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

Eitan Grossman, Anton Antonov and Guillaume Jacques

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 a number of languages with different genealogical and areal affiliations, each of which shows solid synchronic evidence for what appears to be a universally dispreferred feature. Furthermore, we identify some diachronic pathways through which adverbial subordinator prefixes grammaticalize.

Keywords: typology, universals, subordination, grammaticalization

1. Introduction

In a 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.[2]

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,

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.

2 "The second asymmetry is among affixal adverbial subordinators, all clear instances of which are suffixes, with no clear instances of prefixes" (Dryer 2013a).

among many others), stating that "[w]hile this [distribution] fits into the overall preference for suffixes, it constitutes one of the stronger instances of this preference." However, he refrains from drawing any conclusions based on this asymmetry, and we are unaware of any proposed explanations for it or of any consequences that might follow from it.

The present article makes two arguments. First, we argue that this otherwise robust generalization admits exceptions, from different families and different continents, including Abkhaz (Northwest Caucasian; Abkhazia), Amharic (Semitic, Afroasiatic. Ethiopia), Coptic (Ancient Egyptian, Afroasiatic; Egypt), Cree (Algonquian; Canada/USA), Japhug Rgyalrong (Rgyalrong, Sino-Tibetan; China), and a number of Tupi-Guarani languages spoken in South America. 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. The second argument: adverbial subordinator prefixes can and do develop through regular processes of language change.

The structure of this article is as follows: in Section 2, we briefly define the comparative concepts that we use here, and reconsider some of Dryer's coding decisions; in Section 3, we present synchronic data from a number of languages. Section 4 surveys some ways in which such adverbial subordinator prefixes develop diachronically, and Section 5 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.' Crucially, this means that Dryer excludes, a priori, potential adverbial subordinator affixes with temporal meanings. This in turn 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 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 an absolute universal, since Dryer's generalization is not formulated as one. 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 following section, we substantiate our claim about the existence of adverbial subordinator prefixes with data from a number of languages.

3. The data

In the following sections, we discuss data from Abhaz, Amharic, and Coptic, which were in Dryer's sample, as well as from Cree, Japhug, and several Tupi-Guarani languages (Emerillon, Araweté, and Paraguayan Guarani), which were not. Some of these would have been excluded based on Dryer's criteria, while others do not conflict with Dryer's criteria for 'adverbial subordinator.'

3.1 Abkhaz

In Abkhaz, there is a temporal clause prefix *an(ə)-* ('when'), which is inserted into the second slot of the verbal complex, as in (1).[3]

(1) *d-anə́-z-ba* *a-šʲqʲʼə̀* *Ø-lə̀-s-ta-ytʼ*
3SGF-when-1SG-see DEF-book 3SG-to.3SGF-1SG-give
'When I saw her, I gave her the book' (Hewitt 1987: 138).

This prefix would likely have been eliminated from Dryer's sample based on its temporal semantics.

3.2 Amharic

Amharic has an especially rich inventory of adverbial subordinator prefixes, including the

3 We thank George Hewitt for discussing the diachrony of this prefix with us.

temporal clause markers *s-* 'when,' *ɨyyə-* 'while,' *ɨsk-* 'until'; reason clause markers, such as *sɨlə-*, conditional clause markers such as *b-*, and more. These prefixes, which are sometimes called 'conjunctions' in grammatical descriptions (e.g., Leslau 1995), but in other cases are considered prefixes (Hudson & Teferra 2007: 85-87) attach directly to the finite verb, and show allomorphy based on the tense-aspect form of the verb. For example, according to Leslau (1995), allomorphs with the vowel *ə* are conditioned by the verb forms known as the Perfect and the Relative Imperfect, while allomorphs with the vowel *ɨ* occur with the Imperfect. There are also phonological processes that occur at the boundary between these prefixes and the following verb. For example, in (2), the prefix *s-* and the 3PL prefix of the Imperfect form of the verb (*y-*) are reduced to *si-* (< *s-y-*) (Hudson & Teferra 2007: 85, Leslau 1995: 206), a regular phonological process in Amharic (Leslau 1995: 38).

(2) *s-i-mat'-u* *hed-ku*
TEMP-3PL-come.IMPF-3PL go.PRF-1SG.PRF
'I went when they came.' (Leslau 1995: 669)

Furthermore, the prefix *s-*, when attached to the person prefix found in 2SG, 2PL, and 3SGF (*tə-*) results in either loss of the vowel of the person prefix (3) or in gemination of the consonant of the person prefix (4):

(3) *sə-t-səbr*
TEMP-3SGF-break
'while she breaks' (Leslau 1995: 309)

(4) *sə-ttə-səbr*
TEMP-3SGF-break
'while she breaks' (Leslau 1995: 309)

Note the temporal subordinate clause markers *əyyä-* 'while' (5) and *kə-* 'after' (6), the purpose clause marker *lə-* 'in order to' (7), and the conditional clause marker *b-* (8).

(5) *ɨyyə-fəttələčč* *tɨ-zəfn-alləčč*
TEMP-spin_thread.PRF.3SGF 3SGF-sing.prog-3SGF
'She is singing while spinning thread.'(Leslau 1995: 661)

(6) *kə-hed-ə* *mət't'awh*
AFTER-go.PRF-3SGM come.PRF-1SG
'I came after he had left.' (Leslau 1995: 706)

(7) *wəndɨmm-u-n* *li-y-ay* *yɨ-hed-all*
brother-3SGM-ACC PURP-3SGM-see 3SGM-go-3SGM
'He will go in order to see his brother.' (Leslau 1995: 674)

(8) *b-i-t'əyyɨq-əŋŋ* *ɨ-nəgr-əw-allə-hu*

COND-3SGM-ask-1SG 1SG-tell-3SGMCOP-1SG
'If he asks me, I will tell him.' (Hudson & Teffera 2007: 86)

While some of these prefixes would have been eliminated from Dryer's sample on the basis of their semantics, others, with more specific temporal or non-temporal meanings, would not have been excluded.

3.3 Coptic

Coptic has a set of verbal prefixes that mark adverbial clauses. We mention two of them, which form a paradigmatic set (see Table 2). The data are from the best-described dialect of Coptic, Sahidic, and are taken from Layton (2004), the most detailed description of the dialect.[4]

	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'

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

The first, *šant(e)-*, codes a limitative temporal relation, translatable as "until" (9).

(9) *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") (10) or anteriority ("after") (11):

(10) *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).

(11) *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).

These formatives are considered to be affixes for the following reasons. First, they are always immediately adjacent to the subject person marker of the adverbial clause.[5]

4 The transliteration is according to the standard proposed in Author[1] & Haspelmath (2014).

5 This is a complicated issue, which cannot be dealt with fully here. In Coptic, verbs can occur with an incorporated subject, in which case TAM prefixes or adverbial subordinator prefixes attach directly to the subject, followed by the lexical verb. However, it is far more frequent for verbs to have verb-external subjects, in which case the structure is PREFIX-PERSON MARKER+VERB in a tightly bound morphological unit. It is only in the latter case that the adverbial subordinator prefix can be said to be a prefix on the verb, although one could argue that the adverbial subordinator prefixes, together with the incorporated subject

Second, no intervening material can occur between the formative and the subject person marker of the adverbial clause. Second-position clitics, which occur after the first stress-bearing bound group in a clause, occur after the verb (as in 11 above). Third, they have no corresponding free (i.e., unbound) realizations. Fourth, they are required by the morphosyntactic construction, and show evidence of phonological processes that only occur word-internally, such as the elision of the final vowel of the prefix when the subject person marker is itself a vowel or a nasal (as in 9 and 11 above). Fifth, they condition allomorphy of the bound person markers: they condition a different set of bound person markers, originally suffixes, than independent clauses with initial subjects. Compare the person markers in (12-13), with the (a) and (b) examples having different sets of person prefixes, depending on whether they are verb-initial or follow the adverbial subordinator prefix.

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

(13) 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).

Dryer's criteria might exclude the temporal clause prefix *nter(e)-*, but there would be no reason to eliminate the highly specific limitative clause prefix *šant(e)-*.

3.4 Cree

In some varieties of Cree, two adverbial subordinators have undergone coalescence with the verbal complex, becoming prefixes: *mêkwâ-* 'while' and the concessive *âta-* 'although' (Bakker 2013: 145-146; see section 5.2.2 on their diachrony).

That these elements are prefixes rather than clitics can be shown by the fact that the conjunct order prefix *ê-*[6] can appear before them, as shown by examples (14) and (15).

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and the lexical verb, form a single morphological word if not a phonological one. A more complicated solution, which is descriptively accurate, is that both subordinator prefixes and TAM prefixes belong to a paradigm of nominal marking, which simultaneously codes TAM, clause status, and nominative case.

[6] The verbal paradigms of Algonquian languages are traditionally divided into three "orders": independent, conjunct and imperative. The range of functions of the conjunct order cannot be described in this paper (for a book-length treatment of this question, see Cook 2014), but include in particular subordinate clauses and interrogative sentences.

(14)East Plains Cree (Wolvengrey 2011:189)

nikī-kakwē-wāpam-ikawin *ē-mēkwā-nīmihito-yān*.
PST-TRY-see-X>1s CONJUNCT -WHILE-dance-1SG
"I tried to be seen while dancing."

(15) 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 CONJUNCT –although-act.evil-2PL:CO

kêskêlihtam-owêkwe *kihci-iši-mil-êkw-ak*
IC:know-PL: 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 his generalization.

3.5 Japhug

Rgyalrong languages in general, and Japhug in particular, are typologically unusual in being both strictly verb final and mainly prefixing (see Author[2] 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 (Author[2] 2014: 288-9), marked by combining the verb stem with a prefix *tɯ-* preceded by an orientational prefix.[7] Example (16) 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.[8]

(16) *[tɯrme* *ra* *kɯ* *pjɯ-tɯ-mto]* *ʑo* *sat-nɯ*

7 In Rgyalrong languages, nearly all finite forms (except the factual non-past) and some non-finite forms take one obligatory orientation prefix (among seven possible orientations, including up/down, upstream/downstream, east/west and neutral). With the exception of motion verbs and some concrete action verbs that are compatible with all seven orientations, most verbs can only take one or two orientation prefixes, and the orientation associated to a particular verb is not predictable and has to be lexically specified (see Lin 2002, Author 2014:266-9).

8 Note that is not possible to determine whether this form could be considered to be an adverbial subordinator prefix in Dryer's terms rather than "part of the tense-aspect system." Dryer explicitly excluded affixes whose meaning corresponded to English "while" from his category of adverbial subordinators, but in example (5b) he includes a suffix with a temporal meaning "before". If an affix meaning "before" is classified as an adverbial subordinator, we see no reason why one meaning "as soon as" could not.

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 (17).

(17) *[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 /tɤ/ 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 an adverbial subordinator prefix is the Gerund *sɤ(z)-* (with reduplication of the last syllable of the verb stem).[9] Like the Perfective Converb, this form is restricted to subordinate clauses, and the verb is devoid of person marking (Author[2] 2014:293-294). It can appear without any postverbal linker, as in examples (18) and (19).

(18) *[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)

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

(20) *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 while being hungry, today heavens have given (it) to me. (Slobdpon2, 253)

9 Since the meaning of this prefix overlaps with that of English "while", it would not count as an adverbial subordinator in Dryer's definition.

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.

3.6 Tupi-Guarani languages

The data in this section are taken from Rose (2011, 2015).[10] In Emerillon, most subordinating affixes are suffixes, but there are two subordinating prefixes, *t-* and *si-*, both of which mark purpose clauses. We focus here on the *t-* prefix.

(21) *kõʔem* *oro-ho-tar* *Ø-esag* *t-oro-wɨkɨpodʒ*
tomorrow 1EXCL-go-FUT 3-see PURP-1EXCL-fish
'Tomorrow we will go see in order to fish.' (Rose 2011 : 340)

(22) *baʔezaʔu* *a-mumuŋ* *si-zopodʒ* *pita-kom*
food 1SG-cook 1INCL.PURP-feed child-PL
'I cook food in order to feed the children' (Rose 2011: 340)

The *si-* prefix is a portmanteau morpheme that marks both first person inclusive and adverbial subordination.

In the related language Araweté (Solano 2009: 388), *ta-* (*t-* before a vowel) marks purpose clauses.

(23) *uru-mupĩrĩ* *ku* *ure* *pɨda* *t-uru-ʔu* *ne*
1EXCL-fry FOC 1EXCL fish PURP-1EXCL-eat INT
'We fry fish (in order) to eat.'

In Paraguayan Guarani, *t-* marks a purpose clause (Guasch 1996: 278).

(24) *e-heka* *porã* *t-ere-juhu*
2SG.IMP-search well PURP-2SG-find
'Search well in order to find.'

In all of the Tupi-Guarani languages with the *t(a)-* adverbial subordinating prefix, the prefix occurs in the same position, attaching to the left of the person index. Furthermore, these clauses are unusual, in that they follow the main clause rather than preceding it, as subordinate clauses normally do in these languages.

Dryer's criteria would not have excluded these prefixes, since they do not mark temporal simultaneity and they are not semantically 'general.'

3.7 Turning to diachrony

As an interim summary, we would like to point out that the languages discussed above show evidence for prefixed adverbial subordinators. Since any explanation of language

10 We thank Françoise Rose for bringing these data to our attention, and for sharing her unpublished work with us.

structures, especially rare ones, must have a diachronic component (Bybee 2008), considering the sources of adverbial subordinators may shed light on the matter.

4. Pathways to adverbial subordinator prefixes

While there is currently no agreed-upon reconstruction of the adverbial subordinator prefix in Abkhaz, all of the other cases discussed here have viable diachronic reconstructions or, in the case of Coptic, actually attested evidence from diachronic corpora. We find three main sources for the grammaticalization of adverbial subordinator prefixes: first, the reanalysis of existing prefixes, whether nominalizers (4.2) or prepositions (4.3); second, the incorporation of adverbs (4.4); and third, the reanalysis of serial verb constructions (4.5).

4.1 The reanalysis of prefixes

Adverbial subordinator affixes are often grammaticalized from prefixes, e.g., case markers and other flags, 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. 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, our data indicate that existing prefixes do in fact grammaticalize into adverbial subordinator markers. Interestingly, it is not only case markers that constitute source constructions; in Japhug, as we see in 4.2, it is prefixed nominalizers that developed into adverbial subordinators.

4.2 Nominalizer prefix to adverbial subordination prefix

In Japhug, it is clear that the *tɯ-* converb and the *sɤ-* gerund prefix are recently grammaticalized from the action nominalization *tɯ-* and the oblique participle *sɤ-* prefixes. The oblique participle *sɤ-* is used to nominalize instruments; recipient, time and place adjunct; and various postpositional phrases (see Author[2] 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 Author[2] 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
^{n}*bud, bus*	blow	/bu/	*sbud*	bellows
^{n}*gel bkal*	load on	/kal/	*sgal*	load carried on the back, back
ɲan	hear	/ɲan/	*sɲan*	ear (honorific)
^{n}*diŋ, btiŋ*	spread out	/tiŋ/	*sdiŋs*	cavity
dgar, bkar	put up (a tent)	/kar/	*sgar*	tent
k^{h}ag(-po)	difficult, hard	/kag/	*skag*	bad luck, evil omen, accident
bk^{j}on	scold, reprimand	/k^{j}on/	*sk^{j}on*	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 participle, as illustrated by example (25).

(25) *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 (26).

(26) *[nɯ* *ɯ-xpa* *nɯ]* *ʁmɯrcɯ* *a-pɯ-dɤn* *tɕe,*

DEM 3SG.POSS-year DEM thrush IRR-IPFV-be.many LNK
[nɯnɯ ɯ-xpa nɯnɯ] tɤɛi 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 one formal difference with respect to the oblique participle form: the obligatory presence of verb stem reduplication. Verb stem reduplication in Japhug is a very common means for expressing 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...'), though the specific meaning of the Gerund is not predictable from that of the oblique participle. While Gerund and oblique participle are obviously historically related, it is equally clear that they must be distinguished synchronically.

4.3 Preposition to adverbial subordination prefix

4.3.1 Amharic

In Amharic, a similar process of secondary grammaticalization has occurred. While we do not have extensive diachronic data for Amharic, there are some clear hints as to the grammaticalization pathways of some of the adverbial subordinator prefixes. Many – if not all – of these prefixes are demonstrably erstwhile prepositions, some of which are reconstructible to proto-Semitic and possibly Afroasiatic. For example, the conditional clause prefix *b-* was grammaticalized from the preposition *bə-* 'on, at, by', and the purpose clause marker *l-* from the dative/allative preposition *lə-*. These prepositions are listed in Hudson & Teferra (2007: 46-47), and some of them are mentioned in Table 4.

Preposition	Examples	
bə-	*bə-ruč'a* 'by running'	*bə-t'alyaniŋŋa* 'in Italian'
lə-	*lə-məblat* 'for eating'	*l-antə* 'for you'
iskə-	*iskə-qɨdame* 'until Saturday'	
sɨlə-	*sɨlə-polətika* 'about politics	

Table 4: Prepositions in Amharic

Importantly, in some cases they attached to nominalized forms of verbs, which are morphologically marked in Amharic. Evidence for this is found in cases like *sɨlə-* ('about'), which attaches to a nominalized verb form marked by the relative clause prefix *–mm*.

(27) *sɨlə-mm-i-zənb* *ɨzzih* *ɨnnɨqɨr*
because-NMLZ-3SG-rains here stay.HORT.1PL
'Because it's raining, let's stay here.' (Hudson & Teferra 2007: 86)

The prefix *–mm* was originally part of the relativizer of imperfective verbs *yəmm-*, but according to a regular rule of Amharic morphology, *yə-* is elided when preceded by another prefix: **sɨlə-yə -mm-y-zənb* > *sɨlə-mm-i-zənb*, with subject person marker *y-* > *i-* after a prefix (Hudson & Teferra 2007: 86).

In other cases, we observe a pathway of development in which the preposition attaches to a nominalized verb followed by a nominal or adverbial element, in a kind of circumpositional phrase. As noted above, it is generally assumed that the relativizer *yə-* is elided when following another prefix.

(28) *təlantɨnna* *kə-dərrəs-ku* *dʒəmmɨro*
yesterday from-arrived-1SG beginning
'Since I arrived yesterday.' (Hudson & Teferra 2007: 86)

(29) *biro* *bə-hed-ku* *gize*
office at-went-1SG time
'When I went to the office' (literally 'at the time that I went to the office')
(Hudson & Teferra 2007: 87)

The preposition + verb can also occur without the postpositional part of the construction, as in (30). In such cases, the prefix is the sole marker of the adverbial clause.

(30) *kə-hed-ə* *mət't'awh*
AFTER-go.PRF-3SGM come.PRF.1SG
'I came after he had left.' (Leslau 1995: 706)

While the processes here appear to have been complex ones, the point we would like to stress is that Amharic subordinator prefixes may have, in some cases, inherited the position of the erstwhile prepositions from which they were grammaticalized. In these cases, the prefix attaches directly to the verb because it was not an earlier free conjunction that coalesced with an independent verb, but rather a bound preposition that took a nominalized finite verb as its complement. The pathway of development according to which a nominal head followed by an attributive clause may have grammaticalized into a conjunction, and thereafter into a prefix, also seems to be plausible in other cases.[11]

4.3.2 Ancient Egyptian-Coptic

[11] For example, *sɨlə* may ultimately derive from something like Ge'ezʾəsmä 'because,' which in turn may have developed from a lexical item meaning 'name.' However, this is an unlikely source for the prefixes that developed from simple prepositions, most of which reconstruct to Proto-Semitic or even Proto-Afroasiatic. We thank Aaron Butts, Eran Cohen, and Michal Marmorstein for discussing the Semitic data with us.

Another case of the coalescence of prepositions with finite verb forms is found in Ancient Egyptian-Coptic. The earlier stages of Ancient Egyptian[12] had verb-initial clauses with suffixed person markers, as well as deranked verb forms.[13] 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	Sw	Hr	Snb-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 constructions with the auxiliary verb iri 'do' came to dominate the verbal system, with iri + lexical verb replacing older inflected forms of the lexical verb.

(32) Late Egyptian

[Seize this woman, and make her a prisoner]

i:ir-t-tw-gm	iTAw-rmT
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. This change is summarized in Table 5.

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

Table 5: 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).

12 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 Author[1] & Richter (2014). For a typologically-oriented overview of the structure of Ancient Egyptian-Coptic, see Haspelmath (2014).

13 For the notion of 'deranking,' see Stassen (1985) and Cristofaro (2003).

The next stage involved the univerbation of the prefix i- and the deranked form of the verb iri "do" into a single formative iirt-, and the addition of a preposition SAa "until."

(33) Demotic
SAa-iirt-i-Sm 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. 9, repeated here), with an epenthetic nasal (*n*) regularly occurring before dentals (Vt > VNt) (Peust 1999: 170).

(34) 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)	SAa:iirt-PM-V
Stage 4	morpheme-internal phonological change > epenthetic nasal	*šant*-PM-V

Table 6: 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.

4.4 Incorporated adverb > adverbial subordinator prefix

In Cree, the prefixes *mêkwâ-* 'while' and *âta-* 'although' (35) originate from previously independent (unbound) adverbs, still attested as free forms, as *mêkwâc* 'while' and *âta* 'although'.

(35) 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 (35), 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 common Cree 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 be 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. Table 7 summarizes the process of coalescence by which *ê-âta*-V came into being in Cree.

	Change	Construction
Stage 1		âta ê-V
Stage 2	Phonological coalescence	âta-ê-V
Stage 3	Change of prefixal order	ê-âta-V

Table 7: The coalescence of the subordinator *âta* 'although' in Cree

The sources for these prefixes, the adverbs *mêkwâc* 'while' and *âta* 'although' occur either sentence-initially, in Wackernagel position (example 36), or even in rarer cases after several words (37). They may (37) or may not (36) be adjacent to the verb.

(36) 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…

(37) 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).

4.5 Serial verb constructions: a possible origin of Tupi-Guarani

Rose (2015) considers a number of possible pathways of development that could explain the unusual purpose clause prefix in Tupi-Guarani languages. The most likely scenario, in her view, is one in which the verb *ta* 'go' and its cognates were grammaticalized into a purpose clause marker out of a serial verb construction. For example, in Xipaya (Rodridgues 1995), one finds examples like (38):

(38)

una	***ta***	*takaɭĩa*	*a'baku*
1sg	go	chicken	kill

'I am going to kill chickens.'

Rose proposes that constructions involving V1 V2.GO V3 were reanalyzed as V + purpose clause, with the V2 ('go') being reanalyzed as a purpose clause marker. If this is correct, as Rose points out, *ta* remained in preverbal position, and became a prefix (*t-* in some of the Tupi-Guarani languages, such as Emerillon, Paraguayan Guaraní, and Araweté.

6. Conclusions

The main point of this article has been to show that an otherwise robust generalization about language structure, proposed on a large and diverse sample of languages, admits exceptions. For several 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. It still remains to be seen whether Dryer's generalization hold up to closer scrutiny of the languages in his original sample, but it is indeed possible that it will remain as a solid statistical generalization about human languages.

More broadly, however, we have argued that even rare features can have plausible diachronic explanations in terms of well-known processes of language change. On the

one hand, existing prefixes can be reinterpreted as markers of subordination. In the languages we have examined, both nominalizer prefixes and prepositions are documented source constructions. A hitherto undescribed pathway is that proposed by Rose (2015), in which a serial verb may have grammaticalized into a purpose marker, and thereafter univerbated with a following verb.

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