A cross-linguistic rarity in synchrony and diachrony: adverbial subordinator prefixes exist[1]

Abstract

This article shows that a hitherto unattested construction type – namely, adverbial subordinator prefixes – is in fact attested in several languages. While Dryer's (2013) 659-language convenience sample does not turn up any clear example of such a construction, we argue that this is in part due to arbitrary coding choices that a priori exclude potential constructions of this type. In order to document the existence of adverbial subordinator prefixes, we present three languages with different genealogical and areal affiliations (Japhug, Cree, and Coptic), each of which shows solid synchronic evidence for what appears to be a universally dispreferred feature. Furthermore, we propose a diachronic account for the paucity of documented adverbial subordinator prefixes, according to which cross-linguistic distributions of structural features make rare the source constructions from which adverbial subordinator prefixes can grammaticalize. However, there are nonetheless grammaticalization pathways, some of which seem to involve rare types of change, which can lead to the development of such prefixes.

Keywords: typology, universals, subordination, grammaticalization

1. Introduction

In a convenience sample of 659 languages, Dryer (2013a) discovered a robust generalization related to the order of adverbial subordinators and clauses, namely: in a sample of 659 languages, no language has adverbial subordinators that are prefixes. Clause-initial subordinators overwhelmingly tend to be separate words, and subordinating affixes are always suffixes.

Type of adverbial subordinator	Number of languages in sample
Separate words + clause-initial	398
Separate words + clause-final	96
Clause-internal	8
Suffixes	64
More than one type	93
Total	659

Table 1: Dryer's (2013a) typology of adverbial subordinators

As Dryer (2013a) points out, this feature is especially significant, in light of the general suffixing preference in inflectional morphology (Bybee et al. 1990, Himmelmann 2014, among many others). However, he refrains from drawing any conclusions based on this

[1] Glosses follow the Leipzig Glossing Rules, to which we add the following: ADVBZ adverbializer, AUTO autobenefactive, CONJ conjunct order, CONV converb, EGOPH.PRES egophoric present, FACT factual, INDEP independent order, INV inverse, LIM limitative, LNK linker, OBV obviative, ORIENT orientation, TRANSLOC translocative, UNSPEC unspecified actor, VII inanimate intransitive verb, VAI animate intransitive verb,VTA transitive animate verb.

asymmetry, and we are unaware of any proposed explanations for it or of any consequences that might follow from it. It is important to note that since Dryer's generalization is based on a convenience sample, it might not be considered a 'proper' universal, i.e., 'adverbial subordinator prefixes do not exist.'

The present article makes three arguments. First, we argue that this otherwise robust generalization admits at least several exceptions, each from different families and different continents: Coptic (Ancient Egyptian, Afroasiatic; Egypt), Japhug Rgyalrong (Rgyalrong, Sino-Tibetan; China), and Cree (Algonquian; Canada/USA). These exceptions support the line of thinking laid out in Dryer (1998), according to which that linguistic properties which appear to be non-existent in samples, even large ones, cannot be assumed to be non-existent in languages. Second, we provide an explanation for Dryer's generalization, namely, the observed paucity of adverbial subordinator prefixes can largely be derived from a paucity of source constructions that could grammaticalize into such prefixes. In brief, we propose that cross-linguistic distributions of structural features, such as the rarity of verb-initial languages in which subordinators are directly adjacent to verbs, would tend to inhibit the development of adverbial subordinator prefixes. Crucially, we say 'would tend to inhibit' rather than 'rule out,' since there are indeed documented pathways of change that can lead to adverbial subordinator prefixes. This is our third argument: adverbial subordinator prefixes can and do develop through regular but unpredictable processes of language change. Such historical explanations have the advantage of accounting, at least in principle, for the problem of linguistic *rara*.

The structure of this article is as follows: in Section 2, we briefly outline the comparative concepts that we use here; in Section 3, we present synchronic data from Japhug (3.1) Cree and Michif (3.2), and Coptic (3.3). Section 4 surveys some ways in which such adverbial subordinator prefixes might develop diachronically, and proposes some factors that might inhibit their development. Section 5 presents several documented pathways of change that led to the adverbial subordinator prefixes described in Section 3, and Section 6 presents our conclusions.

2. Definitions

2.1 Adverbial subordinators

Dryer defines adverbial subordinators as "morphemes which mark adverbial clauses for their semantic relationship to the main clause," but the notion "adverbial clause" is left undefined. Based on his examples, we infer that adverbial clauses are clauses that code semantic relations like cause/reason, condition, temporality (including posteriority, anteriority, and cotemporality), concession, and purpose. These are largely the relations discussed in Cristofaro (2003: Ch. 6), where the nature of the semantic relationship between two states of affairs (SoAs) is characterized as follows: "Adverbial relations link two SoAs such that one of them (the dependent SoA) corresponds to the circumstances under which the other one (the main SoA) takes place" (2003: 155).

We would like to point to some arguable decisions made in the coding of the WALS data, which we will not adhere to in this article. In his coding, Dryer excludes affixes that are 'general markers of subordination,' on the one hand, and 'affixes which may be more properly viewed as part of the tense-aspect system.' We assume that Dryer's exclusion of affixes of these two types means that adverbial subordinator prefixes

may be more numerous in languages – even in Dryer's sample – than one would infer from the presentation of the data in Table 1, or from Dryer's explicit statement that the absence of adverbial subordinator prefixes constitutes a major asymmetry of word order and affix position.

While it is of course up to typologists how to code their data, the grounds for Dryer's coding appear to be arbitrary at times. For example, according to Dryer (2013a), 'an affix on a subordinate verb indicating that the event of the subordinate clause is simultaneous with that of the main clause has a meaning somewhat analogous to that of *while* in English, but was considered a tense-aspect affix rather than an adverbial subordinator for the purposes of this map.' In essence, this means that Dryer excludes, a priori, potential adverbial subordinator affixes with temporal meanings. This probably contributes to the under-representation of this construction type in his study. Furthermore, the grounds for this decision are unclear: in principle, Dryer's study takes the function of grammatical items ('adverbial subordination') as the basis for comparison, and typologizes for linear order and degree of boundness. In practice, however, this is inconsistently applied, since items that are interpreted as free words are treated in one way, i.e., as subordinators, while items that are interpreted as affixes are treated in another, i.e., as part of the tense-aspect system, and therefore excluded.

Similarly, it is not clear where Dryer draws the line with respect to 'general markers of subordination,' since adverbial subordinators are often polysemous. For example, while it is true that English *while* marks temporal subordination, and as such, Dryer codes it as an adverbial subordinator, it also marks concession, as in this sentence. While we are unaware of any balanced cross-linguistic sample of polysemy of adverbial subordinators, Kortmann (1997: 103) finds that for the languages of Europe, more than a third of the subordinators in his sample are associated with more than one function. Since Dryer does not quantify polysemy in his sample, but makes a simple distinction between 'general' and presumably 'non-general' markers of subordination, it is likely that many of the markers in his sample are in fact polysemous, i.e., associated with two or more functions.

We therefore conclude that there are presumably more adverbial subordination affixes in the world's languages than Dryer's sample indicates, and that at least some of these are presumably prefixes. Since we are interested in the substance of the problem here, i.e., the existence or non-existence of adverbial subordinator prefixes, rather than simply maintaining consistency with Dryer's coding practices, we consider both 'general' markers of subordination and tense-aspect subordinating affixes to be valid exceptions to Dryer's generalization about the non-attestation of adverbial subordinating prefixes.

2.2 Affix

Dryer makes it clear that he considers clitics to be a kind of (syntactically) free word and distinguishes them from affixes. However, the notion "affix" is left undefined in Dryer (2013a), although in his other WALS chapters (e.g., Dryer 2013b), he defines "affix" with reference to one criterion: an item is considered an affix if it always attaches to the same word class. However, this is an example of what Croft (2010) has called Crosslinguistic Methodological Opportunism, in which one criterion is privileged over others in determining whether language-specific constructions match a cross-linguistic notion.

In fact, linguists have long observed that the distinction between clitics and affixes is difficult, and may ultimately be impossible, since most definitions rely on the notion "word," which itself has been argued to be untenable (Haspelmath 2011). However, linguists have used and continue to use the notion "affix" in both language description and cross-linguistic comparison, and it is to this set of practices that the present article responds. This set of practices involves a number of features, and it is likely that linguists judge an item as more clitic-like or more affix-like based on the degree to which the item's properties are closer to one pole of this continuum.

For example, based on Bickel & Nichols (2007) and Himmelmann (2014), one can assume that an item was considered to be an affix in a description if it is a formative that is tightly bound to a base, and has some of the properties typically associated with affixes, e.g., (1) strict adjacency between the formative and a base, or a consistent position within a morphological construction (2) uninterruptability, i.e., no other material can intervene between the formative and the base (3) the lack of a corresponding free form, unlike clitics, which often have corresponding free forms (Himmelmann 2014: 931), and (4) sensitivity to grammatical environment or, put differently, "the host may structurally require the presence of one or more affixes to function as a grammatical unit" (Himmelmann 2014: 931). Linguists often consider that (5) allomorphy is characteristic of affixes, as opposed to clitics.

The point we would like to make here is similar to that made in Section 2.1: Dryer's idiosyncratic criteria for affix status has presumably led to the exclusion of adverbial subordinator affixes, some of which may be prefixes. More importantly, since we are interested in the substance of the question rather than simply following Dryer's coding, we will consider affixes whose function is to mark temporal adverbial subordination to be legitimate candidates for adverbial prefix status.

It is important for us to stress this point: we do not claim that we provide counter-examples to a putative universal, since Dryer's generalization is not formulated as an absolute universal. As such, there is no need to use Dryer's criteria in order to assess the validity of the generalization. We make the simpler point that Dryer's arbitrary coding decisions led to the a priori exclusion of candidates for adverbial prefix status. In the next section, we illustrate three cases of adverbial subordinator prefixes.

3. The data

3.1 Japhug

Rgyalrong languages in general, and Japhug in particular, are typologically unusual in being both strictly verb final and mainly prefixing (see Jacques 2013).

In Japhug, we find two cases of subordinate constructions marked exclusively by verbal prefixes. First, we find the Immediate Succession Perfective ('as soon as') Converb (Jacques 2014: 288-9), marked by combining the verb stem with a prefix *tu-* preceded by an orientational prefix (there are seven possible orientational prefixes, their orientation being lexically determined and unpredictable except for motion verbs). Example (1) illustrates the use of this perfective converb. This verb form cannot be used in an independent clause, and is clearly non-finite in completely lacking person marking.

(1) *[tɯrme* *ra* *kɯ* *pjɯ-tɯ-mto]* *ʑo* *sat-nɯ*
people PL ERG ORIENT-CONV:PFV-see EMPH kill:FACT-PL
ɕti
be.ASSERTIVE:FACT
"People kill it as soon as they see it" (Dhole, 15).

Although most examples of the Perfective Converb in Japhug appear with either the emphatic marker *ʑo* or the linker *tɕe* following the verb, examples with the bare converb, i.e,, the converb without any other marker, are attested in the corpus, as in (2).

(2) *[nɯ* *chɯ-tɯ-łoʁ]* *nɯnɯ* *z-ɲú-wɣ-nɯ-ɕar*
DEM ORIENT-CONV:PFV-come out DEM TRANSLOC-IPFV-INV-AUTO-search
tɕe *tɯjno* *lú-wɣ-nɯ-βzu* *wuma* *ʑo*
LNK vegetable IPFV:UPSTREAM-INV-AUTO-make really EMPH
mɯm
be.tasty:FACT
"When people go to look for it (nettles) as soon as it comes out and make salad (with it), it is very tasty" (Nettle, 35).

The prefixal status of the *tɯ-* marker is clear from the fact that it is fully integrated within the verbal template, as it occurs to the right of the orientation prefixes and undergoes morphological alternations with the syllable following it: when the verb stem begins in *a-*, the stem vowel merges with *tɯ-* as /tʊ/ as in *ɲɯtɤtɯɣ* /ɲɯ-tɯ-atɯɣ/ "as soon as X meets Y." This vowel merger does not occur across word boundaries.

A second example of prefixal subordinator is the gerund *sɤ(z)-* (with reduplication of the last syllable of the verb stem). Like the Perfective Converb, this form is restricted to subordinate clauses, and the verb is devoid of person marking (Jacques 2014:293-294). It can appear without any postverbal linker, as in examples (3) and (4).

(3) *[kukutɕu* *sɤ-mɯ~mu]* *ʑo* *tɤ-nɯ-ndze*
here GERUND-be.afraid EMPH IMP-AUTOBEN-eat[III]
Have (nice food here) while (living) in fear. (tianshu he jiashu, 46)

(4) *[tɤ-pɤtso* *nɯ* *sɤ-ɤmdzɯ~mdzɯ]* *ku-z-rɤzi-nɯ.*
INDEF.POSS-child DEM GERUND-sit IPFV-CAUS-stay-PL
They would put the children (there) sitting. (Raising children, 2:118)

(5) *kutɕu* *[sɤ-mtsɯ~mtsɯr]* *ku-rɤʑit-a* *tɕe* *jisŋi* *ndɤ*
here GERUND-be.hungry EGOPH.PRES-stay-1SG LNK today yet
tɯmɯkɯmpɕi *kɯ* *pú-wɣ-nɯ-mbi-a* *ɕti*
heavens ERG PFV-INV-AUTO-give-1SG
be.ASSERTIVE:FACT
I am staying here very hungry, today heavens have given (it) to me. (Slobdpon2, 253)

The prefixal status of *sɤ-* is also quite clear. This prefix has an allomorph *sɤz-* before verb

stems containing a prefixal syllable with a sonorant initial, and undergoes merger with the verb stem in case of *a-* initial verbs.

3.2 Cree and Michif

The inflectional paradigms of the Algonquian verb classes are organized in three sets, called 'orders' in Algonquian linguistics: the Independent, the Conjunct and the Imperative. While the function of the Imperative order is self-explanatory, the Independent and the Conjunct very roughly correspond to the sets of affixes verb forms take when used in main and subordinate clauses, respectively. Put differently, Conjunct order forms are non-finite, whereas Independent order ones are finite. It is important to stress that *wh-* clauses, and those with focalized constituents or constituents under the scope of (clausal) negation require the use of the Conjunct order, since these seemingly independent clauses are actually diachronically insubordinate, i.e., they are, historically, non-finite.

Importantly for the topic of this paper, Conjunct verb forms, among their uses, also display what we could call clearly converbal functions: they can be used in adverbial clauses which loosely correspond to English adjunct clauses with temporal ("when," "while," "after") and even causal ("because") readings, and – as converbs – also to gerundial clauses as well. In Cree, explicit adverbializers like the English ones mentioned here, although present in the language, are not obligatorily used. Thus, the interpretation of Conjunct forms introduced by the most frequent preverbal elements *ê-* or *kâ-* is largely context-dependent, and it is in case the context is not sufficient or potentially ambiguous that the free adverbializers are used. According to Cook (2014: 236), clauses with *kâ-* have a "presuppositional" interpretation, while clauses with *ê-* are an elsewhere case, introducing a "semantically-unspecified" clause. As for those lacking a clause-typing element, Cook posits an "averidical" interpretation.

The following two examples illustrate the use of *ê-* and *kâ-* in contexts where their meaning is closest to English "when" producing a reading of temporal coincidence.

(6) "when" (*ê-*)
ê-otâkosiniyik *iyikohk,* *kîwêw*
ADVZ-be_evening(VII).OBV at_that_time, go_home(VAI).3:INDEP
'When it was evening, she went home' (Wolfart 1996: 401).

(7) "when" (*kâ-*)
wêpinâson-a *kâ-pîkiskwâtam-ân ...*
cloth_offering-PL/OBV ADVZ -speak_about(VTI)-1:CONJ
'When I speak a prayer over cloth offerings' (Ahenakew & Wolfart 1998a: 67)

The next two examples show how this same *ê-* can produce a reading corresponding closer to English "while," i.e., temporal overlap.

(8) "while"
ê-pa~pîyakow-ân *ni-wanihikîskanâ-hk*
ADVBZ-REDUP~be_alone(VAI)-1:CONJ 1-trapline-LOC
"While I was alone on my trapline" (Ahenakew & Wolfart 1998b: 41).

(9) êkwa ôm ê-ay~itahkamikisi-yân
and PTCL ADVBZ-REDUP~be_busy(VAI)-1:INDEP
"And now, while working about in this way" (Ahenakew & Wolfart 1998b: 41).

The next example illustrates a case where the relationship between the subordinate and the main clause is one of anteriority and is thus translated by "after."

(10) "after"
êkwa ôma pîyakwâw ê-kisîkâ-k
and PTCL one_time ADVBZ-it_is_day(VII)-0:CONJ

ê-kî-nâtaðapê-yân
ADVBZ-PST-visit_nets(VAI)-1:CONJ
"Now one day, after I had checked my nets" (Ahenakew & Wolfart 1998b: 41).

ê-headed Conjunct forms can further generate an adverbial clause reading expressing causal relationship without the use of an explicit noun ("reason") or postposition ("from"), which are two possibilities also attested in cases when a more explicit wording is needed.

(11) "because" (*ê*-)
ôm êkay kîkway ê-mîci-cik
PTCL NEG thing ADVBZ-eat(VAIt)-3PL:CONJ
"Because they were not eating anything" (Wolfart & Ahenakew 2000: 108).

As mentioned earlier, these conjunct forms can co-occur with "free" adverbials such as *mêkwâc* "while" and emphatic particles such as *kiyâm* "even" in contexts where it is important to make the relationship between main and subordinate clauses more explicit.

(12) *mêkwâc nâsipêtimihk ê-itahkamikisi-yân*
while on_water's_edge ADVBZ-be_busy(VAI)-1:ADVBZ
"While I was working along by the water" (Ahenakew & Wolfart 1998b: 47).

(13) "if" (*ê*-)
kiyâm ê-mamâyî -yêk
even ADVBZ-make.mistake(VAI)-2PL
"Even if you make mistakes" (Cook 2014: 241).

(14) "when" (*kâ*-)
êkwa mîna kiyâm awiyak kâ-kakwê-kakêskim-iht
and also even someone ADVBZ-try- counsel(VTA)-UNSPEC
"And even when one tries to counsel them" (Cook 2014: 259).

This situation also obtains in Michif, a mixed language famous for combining (by and large) French nouns and nominal structures with Cree verbs and verbal structures. In the

following examples, Michif *ee-* and *kaa-* correspond to Cree *ê-* and *kâ-*.

(15) "when" (*kaa-*)
maaka henn kii-waniht-aaw kaa-tapashii-t
but one PST-lose(VTI)-3>3':indep ADVBZ-flee(VAI)-3:INDEP
"She had lost one when she was hurrying away" (Fleury 2007).

(16) "when" (*ee-*)
ekota ee-takushih-kik
there ADVBZ-arrive(VAI)-3PL:CONJ
"When they had arrived there, (Fleury 2007)

These preverbal elements cannot be analyzed as clitics: (1) they can be separated by the following verb form only by TAM and directional prefixes and (2) they trigger the obligatory use of the conjunct which entails specific person/direction (direct/inverse) marking affixes. It is important to note that the "simple" Conjunct, i.e., the form without *ê-* or *kâ-* does not have these adverbial readings on its own, and cannot function on its own: it must be either followed by the Subjunctive suffix (*-i*) or preceded by a TAM prefix.

Cree also has several adverbial subordinator prefixes that are *not* highly polysemous or 'general' (in Dryer's terms). For example, Bakker (2013: 145-146) notes a temporal prefix *mêkwâ-* ('while') and a concessive prefix *âta-* ('although'), which precede the verbal stem and are semantically specific.

(16) East Plains Cree (Wolvengrey 2011:189)
nikī-kakwē-wāpam-ikawin ē-mēkwā-nīmihito-yān.
PST-TRY-see-X>1s ADVBZ -WHILE-dance-1SG
"I tried to be seen while dancing."

(17) Moose Cree (John Horden's translation of Matthews 7:11, Kees van Kolmeschate p.c.)
kîšpin mâka kîlawâw ê-âta-macihtwâ-yêk
if but 2PL ADVBZ –although-act.evil-2PL:CO

kêskêlihtam-owêkwe kihci-iši-mil-êkw-ak
IC:know-2PL:DUBIT:CO big-thus-give-2PL:CO-PL

milo=miliwêwin-a kit-awâšimiš-iwâw-ak
good=gift-OBV 2-child-PL.POSS-PL
If ye then, being evil, know how to give good gifts unto your children.

Interestingly, Dryer's criteria would exclude the former, as it would be 'more properly viewed as part of the tense-aspect system,' but could not exclude the latter, which is neither temporal nor 'general' in meaning. As such, even if one were to follow Dryer's criteria, the concessive prefix *âta-* would constitute an exception to the otherwise robust generalization discussed here.

3.3 Coptic

Coptic has a set of verbal prefixes that code adverbial semantic relations in the sense of Cristofaro (2003). We mention three of them, which form a paradigmatic set (see Table 2). The data from the best-described dialect of Coptic, Sahidic, and are taken from Layton (2004), the most detailed description of the dialect.[2]

	Adverbial subordinator	Person marker	Lexical verb	Gloss
Limitative	*šant(e)-*			'until I come'
Temporal	*nter(e)-*	*-i-* (1SG)	*ei* ('come')	'when I come/had come'
Conditional	*eršan-*			'if I come'

Table 2: A schematic representation of adverbial subordinate verb forms in Coptic

The first, *šant(e)-*, codes a limitative temporal relation, translatable as "until" (18).

(18) *šant-n-hôtb* *m-paulos*
LIM-1PL-kill ACC-Paul
"Until we kill Paul." (Acts 23:12).

The second, *nter(e)-*, codes temporality, usually temporal overlap ("when") (19) or anteriority ("after") (20):

(19) *ne-u-r-špêre* *ntere-f-ôsk* *hm-p-erpe*
IMPF-3PL-do-wonder TEMP-3SGM-linger in-DEF-temple
"They were surprised when he lingered in the temple" (Luke 1:21).

(20) *nter-ou-sei=de* *peča-f* *n-ne-f-mathêtês*
TEMP-3PL-be_sated=PTCL QUOT-3SGM to-POSS.PL-3SGM-disciple
"And when they had eaten their fill, he said to his disciples" (John 6:12).

The third, *eršan-*, codes condition ("if") (21) or temporality ("whenever") (22):

(21) *eršan-p-a-son -r-nobe* *ero-i*
COND-POSS.MSG-1SG-brother-do-sin against-1SG
'If my brother sins against me' (SOURCE).

(22) *eršan-n-šêre* *n-pis<raê>l –če-ne-u-sôše*
COND-DEF.PL-son GEN-Israel-sow-POSS.3PL-field
"Whenever the children of Israel sowed their fields" (Judges 6:3).

These formatives are considered to be affixes for the following reasons:

[2] The transliteration is according to the standard proposed in Grossman & Haspelmath (2014).

a) They are always immediately adjacent to the subject of the adverbial clause. While they can attach to either bound person markers or to lexical noun phrases, they cannot attach to non-nominals.
b) No intervening material can occur between the formative and the subject of the adverbial clause. Second-position clitics occur after the verb.
c) They have no corresponding free (i.e., unbound) realizations.
d) They are required by the morphosyntactic construction, and in fact, both show allomorphy and condition allomorphy.

First, these prefixes condition a different set of bound person markers, originally suffixes, than independent clauses with initial subjects. Compare the person markers in the following pairs of examples, with the (a) examples having subject prefixes and the (b) examples having a different set of person markers:

(23) a. *se-nêu*
3PL-come
"They are coming" (Matthew 9:15).
b. *nter-ou-nau*
TEMP-3PL-see
"When they saw" (Matthew 21:15).

(24) a. *t^{i}-čô*
1SG-say
"I say" (Matthew 8:11).
(b) *nter-i-ei*
TEMP-1SG-come
"When I had come" (2 Corinthians 2: 12).

Second, the prefixes may have different allomorphs, depending on whether the subject is a lexical noun phrase or a bound person marker. This is clearest in the case of the Conditional prefix, which has the allomorph *eršan-* if the subject of the adverbial clause is a lexical noun phrase (see (21) and (22)), and the discontinuous *e-* … *-šan-* if it is a bound person marker, as in (25).

(25) *e-i-šan-šlêl*
COND-1SG-COND2-pray
"If I pray" (1 Corinthians 14:14).

Another possible indication that these formatives are bound is that Coptic has adverbial subordinators that are independent words, which can co-occur with the adverbial subordinator prefixes.

(26) *kan* *e-i-šan-krine*
even COND1-1SG-COND2-judge
"Even if I judge" (John 8:16).

It might appear that the formatives dealt with here are clitics,[3] since they can attach to either bound person markers or to lexical noun phrase subjects. However, these can be taken as members of the same form class – it would not be unusual for linguists to take both pronoun-like person markers and lexical noun phrases as members of a broader class 'noun phrase' or 'nominals' – or, more narrowly, A/S arguments. In any event, they do not simply attach to any kind of host - they attach to nominal subjects in a fixed position.

More importantly, however, the argument made here does not crucially depend on the bound item's compatibility with a single word class, although it would if the goal were simply to maintain consistency with Dryer's criteria. As noted above, we think that there is no reason to privilege this criterion over other batteries of properties associated with affixes.

3.4 Turning to diachrony

As an interim summary, we would like to point out that Japhug, Cree, and Michif have unambiguously prefixed adverbial subordinators. Since any explanation of language structures, especially rare ones, must have a diachronic component (Bybee 2008), it would be interesting to determine how these prefixes developed. On general principles, one would expect that rare linguistic features are rare because (a) they develop through rare developmental pathways, or (b) they require rare source structures as inputs, (c) they require a particular constellation of features and changes in a certain order in order to develop, or (d) they are unstable, and disappear quickly after having come into existence. These factors are of course not mutually exclusive.

For an example of (a), Blevins (2009) has argued that languages with coronal segments are more common than languages without coronal segments, because the process of 'coronal annihilation' is rarer than the stability or development of coronals. Nonetheless, Northwest Mekeo underwent precisely such a loss of coronal segments. Examples of (b), (c) and (d) include for instance Harris' (2008) diachronic analysis of split case marking in Georgian, Jacques' (2011) survey of aspirated fricatives respectively, and Blevins' account of coronal-less Northwest Mekeo.

As such, considering the sources of adverbial subordinators may shed light on the matter. In the following sections, we discuss the ways in which the grammaticalization of source constructions into adverbial subordinator prefixes might be inhibited.

4. Pathways to adverbial subordinator prefixes

4.1 Case markers

Adverbial subordinator affixes are often grammaticalized from case marking on deverbal nominals (Haspelmath 1995). Since affixal case markers overwhelmingly tend to be suffixes (452 out of 490 in Dryer 2013b), it is plausible that the cross-linguistic paucity of prefixed adverbial subordinators results in part from the paucity of source constructions that could grammaticalize into such prefixes. We return to this issue in Section 4.4.

[3] An anonymous reviewer felt that these prefixes are 'clearly clitics,' but provided no evidence for the claim. We think that we have provided enough evidence to make it at least plausible that these items are more affix-like than clitic-like. In any event, they arguably meet even Dryer's criterion of attaching to the same 'word class,' i.e., nominals in A/S role. They certainly do not, as the reviewer thought, 'attach to whatever is the first word in the subordinate clause, regardless of its word class,' and we do not know the origin of this misconception.

4.2 Discourse particles

Another, rarely-discussed, source of subordinator morphemes is discourse particles (Bisang 1998). In Khalka Mongolian, for example, the concessive subordinator suffix *-vč* developed from the coalescence of a second-place additive focus particle *ču/či*, which is still attested in Khalka Mongolian as *-č*. Examples (27-28) show the function of the original second-place particle; Bisang does not adduce examples of the subordinator suffix *–vč*.

(27) *sur-san* *c,* *dadlaga* *baga*
study-VN:PST:PF too, experience small
'Although he has been studying, his practice is small.'

(28) *ter* *c* *ir-ev,* *bi* *zolg-ox-güj*
he too come-PST, I greet-VN-FUT:NEG
'Even if he comes, I shall not greet him.

To the extent that such particles tend to occur in non-initial position, they would be poor candidates for grammaticalization into adverbial subordinator prefixes.

4.3 Coalescence of free adverbial subordinator and verb

According to Dryer (2013a), 398 out of 659 adverbial subordinators are clause-initial, while only 96 are clause-final. If it can be assumed that at least some adverbial subordinator prefixes may have resulted from the coalescence of an erstwhile free adverbial subordinator with a following verb, this would predict that an asymmetry in the order of free adverbial subordinators vis-à-vis verbs would result in an asymmetry in the order of adverbial subordinator affixes vis-à-vis verbs. Interestingly, it would predict more prefixed than suffixed adverbial subordinators.

However, the existence of clause-initial free adverbial subordinators in a language does not entail that they are adjacent to the verb. For example, in an SV language like English, adverbial subordinators are generally clause-initial without being necessarily adjacent to the verb. This would reduce the availability of source constructions that could grammaticalize into a prefix on the verb. Out of the set of languages with strictly clause-initial subordinators, it would only be in languages with frequent VS order that free subordinators would regularly be adjacent to the verb. A rough validation of this hypothesis is found by combining the WALS values for 'Order of Subject and Verb' and 'Order of Adverbial Subordinator and Clause.' Languages with dominant VS order overwhelmingly have clause-initial free subordinators (102 out of 117 VS languages in the sample). Given Dryer's coding decisions, as discussed in Section 2, it may be that some of these clause-initial subordinators are in fact interpretable as prefixes.

Moreover, even in languages that may be characterized as having clause-initial free adverbial subordinators, it is typical of East Asian languages for this to need qualification. Bisang (1998) points out that free adverbial subordinators tend to be either clause-initial or to follow the topic and/or subject of a sentence. This variability of linear order would likely reduce the chances for a consistently recurring adjacency between

subordinator and verb, which seems to be a precondition – or at least facilitating factor – for the coalescence of free subordinator and verb.

Another pathway through which adverbial subordinators may develop is from converbs. Again, assuming that adverbial subordinator prefixes may result from the coalescence of a free adverbial subordinator and a following verb, it stands to reason that the frequent adjacency of a converb and a following verb could result in a subordinator prefix. However, converbs that grammaticalize into subordinators are frequently followed by complementizers or an equivalent construction, rather than by a verb. For example, Haspelmath (1995) lists some instances of converbs that grammaticalized into adverbial subordinators, e.g., English *considering*, French *durant*, and Russian *nesmotrja*, all of which are clause-initial but none of which are adjacent to the verb. Haspelmath also mentions the causal subordinator *kiligna* in Lezgian, which directly follows the verb, and as such, is a poor candidate to develop into a subordinator prefix. However, Haspelmath also suggests that subordinators that developed from converbs are rare in spoken discourse, have highly specific meanings, and are not highly grammaticalized. As such, they would be even worse candidates for grammaticalizing into affixes.

4.4 Interim summary

Summarizing this section, we observe that for each plausible pathway of grammaticalization of adverbial subordinator prefixes, there are inhibiting factors. First, the development of case-marking on deverbal nominals into adverbial subordinator prefixes is inhibited by the relative paucity of case prefixes vis-à-vis case suffixes. Second, the development of adverbial subordinator prefixes from the coalescence of free adverbial subordinators ('conjunctions') may be inhibited by the prevalence of SV order in the world's languages, since in these languages, strictly clause-initial subordinators would tend to be separated from verbs by subject expressions. The development of free subordinators into converbs, which in turn could coalesce with a following verb, may be inhibited by the presence of complementizers or equivalents that intervene between the converb and the verb. Furthermore, subordinators that develop from converbs seem to be characterized by low token frequency and a low degree of grammaticalization, and to be limited to particular registers. Third, the development of adverbial subordinator prefixes from discourse particles might be inhibited by a tendency for discourse particles to occur in non-initial position in the clause.

Of course, these factors are only likely inhibiting factors, and it is possible that all might eventually be overcome. For example, if for some reason, French *durant que* were to become extremely frequent in texts, and were to frequently precede verb-initial clauses, one could imagine a temporal adverbial subordinator prefix like *durk-*. However, it seems that most scenarios would have to involve a grammaticalizing subordinator occurring consistently adjacent to a following verb. Since we do not know what underlies token frequency, we leave this in the realm of speculation. However, it is to be noted that such a pathway would presuppose a relatively complex constellation of structural features and processes of change, which, as Harris (2008) has argued is likely to result in cross-linguistic rarity.

In the next section, we show how adverbial subordinator prefixes can and do develop as the result of language change.

5. Attested pathways to adverbial subordinator prefixes

5.1 Secondary grammaticalization or re-analysis of pre-existing prefixes

Since linear order factors probably tend to inhibit the coalescence of clause-initial free adverbial subordinators into adverbial subordinator prefixes, we turn to another plausible source of such prefixes, namely, the reanalysis (or 'secondary grammaticalization') of a pre-existing prefix into an adverbial subordinator. Here we are in fairly uncharted territory, since the very existence of adverbial subordinator prefixes has hitherto been denied; as such, we cannot rely on existing literature on their grammaticalization pathways.

However, some of the prefixes discussed in this article seem to be examples of such secondary grammaticalization. For example, the etymological origin of the prefix *kâ-* in Cree is uncontroversial. It originates from the preverb **kî-* 'around, going about' in its Initial Change form (on Initial Change in Algonquian, see Costa 1996). The preverb **kî-* is not directly attested in Cree but is reconstructible to proto-Algonquian and is found in languages such as Fox (Goddard 1993: 224, ft. 8, Pentland 2005). As for *ê-*, Ives Goddard (p.c.), suggests that it is related to the Aorist *êh-* prefix in Meskawki, and that these are related to the deictic prefix **êši-* (Ojibwe *ezhi-* 'in a certain way/place/thus').

What is important in the present context is that the Cree adverbial subordinator prefixes discussed in this subsection are the result of the reanalysis of pre-existing prefixes. As such, we are not dealing with a simple case of coalescence of a formerly free subordinator with a subsequent verb, but rather with functional change of a morpheme that 'got into' the verbal morphology as the result of another, earlier, process of change.

As for Japhug, it is clear that the *tɯ-* converb and the *sɤ-* gerund prefix are recently grammaticalized from the action nominalization *tɯ-* and the oblique nominalizer *sɤ-* prefixes. The oblique nominalizer sɤ- is used to nominalize instruments, recipient, time and place adjunct, and various postpositional phrases (see Jacques to appear). There is evidence that the *sɤ-* prefix is not recently grammaticalized, as cognates are found elsewhere in the Sino-Tibetan family, in particular in Tibetan and probably also in Chinese (for the action nominalization *tɯ-* prefix, such evidence may exist, but is more controversial).

In Tibetan, there is evidence for nouns derived from verbs by addition of a prefix *s-* (note that Tibetan regularly loses vowels in prefixes) with the same set of meanings as in Japhug (especially instrument and place), as shown in Table 3 (nouns are derived from the verb root rather than from the present or past forms in the first column; see Jacques 2012 for an explanation how to derive the root form from the conjugation patterns).

Verb	Meaning	Root	Noun	Meaning
Nod, mnos	receive	/no/	*snod*	vessel
ⁿbud, bus	blow	/bu/	*sbud*	bellows
ⁿgel bkal	load on	/kal/	*sgal*	load carried on the back, back
ɲan	hear	/ɲan/	*sɲan*	ear (honorific)
ⁿdiŋ, btiŋ	spread out	/tiŋ/	*sdiŋs*	cavity
dgar, bkar	put up (a tent)	/kar/	*sgar*	tent
kʰag(-po)	difficult, hard	/kag/	*skag*	bad luck, evil omen, accident
bkʲon	scold, reprimand	/kʲon/	*skʲon*	defect, flaw

Table 3: Examples of s- nominalization in Tibetan

In Old Chinese, examples of this *s- oblique nominalization prefix are only detectable through phonological reconstruction. Sagart (1999:73) proposes pairs such as 射 *m-laks > ʑæH “shoot” => 榭 *s-laks > zjæH “open hall for archery exercises”.

The pathway NOMINALIZER ⇒ RELATIVIZER ⇒ CONVERB-MARKER is amply attested in various language families, including Hup (Makú, Brazil, see Epps 2009) and Sino-Tibetan (see for instance Coupe 2007). The mechanism through which this reanalysis took place in Japhug is almost synchronically transparent. Reanalysis occurred through the use of the *sɤ-* prefix as a time adjunct nominalizer, as illustrated by example (29).

(29) *tɕe* *nɯnɯ* *ʑaka* *ɯ-sɤ-ji* *ɲɯ-ŋu* *tɕe*
LNK DEM each 3SG.POSS-NMLZ:OBLIQUE-plant SENS-be LNK
These are the (periods) when (people) plant each of these (crops). (15 tChWma, 19)

A crucial fact for the reanalysis is that bare NPs can occur as time or place adjuncts in Japhug without any case marking, as in (30).

(30) *[nɯ ɯ-xpa nɯ] ʁmɯrcɯ a-pɯ-dɤn tɕe,*
DEM 3SG.POSS-year DEM thrush IRR-IPFV-be.many LNK
[nɯnɯ ɯ-xpa nɯnɯ] tɤɕi ɣɯ ɯ-kɯ-łoʁ
DEM 3SG.POSS-year DEM barley GEN 3SG.POSS-NMLZ:S/A-come.out
pe
be.good:FACT
(People say that) if during a particular year thrushes are many, then in that year barley will grow well. (23 pGAYaR, 122)

Thus, a verb with the *sɤ-* prefix, not followed by any case marker, can be potentially interpreted as meaning 'in the time/moment/period when X,' of which the gerund (which implies simultaneity between the actions of the subordinate and the main clause) is a particular interpretation. The gerund has only one formal difference with respect to the oblique nominalized form: the obligatory presence of verb stem reduplication. Verb stem reduplication in Japhug is very common to express various meanings, in particular emphasis and totality of a set of events, which accounts well for the meaning of the gerund ('during the whole time when...').

5.2 Coalescence as part of a complex series of changes

In Section 4.3, we observed that linear order distributions would likely inhibit the coalescence of adjacent clause-initial subordinators and verbs. A combination of features that could potentially yield adverbial subordinator prefixes is that of clause-initial subordinators and strict verb-initiality, as in Coptic, though such prefixes can also appear in non-configurational languages where the source subordinators are not always adjacent to the verb, as in Cree.

5.2.1 The emergence of an adverbial subordinator prefix in Coptic

The earlier stages of Ancient Egyptian[4] had verb-initial clauses with suffixed person markers, as well as deranked verb forms (Cristofaro 2003). These deranked verb forms, marked by a suffix *–t*, could be headed by prepositions, to compose adverbial subordinate clauses. For example, the allative preposition *r*, which also marked purpose clauses, could combine with a deranked verb form, glossed here as LIM.

(31) Middle Egyptian
[A torch will be lighted for you]
r wbn-t šw ḥr šnb-t-k
ALL rise-LIM sun on breast-F-2SGM
"Until the sun has risen over your breast"

Over time, these prepositions became incorporated into the verb form, with the erstwhile preposition *r* being written as an unanalyzable prefix *i-*. Moreover, periphrastic

[4] Ancient Egyptian-Coptic is traditionally divided into five macro-stages: Old Egyptian (3000 CE-2000 CE), Middle Egyptian (2000 CE-1350 CE), Late Egyptian (1350-700 BCE), Demotic (700 BCE-450 CE), and Coptic (400 CE-1450 CE); the dates given here are approximate. For a more detailed account of the linguistic history of Egyptian, see Grossman & Richter (2014). For a typologically-oriented overview of the structure of Ancient Egyptian-Coptic, see Haspelmath (2014).

constructions with the auxiliary verb *irỉ* 'do' came to dominate the verbal system, with *irỉ* + lexical verb replacing older inflected forms of the lexical verb.

(32) Late Egyptian
[Seize this woman, and make her a prisoner]
ỉ:ỉr-t-tw-gm *ỉṯ3w-rmṯ*
LIM1:do-LIM2-IMPRS-find thief-man
"Until a thieving person is found."

This, in effect, led to the reanalysis of suffixed person markers as prefixes, with respect to the lexical verb, since the bound person markers became "entrapped" (Yu 2007: Ch. 5) between the clause-initial inflection-bearing auxiliary verb and the following uninflected lexical verb.

Stage 1	Stage 2	Stage 3
V-PM	V-PM	
	Aux-PM-V	Aux-PM-V > ADVZ-PM-V

Table 4: From suffix to prefix via entrapment (V= lexical verb, PM = bound person marker)

This has recently been called "anasynthesis," i.e., the macro-process in which synthetic patterns are replaced by analytic patterns, which in turn undergo secondary synthesis (Haspelmath 2014). What is important to note is that it is a potentially significant source of prefixed person markers, but equally important is that it presupposes the relatively rare verb-initial order as well as a tendency to replace non-periphrastic with periphrastic constructions.

The next stage involved the univerbation of the prefix *ỉ-* and the deranked form of the verb *irỉ* "do" into a single formative *ỉirt-*, and the addition of a preposition *š3ʿ* "until."

(27) Demotic
š3ʿ-ỉỉrt-ỉ-šm *r-rsy*
until-LIM-1SG-go ALL-south
"Until I go south"

It is this construction that developed into the Coptic Limitative prefix *šant(e)-* (see ex. 18, repeated here), with an epenthetic nasal (*n*) regularly occurring before dentals (Vt > VNt) (Peust 1999: 170).

(18) Coptic (Sahidic dialect)
šant-n-hôtb *m-paulos*
LIM-1PL-kill ACC-Paul
"Until we kill Paul." (Acts 23:12).

The stages of this process can be sketched as follows:

	Change	Construction
Stage 1	preposition + V-limitative suffix	*r*-V-*t*-PM
Stage 2	(1) periphrasis of V	*r-ir-t*-PM-V
	(2) univerbation of preposition + auxiliary > limitative prefix (a)	*i:irt*-PM-V
Stage 3	new preposition + limitative prefix (a) > new limitative prefix (b)	*šɜʿ:iirt*-PM-V
Stage 4	morpheme-internal phonological change > epenthetic nasal	*šant*-PM-V

Table 5: The grammaticalization of the Limitative prefix in Ancient Egyptian-Coptic

Broadly similar explanations can be given for the development of the other adverbial subordinator prefixes, although the specific pathways of change differ in detail, as well as in date and rate of grammaticalization (Junge 2001).

The changes themselves are not unusual: the emergence of periphrastic constructions is cross-linguistically well-attested (Haspelmath 2000), but the "periphrastic takeover" of an entire verbal system is clearly less common, since not all languages with periphrastic constructions undergo changes in which periphrastic constructions come to dominate the entire verbal system, ending up as non-periphrastic verbs. The grammaticalization and univerbation of previously distinct morphemes is a highly regular change in languages of the world. But this particular pathway to adverbial subordinator prefixes, i.e., the particular constellation of verb-initial order – known to be relatively rare worldwide – with suffixed person markers, plus deranked verb forms, plus the "periphrastic takeover" of the verbal system, plus the grammaticalization and univerbation of prepositions and deranked verb forms, is bound to be a relatively infrequent diachronic scenario. Crucially, there is nothing unusual per se about the actual processes of change themselves.

5.2.2 Cree

In Cree, the prefixes *mêkwâ-* ('while'), *âta-* ('although', example 31) originate from previously independent (unbound) adverbs, still attested as free forms, as *mêkwâc* 'while' and *âta* 'although'.

(31) Plains Cree (Wolfart and Ahenakew 2000:132)
*ê-**âta**-asawâpi-t*
ADVBZ-**although**-be.on.the.lookout(VAI)-3SG:CONJ
Although she was watching…

While some prefixes, such as the adverbializer *ê-* in particular, can appear before the prefixes *mêkwâ-* and *âta-* as in (31), this is in no way indicative of the relative order in which these two prefixes became grammaticalized. Although *ê-* is further away from the verb stem, there can be no doubt that it was grammaticalized earlier (at the proto-Algonquian stage), while *-mêkwâ-* and *-âta-* became prefixes recently, since (i) their

lexical origin is transparent, (ii) they are not found in any other Algonquian languages as prefixes and must by Cree-proper innovations, and (iii) both the orders *ê-âta-* and *âta-ê-* are found in texts (the second being more frequent), suggesting that the prefix *âta-* is becoming increasingly integrated into the verb.

The sources for these prefixes, the adverbs *mêkwâc* 'while' and *âta* 'although' occur either sentence-initially, in Wackernagel position (example 32), or even in rarer cases after several words (33). They may (example 33) or may not (32) be adjacent to the verb.

(32) Plains Cree (Wolfart and Ahenakew 2000:112)
nanâtohk ***âta*** *mân* *ê-kî-itâcimo-t*
various.kinds **although** usually ADVBZ-PST-tell.a.story(VAI)-3SG:CONJ
He used to tell all kinds of stories, but…

(33) Plains Cree (Wolfart and Ahenakew 2000:122)
âspis *êwakw ânim* ***âta*** *kî-ispayi-w*
seldom TOP DEM.INAN **although** PST-happen(VII)-3SG:INDEP
Although it only happened once in a while.

Moreover, Cree is a non-configurational language; although there is a preference for VOS order (Dahlstrom 1991), all possible linear combinations of verb, subject and object are possible. Thus, in the text corpora at hand, *âta* and *mêkwâc* are more often than not non-adjacent to the verb. However, there is in Cree a strong tendency to incorporate adverbs in the preverbal chain, and the evolution of *mêkwâ-* and *âta-* as prefixes is part of this phenomenon. In Cree, unlike Egyptian, recurrent adjacency of verb and source element of the prefix is not the reason for the development of subordinator prefixes; rather, the facilitating factor is the presence of a pre-existing prefixing slot in the verbal template where either adverbs, numerals or nouns expressing colour or location can be incorporated (a feature shared by other Algonquian languages such as Ojibwe, see Valentine 2001:152-158).

6. Conclusions

The first point of this article has been to show that an otherwise robust generalization about language structure, proposed on a large convenience sample of languages, admits exceptions, and to offer an explanation for the paucity of the construction that still allows for exceptions. For at least three languages with different genealogical and areal affiliations, there is solid synchronic evidence for the universally dispreferred feature. We take these facts to be evidence for the view that universally dispreferred structures, such as languages without coronal segments (Blevins 2009) are indeed learnable and transmissible over generations.

More broadly, however, we have argued that to the extent that linguists are interested in explaining cross-linguistic rarity as a phenomenon, diachronic explanations are necessary, since they both account for regularities and allow for exceptions. Linguists generally propose diachronic explanations on the basis of several types of sources: (1) inferences based on established cross-linguistic regularities of change, (2) reconstructions, and (3) changes documented in historical corpora. Of course, each type

of source has its weaknesses and limitations. First, inferences based on cross-linguistic regularities may not turn out to be correct in individual cases. Examples of degrammaticalization and retraction (Haspelmath 2004, Norde 2009) go against linguists' general expectations of directionality in language change. Second, arguments based on reconstructions can never provide certainty about the actual processes and mechanisms of change, and arguments can only be as good as the reconstructions themselves. Third, even historical corpora have problems, since it is often the case that different documented stages of a language actually reflect different dialects or genres, and as such, there is no real continuity. Moreover, even in best-case scenarios, when we have access to good historical corpora that reflect a single variety over a period of time, we never have access to changes in spoken languages predating modern recording technology, and as such, we can only formulate plausible hypotheses about the actual mechanisms of change. Nonetheless, these three types of sources provide progressively more useful information about processes and mechanisms of language change, and as such, about the diachronic sources of synchronic distributions of language structures.

This has consequences for linguistic typology. In order to evaluate hypotheses about cross-linguistic distributions, it is not enough to have databases based on large samples. Since a particular construction type, e.g., prefixed adverbial subordinators, may be the result of multiple diachronic pathways, we also need detailed studies of the actual pathways in languages with adequate historical documentation or solid reconstructions. And in order to explain why a particular linguistic property is rare – and not simply unattested – we need to have a clearer picture of the structural and functional factors that inhibit or facilitate the diachronic development of that property.

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