this is a counterexample to an otherwise robust universal: "A logically possible type for which I have no clear example is a language where the adverbial subordinator is a prefix on the verb" (Dryer 2013f).[29]

5. Conclusions

Table 26 summarizes the parameters, if and when they shifted to prefixing, and through what process of language change.

Table 26. Summary of changes

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[29]   Grossman et al. (2018) show that there are numerous languages from diverse areas and families, including the Sino-Tibetan, Algonquian, Afroasiatic, and Tupi-Guarani families, which have adverbial subordinator prefixes.

PARAMETER	TYPE OF CHANGE	EMERGENCE	FULLY GRAMMATICALIZED
Case affixes on nouns	grammaticalization	Late Egyptian (ACC) Demotic (NOM)	Demotic (ACC) Coptic (NOM)
Pronominal subject affixes on verbs	(1) grammaticalization (2) marginal-to-major pattern + entrapment	Late Egyptian	Coptic
Tense-aspect affixes	(1) loss of suffixes (2) grammaticalization of auxiliary constructions	Late Egyptian	Coptic
Plural affixes on nouns	replacement	Late Egyptian	Coptic
Pronominal possessive affixes	replacement	Late Egyptian	Coptic
Definite or indefinite affixes	grammaticalization	Late Egyptian	Late Egyptian (DEF) Coptic (INDEF)
pronominal object affixes on verbs	minor-to-major pattern	Old Egyptian	Coptic
Negative affixes on verbs	grammaticalization	Late Egyptian	Coptic
Interrogative affixes on verbs	grammaticalization	Late Egyptian	Coptic
Adverbial subordinator affixes on verbs	grammaticalization	Late Egyptian	Coptic

We can now provide a finer-grained description of the diachrony of affixing preferences in Ancient Egyptian Coptic. Broadly, the language shifted from a moderate suffixing preference in Earlier Egyptian, to a moderate prefixing preference in Late Egyptian and Demotic, and finally to a predominantly prefixing stage of the language in Coptic (Table 27).

Table 27. The affixing preference over time

		EARLIER EGYPTIAN		LATER EGYPTIAN		COPTIC	
		Suff.	Pref.	Suff.	Pref.	Suff.	Pref.
1	case affixes on nouns	0	0	0	1.5	0	2
2	pronominal subject affixes on verbs	1	1	0.5	1.5	0	2
3	tense-aspect affixes on verbs	2	0	0.5	1.5	0	2
4	plural affixes on nouns	1	0	.25	.75	.25	.75
5	pronominal possessive affixes on nouns	1	0	.25	.75	.25	.75
6	definite or indefinite affixes on nouns	0	0	0	0	0	1
7	pronominal object affixes on verbs	.25	0	.5	0	1	0
8	negative affixes on verb	0	0	0	0.5	0	1
9	interrogative affixes on verbs	0	0	0	0	0	.25
10	adverbial subordinator affixes on verbs	1	0	0	.75	0	1
Total		6.25	1	2.0	7.25	1.5	10.75
Affixing index		55.8%		71.2%		94.2%	
Suffixing vs. prefixing		48.1%	7.7%	15.4%	55.8%	11.5%	82.7%

In some of the changes, anasynthesis was at work, with innovative periphrastic constructions (involving preposed grammatical items) emerging and ultimately coalescing. This resulted in subject prefixes, TAM and adverbial subordinator prefixes on verbs, and possessor-prefixes on nouns. In these cases, in which minor usage patterns became conventionalized and frequent, older constructions were either lost or were marginalized as unproductive relics. In other cases, entirely new categories developed, such as number-bearing (in)definiteness markers that later became prefixes. In yet other cases, preposed or prefixed grammatical items underwent secondary grammaticalization, leading to, e.g., prefixes marking case, negation, and yes-no questions.

Interestingly, a change that is not anasynthetic with respect to a particular domain may entail a change that is anasynthetic for another domain. For example, Earlier Egyptian marked number

as suffixes on nouns, but did not mark (in)definiteness. In Later Egyptian, new preposed (in)definiteness markers grammaticalized. This in itself is not an anasynthetic change, because a new category was created. However, these (in)definiteness markers were themselves marked for number, leading to prefixed number marking. In other words, anasynthesis may be the indirect result of a change in another domain.

All in all, we have showed that Ancient Egyptian-Coptic (Afroasiatic) shows a long-term diachronic macro-change from mixed suffixing-prefixing to an overwhelming preference for prefixing. Furthermore, we argue that each of the micro-changes implicated in this macro-change occurred at the level of individual constructions (see already Sapir 1921: 128; Haspelmath 2008). Importantly, these changes did not occur at the same time, even within a single domain. For example, within the domain of (in)definiteness and number marking, the grammaticalization of singular definite markers preceded both plural definite markers and singular indefinite markers, with plural indefinite markers lagging far behind.

Although we have demonstrated that changes in affix order in Ancient Egyptian-Coptic occur at different times, at different rates, and to different degrees in different domains, this does not contradict the generalization that there is a strong global preference for suffixed inflectional items. Nor does it rule out the possibility that the emergence of early prefixes served as an attractor or perceptual magnet (Blevins 2017), indirectly leading to speakers preferentially using constructions with preposed or prefixed grammatical items rather than suffixed items. However, such a claim remains to be evaluated empirically. What the evidence allows us to observe is that the Coptic prefixing preference developed slowly and incrementally.

As we noted in Section 1, this is in line with the likely role of the forces underlying statistical universals, at least some of which are likely to show weak signals. Due to the range of factors that may shape language change, and the potential complexity of their interactions, the forces underlying statistical universals "manifest themselves only statistically, never categorically" (Bickel 2015: 115). This means that it is only to be expected that some languages, given the right conditions, would develop disharmonic linear patterns, tense-aspect marking on nouns, or, as in the present case, a strong macro-preference for prefixed inflectional items.

However, even though many of these changes are cross-linguistically frequent (TYPE) and involve cross-linguistically frequent source constructions (SOURCE) and multiple pathways (PATH), the prefixing macro-preference of Coptic is the result of many smaller changes, some of which involve multiple stages occurring in a particular sequence (STAGE). It does not seem that language contact played any role, as the main language with which Coptic was in contact – Greek – had a moderate suffixing preference, so DIFFUSABILITY is not likely to have played a role (Grossman 2018). Furthermore, even though affixing preferences show clear areal signals (Dryer 2013a), the role of area, as a proxy for language contact, has yet to be established as a predictor independent of inheritance. Similarly, it remains to be seen whether prefixes in inflectional domains are inherently stable or unstable; statistical methods, such as the Family Bias Method (Bickel 2011) might shed light on this issue.

Glossing abbreviations

1	1st person	FOC	focalizer, focalizing form	PL	plural
2	2nd person			PERT	pertinative
3	3rd person	FUT	future	POSS	possessive
ACC	accusative marker	IMP	imperative	PRF	perfect
ALL	allative	IMPRS	impersonal	PROH	prohibitive
ANT	anterior	INDEF	indefinite	PST	past
ATT	attention marker	INF	infinitive	PTCL	particle
AUX	auxiliary	INT	interrogative	PTCP	participle
CAUS	causative	IPFV	imperfective	PRIV	privative
CNSV	consecutive	LIMIT	limitative	REL	relative marker / relative form
CORD	coordinating particle	LOC	locative		
		M	masculine	SBJV	subjunctive
DAT	dative	NEC	modal necessity	SBRD	subordinating particle
DEF	definite	NEG	negation		
DEM	demonstrative	NMLZ	nominalized	SEQ	sequential
DIR	directional	NOM	nominative marker	SG	singular
EXIST	existential			STAT	stative
F	feminine	OPT	optative	VET	vetitive

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