Explanation in typology

Diachronic sources, functional motivations and the nature of the evidence

Edited by

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Conceptual Foundations of Language Science

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Introduction

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The present volume addresses a foundational issue in linguistic typology and language science more generally. It concerns the kinds of explanation that typologists provide for the cross-linguistic generalizations they uncover, i.e. for so-called universals of language. The universals at issue here are usually probabilistic statements about the distribution of specific structures, such as the classic Greenbergian generalizations about word order and morphological markedness patterns. Some examples are given in (1)–(4) below:

(1) With overwhelmingly greater than chance frequency, languages with normal SOV order are postpositional. (**Greenberg1963**)

(2) A language never has more gender categories in nonsingular numbers than in the singular. (**Greenberg1963**)

(3) If a language uses an overt inflection for the singular, then it also uses an overt inflection for the plural. (**Croft2003** 89, based on **Greenberg1966** 28)

(4) In their historical evolution, languages are more likely to maintain and develop non-ergative case-marking systems (treating S and A alike) than ergative case-marking systems (splitting S and A). (**BickelEtAl2015** 5)

As can be seen from these examples, cross-linguistic generalizations of this kind may be formulated in terms of preferred types in synchronic samples or in terms of higher transition probabilities for these types in diachronic change (see also **Greenberg1978**; **Maslova2000**; **Cysouw2011**; **Bickel2013** for discussion of the latter approach). But this is, strictly speaking, independent of the question we are primarily concerned with here, namely how to best account for such generalizations once they have been established.

The most widespread typological approach to explanation is grounded in functional properties of the preferred structural types: For example, typical correlations in the ordering of different types of phrases (e.g. object–verb and NP–postposition) have been argued to allow efficient online processing (e.g. **Hawkins1994** 2004). Markedness patterns in morphology (e.g. the distribution of zero expression in case, number or person systems) have been attributed to economy, i.e. the desire to leave the most frequent and hence most predictable constellations unexpressed, or rather to a competition between economy and the motivation to code all semantic distinctions explicitly (e.g. **Haiman1983**; **Comrie1989**; **Aissen2003**; **Croft2003**; **Haspelmath2008** among many others). The general idea behind this approach is thus that speech communities around the world are subject to the same kinds of cognitive and communicative pressures, and that the languages they speak tend to develop structures that respond to these pressures accordingly, or, as **Bickel2014** puts it, "in such a way as to fit into the natural and social eco-system of speakers: that they are easy to process, that they map easily to patterns in nonlinguistic cognition, and that they match the social and communicative needs of speakers."

There is a clear parallel to evolutionary biology here, in that languages are said to *converge* on similar structural solutions under the same functional pressures, just like unrelated species tend to develop similar morphological shapes in order to be optimally adapted to the specific environment they co-inhabit (**Deacon1997**; **Caldwell2008**; **EvansLevinson2009**; **Givón2010**). When applied to language, this line of explanation at least implicitly invokes what is known as "attractor states", i.e. patterns of structural organization that languages are drawn into in their course of development.[1] For this reason, one could also speak of a **result-oriented** approach to explanation.

There is, however, another way of looking at the same patterns, one that redirects attention from the functional properties to the diachronic origins of the linguistic structures in question. On this view, many universal tendencies of order and coding are seen as by-products, as it were, of recurrent processes of morphosyntactic change, notably grammaticalization, but without being adaptive in the above sense: There is no principled convergence on similar structural traits because these traits might be beneficial from the perspective of processing, iconicity or economical communicative behaviour. Instead, the current

[1] The term attractor state (or basin of attraction) is adopted from the theory of complex dynamic systems (e.g. **Cooper1999**; **HoweLewis2005**; **Holland2006**), which has become increasingly popular as a way of viewing linguistic systems as well (see **BecknerEtAl2009** and **Port2009** for general overviews, and **Haig2018** or **Nichols2018** for very recent applications to typological data).

synchronic distributions are argued to be long-term reflections of individual diachronic trajectories, in particular the diachronic sources from which the structures in question originate. **Givón1984** and **Aristar1991** for example, suggested that certain word-order correlations may simply be a consequence of a given ordering pair (e.g. Gen–N & Rel–N, or V–O & Aux–V) being directly related diachronically: Auxiliaries normally grammaticalize from main verbs that take other verbs as complements, and since these complements follow the verb in VO languages, they also follow the auxiliary in the resulting Aux–V construction; the mirror-image pattern holds for OV languages (see also **Lehmann1986** 12–13). If this line of reasoning extends to most other word-order pairs, there is no need to motivate the synchronic correlations in functional-adaptive terms, e.g. by saying that the correlations arise *in order to* facilitate efficient sentence processing.

In the domain of morphology, **Garrett1990** argued that patterns in case marking, specifically of differential ergative marking, are exhaustively explained by the properties of the source of the ergative marker: When ergative case arises from the reanalysis of instrumental case, the original characteristics of the latter, such as a restriction to inanimate referents, are directly bequeathed to the former. The result is a pattern in which animate A-arguments are left unmarked, but since this is a direct "persistence effect" (**Hopper1991**) of the history of the ergative marker, there is again no need for an additional functional-adaptive explanation in terms of other principles, such as a drive for economical coding patterns. Rather than being result-oriented, then, this way of explaining universals can be characterized as **source-oriented**.

Such source-oriented explanations thus move away from attractor states of grammatical organization and often emphasize the importance of "attractor trajectories" instead (**BybeeBeckner2015** 185): In some domains of grammar, the patterns of reanalysis and ensuing grammaticalization are so strikingly similar across the world's languages that it is not surprising that they yield similar outcomes, such as strong correlations between V–O & Aux–V or V–O & P–NP ordering. In other cases, it is argued that many individual, and partly very different, diachronies are capable of producing a uniform result, but without any consistent functional force driving these trajectories. **Cristofaro2017** for instance, claims that this is the case for plural markers: An initial system without number marking can develop an overt plural morpheme from many different sources – usually by contextual reanalysis – and thus ultimately come to contrast a zero singular with an overt plural, but these developments are neither triggered nor further orchestrated by a need for economical coding: They do not happen to keep the (generally more frequent) singular unmarked and the (generally less frequent)

plural overtly signalled.

In other words, whether the individual diachronic trajectories are highly similar or rather diverse, the premise of the source-oriented approach is that they can scale up to produce a predominant structural pattern in synchronic samples. Hence they obviate the need for highly general functional principles tying these patterns together.

While the source-oriented approach was still a more marginal position in previous volumes on explaining language universals (e.g. **Hawkins1988a**; **Good2008**), it has gained considerable ground over the last decade, notably in a series of articles by Cristofaro (e.g. **Cristofaro2012** 2014; 2017) but also in other publications (e.g. **Creissels2008**; **GildeaZúñiga2016**). Moreover, while the basic thrust of the two explanatory approaches is straightforward, clarification is needed on a number of – equally fundamental – details. After all, both approaches are functionalist in nature, as they rely on domain-general mechanisms (**Bybee2010**) to explain the emergence of language structure and linguistic universals; and in both approaches, these mechanisms constrain how languages "evolve into the variation states to which implicational and distributional universals refer" (**Hawkins1988b**). But as **Plank2007** notes, "what is supposed to be the essence and force of diachronic constraints would merit livelier discussion." It is the goal of the present book to offer precisely a discussion of this kind.

The volume begins with a programmatic paper by **Martin Haspelmath** on what it means to explain a universal in diachronic terms. He aims to clarify how diachrony is involved in result-oriented and source-oriented accounts, respectively, and thus lays out a general conceptual framework for the explanation of universals. At the same time, Haspelmath opens the floor for debating the strengths and weaknesses of the two explanatory accounts at issue here. His own position is that, in many cases, current source-oriented explanations are ill-equipped to truly explain the phenomena they intend to account for, and hence cannot replace result-oriented motivations. Haspelmath's arguments for this position, as well as his terminological proposals, provide a frame of reference to which all other contributions respond in one way or another.

The lead article is followed by two endorsements of source-oriented explanations, articulated by **Sonia Cristofaro** and **Jeremy Collins**, respectively. They both describe the approach in widely accessible terms, allowing also readers outside of linguistic typology to appreciate the general argument as well as the specific examples discussed. The phenomena themselves involve domains that are particularly well-known for being explained in functional-adaptive terms, namely differential argument marking, number marking and word-order corre-

lations, and these are all argued to be best captured by persistence effects from their respective diachronic origins.

We then proceed to papers that allow for progressively more room for functional-adaptive motivations and, importantly, for methodological discussions on how to obtain evidence for such pressures. Accordingly, all of these papers adduce novel empirical data and discuss them in light of the present debate.

Matthew Dryer's paper is an immediate follow-up on Collins' discussion of word-order correlations. On the one hand, Dryer argues that the various correlates of adposition–noun ordering (e.g. OV and NP–P, and Gen–N and NP–P) are, indeed, best accounted for in source-oriented terms. In particular, only this approach proves capable of explaining the occurrence (and the individual semantic types) of both prepositions and postpositions in SVO languages. On the other hand, however, Dryer contends that there are some significant correlations for which a source-based account either fails to offer an explanation or else makes the opposite prediction of the patterns we find synchronically. Dryer concludes, therefore, that neither a purely source-based nor a purely result-based explanation is sufficient to deal with word-order correlations.

In a similar fashion as Dryer's paper, **Holger Diessel**'s article demonstrates that different aspects of the same grammatical domain – in this case adverbial clause combinations – are amenable to different types of explanation. Diessel focuses specifically on the structure and development of preposed adverbial clauses and argues that some of their typological characteristics, notably the properties of their subordinating morphemes, receive a satisfactory explanation in terms of the respective source construction(s), thereby supplanting earlier processing-based explanations. On the other hand, he proposes that the position of adverbial constructions (in general) is clearly subject to a number of functional-adaptive pressures, and that these may already have affected the diachronic sources from which the current preposed adverbial clauses have grammaticalized.

Karsten Schmidtke-Bode offers a review of Hawkins' (2004, 2014) research programme of "processing typology", examining the plausibility of Hawkins' functional-adaptive ideas in diachronic perspective. On a theoretical level, it is argued that a predilection for efficient information processing is operative mostly at the diffusion stage of language change, regardless of the source from which the respective constructions originate. On a methodological level, the paper proposes that the cross-linguistic predictions of Hawkins' programme can be tested more rigorously than hitherto by combining static and dynamic statistical models of large typological data sets; this is demonstrated in a case study on the distribution of article morphemes in VO- and OV-languages, respectively.

An important methodological point is also made by **Ilja A. Seržant**, who claims that certain functional-adaptive pressures may not actually surface in standard typological analysis because they are weak forces, clearly at work but also easily overridden by other, language-specific factors. Because of their weak nature, they may not be directly visible any-more in a synchronic type, but they can be detected in qualitative data from transition phases. Based on diachronic data from Russian, Seržant shows how the development of differential object marking was crucially influenced by considerations of ambiguity avoidance (and hence a classic functional-adaptive motivation), over and above the constraints inherited from the source construction. In the absence of such longitudinal data, transition phases can be identified on the basis of syn-chronic variability, and Seržant shows that a wide variety of languages currently exhibit variation in differential object marking that mirrors the diachronic findings from Russian, and that is not predictable from the source meaning of the marker in question.

Susanne Maria Michaelis adds another source of data to the debate at hand. She argues that creole languages provide a unique window onto the relationship between synchronic grammatical patterns and their diachronic trajectories, as the latter are often relatively recent and also accelerated when compared to normal rates of grammatical change. The developments are, consequently, more directly accessible and less opaque than in many other cases. By inspecting creole data on possessive forms in attributive and referential function (e.g. *your* versus *yours*), Michaelis finds evidence for the development of the same kinds of coding asymmetries that this domain offers in non-contact languages around the world. She proposes that the data are indicative of result-oriented forces that drive diverse diachronic pathways towards the same synchronic outcome. This stance contrasts most explicitly with Cristofaro's, who interprets such situations in exactly the opposite way (i.e. as providing evidence *against* a unifying functional explanation).

Natalia Levshina, finally, adopts an entirely different methodological approach to illuminate the present discussion: In her paper, she showcases the paradigm of artificial language learning, which can be employed to inspect whether users of such newly acquired languages develop performance biases that are in keeping with hypothesized functional principles, such as an increasingly efficient distribution of morphological marking. Her case study clearly demonstrates such biases and discusses where they may ultimately come from, i.e. how they fit into the new conceptual framework of constraints offered by Haspelmath's position paper.

The volume is rounded off by a brief **epilogue** in which **Karsten Schmidtke-**

Bode and **Eitan Grossman** summarize and further contextualize the arguments put forward by the contributors.

Overall, the purpose of the present book is to provide a state-of-the-art overview of the general tension between source- and result-oriented explanations in linguistic typology, and specifically of the kinds of arguments and data sources that are (or can be) brought to bear on the issue. It should be made clear from the outset that the two types of explanation are framed as antagonistic here even though in most cases, an element of both will be needed in order to fully account for a given grammatical domain. As we emphasize in the epilogue, the diachronic source of a grammatical construction certainly constrains its further development, but the major issue at stake here is the extent to which result-oriented, functional-adaptive motivations enter these developments as well. By the end of the day, universals of language structure will thus differ in the *degree* to which they are shaped by such adaptive pressures.

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Chapter 1

Preposed adverbial clauses: Functional adaptation and diachronic inheritance

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In the historical literature it is commonly assumed that subordinate clauses are derived from paratactic sentences. However, while this assumption is not implausible for certain types of postposed adverbial clauses, there is no obvious connection between preposed adverbial clauses and parataxis. This paper investigates the diachronic development of preposed adverbial clauses from a cross-linguistic perspective. Drawing on data from a typological and diachronic database, it is shown that preposed adverbial clauses evolve from various diachronic sources that are semantically and structurally similar to the target construction (e.g. adpositional phrases, pre- and postnominal relative clauses, juxtaposed sentences). Considering the factors behind these developments, the paper argues that while the occurrence of preposed adverbial clauses can be explained by general cognitive processes of language use, the internal structure of preposed adverbial clauses, notably the position of the subordinator, is primarily determined by grammaticalization.

1 Introduction

It is a standard assumption of historical linguistics that syntactic structures often develop from structurally independent elements in discourse (**Givón1979**). An oft-cited example is the diachronic development of subordinate clauses from paratactic sentences. As **Lehmann1988** and others have shown, there is a cline of clause linkage ranging from the combination of two structurally independent sentences in discourse to tightly organized bi-clausal structures in which one clause is syntactically dependent on the other one. Building on this observation, it is commonly assumed that subordinate clauses have evolved from independent sentences or parataxis (e.g. **HopperTraugott2003** 176–184). However,

while this assumption appears to be plausible for many postposed subordinate clauses, there is no obvious connection between parataxis and preposed subordinate clauses.

Clause combining in discourse has a backwards orientation. Paratactic sentences are usually related to previous sentences, as evidenced by the occurrence of anaphoric pronouns and clause linkers that connect the current sentence to participants and propositions of the preceding sentence or discourse (cf. (1)).

(1) *John*$_i$ was accepted to Harvard. *Therefore, he*$_i$ moved to Boston.

Like independent sentences, complex sentences are processed with a backwards orientation if the subordinate clause follows the main clause (e.g. *John*$_i$ *moved to Boston, because he*$_i$ *was accepted to Harvard*). However, unlike paratactic sentences, preposed subordinate clauses have an inherent forward orientation in that pronouns and clause linkers are related to elements of the upcoming main clause (cf. (2)).

(2) *Because he*$_i$ was accepted to Harvard, *John*$_i$ moved to Boston.

Considering the projective force of preposed subordinate clauses, it is unclear if and how these structures have evolved from clause combining strategies in discourse. It is the purpose of this paper to investigate the diachronic developments of preposed subordinate clauses from a cross-linguistic perspective. Specifically, the paper is concerned with the development of preposed adverbial clauses.

Following **Cristofaro2003** adverbial clauses are here defined as part of a biclausal construction consisting of a main clause and a subordinate clause in which the event designated by the subordinate clause specifies the circumstances under which the event of the main clause takes place. Several typological studies have investigated the positional patterns of adverbial clauses (e.g. **Greenberg1963**; **Diessel2001** Schmidtke-**Bode2009**; **DiesselHetterle2011**; **Hetterle2015**); but they are either based on small and biased samples or concentrate on particular adverbial relations (e.g. purpose or cause). In the current study, we will be concerned with four general semantic types of adverbial clauses (i.e. adverbial clauses of time, condition, cause and purpose) based on data from a genetically and geographically dispersed convenience sample of 100 languages. The languages come from 85 genera (which maximally include two languages) and six large geographical areas (i.e. Eurasia, Africa, South East Asia and Oceanic, Australia and New Guinea, North America, South America) (cf. **Dryer1992**). The bulk of the data

were gathered from reference grammars and other published sources, supplemented by information from native speakers and language specialists.[1]

The paper is divided into three parts. The first part describes the cross-linguistic distribution of preposed adverbial clauses in the 100 language sample; the second part provides an overview of the main diachronic paths to preposed adverbial clauses; and the third part considers the developments described in light of the debate about functional and diachronic explanations for language universals that takes center stage in the present volume.

2 Cross-linguistic patterns

Let us begin with some general observations regarding the position of subordinate clauses. Subordinate clauses are dependent categories of an associated element. Three basic types of subordinate clauses are commonly distinguished: (i) complement clauses, which are dependent categories of a complement-taking verb or predicate, (ii) relative clauses, which are dependent categories of a noun or noun phrase, and (iii) adverbial clauses, which may be seen as dependent categories of a main clause or main clause predicate.

The position of all three types of subordinate clauses relative to the associated element correlates with the position of other dependent categories relative to the so-called head, but the correlations are skewed in particular directions (**Diessel2001**). As **Greenberg1963** already noted, the order of relative clause and noun correlates with that of verb and object, but there is a predominance of postnominal relative clauses. In VO languages, relative clauses are almost always postposed to the associated N(P), but in OV languages we find both pre- and postnominal relatives (cf. **Dryer2005**).

The order of complement clause and verb is similar. As Schmidtke-**BodeDiessel2017** have shown, although object complement clauses usually serve the same syntactic function as object NPs, they do not always occur in the same structural position as nominal objects. In VO languages, complement clauses follow the verb with almost no exception, but in many OV languages they are postposed to the main verb, as for instance in Persian, Epena Pedee and Supyire. There is thus a general tendency for both relative and complement clauses to follow the associated category, which may be due to the oft-noted trend for long and heavy constituents to follow short ones (cf. **Behaghel1932**).

However, adverbial clauses are different. Although adverbial clauses are long

[1] A list of languages included in the sample is given in the Appendix.

constituents, they often precede the main clause. As **Diessel2001** observed (based on data from a small and biased sample), in VO languages, adverbial clauses occur both before and after the associated main clause, but in some OV languages, there is a general tendency to prepose all adverbial clauses. This tendency is also evident in the current sample (cf. Table **??**).

Table 1: The position of adverbial clauses and the order of verb and object

	Languages in which all types of ACs (usually) precede the MC	Languages in which ACs are commonly pre- and postposed	Languages in which all types of ACs (usually) follow the MC	Total
VO	-	40	-	40
VO/OV	-	8	-	8
OV	31	21	-	52
Total	31	69	-	100

As can be seen, most of the languages of the current sample make common use of both pre- and postposed adverbial clauses, but in more than half of all OV languages, adverbial clauses are usually preposed to the main clause. In Japanese, for instance, there is a very strong tendency to prepose adverbial clauses (though in spoken Japanese, adverbial clauses sometimes follow the main clause as afterthoughts; cf. **FordMori1994**).

Generalizing across the data in Table **??**, we may say that while the order of adverbial clause and main clause correlates with that of verb and object, the occurrence of preposed adverbial clauses is cross-linguistically predominant. However, on closer inspection we find that the predominance of preposed adverbial clauses is mainly due to certain semantic types of adverbial clauses that precede the main clause in both VO and OV languages. Consider the data in Table **??**, which show that the positional patterns of adverbial clauses correlate with their meaning.

Note that the frequencies in Table **??** are based on constructions rather on languages. Since some languages have multiple adverbial clause constructions of the same semantic type, Table **??** includes a larger number of constructions than languages. Note also that this table concerns both adverbial clauses that are tied to a specific position by linguistic convention and adverbial clauses that are statistically biased to precede or follow the main clause. In the latter case, some of

Table 2: The meaning and position of adverbial clause constructions in a sample of 100 languages

	Preposed	Pre- and postposed	Postposed	Total
Condition	94 [91.3%]	9 [8.7%]	0 [0%]	103
Time	119 [59.8%]	68 [34.2%]	12 [6.0%]	199
Cause	40 [38.8%]	24 [21.2%]	49 [43.4%]	113
Purpose	33 [28.7%]	19 [16.5%]	63 [54.8%]	115
Total	286	120	124	530

the data in Table **??** are based on frequency counts from linguistic corpora, but more often these data are based on field workers' judgements regarding the position of adverbial clauses. While expert judgements are less reliable than corpus counts, they provide a reasonable estimate as to how main and adverbial clauses are arranged in a particular language.[2]

As can be seen, conditional clauses typically precede the main clause (cf. **Greenberg1963** Universal 14), though in many languages, conditional clauses can also be postposed to the main clause. Like conditional clauses, temporal clauses tend to precede the main clause, but temporal clauses follow the main clause more often than conditionals. The position of temporal clauses varies with the nature of the temporal link they encode. For instance, temporal clauses denoting a prior event, i.e. an event that precedes the one in the main clause, are more often preposed than temporal clauses denoting a posterior event. In English, for example, *after*- and *since*-clauses denote a prior event and precede the main clause more often than adverbial clauses denoting a posterior event such as *before*- and *until*-clauses (cf. **Diessel2008**). The same tendency has been observed in several other languages of the current sample (e.g. in German, Supyire, Abun, Nkore Kiga, Noon, and Taba).

Moreover, and this is particularly striking, there is a general tendency to prepose adverbial clauses that correspond to English *when*-clauses. Like *after* and *since*, *when* can denote a prior event, but it can also indicate a link between events that occur simultaneously (**Diessel2008**). However, regardless of the temporal relationship that is expressed by a *when*-clause, there is a tendency for temporal

[2] Psycholinguistic evidence suggests that while speakers have difficulties to estimate the absolute frequencies of linguistic elements, their judgements of relative linguistic frequencies are quite reliable (**HasherZacks1984**).

when-clauses to precede the main clause. In fact, in a substantial number of languages *when*-clauses are generally preposed to the main clause in the current sample (i.e. Abun, Supyire, Yagua, Trumai, Motuna).

Finally, cause and purpose clauses tend to follow the main clause. Table **??** shows that there are 40 adverbial clause constructions of cause and 33 adverbial clause constructions of purpose that precede the main clause, but most of these constructions occur in languages like Japanese, in which all adverbial clauses are preposed to the main clause regardless of their meaning. Generalizing across these findings we may conclude that that the cross-linguistic tendency to prepose adverbial clauses is mainly due to the fact that conditional clauses and certain types of temporal clauses, notably *when*-clauses, precede the main clause regardless of the order of other syntactic constituents.

Interestingly, a number of studies suggest that the position of adverbial clauses does not only correlate with the semantic link between main and adverbial clauses, but also with aspects of their internal structure. Of particular importance is here the position of the subordinator (cf. **Diessel2001** Schmidtke-**Bode2009**; **Hetterle2015**). Across languages, adverbial clauses are often marked by subordinate conjunctions that typically appear at the beginning or end of the subordinate clause. **Dryer1992** showed that the position of the subordinator correlates with the order of verb and object: In VO languages, adverbial clauses usually occur with initial subordinators, but in OV languages they often include a final marker. However, the position of the subordinator does not only correlate with the order of verb and object, it also correlates with the position of the adverbial clause. Consider the data in Table **??**, which is restricted to adverbial clauses with free subordinating morphemes.[3]

As can be seen, adverbial clauses that follow the main clause or that are flexible with regard to their position typically occur with an initial marker. There are languages in which postposed and flexible adverbial clauses include a final marker, but this is relatively rare (and mainly found in certain areas, e.g. South America). By contrast, preposed adverbial clauses are frequently marked by a final subordinator, especially in languages in which all adverbial clauses precede the main clause, as for instance in Amele, Burmese, Japanese, Korafe, Korean, Santali, Slave, Turkish, Wappo, Warao, and Menya. Only conditional clauses and temporal *when*-clauses are commonly preposed and often marked by an initial subordinator (in languages in which other semantic types of adverbial clauses are flexible or postposed to the main clause).

[3]Since adverbial clause constructions that do not include a free subordinating morpheme are disregarded, Table **??** includes only a subset of the adverbial clause constructions in Table **??**.

Table 3: The position of free subordinators in pre- and postposed adverbial clauses

	Preposed		Flexible (no preference)		Postposed		
	Initial	Final	Initial	Final	Initial	Final	Total
condition	34	22	5	-	-	-	61
time	20	47	43	5	7	3	125
cause	2	26	11	6	37	4	86
purpose	-	20	2	4	38	4	68
total	56	115	61	15	82	11	340

3 Diachronic sources

Having described the positional patterns of adverbial clauses (and adverbial subordinators), let us now consider their diachronic evolution. Where do preposed adverbial clauses come from? In the historical literature, syntactic development is commonly described as a process that leads from a source construction A to a target construction B, but this scenario is not always appropriate to characterize syntactic change (cf. **Givón1991** Van de **VeldeEtAl2013**). Since subordinate clauses are complex grammatical units, they are usually related to several other constructions, e.g. other types of subordinate clauses, certain types of phrasal constituents and independent sentences. Since all of these constructions can influence the development of a particular adverbial clause, it is not always possible to trace adverbial clauses to one specific source. However, while the diachronic developments of adverbial clauses are (usually) influenced by several constructions, in many cases there is one construction that is so closely related to a certain type of adverbial clause that it can be seen as the primary determinant, or source, of that clause. For instance, many postposed adverbial clauses are so similar to paratactic sentences that it seems reasonable to assume that parataxis has a significant impact on the development of (many) postposed subordinate clauses. However, while the development from parataxis provides a plausible scenario for the rise of (many) postposed adverbial clause, it does not explain where preposed adverbial clauses come from.

Since preposed adverbial clauses are thematically related to the ensuing discourse, there is no obvious connection to parataxis unless we assume that pre-

posed adverbial clauses are based on postposed subordinate clauses that were fronted after they developed from paratactic sentences. However, there is no evidence for this scenario. The diachronic developments of adverbial clauses have been examined in a large number of studies (e.g. **Haiman1985**; **Haspelmath1989**; **Givón1991**; **Genetti1991**; **HarrisCampbell1995**; **Frajzyngier1996**; **DisterheftViti2010**), but although fronting appears to provide a plausible scenario for the development of preposed adverbial clauses, there is almost no evidence for this scenario in the historical literature. On the contrary, what previous studies suggest is that adverbial clauses usually occur in the same position as their diachronic sources. In what follows, we consider four common source constructions for preposed adverbial clauses.

First, while preposed adverbial clauses are unlikely to have evolved from paratactic sentences through fronting, there is one common diachronic path that leads from independent sentences in discourse to complex sentences with preposed adverbial clauses. As **Haiman1985** observed, in many languages conditional relations are expressed by juxtaposed clauses that have the same structure as two simple sentences, as in the following examples from Vietnamese (cf. (3)), Mapudungun (cf. (4)) and Wambaya (cf. (5)).

(3) Vietnamese (Austro-Asiatic, Viet-Muong; **Haiman1985** 45)
Vietnamese
[Không có màn], không chịu nôi.
not be net not bear can
'If there's not net, you can't stand it.'

(4) Mapudungun (Araucanian; **Smeets2008** 184)
Mapudungun
[Aku-wye-fu-l-m-i], pe-pa-ya-fwi-y-m-i.
arrive-PLPF-IPD-COND-2-SG see-hither-IRR-OBJ-IND-2-SG
'If you had arrived (by then), you would have seen him.'

(5) Wambaya (West Barkly; **Nordlinger1998** 219)
Wambaya
[Yabu ng-uda gijilulu] jiyawu ng-uda.
have 1SG.A-NACT.PST money.IV(ACC) give 1SG.A-NACT.PST
'If I'd had the money I would have given (it to her).'

While some of these languages have conditional markers (e.g. Vietnamese *nêu* 'if'), conditional relations are commonly expressed by unmarked sentences that have the same structure as main clauses: they include finite verb forms, occur with the same arguments and adjuncts as independent sentences, and do not include an (obligatory) subordinate marker. Note, however, that while these constructions look like independent sentences, they are intonationally bound to the

ensuing clause and sometimes constrained with regard to verb inflection. The conditional clause in Mapudungun, for instance, takes a mood suffix that is optional in main clauses but obligatory in conditionals. Moreover, in some languages these constructions occur with a topic or focus marker that one might analyze as a subordinator, such as the focus clitic at the end of the protasis in example (6) from Mangarayi.

(6) Mangarayi (Isolate; **Merlan1982** 22)
[Na-yang-gu=**bayi**] wawg wa-nan-mi biwin-gana. Mangarayi
2SG-go-DES-FOC follow IRR-1SG>2SG-AUX behind-ABL
'If you go, I will follow (after) you.'

In addition to conditional clauses, preposed temporal clauses are sometimes based on juxtaposed sentences (e.g. Lao, Vietnamese, Taba, Tetun, Gooniyandi); but preposed cause and purpose clauses are usually based on other types of constructions. Adpositional phrases, for instance, are often closely related to (preposed) cause and purpose clauses. Consider, for instance, the following examples from Turkish (cf. (7)) and Amele (cf. (8)), in which cause and purpose clauses are marked by benefactive postpositions.

(7) Turkish (Turkic; **Kornfilt1997** 74)
Hasan [kitab-ı san-a ver-diğ-im **için**] çok kız-dı. Turkish
Hasan book-ACC you-DAT give-F.NML-1SG for very angry-PST
'Hasan got very angry because I gave the book to you.'

(8) Amele (Nuclear Trans New Guinea, Madang; **Roberts1987** 58)
[Ija sab faj-ec **nu**] h-ug-a. Amele
1SG food buy-INF/NOML for come-1SG-PST
"I came to buy food.'

Note that the adverbial clauses in both examples are expressed by nominalizations. While adpositions and case affixes are also found with finite clauses, they are especially frequent with nominalized clauses, suggesting that nominalization provides a link between adpositional phrases and fully developed (subordinate) clauses (cf. **Deutscher2009**; **Heine2009**).

Adverbial clauses that are morphologically related to adpositional phrases are widely used to express semantic relations of cause and purpose. In addition, certain types of temporal clauses denoting a prior or posterior event are often strikingly similar to (temporal) adpositional phrases (e.g. Engl. *after-, since-* and

before-clauses) (**Blake1999**; **Hetterle2015**); but conditional clauses and temporal *when*-clauses are only rarely marked by adpositions.

Apart from juxtaposed sentences and adpositional phrases, relative clauses provide a very frequent source for (preposed) adverbial clauses. The development is well-known from English. As **HopperTraugott2003** have shown, temporal *while*-clauses have evolved from a relative or appositive construction that modified a generic head noun meaning 'time' (cf. (9)).

(9) Old English (Indo-European, Germanic; **HopperTraugott2003** 90)
Old English
& wicode Þær Þa **hwile** [Þe man Þa burg worthe
and lived there that.DAT time.DAT that one that fortress worked.on
& getimbrode].
and built
"… and camped there at the time that/while the fortress was worked on and built.'

Similar types of adverbial clauses occur in many other languages of the current sample (e.g. in Mayogo (ex. (10)) and Toqabaqita (ex. (11)). Sometimes the subordinator is based on a generic noun, and sometimes it is based on a relative marker (as for instance many of the adverbial subordinators in Tamashek; cf. **Heath2005** 660).

(10) Mayogo (Niger-Congo, Ubangi; **Sawka2001** 153)
Mayogo
[**Nedhinga** u a-zu 'he], ndili-e a-si kuto.
while (=time) 3PL PST-eat thing child-REF PST-sleep down
'While they ate something, this child slept on (the) floor.'

(11) Toqabaqita (Austronesian, Oceanic; **Lichtenberk2008** 1173)
Toqabaqita
[**Si manga na** kero fula mai], keko qono qa-daroqa
PRTT time REL 3DU.NON.FUT arrive VENT 3DU.SEQ sit SBEN-3DU.PERS
…
'When (lit. 'the time that') they arrived, they sat (down)…"

The development is especially frequent with temporal *when*- and *while*-clauses, but there are also other semantic types of adverbial clauses that are based on relative clauses in my data. In German, for instance, cause and condition clauses are marked by adverbial subordinators (i.e. *weil* and *falls*) that are based on nominal heads of relative or appositive clauses meaning 'time (span)' and 'case'. Moreover,

at least 25 languages of the current sample have conditional clauses based on temporal *when/while*-clauses (which at least in some cases are ultimately based on relative clauses). Note that this development does not only involve postnominal relatives but also prenominal and internally headed relative clauses, as illustrated by the following examples from Amele (12), Korean (13) and Jamsay (14).[4]

(12) Amele (Nuclear Trans New Guinea, Madang; **Roberts1987** 57)
[Ija cabi meul ceh-ig-en **sain eu na**] ma ca ceta ca
1SG garden new plant-1SG-FUT **time that at** taro add yam add banana
mun ca manin ca ceh-ig-en.
add bean add plant-1SG-FUT
"When I plant my new garden, I will plant taro, yam, banana and beans.'

(13) Korean (Isolate; **Sohn1994** 70)
Na-nun [pi-ka w-ass-ul **ttay-(ey)**] ttena-ss-ta.
I-TC rain-NOM come-PST-PRS time-at leave-PST-DECL
'I left when it had rained.'

(14) Jamsay (Dogon; **Heath2008** 559)
[wárú **dògùrù** ù gô:-Ø] ...
farming time 2SG.SBJ go.out-PTC.NON.HUMAN
'At the time when you (first) went out to do the farming, ..."

Finally, preposed adverbial clauses are also often influenced by complement clauses. In Middle English, for instance, adverbial subordinators were frequently accompanied by the complementizer *that (e.g. after that, since that, gif that),* which is still commonly used in result clauses (cf. *so that*). Likewise, in Chalcatongo Mixtec, most adverbial clauses are marked by the complementizer *xa=*, which also appears in complement and relative clauses (**Macaulay1996** 156–168). Moreover, there is a well-known path that leads from quotative constructions, which in many languages are similar to complement clauses, to adverbial clauses. In particular, purpose and cause clauses are sometimes derived from quotatives (cf. **Güldemann2008**).

Quotative constructions consist of a "quote index", including a "quotative marker", and a "quote clause" of direct speech that often shows little evidence for embedding (cf. **Güldemann2008**). In many cases, the quotative marker is a general verb of saying (e.g. 'say', 'speak'), but it can also be a marker of similarity (e.g. 'like')

[4] According to **Epps2009** Hup has adverbial clauses that are based on headless relative clauses.

or a manner deictic (e.g. 'so'). Although quote clauses are often not embedded in the associated clause, the quotative verb takes the quote clause as some kind of semantic argument, which typically occurs in the same position as a direct object.[5] When this happens in OV languages, the consequence is that quote clauses precede the quotative verb. If these constructions are extended into the domain of adverbial subordination, the adverbial clause is preposed to the main clause (or main verb) and marked by a clause-final subordinator that is ultimately based on the quotative verb, as in the following examples from Aguaruna (15) and Lezgian (16).

(15) Aguaruna (Jivaroan; **Overall2009** 175)
Aguaruna
Nuwa-na [yumi ʃikika-ta **tu-sã**] awɨma-wa.
woman-ACC water draw.ASP-IMP say-SUB.3.SS send.ASP-NON.A/S>A/S
"When (they) sent a woman to draw water, ..." (lit. 'saying "draw some water, ..."')

(16) Lezgian (Nakh-Daghestanian; **Haspelmath1993** 390)
Lezgian
Bazar.di-n juğ ada-z [tars-ar awa-č **luhuz**] tak'an
Sunday-GEN day he-DAT lesson-PL be.in-NEG saying hateful
x̂a-nwa-j.
become-PRF-PST
'He hated Sunday because there were no lessons.'

Table **??** provides an overview of the various sources for preposed adverbial clauses considered in this section.

Let me emphasize that this table simplifies in several ways. First, as pointed out above, the development of adverbial clauses is usually influenced by multiple constructions so that there are often several source constructions (though one of them is often dominant). Second, there are frequent diachronic connections between the various semantic types of adverbial clauses that are not indicated in Table **??** except for the development of temporal *when/while*-clauses into conditional clauses, which is particularly frequent. Third, there is reason to assume

[5] **Munro1982** and **Güldemann2008** point out that quote clauses do not generally occur in the same position as direct objects, which is one reason why these researchers argue that quote clauses are not (always) complements. However, while quote clauses are often less tightly integrated into a clause (or VP) than direct objects, they are related to object complement clauses by family resemblance and since object complement clauses pattern with object NPs, there is also a tendency for quote clauses to occur in the same position as direct objects (see Schmidtke-**BodeDiessel2017** for some discussion of the relationship between quote clauses, object complement clauses and nominal objects from a cross-linguistic perspective).

Table 4: Frequent source constructions of preposed adverbial clauses

condition	juxtaposed sentences (cf. **Haiman1985**) temporal 'when/while' clauses (cf. **Traugott1985**)
time	adpositional phrases / nominalizations (cf. **Genetti1991**) pre- and postnominal relative clauses (cf. **Givón1991**)
cause	adpositional phrases / nominalizations (cf. **Genetti1991**) quotative / complement constructions (cf. **Ebert1991**)
purpose	adpositional phrases / nominalizations (cf. Schmidtke-**Bode2009**) quotative / complement constructions (cf. **Güldemann2008**)

that postposed adverbial clauses can influence the structure of preposed adverbial clauses through analogical extension (cf. **Traugott1985**). Fourth, in addition to the eight source constructions shown in Table **??**, there are other (less frequent) source constructions of preposed adverbial clauses that have been disregarded. And finally, there is evidence that constructional change typically proceeds in a local fashion that is driven by the language users' experience with particular lexical expressions (e.g. **Givón1991**), but this has been ignored in the above discussion. In order to account for all of these factors, one would need a different theoretical approach—perhaps some kind of network model, in which adverbial clauses are linked to various other types of constructions that simultaneously affect their use and their development (see **Diessel2015** for some discussion of such a model). However, in what follows we concentrate on the idealized developments that are summarized in Table **??**.

4 Discussion: Functional adaptation and/or persistence

To recapitulate, we have seen that the occurrence of preposed adverbial clauses correlates with the position of other grammatical categories and the semantic relationship between main and adverbial clause (§2), and we have seen that condition, time, cause and purpose clauses develop from, or under the influence of, a wide range of constructions (§3). Concluding the paper, let us ask what leads to the development and cross-linguistic distribution of preposed adverbial clauses.

Many linguistic typologists assume that language universals are motivated by semantic and pragmatic factors that influence the diachronic developments of lin-

guistic structure. On this view, cross-linguistic regularities are functional adaptations to communication and processing (e.g. Foley & Van**Valin1984**; **Dik1989**; **Hawkins2004**).

However, as particularly Cristofaro (2018 [this volume]) and Collins (2018 [this volume]) argue, there is an alternative approach that stresses the importance of diachronic inheritance, or persistence, for the rise of language universals. In this approach, cross-linguistic tendencies, or statistical universals, are the by-product of diachronic processes that are NOT immediately motivated by functional-adaptive factors.

In the remainder of this paper, I argue that the cross-linguistic tendencies in the linear organization of adverbial clauses are the result of both functional aspects of language use and

persistence effects of grammaticalization.

PREPOSED ADVERBIAL CLAUSES IN HEAD-FINAL LANGUAGES. Given that clause combining in discourse has a strong backwards orientation, one might wonder why adverbial clauses are not generally postposed. However, there are several reasons why languages prepose adverbial clauses. To begin with, above we have seen that the positional patterns of adverbial clauses vary with their meaning, but in some rigid OV languages, they are consistently preposed to the main clause, suggesting that the order of main and adverbial clauses is part of the traditional VO/OV typology (cf. **Diessel2001**).

There are numerous proposals in the literature to explain correlations between the order of verb and object and that of other grammatical categories. Especially prominent is Hawkins' processing approach, in which word order correlations are explained by general principles of syntactic processing that are assumed to influence both language use and language change (cf. **Hawkins1994** 2004). Specifically, Hawkins proposed that head-final or OV languages tend to prepose dependent categories, including subordinate clauses, because syntactic structures with consistent dependent-head orders are easier to process, and thus more strongly preferred, than structures with mixed or inconsistent dependent-head orders (see **Dryer1992** for a similar explanation).

The processing approach provides a straightforward explanation for the dominant use of preposed adverbial clauses in OV languages, but as **Krifka1985** and others noted, word order correlations can also be explained by analogy or similarity. There is abundant evidence from psycholinguistic research that speakers tend to arrange semantically or formally similar expressions in parallel positions (see **PickeringFerreira2008** for a review of psycholinguistic research on the influence of structural priming on linear order). Like objects, adverbial clauses are

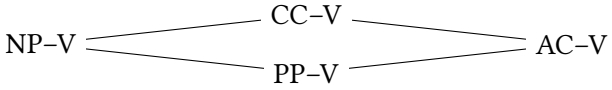
dependent categories, but other than that, adverbial clauses do not seem to have much in common with object NPs, making it rather unlikely that analogy and similarity account for this correlation. However, if we broaden the perspective and include other types of constructions into the analysis, there is reason to assume that the correlation between adverbial clauses and object NPs is due to analogical pressure that affects a whole network of constructions.

To begin with, adverbial clauses are often similar to adpositional phrases functioning as adjuncts, and since the latter are usually similar to object NPs, adverbial clauses are also related to direct objects (via adjuncts). As **Dryer1992** showed, there is a very strong tendency to place nominal objects and (certain semantic types of) adjuncts on the same side of the verb and since adverbial clauses pattern like adjunct phrases, they also pattern with object NPs.

Moreover, in many languages, adverbial clauses are expressed by the same or very similar types of constructions as complement clauses. Since complement clauses are also related to object NPs, we may hypothesize that the ordering correlation between complex sentences including adverbial clauses and verb phrases including nominal objects is (also) mediated by constructions including complement clauses, as the latter share properties with both of them.

Thus, while adverbial clauses do not have much in common with object NPs, they are similar to adpositional phrases and complement clauses, which in turn are similar to nominal objects, suggesting that OV (or head-initial) languages prepose adverbial clauses in analogy to (preposed) adpositional phrases and complement clauses (cf. (17)).

(17)



PREPOSED ADVERBIAL CLAUSES IN HEAD-INITIAL LANGUAGES. Analogy is one factor that can motivate the occurrence of preposed adverbial clauses in head-final languages, but since the occurrence of preposed adverbial clauses is not restricted to head-final languages, analogy alone is not sufficient to explain why adverbial clauses are commonly preposed. As we have seen, certain semantic types of adverbial clauses, notably conditional clauses and temporal *when*-clauses, precede the main clause in both head-initial and head-final languages. In order to explain these patterns, we have to consider the semantic and discourse-pragmatic properties of adverbial clauses.

As **Chafe1984 Givón1984** and many others have pointed out, preposed ad-

verbial clauses serve particular discourse-organizing functions. They provide a thematic ground or orientation for subsequent information, as evidenced by the fact that preposed adverbial clauses are often marked as topics (**Haiman1978**). In addition, there are particular conceptual motivations to prepose certain semantic types of adverbial clauses. Conditional clauses, for instance, exhibit a strong tendency to precede the main clause, as conditionals are used to create a particular conceptual framework for the semantic interpretation of associated clauses (**Diessel2005**), and some temporal clauses precede the main clause for reasons of iconicity (**Diessel2008**).

Considering the semantic and discourse-pragmatic functions of preposed adverbial clauses, we may hypothesize that these functions do not only influence speakers' use of a particular clause order (where there is synchronic choice) but also the development of preposed adverbial clauses in language change or language evolution. In particular, the initial stages of the development seem to be motivated by semantic and discourse-pragmatic factors. For instance, as we have seen, adverbial clauses are often based on relative clauses and adpositional phrases, which in VO languages usually follow the main verb (if we disregard center-embedded RCs), but may be fronted in order to provide an orientation, or topic, for the unfolding sentence. When the fronted constructions are routinely used for discourse-organizing functions, they may develop into preposed adverbial clauses with the same or similar functions.

Assuming that preposed adverbial clauses inherit their discourse functions from fronted relative clauses, adpositional phrases and similar constructions, one might argue that while discourse considerations motivate the use of the various source constructions, they do not immediately motivate the extension of these constructions to adverbial clauses, which seems to be a consequence of automatization, semantic bleaching and formal reduction rather than of discourse processing. However, since grammaticalization is a gradual process with no sharp division between source and target, I would contend that the influence of discourse is not restricted to the initial uses of the source constructions but affects the entire course of the development. After all, automatization, semantic bleaching and formal reduction are driven by frequency of language use, which in turn is driven by the need to use fronted relative clauses, adpositional phrases or (incipient) adverbial clauses for particular discourse purposes.

Thus, while one cannot say that preposed adverbial clauses have evolved to fill a functional gap within the linguistic system, it is still reasonable to conceive of them as functional adaptations to particular discourse environments, as preposed adverbial clauses develop under the continuing influence of discourse

considerations.

INITIAL AND FINAL SUBORDINATORS. Let us finally turn to the correlation between the position of adverbial clauses and that of the subordinator. Recall that while postposed adverbial clauses are commonly introduced by a clause-initial conjunction, preposed adverbial clauses often occur with a final marker. In particular, in languages in which adverbial clauses are generally preposed to the main clause, the subordinator typically occurs at the end of the adverbial clause. There are two general explanations for the position of adverbial subordinators in pre- and postposed subordinate clauses: one refers to processing, the other to grammaticalization.

In Hawkins' (**Hawkins1994**; **Hawkins2004**) processing approach, the positional patterns of adverbial subordinators are explained by two general principles. To simplify, one principle predicts that the subordinator occurs at the boundary to the main clause because linear structures of this type have a short "recognition domain" that is easy to process and thus more highly preferred than structures with a long recognition domain. And the second principle predicts that there is a general tendency to place the subordinator at the beginning of the subordinate clause (regardless of clause order), because initial subordinators prevent the parser from misinterpreting subordinate clauses as main clauses (see also **Diessel2005** 455–459).

Hawkins' theory provides a good fit to the data, but lacks a diachronic dimension. As it stands, it is completely unclear how the word orders that are explained by syntactic processing in this approach have evolved in language history. Haspelmath (2018 [this volume]) argues that functional explanations do not need diachronic evidence if they correctly predict the typological data; but I disagree with this view because functional explanations can turn out to be spurious when we consider how particular phenomena have evolved.

In fact, there is evidence that the above described correlation between the position of the subordinator and the position of the subordinate clause is just a byproduct of grammaticalization processes that are not immediately influenced by syntactic processing. That grammaticalization can have an impact on the linear organization of syntactic constituents has been observed in previous research (**LiThompson1974**). In fact, a number of studies have argued that (some) word order correlations are due to persistence effects in grammaticalization (e.g. **Givón1975 Aristar1991**; **Bybee2010**; **Collins2012** see also **Collins2018** [this volume] and **Dryer2018** [this volume]).

For instance, according to **Bybee2010** the correlation between the order of verb and object and that of verb and auxiliary does not need a particular functional ex-

planation, as auxiliaries are usually derived from the main verb of a complement construction that includes an infinitive, or some other type of verb, as verbal complement (e.g. *want* INFINITIVE). If the verb precedes the verbal complement of a complex VP in the diachronic source, the auxiliary precedes the main verb in the target construction; but if the verb follows the verbal complement in the diachronic source, the auxiliary is postposed to the main verb in the target construction. As a consequence of these developments, the order of auxiliary and verb correlates with that of verb and object (cf. (18)).

(18) $[\text{VERB} \quad [\text{VERB}]_{\text{OBJ}}]_{\text{VP}}$ $\qquad\qquad$ $[[\text{VERB}]_{\text{OBJ}} \quad \text{VERB}]_{\text{VP}}$

$\downarrow \quad \downarrow$ $\qquad\qquad$ $\downarrow \quad \downarrow$

$[\text{AUX} \quad \text{VERB}]_{\text{VP}}$ $\qquad\qquad$ $[\text{VERB} \quad \text{AUX}]_{\text{VP}}$

It is conceivable that the correlation between the position of adverbial subordinators and that of adverbial clauses is also due to persistence effects of grammaticalization. For instance, above we have seen that purpose clauses in Amele und cause/purpose clauses in Turkish are marked by a clause-final subordinator that also serves as a benefactive adposition in postpositional phrases. Since postpositional phrases usually precede all other constituents in Amele and Turkish (and most other head-final languages), it is a plausible hypothesis that the occurrence of final subordinators in these constructions is related to the fact that they are based on postpositions (of preposed adpositional constructions).

(19) $[[[\text{NP}\ ]\ \text{P}]_{\text{PP}} \qquad [\ \ldots\ \text{V}\ \ldots]_{\text{S}}$

$\downarrow \quad \downarrow \qquad\qquad \downarrow$

$[[\ldots\text{S}\ldots \quad \text{SUB}]_{\text{AC}} \quad [\ \ldots\ \text{V}\ \ldots]_{\text{MC}}]$

In other cases, final subordinators are based on quotative verbs, as for instance, in some temporal and causal clauses of Aguaruna and Lezgian (ex. (15–16)). Here again, the final position of the subordinator is likely to be a consequence of grammaticalization. Since quotative clauses precede the quote verb in Aguaruna and Lezgian (and many other head-final languages), the final position of the subordinator is readily explained by the fact that it evolved from a quotative verb that followed the quote clause in the source construction.

(20) $[[[\text{QUOTE}]\ \text{V}] \qquad [\ \ldots\ \text{V}\ \ldots]_{\text{SIMPLE S}}$

$\downarrow \quad \downarrow \qquad\qquad \downarrow$

$[[\ \ldots\ \text{S}\ \ldots \quad \text{SUB}]_{\text{AC}} \quad [\ \ldots\ \text{V}\ \ldots]_{\text{MC}}]_{\text{COMPLEX S}}$

While Hawkins' processing approach can also account for the main trends in the data, it cannot explain the exceptional cases. For instance, while postposed

and flexible adverbial clauses are usually marked by initial subordinators (as predicted by Hawkins), there are 26 postposed (and flexible) adverbial clause constructions in the data in which the subordinator comes at the end of the adverbial clause, as in example (21) from Yagua.

(21) Yagua (Peba-Yaguan; **PaynePayne1990** 340)
Deera-miy saaniy-yaa [sa-tiiysia **túuni**].
child-COLL shout-ASP 3SG-play while
'The children are shouting while they play.'

Yagua

While the existence of these structures flies in the face of Hawkins' processing account, it has a straightforward diachronic explanation. As Payne & **Payne1990** point out, the subordinate conjunction comes at the end of the adverbial clause in (21) because *túuni* 'while' has evolved from a postposition meaning 'side', and since postpositional phrases follow the verb in Yagua, the resulting adverbial clause includes a clause-final marker.

Considering these examples, we may hypothesize that grammaticalization accounts for the occurrence of final subordinators in preposed adverbial clauses. However, since adverbial subordinators are derived from a wide range of sources, it is unclear at this point if the grammaticalization account is sufficient to explain the cross-linguistic data. Moreover, even if it turns out that the position of the subordinator is primarily determined by grammaticalization, this does not necessarily exclude the possibility that processing also affects the position of the subordinator as an independent factor. More research is needed to determine the role of grammaticalization (and processing) on the development of word order correlations, but I suspect that the cross-linguistic distribution of initial and final subordinators is primarily caused by grammaticalization rather than by Hawkins' principles of syntactic processing.

5 Conclusion

To summarize the main points of this paper, we have seen that the position of adverbial clauses correlates with the meaning of adverbial relations and the position of other grammatical categories that are similar to adverbial clauses. Since preposed adverbial clauses include a forward orientation that deviates from the dominant backwards orientation of clause combining in discourse, there is no obvious (diachronic) connection between preposed adverbial clauses and independent sentences. Only conditional and some temporal clauses that precede the

main clause are (often) based on juxtaposed sentences that are oriented towards the subsequent clause. All other semantic types of preposed adverbial clauses develop from, or under the influence of, other (source) constructions: adpositional phrases and nominalizations, pre- and postnominal relative clauses, internally headed relatives, and quotative constructions.

The positional patterns of adverbial clauses can be explained by functional and cognitive processes that influence both speakers' choice of a particular clause order in language use and the diachronic developments of pre- and postposed adverbial clauses form certain source constructions. Some of these processes affect the whole class of adverbial clauses (e.g. the discourse-organizing function that motivates the occurrence of preposed adverbial clauses), others are only relevant for certain semantic types of adverbial relations (e.g. iconicity of sequence). Crucially, while the positional patterns of adverbial clauses are motivated by functional and cognitive aspects of language use, the position of the adverbial subordinator may just be a byproduct of grammaticalization. Like the positional patterns of auxiliaries and other grammatical markers that evolved through grammaticalization, the positional patterns of adverbial subordinators seem to be determined by the position of their diachronic sources. Since the various source constructions tend to occur in reverse orders in VO and OV languages, it is not improbable that the position of adverbial subordinators correlates with that of other grammatical categories in head-initial and head-final languages because of persistence effects in grammaticalization. However, more research is needed to investigate the cognitive and diachronic mechanisms behind these correlations.

Abbreviations

The paper abides by the Leipzig Glossing Rules. Additional abbreviations include:

AC	adverbial clause	PLPF	pluperfect
ASP	aspect	PRTT	partitive
IPD	impeditive	REF	referential
MC	main clause	S	sentence/clause
MID	middle voice	SBEN	self-benefactive
NACT	non-actual (irrealis) mood	SEQ	sequential
PART	particle	VENT	ventive

6 Appendix: Language sample

Africa: Fongbe, Hausa, Jamsay, Kana, Khwe, Konso, Koyra Chiini, Krongo, Lango, Mayogo, Mbay, Nkore Kiga, Noon, Supyire, Tamashek. North and Central America: Chalcatongo Mixtec, Choctaw, Chumash, Jamul Tiipay, Kiowa, Lakota, Musqueam, Ojibwe, Purépecha, Rama, Slave, Tepehua, Tümpisa Shoshone, Tzutujil, Wappo, West Greenlandic. South America: Aguaruna, Awa Pit, Barasano, Cavineña, Epena Pedee, Hup, Jarawara, Kwazá, Mapudungun, Matsés, Mekens, Mosetén, Ndyuka, (Huallaga) Quechua, Tariana, Trumai, Urarina, Warao, Wari', Yagua, Yuracaré. Eurasia: Abkhaz, Ainu, Arabic (Gulf), Basque, Evenki, French, Georgian, German, Hungarian, Japanese, Korean, Lezgian, Malayalam, Marathi, Persian, Santali, Serbo-Croatian, Turkish, Yukaghir (Kolyma). South-East Asia and Oceanic: Burmese, Hmong Njua, Begak Ida'an, Karo Batak, Lao, Mandarin Chinese, Newari, Qiang, Semelai, Taba, Tetun, Toqabaqita, Tukang Besi, Vietnamese, Yakan. Australia and New Guinea: Gooniyandi, Imonda, Kayardild, Kewa, Korafe, Lavukaleve, Mali, Mangarayi, Menya, Motuna, Martuthunira, Ungarinjin, Wambaya, Yimas

Explanation in typology